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ADAPTED PHYSICAL EDUCATION

Understanding Career Changes: Physical Educators to Adapted Physical Educators

Takahiro Sato and Justin A. Haegele

Abstract

The purpose of this study was to understand career changes of in-service teachers transitioning to the adapted physical education (APE) profession after completing online APE professional development graduate courses. This study was based on intentional change theory (Boyatzis, 2006). Participants were five in-service teachers who decided to change their careers from physical education to APE in their school districts. Data collection consisted of a career reasoning questionnaire, semistructured interviews, and e-mail communication. A constant comparative method (Boeije, 2010) was used in the interpretation of the data, which allowed themes to emerge. Three interrelated themes emerged from the in-service teachers' narratives: factors and influences of APE career choices, administrative and transition planning duties, and career motivations and expectations. The participants demonstrated strong leadership that built on opportunities for innovation and renewal through provision of APE professional culture. Through the online professional development courses, the teachers gained lifelong learning opportunities and increased satisfaction, motivation, and expectations for APE.

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In the United States, there is a shortage of teachers, including adapted physical education (APE) teachers (those who teach physical education for students with disabilities), expected over the coming years (Bullock, Gable, & Mohr, 2008; Healy, Block, & Judge, 2014; Sutchter, Darling-Hammond, & Carver-Thomas, 2016). To be effective, APE teachers must possess a certain degree of competency (e.g., graduate degree or endorsement) to practice effective pedagogy with students with disabilities (Kelly, 1993). However, unfortunately, many physical education teacher education programs do not offer APE programs at the graduate or undergraduate level. Thus, pre-service teachers are left unaware of growing career opportunities in the field of APE (Zhang, Kelly, Berkey, Joseph, & Chen, 2000).

One way to address the shortage of APE teachers is the recruitment of physical education teachers who are motivated to teach children with disabilities (Sato, Haegele, & Foot, 2017b; Webb & Hodge, 2003) as a second career. A career as a physical education teacher can take a toll on a person physically and emotionally, and that differentiates them from teachers of different academic subjects (Bizet, Laurencelle, Lemoyne, Larouche, & Trudeau, 2010). Physical education teachers are frequently assigned to teach for an extended period, while having limited teaching time per class, a lack of lesson preparation time, and difficult organizational and administrative tasks. Additionally, they tend to receive little appreciation from parents, colleagues, and school administrators (Bizet et al., 2010). A career change to APE can be desirable because of opportunities for personal growth and development, the ability to apply previous experience to a new profession, and the ability to contribute to society and the development of children with disabilities (Williams, 2013).

Opportunities for professional development are important factors in terms of socialization into the APE profession (Sato & Haegele, 2017b; Webb & Hodge, 2003). Effective professional learning can help physical educators gain useful ideas from credible sources who understand real-world teaching and problem-solving techniques, as well as from thought-provoking materials (Sato & Haegele, 2017a). For example, Sato, Haegele, and Foot (2017a) studied in-service physical education teachers' professional development in Web-based APE graduate courses and found them to have positive learning experiences when teaching students with disabilities. Additionally, the

participants reported that the online courses helped them improve the quality of APE classes in their school districts (Sato & Haegele, 2017b). Experiences like these can help physical educators find meaning in teaching students with disabilities and attract them to pursue a career of APE (Hutchinson, 1993). Hodge and Stroot (1997) asserted that it is important to investigate factors that influence APE teachers' experiences and career choice. Yet little research has been conducted in the arena of career choice, particularly those who transition from being physical educators to being APE teachers. Thus, the purpose of this study was to understand career changes of in-service teachers transitioning to the APE profession after completing online APE professional development graduate courses.

This study was based on intentional change theory (ICT; Boyatzis, 2006). This theory describes the essential components and process of desirable, sustainable change in one's behaviors, thoughts, feelings, and perceptions. The change may be in a person's actions, habits, or competencies. It may be in the way they feel in certain situations or around certain people. It is "desired" in that the person would like it to occur. ICT comprises five factors of change, which function as an interactive cycle in producing the sustainable change at the individual level. These are (a) the ideal self and personal vision; (b) the real self and its comparison to the ideal self, resulting in an assessment of one's strengths and weaknesses; (c) a learning agenda and plan; (d) experimentation and practice with the new behaviors, thoughts, feelings, and perceptions; and (e) trusting or resonant relationships that enable a person to experience and process each discovery (Boyatzis, 2006).

First, the ideal self contains imagery of the desired future (Boyatzis & Akrivou, 2006). This image is an evolving, motivational core within the self, focusing a person's desires, hopes, aspirations, and dreams. The ideal self serves as a mechanism linked to self-regulation. It helps to organize the will to change and direct it with positive affect from within the person. Second, a major determinant of ideal self is hope. Hope is conceptualized as a cognitive set that is built on the importance of goals. Snyder (2000) explains that personal self-efficacy and optimism affect a person's experience of hope by creating a belief in the feasibility or possibility that a desired future might occur. Teachers with high hope produce alternative

routes to their goals when they face goal impediments (Boyatzis & Akrivou, 2006). The teachers who have gaps of emotional conditions and conceptual images of a desired future in a profession tend to seek openness to career change opportunities (Boyatzis, 2006). Third, the learning agenda and plan focus on the desired future of intentional change in the profession (Beaubien & Payne, 1999). While professional performance at the workplace or happiness in life may be the eventual consequence of teachers' efforts, a learning agenda focuses on development. The learning agenda and plan allow teachers to develop positive beliefs and confidence in their professional capability and the hope of improvement. Fourth, teachers experience and practice desired changes. Acting on the plan and toward the goals involves numerous activities through teachers' professional development. Teachers practice the new behaviors in APE settings similar to the setting in which they wish to use them in the workplace (Boyatzis, 2006). During this part of the process, teachers show continual improvement throughout their career. The fifth factor describes teachers' relationship and group orientation, which provide a sense of identity and guidance to what is appropriate and good behavior and feedback on their behaviors (Kram, 1996). These relationships create a context within which teachers interpret their progress on desired changes and the utility of new learning that contribute significant input to the formulation of the ideal self.

Method

This study adopted a descriptive, qualitative methodology using an explanatory case study design (Yin, 2003). Qualitative studies typically focus "in depth on relatively small samples, even a single case ($n=1$), selected purposefully" (Patton, 2002, p. 169). The main principle of the case study method is to better understand complex educational and/or social phenomena while retaining the holistic and meaningful particularities of real-life circumstances (Yin, 2003). Thus, an explanatory case study is appropriate for exploring in-service teachers' intentional career change from physical educators to APE teachers in their school districts. Two research questions that guided the study were (a) What factors influenced in-service teachers to choose to change their careers to APE teachers? and

(b) How did in-service teachers adapt themselves to learn new roles, master new tasks, and build new relationships in their new professional role?

Participants and Setting

Upon ethical approval from the first author's university institutional review board, individuals who changed their careers from physical educators to APE teachers after completing a state-approved online graduate APE endorsement program (academic year of 2014 through 2015) at a Midwestern public university in the United States were recruited via e-mail to participate in this study (Table 1). The APE professional development courses consisted of two 15-week, 3-credit courses (i.e., introduction of online APE course and practicum of online APE course). All participants completed their practicum experience of at least 150 hr of teaching experiences in either APE classes or inclusive physical education as part of the program. Five teachers, who traveled and taught APE at six to eight public schools each, were identified for this study. Pseudonyms were assigned to all participants to ensure anonymity. All participants provided permission to use interview data for this study.

Table 1
Teachers' Background

Teacher	Age	Gender	Years of PE teaching experiences	Years of teaching APE	Location of school
Rosie	40	Female	17	1	Near Columbus, Ohio
Nicki	33	Female	10	1	Near Sandusky, Ohio
Matt	31	Male	8	1	Near Dayton, Ohio
Donna	28	Female	7	1	Near Columbus, Ohio
Christy	27	Female	4	1	Near Cleveland, Ohio

Data Collection

Face-to-face open-ended interviews. The primary source of data for this study was face-to-face open-ended interviews. According to Yin (2003), the researcher has two jobs in conducting interviews: (a) to follow the interview case study protocol and (b) to ask the researcher's actual (conversational) questions. Each participant completed two face-to-face interview sessions with the lead researcher. The interview questions were modified based on those used by Bizet et al. (2010) and Gilbert (2011). The specific questions were carefully worded for relevancy (question style, language, conciseness, and frame) to the current study (Yin, 2003). Examples of questions in this study include (a) What were positive and negative elements you faced throughout physical education and APE teaching careers? (b) What expectations did you have toward your profession as an APE teacher at the beginning of your career? and (c) What reasons led you to change careers or disengage from previous teaching positions? Using a face-to-face interview approach, the interviewer asked participants factual questions as well as their opinions about career choices, roles and responsibilities in their new profession, professionalism, and personal and professional goals and objectives (Yin, 2003). Two face-to-face interviews (one-on-one) were audio recorded and conducted for approximately 60 to 90 min each with every participant. In the first interview, teachers were asked about their experiences of career change in their first semester teaching APE. Then in the second interviews, the lead researcher asked teachers about their administrative experiences such as individual educational plan (IEP) meeting attendance. Data were stored in the secured document files in the researcher's computer.

Career reasoning questionnaire. A career reasoning questionnaire was used to collect descriptive quantifiable data regarding the teachers' professional experiences. This questionnaire, established by Zounhia, Chatoupis, Amoutzas, and Hatziharistos (2006), was modified to include specific questions about career experiences of APE teachers. This questionnaire was designed to examine what influenced their decision to become APE teachers. It included two subsets of reasoning questions such as altruistic and intrinsic reasons. All participants completed the career reasoning questionnaire after the interviews. Table 2 shows how the five teachers rated each question.

Table 2
Career Reasoning Questionnaire

Question	Not important 1	Least important 2	Moderately important 3	Important 4	Most important 5
1. I help students with disabilities to learn useful things.				3	2
2. I like teaching students with disabilities in APE.					5
3. I like working with students with disabilities.					5
4. I want to be creative to improve learning of students with disabilities.		1	1	2	1
5. Being an APE teacher can help improve culture of my school district.					5
6. I would like to stay in touch with adapted sport and events.				3	2
7. I am interested in learning about coaching adapted sport.		3		1	1
8. I use my knowledge and skills from professional development workshops and/or courses.					5
9. I think APE teaching is a respectable career.				1	4
10. I had an ambition to become an APE teacher.		4	1		

Note. Modified from “Greek Physical Education Student Teachers’ Reasons for Choosing Teaching as Career,” by K. Zouhia, C. Chatoupis, K. Amoutzas, and D. Hatziharistos, 2006, *Studies in Physical Culture and Tourism*, 13, pp. 99–108.

E-mail communication. The researchers used e-mail messages to ask professional development questions and/or to seek clarification of previous responses of interview questions (Meho, 2006). Participants permitted the researchers to use all e-mail communications as part of the data source in this study. When there was a need to clarify, explain, or elaborate the content of the interview transcription, the researcher asked each participant to respond by e-mail.

Data Analysis

A constant comparative method (Boeije, 2010) was used in the interpretation of the data, which allowed themes to emerge. Using this strategy, the first and second author independently coded each potentially meaningful piece of data in the transcripts from the first set of interviews and discussed differences until reaching agreement. The lead author coded the second set of interviews, as well as data from e-mail communication, and then the second author checked the data. The researchers conducted a second round of coding key terms in the transcripts of data sources. Some codes were combined during this process, whereas others were split into subcategories (subthemes). In addition, two peer debriefers reviewed the codes to avoid potential researcher bias. Coded data from each participant were compared and similarities and differences identified. Further, after peer debriefing, the researchers conducted a second round of coding key terms (e.g., intentional changes, ideal self, real self, and/or roles) in the transcripts of data sources. Some codes were combined during this process (e.g., similar terms, transitions, and/or change), whereas others were split into subcategories (subthemes). Finally, the researchers examined the final codes to organize them into a hierarchical structure using individual and group coding percentage. Then all data and definitions of key terms were sent back to all participants for a second round of member checking for final confirmation. The researchers grouped the codes into thematic categories, which were then refined into recurring themes (Boeije, 2010). Each response to the career reasoning questionnaire (Zounhia et al., 2006) was treated as a comprehensive case. In this case, the researchers sought to glean responses of least or not important categories to understand how each participant's reasons were presented.

Trustworthiness

Trustworthiness in this study was established through triangulation, member checking, and peer debriefing. Triangulation involved the use of multiple perspectives, such as data from interviews and e-mail communication. The intention of triangulation was to evaluate the accuracy of the data, as opposed to seeking universal truth (Merriam, 1998). Member checking reduced the impact of subjective bias (Patton, 2002). The lead researcher distributed copies of the analyzed themes from the e-mail communication and the transcribed interview data to the participants. The participants' acknowledgment of the accuracy of the data and of the researchers' interpretations of the data ensured the establishment of trustworthiness (Merriam, 1998). Peer debriefing is a process of exposing oneself to a distinguished peer in a manner that parallels an analytic session, with the purpose of exploring aspects of inquiry that might remain only implicit in the inquirer's mind (Patton, 2002). For this study, the primary researcher shared his data analysis process with peer debriefers (graduate assistants) at his respective university and utilized their feedback when developing themes.

Results

Explainable in the logic of ICT (Boyatzis, 2006), three inter-related themes emerged from the participants' narratives. The first theme, *factors and influences of APE career choices*, exposes the self-images and career goals the participants perceived regarding their APE careers after the online APE graduate courses. The second theme, *administrative and transition planning duties*, described participants' perceptions of their learning experiences of new teaching duties and administrative tasks. The final theme, *career motivations and expectations*, described how the participants experienced increased intrinsic motivation and career goals when transitioning to teaching students with disabilities.

Factors and Influences of APE Career Choices

A range of social and personal factors influenced the participants' decision to change careers after completing their online professional development courses. They reported being unhappy in their former careers as physical education teachers and were dissatisfied with their

professional life. Based on results of the career reasoning questionnaire (Zounhia et al., 2006), all participants were in favor of teaching students with disabilities. They were unaware of the existence of APE as a career choice (APE teachers and/or adapted sport coaches) until they enrolled in the APE professional development courses. They wanted to find meaning in their career and found passion in teaching children with disabilities. For example, Rosie explained her reasons for changing careers:

I taught middle and high school physical education classes for more than 10 years. I had a large group of students and it was difficult to connect with students in the class. When I look back, I think I taught similar curricula and lessons for many years. I did not have any meaningful challenges. When I took the APE courses, I had to develop individual lessons, medical backgrounds, service backgrounds, and individual education plans. Everything is case by case and on an individual basis. Although I spent more time preparing lessons and plans, it was a professional challenge. I am pleased that I chose APE as a second career. I want to work hard to see good results for students with disabilities in my classes. (Interview)

Rosie also noted, “I was looking for lifelong learning opportunities in my career” (Interview). She explained that learning about her students’ medical conditions and limitations motivated her to become a better APE teacher. She had a chance to collaborate with special education teachers, nurses, physical therapists, and occupational therapists. Similarly, Nicki explained,

I think that physical education teachers are always isolated and marginalized, because our academic subject is different from classroom setting. I did not have a chance to collaborate with other teachers from different academic and professional experts, but after completing APE courses, I had an opportunity to collaborate with other teachers and staff. I learned knowledge skills from other experts. (Interview)

Another participant, Matt, explained that when he taught physical education at an elementary school, he felt that parents did not appreciate physical education. He shared,

When I was working as a physical education teacher at the elementary school, the parents cared about reading, mathematics, and science subjects but not physical education. I was disappointed that my career was not appreciated and I was emotionally hurt. Then while I was taking APE graduate courses, during my practicum in APE, I had to do an assessment project as part of the course assignments. Because of a school policy, I had to report the results to the student's parents. I was afraid of how the parents would respond to the assessment results. But I was pleased when the parents appreciated what I had done. I was pleased that I did something good for students with disabilities and parents. This is the part of reason that I chose to change my career. (Interview)

Matt stated that he felt that the professional development courses helped him to make the decision to change his career choice to APE. Simultaneously, he felt that it was important that the parents fully supported physical education for their child with a disability.

Administrative and Transition Planning Duties

The participants noted that they felt that they transitioned into more of an administrative role than a teaching role after their career change to APE. They spent more time studying their students' academic, social, and family histories including assessments, medical conditions, and nutrition history. They also served as resource teachers of leisure and recreation physical activity and/or vocational programs that helped students' in the transition process. The participants felt that their administrative duties were eye-opening for them. For example, participants reported that learning about and documenting students' IEPs became a major role in their new careers. Because they taught about 40 to 60 students per year, they spent more time engaging in administrative activities (e.g., IEP writing) than they had as physical educators. They felt that they were responsible to facilitate and improve students' motor competency as well as recommend transition services and community resources (e.g., Special Olympic or summer camp programs). Donna explained,

I have more than 60 IEP meetings with school administrators, special education teachers, classroom teachers, and parents annually. I did not know anything about IEPs when I was a physical education teacher at elementary schools, but it helped me to reflect on my teaching and begin to think about what and how to teach my students with disabilities now. I think that documenting IEP forms helped my lifelong learning and I really love my career because it is helping me grow professionally. I checked my students' IEP forms from previous years and I found that these were not properly documented, because special education teachers wrote their physical education goals. I am pleased that IEP committee members listen and pay attention to my opinions. (Interview)

Donna also mentioned that finding available community activities and developing transition plans were difficult tasks to complete, because each student had unique needs related to their type of disability and level of severity. Christy also mentioned that planning students' transition plan created challenges in understanding and exploring new service availability for her students. She said,

One challenge of teaching APE is to plan for smooth transitions for students with disabilities after graduation. For example, I have a student with a neurological disorder who will be graduating from this school soon, but there are not many community services for him to choose from after graduation. I did not know anything about these types of opportunities before. Transitioning from an education to a recreational, vocational, or physical activity setting can be difficult because there are budget issues, transportation, and lack of partnerships with community services. But I enjoyed this lifelong learning experience. I am planning to seek out professional development courses focusing on students' transition services in special education. I think this is important content to learn. (Interview)

She believed that transition plans were an important component of education that helped facilitate students' lifelong activities. Rosie

also mentioned, “I need to seek service options for individuals and/or group. My student’s parents want him to participate in Special Olympics, I found practice and game schedule. I had to include activities he would be participating in. I had to cover in my APE class.” Rosie and Christy felt that this was the first time they investigated in-service opportunities outside of traditional educational opportunities. She realized that there are external professional and personal opportunities of growth in APE careers.

Career Motivations and Expectation

This theme captures that participants were motivated to recruit other physical education teachers who they believed would be interested in changing careers to APE. They felt obligated to help increase the number of APE teachers, because their school districts had a shortage of APE teachers as well as inability to retain effective ones. All participants strongly desired to develop a mentoring system to help enhance the quality of APE programs in their school districts. They believed that acting as or having role models was important for professional success and for retention of APE teachers. Nicki explained,

I am only one of two APE teachers in the school district. I know that there were some physical education teachers who were interested in changing their careers to APE. So one of my new career goals is to recruit a good number of applicants [for the online APE program] and develop effective mentoring programs among the APE teachers. When I was hired in this school district, my APE colleague helped me adjust to the process [of being an APE teacher], but we were traveling teachers and did not have a chance to meet during the school year. I think we should develop a mentoring program with professional development workshops or classes that help to increase APE teachers in this district. This position has not been filled for a few years, and I know this school district wants to hire APE teachers, but it is difficult. (E-mail communication)

Nicki felt that the shortage of APE teachers was compounded by physical education teachers having limited knowledge (e.g., disability

awareness, assessment, and pedagogy) and teaching experiences working with students with various disabilities. Matt felt that school districts should require all physical education teachers to complete the APE graduate professional development courses as a part of professional development requirements. He believed that it was important to advocate these APE professional development opportunities for all physical education teachers. He said,

My future career goal is to advocate for the importance of APE professional development courses to physical education teachers and school administrators. I think that physical education teachers have a lack of disability knowledge and low self-confidence. They have a hard time picturing what APE teachers do and how we teach. I did not have any ideas about teaching students with disabilities before taking the APE professional development courses. I should have found this opportunity many years ago. I am happy with becoming an APE teacher. (Interview)

Matt explained that professional development courses can motivate physical education teachers to improve the quality of education for students with disabilities. He also explained that physical education teachers need to know about inclusive and self-contained teaching settings. He said,

APE professional development gives opportunities for physical education teachers to learn about inclusive and individual instruction for students with disabilities in physical education. It is important that physical education teachers reflect on themselves in regard to how their teaching philosophy and teacher identity fit into the specific setting. (Interview)

Discussion

The purpose of this study was to understand career changes of in-service teachers transitioning to the APE profession after completing online APE professional development graduate courses. The results demonstrate that the participants decided on a career change from physical education to APE because their APE professional

development courses stimulated their personal and professional growth and development and made them want to contribute to their students' academic learning and personal lifelong learning experiences. Their learning orientation aroused a positive belief in their capability, including sense of ideal images of APE teachers and career pathway (Snyder, 2000). In ICT, teachers' pathway thinking affects their experience of hope by creating a belief in the feasibility or possibility that a desired future may occur (Boyatzis & Akrivou, 2006).

Prior to making career decisions about becoming an APE teacher, teachers felt overwhelmed and isolated because of a lack of administrative support, parental support, and behavioral management (Banville, 2015). They had difficulties and challenges working with students and a wide disparity and personal issues and concerns that caused dilemmas for the teachers (Banville, 2015). The decision to make a career change for personal reasons was a gradual process for all participants after realizing that they were dissatisfied with their former career in physical education (Bauer, Thomas, & Sim, 2017). In ICT, two emotional attractors (positive and negative) determine the contexts of the self-organizing process and whether it is an adaptation to existing conditions or adaptation to new, emergent conditions (Boyatzis, 2006). These teachers often had negative emotions such as a general dimension of subjective distress and unpleasing engagement that subsumed a variety of aversive mood states that led to the decision to change careers (Watson & Tellegen, 1985). McCaughtry, Kulinna, Cothran, Martin, and Faust (2005) explain that professional development courses can serve a critical and important role in shaping the attitudes of teachers about career development. Because of the professional development course, the teachers were motivated to become APE teachers because they believed they would serve as important gatekeepers of students' medical conditions, academic placement decision (inclusion or individualized educational setting), and school and community services for students with disabilities (Haegele & Hodge, 2016). Haegele and Hodge (2016) suggest that APE teachers should arrange social and constructive solutions that emphasize political action and social change and remove environmental barriers for students with disabilities.

The APE teachers were concerned that they were unaware of how to collaborate with parents (Samalot-Rivera & Porretta, 2009),

because they had a hard time finding strategies that promote open and ongoing collaborations based on their previous career experiences (Columna, Cook, Foley, & Bailey, 2014). However, since they became APE teachers, they communicated with students' parents better and found collaborative efforts essential for enhancing the quality of the instruction (An & Goodwin, 2007). They used the parents as resource teachers, because the parents served a role of the child's first teachers who know their child's skill, habits, and abilities (from birth) better than anybody else. In ICT, two types of phenomena (honeymoon and sleep effects) exist during career changes. For example, some teachers develop immediate improvement of collaborative partnership with students' parents (honeymoon effect) (Campbell, Dunnette, Lawler, & Weick, 1970). In contrast, others experience a sleep effect in which sustainable changes of collaborative partnership (behaviors, interactions, and emotional reactions) between teachers and parents do not appear until several months into their new careers (McClelland, 1965). This depends on the teachers' personality and social factors. The APE teachers echoed that teachers should care and respect the family's needs and expectations for enhancing quality of education for their child with a disability (Columna et al., 2014).

Since the teachers changed their careers to APE, their expertise was highly respected by school administrators and other teachers who were involved in the students' education. The APE teachers provided input into IEP meetings about students' strength, needs, and interests in physical education and sport (Mareoiu, Abercrombie, & Murray, 2016). They believed that this was a part of administrative learning processes, that they were charged to improve and update professional knowledge, increase practical experiences, collaborate with other colleagues and professionals, and seek diverse learning opportunities in an educational group (Dabija, Abrudan, & Postelnicu, 2016). In their previous careers, these teachers were countered by competing concerns about inadequate resources, isolating work, and subordinate status (Banville, 2015; Kane & Mallon, 2006). However, their administrative duties made them feel more like a valued member of the school district team. In ICT (Kolb & Boyatzis, 1970), the teachers' professional expectancy influences administrative performance, because they engage in professional duties and obtain desirable results. Haggard, Slostad, and Winterton

(2006) explain that career changers feel confident and valued when they can bring valuable and beneficial skills and competencies to the teaching and learning settings. These teachers' expectations, prior experiences, and skills were integrated and valued in their new career phase (Anthony & Ord, 2008).

The participants believed that as part of lifelong learning, APE teachers must seek opportunities for students' transition service needs and options including postsecondary education, adult services, independent living, development of employment objectives, and community participation (Krueger, DiRocco, & Felix, 2000). They found that a lack of partnerships between school districts and community-oriented leisure education programs and/or community-based programs caused some issues (Krueger et al., 2000). They felt that the students with disabilities needed teachers who encouraged them to want, learn, achieve, and treat community as a land of limitless horizon (Day, 1998). The teachers believed they helped their students with disabilities to make and contributed to these students' smooth transition from school to adult life in a community setting (Krueger et al., 2000).

The APE teachers portrayed teaching students with disabilities as an intellectually challenging career that offers professional opportunities to strengthen their roles and responsibilities and interest-related abilities alongside opportunities to develop new skills that served them well in teaching (Anthony & Ord, 2008). They believed that the APE professional development courses helped them make life-changing and new meaning of their professional roles and responsibilities, and felt that their learning experiences were eye-opening (Sato & Haegele, 2017b). This study found that physical education teachers face challenges meeting needs of students with disabilities in inclusive settings. This is a critical area of need, given the increasingly broad array of students with disabilities whom physical education teachers serve (Voltz, 2001). To recruit physical education teachers for career changes or dual roles with APE, professional development course instructors must target multiple factors that impact their decision to enter teaching APE as a career. Smethem (2007) explains that teachers who choose second careers modify their initial projected longevity in the career (of physical education) in light of the energy to maintain and/or enhance levels of

satisfaction and performance in a new career (of APE). Professional development and community contribute to teachers' motivation, expectations, and demands for meeting students' diverse learning needs.

Limitations

This study has three major limitations. First, the participants were targeted and selected from APE teachers who proceeded with career changes and whom the authors received approval and permission to observe and interview. Statistically speaking, therefore, the findings are not generalizable to all PE and APE teachers who complete online APE professional development courses. Second, the number of participants was small. Qualitative inquiries, including case studies, typically use small samples, and in the logic of criterion sampling, the intent is to capture and describe the central themes that represent the phenomena under study for a particular cohort of interest (Patton, 2002). Our intent in using this sampling approach was to uncover common themes in APE teachers' career transition experiences and professional goals and objectives through working with students with disabilities, other professionals (e.g., special education teachers), school administrators, and parents in their school districts. Third, this study did not focus on how social factors such as needing a career change due to economy, unplanned life change, or job security resulted in teachers' career change decision (Bauer et al., 2017). Future research can extend this study to investigate professional and life balance of APE teachers through career change.

Conclusion

This study explored APE teachers' experiences with career change on a small scale and provided insight into the complex factors that influenced their decisions to leave their previous careers after completing APE online professional development courses. They explained their perception toward physical education teaching and a vision of future possibilities that drove their decision making while they negotiated their career transition and lifelong learning (Gilbert, 2011). Although APE professions have new challenges, the APE teachers believed that the professional development courses helped prepare them for the job (Sato et al., 2017b). Many school districts are in the position to recruit candidates and offer APE

teaching positions as the second career choice. The APE teachers demonstrated strong leadership that built on opportunities for innovation and renewal through provision of APE professional culture (Kardos & Johnson, 2007). Through the online professional development courses, the teachers gained lifelong learning opportunities and increased satisfaction, motivation, and expectations for APE.

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ASSESSMENT

Early Validation Evidence of the Canadian Practitioner-Based Assessment of Physical Literacy in Secondary Physical Education

Ken R. Lodewyk

Abstract

The assessment of physical literacy is vital and challenging for researchers and practitioners. Passport for Life is a Canadian global practitioner-based, formative, criterion-referenced assessment of physical literacy that is recorded in an online program. Students complete eight assessments divided across four broad categories of physical literacy (active participation, fitness, movement, and living skills). This study is an endeavor to uncover initial validation and feasibility evidence for the proposed use of Passport for Life with Grade 10–12 physical education students from various regions of Canada. The Standards for Educational and Psychological Testing were used as the theoretical framework. The results with 1,003 secondary school students provide score validity evidence on the content, format, and administrative guidelines of the items and scales; response process evidence about how the program was valued and how the assessments were implemented; internal structure evidence about how participants performed and the extent of associations between items within each scale; predictive evidence as to how scales related temporally to a second measurement of each assessment scale; and concurrent evidence about how the scales related to those of other components. While drawing attention to certain limitations and adding some recommendations,

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this article shows that the results generally support the Grade 10–12 Passport for Life relative to its intended use.

Physical literacy is “the motivation, confidence, physical competence, knowledge and understanding to value and take responsibility for engagement in physical activities for life” (International Physical Literacy Association, 2015). This concept has received increasing conceptual, professional, empirical, and curricular attention and development, particularly in the domains of sport (Jurbala, 2015; Lundvall, 2015) and physical education (PE; Edwards, Bryant, Keegan, Morgan, & Jones, 2017; United Nations Educational, Scientific, and Cultural Organization, 2015). Most of these developments stem from the conceptual work of Whitehead (2010), who envisioned physical literacy to be a holistic embodied experiential personal journey toward active, healthy, and meaningful being. Similar conceptualizations have been adopted by a variety of national PE associations including Physical and Health Education Canada (PHE Canada, 2015) and the Society of Health and Physical Educators (SHAPE America, 2014). Perhaps most for reasons of feasibility and policy, many of these initiatives have lessened emphasis on Whitehead’s (2010) monistic, contextualized, and embodied movement experiences (Lundvall, 2015) to highlight elements of a fit and healthy lifestyle (Longmuir & Tremblay, 2016), a competent movement foundation (Silverman & Mercier, 2015), relevant and useful cognitive knowledge (Ennis, 2015), and availing affect (Chen, 2015; Weiss, 2011), which are primary aims of PE curricula across Canada (Kilborn, Lorusso, & Francis, 2015) and elsewhere (Dudley, 2015; SHAPE America, 2014).

The assessment of physical literacy has also received considerable attention as it is vital and poses particular challenges to researchers and practitioners because of the enormity of its scope and its varied conceptualizations, multidimensionality, fluidity, and proportion of irreducible qualities (Corbin, 2016; Giblin, Collins, & Button, 2014). Despite these challenges, the assessment of physical literacy is vital, should be authentic and feasible for practitioners, and needs to closely align with one’s context and applied definition of physical literacy (Corbin, 2016). Several Canadian attempts include the Canadian Assessment of Physical Literacy (CAPL), Physical Literacy Assessment for Youth (PLAY Tools), and the Passport for Life

(PFL). In their review of these, Robinson and Randall (2017) note that despite compelling evidence for PFL's usability, applicability to practice, and fidelity to Whitehead's (2010) physical literacy ideals, more peer-reviewed evidence for its trustworthiness is yet needed. There is some validation evidence, that is, "the degree to which evidence and theory support the interpretation of test scores," for its proposed use (American Educational Research Association [AERA], American Psychological Association [APA], & National Council on Measurement in Education [NCME], 2014)—with Grade 3–9 PE students in certain regions of Canada (Lodewyk & Mandigo, 2017). The aim of this study was to uncover similar initial evidence for the use of the PFL with Grade 10–12 PE students in Canada and, if applicable, to add to the considerable support for its feasibility (usability).

PFL was developed specifically by PE experts to authentically promote, develop, and assess physical literacy in K–12 PE students across Canada while serving as a useful online resource for PE teachers (see <http://passportforlife.ca/>). To fulfill this aim, they designed PFL to emphasize feasibility (i.e., clarity, attainable, online recording, economical, efficient, safe, and timely) over elite psychometrics, timely duration to maximize participation and retention, and criterion (to serve as subgoals on one's journey) over norm-referencing (comparison to a population), and to be practitioner friendly instead of relying on highly trained technicians to administer the assessments. Other vital PFL aims include ensuring the assessments are "inclusive, adaptable, individualized, relevant (e.g., aligned to curriculum), process (versus product) oriented, safe, comprehensive, ongoing, affirming, valid, efficient and clear, useful for formative (learning) rather than summative (grades) and for the promotion of life-long development of physical literacy" (Lodewyk & Mandigo, 2017, p. 445). In endeavoring to meet these aims while reflecting a holistic conceptualization of students' physical literacy, the self-report assessments of PFL often had a single or a few items for some scales (e.g., cooperation, moderate-to-vigorous physical activity [MVPA], self-efficacy, empathy, perspective-taking). The advantages of this are clear and likely outweigh somewhat diminished psychometric properties that may result from using shortened scale assessments (Gosling, Rentfrow, & Swann, 2003; Horvath & Röthlin, 2018).

Extensive consultation and planning led to the selection of four PFL components of physical literacy known as active participation, movement, fitness, and living skills. The initial version was developed for and implemented with Grade 3–9 PE classes (for a review, see Lodewyk & Mandigo, 2017). Shortly thereafter (2014–2015), the Grade 10–12 program was piloted and then full implementation began in 2015–2016. In each version, students first complete a short demographic survey and then complete eight assessments: one for active participation (self-report survey of participation, interests, and preferred environments for physical activities), three fitness skills (core strength, cardiorespiratory endurance, and dynamic stability), three movement skills (locomotion, object control, and object manipulation), and one for living skills (a self-report survey assessing feeling, thinking, and relating). The teacher administers each assessment during PE—with the option of having students complete the online surveys for homework—and can enter and manage resources and student data in a secured online platform housed and maintained by PHE Canada. This enables teachers to track students' results over time so they can provide more specific attention to students and classes where necessary. Their online teacher resource also provides them information about how to interpret students' PFL results and help them set goals and work for ongoing improvement. Rather than being given a score for each component, students receive a personal paper “passport” that summarizes their results on each completed assessment and provides suggestions for how they might further develop on the components.

This study was theoretically grounded in the broad guidelines of the Standards for Educational and Psychological Testing (Standards; AERA, APA, & NCME, 2014). While traditional validation processes have focused on demonstrating a variety of types of validity (e.g., content, criterion, and construct) to validate an instrument, the Standards recommend the provision of ongoing evidence about the relative validity of the applications of an instrument based on properties of the test scores and contextual interpretations derived from particular uses of the instrument. The Standards further recommend the provision of multiple forms of validity evidence (content, response processes, internal structure, relations with other variables, and consequences of testing) to arrive at a more global perspective

of the validity evidence. This study provides score validity evidence based on (1) the content, format, and administrative guidelines of its items and scales; (2) response process evidence about how the assessments were understood, implemented, and performed; (3) internal structure evidence about how the items relate to their scale; (4) predictive evidence as to how scales relate temporally to a second measurement of each assessment scale; and (5) concurrent evidence about how the scales relate to scales of other components and how the four components (i.e., active participation, fitness, movement, and living skills) are associated, including to daily physical activity and MVPA.

Method

Participants

The sample size was 1,003 ($n_{\text{females}} = 431$ or 43% ; $n_{\text{males}} = 572$ or 57%) in Grades 10 ($n = 496$, 49.5%), 11 ($n = 227$, 22.6%), and 12 ($n = 263$, 26.2%); 17 students (1.7%) did not report grade. Most (90%) were from the provinces of Manitoba ($n = 519$, 51.7%) and Ontario ($n = 380$, 37.9%) with the remainder from Alberta ($n = 35$), British Columbia ($n = 16$), Saskatchewan ($n = 11$), and Nova Scotia ($n = 3$). Several ($n = 39$) did not report their province. The quantities of participants completing each dimension by Assessment Time 1 and 2, respectively, were 818 and 122 for active participation, 707 and 88 for living skills, 523 and 148 for fitness skills, and 558 and 127 for movement skills. The living skills sample was reduced to 707 from 730 following a screening of multivariate outliers based on protocol (i.e., excessive Mahalanobis distance values; Tabachnick & Fidell, 2006).

Data Collection

As in prior uses of PFL (Grades 3–9), students' assessment data were entered into the password-protected online PFL database hosted by PHE Canada, by participating teachers who received a password and username to enter the program, register their class, and enter data for any of the assessments. For each class and/or student, teachers could then request Passports that provided concise yet useful formative feedback on students' physical literacy. Since there were no individual identifiers (names are replaced with a

unique code for each student), students were given a password and selected a username to access PFL so they could complete the online self-report surveys and view the summary and explanation of the assessments and their results on them. A university research ethics board and by PHE Canada approved the secondary use of the data (Canadian Institutes of Health Research, Natural Sciences and Engineering Research Council of Canada, & Social Sciences and Humanities Research Council of Canada, 2014) for the purposes of this study.

Measures

Feedback from practicing teachers. Of the 26 participating teachers in the pilot study of PFL Grade 10–12, 14 voluntarily completed an online Exit Survey (12 did not due to their work-to-rule status at the time) that was developed by PHE Canada program managers to provide useful teacher feedback about the assessments, the online system, the teacher resources, and whether the PFL helps teachers to facilitate physical literacy development in their students. The survey consisted of 55 items responded through both a 4-point Likert scale (1 = *strongly agree*, 4 = *strongly disagree*) and some written responses.

Student profile. Each participant was asked to provide some demographic information (e.g., gender, grade level) and responses to two questions when they initially entered the online PFL website. The two questions were “How many times a week do you have PE class?” with response choices from 0 to 5, and “How long are you physically active each day?” with options being less than 20 min (1), 20 to 40 min (2), 41 to 60 min (3), or more than 60 min (4).

Active participation. The active participation component consisted of 46 self-report items within these nine categories: MVPA (3 items), perceived fitness level (1 item), hours of daily sleep time (2 items), hours of daily sedentary screen time (2 items), barriers to physical activity (9 items), participation in diverse physical activities (19 items) and environments (5 items), and interest in participating in more diverse physical activities (4 items). The daily physical activity item from the Student Profile Survey was also included in the active participation component. Two other active participation items were not within the purposes of this study. Category scores consisted of the mean of all of the items within that category. Each

item was designed to assess a relatively unique aspect of active participation, so items within the categories were not expected to be positively and significantly correlated within categories and alpha reliability was not relevant or computed for the active participation categories.

Many ($n = 18$) of the active participation items were also used in the Grade 7–9 PFL survey of active participation. Of these, eight items assessed participation in the diverse activities of team sports, individual sports and physical activities, dance, and fitness activities at home and at school (a list of sample activities was included); four items assessed participants' interest in participating in more diverse physical activities; one item assessed daily physical activity; and five items measured level of participation in physical activities on or in land, snow or ice, water, air, and outdoor settings. Response choices were on a 4-point scale generally ranging from *strongly disagree* (1) to *strongly agree* (5).

The remaining items ($n = 28$) in the PFL Grade 10–12 active participation survey consisted of two items each for sleep, sedentary screen time, and MVPA that were adapted from previous uses (Hay & Cairney, 2006). For example, the sedentary screen time item for schools days was “On most typical school days (Monday to Friday), I spend approximately the following number of hours per day inactive and in front of a screen (e.g., phone, TV, video, computer, video game) during my own free time.” It offered students 12 response choices (0–Over 10). This was also the response choices for the two MVPA items with a similar question stem, whereas the sleep items responses could range from 0–Over 12. The third MVPA item (“How many days in the last week did you exercise/participate in moderate-to-intense physical activity for at least 20 minutes?”) provided eight response choices (0–Everyday) and was adapted from the Active Australia Survey (Australian Institute of Health and Welfare, 2003). Finally, the perceived fitness level item has been used previously (e.g., Lodewyk & Sullivan, 2015), used a 5-point response scale (1 = *very poor*, 5 = *very good*), and asked students, “Which of following most closely describes your current level of physical fitness (strength, endurance, flexibility...)?”

The author(s) of the survey ($n = 20$) developed items for nine research-based barriers to physical activity (work, technology,

weather, season, peers and lack of time, finances, parental/guardian support, and transportation) that used the stem “Being regularly physically active is difficult for me because” and a 5-point Likert scale (1 = *strongly disagree*, 5 = *strongly agree*). The designers also included 11 items assessing activities of daily living that were part of the participation in diverse activities subscale. These were walking or bicycling to and/or from school, walking or bicycling to and/or from work, walking or bicycling elsewhere (e.g., post office), household chores (vacuuming, cleaning, doing dishes...), yard work (raking leaves, lawn mowing, shoveling snow), gardening, washing clothes, active hobbies (crafts, sewing, woodwork, auto mechanics), baking/cooking, shopping (for home and personal essentials), and being physically active as an employee at work.

Living skills. The living skills component consisted of 49 items related to physical literacy that assessed feelings (17 items), thinking (20 items), and relating (12 items). Items were scored on a 4-point scale (1 = *never*, 2 = *sometimes*, 3 = *most of the time*, 4 = *all of the time*). Students with higher positive feeling tend to report that physical activity and learning new physical activities is important, interesting, and useful to them. They have a high level of confidence to successfully perform physical activity and physical education and are generally satisfied with their physical appearance. They also report higher positive emotional experiences during physical activity (e.g., alert, excited, determined, enthusiastic, enjoyable, and proud) and lower negative feelings such as being irritable, distressed, upset, nervous, afraid, and embarrassed in physical activity settings. Those reporting high scores on the thinking survey are more likely to intend to exercise regularly and do so because of more intrinsic reasons such as a life goal or choosing to be healthier; know about and how to monitor activity intensity, cultural diversity, the benefits of regular physical activity, eating and sleeping well, and managing stress; report that one’s physical ability can be improved with effort, learning, and practice; carefully consider and apply previous insight, evidence, and different possibilities to make a difficult decision; are able to regulate obstacles to their attention, learning, and motivation to persist in physical activity; are able to set challenging and realistic short- and long-term standards to aim to achieve; and report managing their activity, time, peers, and sources of help to

enhance their being physically active. Finally, students with higher averages for interacting tend to be appropriately assertive, listen actively, apply self-control, have friends, and cooperate (get along with, compliment, and respect others). They are also more empathic, as they report having legitimate feelings of compassion and concern for someone who is encountering some difficulty or misfortune. They also try to understand another person's perspective or feelings compared to their own before coming to conclusions or making decisions.

Of the 49 items, 20 were from the existing Grade 7–9 PFL living skills survey with minor modifications for the Grade 10–12 level. The 29 additional items were used previously in other validated measures and modified for relevance to physical literacy (i.e., regular physical activity and health). They consisted of an additional item each for self-efficacy, value, critical thinking, peer learning, effort regulation, and goal setting from the Motivated Strategies for Learning Questionnaire (Pintrich, Smith, Garcia, & McKeachie, 1991); positive (6) and negative (6) feelings from the Positive and Negative Affective States survey (Watson, Clark, & Tellegen, 1988), with the latter being recoded to a positive valence for this study; two perspective-taking items and one empathy item from the Interpersonal Reactivity Index (Davis, 1983); an incremental ability conception item from the Conceptions of the Nature of Athletic Ability II Questionnaire (Wang, Liu, Biddle, & Spray, 2005); two autonomous motivation items from the Treatment Self-Regulation Questionnaire (Williams, Freedman, & Deci, 1996); a cooperation item from the Modified Aggression Scale (Orpinas, 1993); and two knowledge items from the Active Australia Survey (Australian Institute of Health and Welfare, 2003). The two remaining items were newly developed by the survey authors and assessed active listening within the related subscale (“I am able to easily listen to someone who is talking to me about something important without interrupting them”) and understanding within the thinking subscale (“I am aware of how other cultures view the importance of the body and movement compared to mine”).

Fitness skills. The teacher guides, tasks, and scoring rubrics and scale (1 = *emerging*, 2 = *developing*, 3 = *acquired*, 4 = *accomplished*) for the three fitness skill assessments closely resembled those for

Grades 7–9. The fitness assessment that differed most was the agility and balance assessment that involved a “hexagon hop” rather than the previously used “lateral bound.” The aim of this task was to assess each student’s ability to consistently maintain a state of balance while changing direction with speed. The comparison of clockwise and counterclockwise trials could also reveal imbalance between the right and left movement skills. The task basically involved making five small hexagons on the floor using tape with two students (one participant and one observer) at each. The teacher determines and informs the participant of the direction of the hops (clockwise or counterclockwise) and the foot to be used for hopping for each of four trials and prompts them when to begin. The participant begins in the center of the hexagon facing forward and will rapidly complete sequences of hops out of and back into the hexagon, landing on both feet and maintaining a forward-facing position without stopping throughout the sequence (until returning to the starting position). Each student performs the assessment in both directions—clockwise and counterclockwise—for a total of 2 sequences with a 1-min rest period between each.

The aim and general protocol of the second fitness skill (core strength) for the “plank challenge” remained as they were in Grades 7–9. The plank challenge was altered so students could choose a more difficult plank position compared to the regular and least difficult four-point (“table-top”) position used in Grades 7–9. If they chose a higher (medium) level of difficulty, they performed a three-point plank, which was the same as the initial (least difficult) plank except students then extended one arm or foot parallel to the floor and fully extended. The most difficult level option involved a two-point plank wherein they initially set up in the regular plank position, then extend one foot and the opposite arm parallel to the floor and fully extended. To account for these differences in difficulty level, the second (medium, three-point plank) level served as the average so the data for students in that level was not altered. One point (to a minimum of 1) was subtracted from those who chose to complete the first (easiest) level, whereas 1 point was added (to a maximum of 4) to those selecting the third (most difficult) level. The 60-s trial (followed by a second trial) begins when the correct plank position is performed.

The aim of the third fitness skill (cardiorespiratory endurance) for the “four-station circuit” remained the same as for Grades 7–9. The students performed a different movement pattern continuously for 30 s at each station prior to rotating to the next station. The overall duration was changed for Grades 10–12 to enable participants the option of continuing beyond 12 min to a maximum of 20 min. In addition, each circuit station and scoring rubric was revamped. The first station remained the “agility ladder” except the foot pattern changed from a two-foot hop in Grades 7–9 to students hopping on one foot in the following pattern: dominant foot in, nondominant foot in, dominant foot out, nondominant foot out over the next square of ladder. They continued the “one in, one in, one out, one out” pattern up the ladder and then turned to go back (returning) through the ladder. The second station consisted of “mountain climbers” wherein students start in the hand-plank position and, while maintaining good core stability, flex one knee toward the chest, then rapidly extend that knee and simultaneously flex the opposite knee toward the chest. “Cone carousel” was the name of the third station. Students begin at the first of the three pylons arranged in a triangular pattern, while facing forward in the direction of travel. They move forward quickly to the second pylon, shuffle quickly to the third pylon, then backpedal quickly to the first pylon. The final station was called “split jumps/push” wherein students move from a squat to a standing position with feet parallel and shoulder width apart and arms elevated overhead. On the teacher’s signal they (in one fluid motion jump while maintaining hands elevated overhead) split their feet, placing one foot on either side of the badminton end line, and immediately return to the start position with feet parallel. Without pause, the students jump split again, placing their other foot forward while maintaining the hands elevated overhead.

Movement skills. The teacher guides, tasks, and scoring rubrics and scale (1 = *emerging*, 2 = *developing*, 3 = *acquired*, 4 = *accomplished*) for the three movement skill assessments also closely resembled those for Grades 7–9 except for modifications to increase the difficulty. Each student completes two trials of each assessment. The locomotion assessment was changed from “run, side shuffle, backpedal” in Grades 7–9 to “run, cross over, shuffle, backpedal” in Grades 10–12. The setup involves setting up two pylons 10 m apart

from each other with the first pylon (A) serving as the starting point and the other pylon being B. Two other pylons (C and D) are set up 5 m from and at 45 degrees from Pylon A in the direction of and each flanking Pylon B. All pylons should be a minimum of 3 m from any outside wall. On the tester's prompt, the student runs forward as fast as he or she can and slightly past Pylon B (10 m). At Pylon B, the student then performs an appropriate crossover step (right leg crosses over left to travel to the left) on a 45-degree angle to Pylon C (5 m). The student cuts around Pylon C and then performs a rightward side shuffle to return to the outside of Pylon B (5 m). The student then performs an appropriate crossover step (left leg crosses over right to travel to the right) on a 45-degree angle to Pylon D (5 m). The student cuts around Pylon D and then performs a leftward side shuffle to return to Pylon B (5 m). The student goes around Pylon B and backpedals toward Pylon A (10 m), completing the task. Using the teacher rubric for guidance, the instructor observes for strong acceleration and deceleration, control, and fluid conversion between running, crossing over, shuffling, and backpedaling.

Dynamic running movement was added to the start of both the object control ("throw and catch") and object manipulation ("punt and catch") movement skill assessments used in Grades 7–9, hence the new titles for each ("run, throw, and catch" and "run, punt, and catch"). The floor setup for the "run, throw, and catch" was similar except for having three lines parallel to the wall at 2.0 m, 2.75 m, and 3.0 m from the wall with the 1 m wide target box running between the 2.0-m and 2.75-m lines. A taped spot on the floor 4 m behind the 3-m throwing line serves as a starting point for the seated student. On the prompt to start, the student stands, turns, and travels 4 m (to behind the 3-m line) and throws the ball at the wall so it bounces in the target area *after* hitting the wall. The student then catches the ball after the bounce while remaining behind the 3-m line. The scoring rubric guides observers to additionally check (from Grades 7–9) whether the student is able to rise and turn without stumbling or falling, travels forward using a mature running pattern, moves in a continuous fluid motion toward the target, and crosses the throwing line (3.0 m) on the floor when throwing or catching. Finally, a short run was similarly added to the start of the object manipulation ("kicks" involving a punt and catch) Grade 7–9 assessment. In

the revised object manipulation (“run, punt, and catch”) assessment, participants attempt to demonstrate a mature and controlled running pattern prior to coordinating hand and foot to control kick (punt) a ball and then to predict the motion of the ball so they successfully pursue, intercept, and catch it without crossing the restraining line 3 m from the wall. The scoring rubric was also adapted to add the relevant observations of fluidity, control, and maturity of running during the task.

Results

Content Evidence

Development. The development of the Grade 10–12 PFL involved an extensive consultation process that has been previously reported (Lodewyk & Mandigo, 2017). During and following the development and initiation of the Grade 3–9 PFL, a team of six domain experts that included two university professors met occasionally to plan, write, review, and edit iterations of the Grade 10–12 PFL. Once again, each member of this team represented a balance of expertise in each of PFL components from across Canada and had teaching-coaching experiences with adolescents in physical activity settings, and five had teaching certification in PE. The Grade 10–12 PFL assessments were also developed after a thorough review of the feedback about the Grades 3–9 PFL assessments from the data, advisory committee, teachers, parents, and students. In line with that feedback, several assessment items were altered and retained and many new items were added. Care was taken to ensure that the content and nature of the assessments was well-justified in the academic (research) literature relative to physical literacy and health outcomes.

Data from a pilot test of a draft of the Grade 10–12 PFL conducted a year prior to the finalized version in 2015–2016 was also considered as feedback in the development process. The pilot study was conducted with a sample of 642 students in Grades 10–12 ($n_{\text{females}} = 261$; $n_{\text{males}} = 381$) from four Canadian provinces (Alberta, Saskatchewan, Manitoba, and Ontario) the year before the data for this study. Relatively normal scale distributions, satisfactory-to-high alpha reliability (.66–.93), and significant relations in theoretically justified directions provided evidence for the interactive nature of

active participation, fitness, living, and movement skills for physical literacy, and for the general validity of the assessments for the intended use. For example, there were positive and significant correlations (.50–.84) between each living skill assessment (feeling, thinking, and interacting) and between each of the fitness and movement skill assessments (.23–.54), and between these skills and fitness level (.32–.45), MVPA (.27–.39), and participation and interest in fitness activities and team and individual sports (.18–.48). Through the feedback from this pilot test, minor modifications were made to the wording of some of the items.

Components. The four PFL assessment components with their scales (see Table 1) venture to reflect a holistic conceptualization of physical literacy (Dudley, 2015; PHE Canada, 2015; Roetert & MacDonald, 2015; Whitehead, 2010). For example, the Grade 10–12 PFL includes at least one assessment item for each concept to be included in a holistic understanding of physical literacy provided by Corbin (2016). Readers are also referred to Lodewyk and Mandigo (2017) for more about the similarity of items between the Grade 3–9 and 10–12 PFL assessments. The additional active participation items in the Grade 10–12 PFL reflect students' increased cognitive capability to complete longer surveys (Jordan & Turner, 2008), increased diversity and personalization of activities in high school PE curricula (Kilborn et al., 2015; Lacy & Hastad, 2003; SHAPE America, 2014), and the particular importance of psychosocial and environmental factors during adolescence when youth tend to enjoy more choices while likely facing added barriers to health and physical activity that require more self-regulatory skills (Chen, 2015; Weiss, 2011). For this reason, the Grade 10–12 active participation component added more assessment items for activities of daily living, sleep, sedentary screen time, MVPA, and barriers to physical activity. Additional items added to the living skills component included assessments of more specific feelings (e.g., afraid, determined), thinking skills (e.g., autonomous regulation, understanding, goal-setting), and relational skills (e.g., empathy, active listening, perspective-taking, and respect). Use of scales with only one or two Likert-style items might compromise some psychometric qualities while increasing feasibility for use in larger populations with limited time, but can also still be useful for use in empirical research (Horvath & Röthlin, 2018).

Table 1

Descriptive Statistics and Alpha Reliability for PFL Components by Assessment Time

Scale (# of items)	First assessment time			Second assessment time		
	<i>n</i>	<i>M (SD)</i>	α	<i>n</i>	<i>M (SD)</i>	α
Movement Skills (3)	558	2.90 (.77)	.75	127	3.50 (.58)	.69
1. Locomotion (1)	-	2.92 (.96)	-	-	3.67 (.58)	-
2. Object Control (1)	-	2.97 (.85)	-	-	3.43 (.77)	-
3. Object Manipulation (1)	-	2.80 (1.02)	-	-	3.39 (.85)	-
Fitness Skills (3)	523	2.67 (.79)	.64	148	3.33 (.67)	.66
1. Speed/Agility/Balance (1)	-	2.81 (.85)	-	-	3.35 (.80)	-
2. Core Strength (1)	-	2.58 (1.13)	-	-	3.31 (.87)	-
3. Cardiorespiratory Endurance (1)	-	2.63 (1.10)	-	-	3.34 (.94)	-
Living Skills (49)	708	3.10 (.39)	.94	88	3.17 (.44)	.94
1. Feeling (17)	-	3.08 (.49)	.89	-	3.18 (.43)	.85
2. Thinking (20)	-	3.14 (.42)	.91	-	3.15 (.42)	.90
3. Interacting (12)	-	3.06 (.43)	.83	-	3.17 (.44)	.84
Active Participation (46)	818	2.69 (.36)	-	122	2.84 (.35)	-
1. Daily Physical Activity (1)	853	3.33 (.84)	-	0	-	-
2. MVPA (3)	-	3.68 (1.78)	-	-	3.39 (1.06)	-
3. Fitness Level (1)	-	2.80 (.86)	-	-	3.09 (.75)	-
4. Sleep (2)	-	8.17 (1.30)	-	-	8.52 (1.41)	-
5. Sedentary Screen Time (2)	-	4.57 (2.30)	-	-	4.20 (2.17)	-
6. Barriers to Physical Activity (9)	-	2.29 (.36)	-	-	2.31 (.38)	-
7. Participation in Diverse PA (19)	-	2.24 (.44)	-	-	2.38 (.45)	-
8. Diverse Environments (5)	-	2.36 (.54)	-	-	2.50 (.56)	-
9. Interest in More Diverse PA (4)	-	2.47 (.61)	-	-	2.64 (.57)	-

Note. All on a 4-point scale except for daily physical activity, MVPA (moderate-to-vigorous physical activity), and sedentary screen time.

Response Process Evidence

Exit Survey data from participating teachers following their use of PFL in the piloted version that was almost identical to this version provided useful feedback about teachers' and their students' experiences with the assessments relative to the aim of assessing,

promoting, and developing physical literacy. All of the teachers were very positive about the way PFL helped to increase their students' understanding of physical literacy, noted that it was useful to their teaching, and said that items for active participation and living skills were easy for their students to follow and understand. The majority of teachers (85–95%) reported that the results of each assessment enabled their accurate evaluation of their students' physical literacy; that the teacher support resources were useful, relevant, and easy to apply; and that it was easy to access, register students, navigate, and enter and interpret the data and results in the online system (Web usability). A lower yet still high proportion of teachers (70–85%) reported that PFL would increase their knowledge of physical literacy, change aspects of their teaching, and help them to identify gaps in and improve their students' physical literacy. Teachers' lowest ratings (45%) were that PFL assessments—especially those for movement and fitness skills—took a reasonable amount of time to complete (on average 4–6 classes). Several teachers also recommended adding more video aids, which PHE Canada has since done (T. Zakaria, personal communication, December 16, 2017).

Internal Structure Evidence

The descriptive (i.e., means and standard deviations) and normality (i.e., skew and kurtosis) statistics did not signal any discrepancies for a sample of this size (Tabachnick & Fidell, 2006). The Standards (AERA, APA, & NCME, 2014) also note the importance of (relative to an assessments' intended interpretation) assessment item scores aligning with the construct being assessed. The factor structure of each living skills dimension (feeling, thinking, and relating) was explored via a separate principal component exploratory factor analysis with only the first assessment data since the sample size of the second assessment period was insufficient (< 200; Tabachnick & Fidell, 2006). In line with theoretical expectations for each dimension, each analysis requested a single factor and suppressed factor loadings < .30. Results revealed that except for one thinking (knowledge) and one feeling (negative affect) item, each item had a satisfactory-to-high factor loading (.30–.81), the extracted factor explained a satisfactory proportion of the variance (feeling = 38.49%, thinking = 36.76%, relating = 35.78%), and the eigenvalues were 6.54 for feeling, 7.35 for thinking, and 4.29 for relating. The two items

that failed to adequately load onto their factor were omitted from subsequent analyses in the study. The alpha reliability coefficients for each of the extracted living skills dimensions were high for both assessment times ($\alpha = .83-.91$), as was the alpha reliability for the 47 living skills items ($\alpha = .94$).

Pearson bivariate correlations were computed between each scale within each component (movement, fitness, living skills, and active participation) for the first assessment period. The results (Tables 2 and 3) reinforced expected scale associations within each component from previous research based on the level and direction of the correlations and the absence of multicollinearity. There were positive and moderate-to-high correlations between the three movement skills ($r = .46-.55$), fitness skills ($r = .36-.43$), living skills ($r = .46-.78$), and most of the active participation scales as only five of the 36 active participation relationships were not significant ($p = .01$). For example, as sedentary screen time and perceived barriers to physical activity decrease, most of the remaining aspects of active participation tend to increase (daily and diverse physical activity, MVPA, perceived fitness level, diverse environments, and interest in diverse physical activities). These results, the satisfactory evidence of the factor structure of the three living skills dimensions (feeling, thinking, and relating), and sound alpha reliability of relevant scales support the internal structure of each PFL component and scale.

Table 2
Component and Physical Activity Correlations

Scale (# of items)	1	2	3	4	5
1. Movement Skills (3)	-				
2. Fitness Skills (3)	.60*	-			
3. Living Skills (49)	.32*	.29*	-		
4. Active Participation (46)	.37*	.36*	.57*	-	
5. Daily Physical Activity (1)	.34*	.33*	.36*	.44*	-
6. MVPA (3)	.27*	.29*	.42*	.62*	.47*

Note. MVPA = moderate-to-vigorous physical activity.

* $p < .01$. Time 1 only.

Table 3
Component Scale Correlations

Scale	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1. MS1 (Locom.)	-																
2. MS2 (Obj. Con.)	.46**	-															
3. MS3 (Obj. Man.)	.52**	.55**	-														
4. FS1 (SAB)	.47**	.42**	.41**	-													
5. FS2 (Core Str.)	.45**	.27**	.28**	.43**	-												
6. FS3 (Card. End.)	.43**	.36**	.35**	.36**	.37**	-											
7. LS1 (Feeling)	.32**	.28**	.32**	.37**	.22**	.24**	-										
8. LS2 (Thinking)	.20**	.19**	.21**	.22**	.16**	.19**	.67**	-									
9. LS3 (Interacting)	.13*	.13*	.10	.11*	.09	.07	.46**	.78**	-								
10. AP1 (DPA)	.32**	.27**	.24**	.24**	.27**	.25**	.38**	.31**	.21**	-							
11. AP2 (MVPA)	.41**	.24**	.25**	.27**	.23**	.30**	.39**	.41**	.34**	.55**	-						
12. AP3 (Fitness)	.45**	.29**	.32**	.33**	.40**	.44**	.53**	.43**	.26**	.45**	.59**	-					
13. AP4 (Sleep)	.09	.07	.05	.11*	.05	.06	.11	.09*	.05	.08*	.15**	.15**	-				
14. AP5 (Screen)	-.20**	-.16**	-.10*	-.12*	-.14**	-.20**	-.28**	-.22**	-.16**	-.19**	-.27**	-.23**	-.03	-			
15. AP6 (Barriers)	-.19**	-.24**	-.20**	-.22**	-.16**	-.21**	-.29	-.14**	-.05	-.27**	-.31**	-.29**	-.06	.25**	-		
16. AP7 (Div. PA)	.19**	.16**	.17**	.11*	.17**	.10*	.29**	.44**	.39**	.27**	.43**	.36**	.14**	-.15**	-.08*	-	
17. AP8 (Div. Env.)	.31**	.25**	.17**	.25**	.24**	.20**	.38**	.41**	.34**	.29**	.52**	.40**	.15**	-.29**	-.22**	.60**	-
18. AP9 (Interest)	.21**	.13**	.15**	.20**	.26**	.16**	.45**	.42**	.32**	.25**	.35**	.36**	.10*	-.22**	-.11**	.49**	.41**

Note. MS = movement skill; FS = fitness skill; LS = living skill; AP = active participation; Locom. = locomotion; Obj. Con. = object control; Obj. Man. = object manipulation; SAB = Speed/Agility/Balance; Str. = strength; Card. End. = cardiorespiratory endurance; DPA = daily physical activity; MVPA = moderate-to-vigorous physical activity; Div. PA = participation in diverse physical activities; Div. Env. = participation in diverse environments; Interest = interest in more physical activities.

* $p < .05$. ** $p < .01$. Time 1 only.

Temporal Consistency

Stability of measurement across the two repeated assessment times (fall and spring seasons) was assessed with alpha reliability coefficients $> .50$ as the criterion based on McCrae's (2015) justification, particularly for scales with very few items. This level was also set since scales are likely to differ somewhat by assessment period because of the different seasons (fall and winter) in which they were administered. The results revealed that each scale met the criterion as the scales for active participation and living skills had coefficients ranging from .68 (the thinking dimension of living skills) to .88 (interest in more diverse activities), whereas those for movement and fitness skills were between .53 (object control) and .74 (core strength/plank). The coefficients between assessment times for the mean of the three movement skills ($\alpha = .61$), three fitness skills ($\alpha = .80$), three living skills ($\alpha = .73$), and active participation items ($\alpha = .89$) also signaled satisfactory stability across assessment periods.

Relations to Other Variables

The Standards (AERA, APA, & NCME, 2014) also report that another important form of validation evidence is the degree that scales of an assessment relate concurrently between components. As is evident in Table 3, correlations between the movement, fitness, and living skills were positive and significant ($p = .01$) except for those involving the relating scale of living skills. Further, except for the sleep scale, 67 of the 72 bivariate correlations between the active participation scales and either fitness, movement, or living skills were significant ($p = .01$) and in the theoretically expected direction. These relationships were also evident in the positive, moderate ($r = .29-.60$), and significant ($p = .01$) bivariate correlations between the composite means for active participation and movement, fitness, and living skills (Table 2). More specifically, except for some relationships—particularly those involving relating and sleep—as one scale or component of PFL increases or decreases, the more likely the others will also do so. Finally, correlation and regression analyses tested whether the different PFL components predicted two important physical literacy outcomes (levels of MVPA and daily physical activity). The results revealed moderate, positive, and significant ($p = .01$) bivariate correlations between both of these outcomes and

each scale (except for sleep) and component of PFL (Tables 2 and 3). MVPA was omitted from the active participation mean for the regression analyses. Results revealed that the four PFL components collectively predicted self-reported daily physical activity, $R^2 = .20$, $F(4, 351) = 21.94$, $p < .001$, and MVPA, $R^2 = .28$, $F(4, 359) = 34.66$, $p < .001$. Except for the prediction of MVPA by the overall mean of movement skills ($p = .76$), the PFL components each predicted MVPA (fitness skills, $p = .01$; living skills, $p = .01$; active participation, $p = .01$), and daily physical activity (movement skills, $p = .02$; fitness skills, $p = .01$; living skills, $p = .04$; active participation, $p = .001$).

Discussion

PFL is intended to serve as a feasible, formative, criterion-referenced, and practitioner-based assessment of a holistic physical literacy. The aim of this study was to discover any validation evidence for early use of the PFL with Grade 10–12 PE students in Canada. Theoretically grounded in the broad guidelines of the Standards for Educational and Psychological Testing (AERA, APA, & NCME, 2014), the study provides score validity evidence on the content, format, and administrative guidelines of the items and scales; response process evidence about how the program was valued and how the assessments were implemented; internal structure evidence about how participants performed and the extent of associations between items within each scale; predictive evidence as to how scales related temporally to a second measurement of each assessment scale; and concurrent evidence about how the scales related to those of other components. While drawing attention to certain limitations and adding some recommendations, this article shows that the results generally support the Grade 10–12 PFL for its intended use.

The study revealed content validity evidence in the development of the Grade 10–12 PFL that was based on a thorough review of a pilot study and previous use of PFL for Grades 3–9, extensive consultations and planning by a balanced team of experts, and research-based justification of assessment items attempting to reflect a relatively holistic conceptualization of physical literacy (Dudley, 2015; Jurbala, 2015; Lloyd, 2016; Whitehead, 2010) that is aligned with many PE curricular standards and outcomes (Ontario Ministry of Education, 2015; PHE Canada, 2015; Roetert & MacDonald, 2015). The level and direction of the correlations between assessment items within

their scale or construct signaled alignment with the intended interpretation of each construct or scale. For example, there were positive and moderate-to-high correlations between the three assessment items within each of the movement, fitness, and living skill components and almost all of the active participation scales. Satisfactory factor structure of the three living skills dimensions (feeling, thinking, and relating) and sound alpha reliability of relevant scales also supported the internal structure of each PFL component and scale. Further, the assessment scales were relatively stable across the two repeated assessment times (fall and spring seasons) and also related as expected *between* components. Bivariate correlations between the assessments in one component (e.g., movement skills) and those in another component (e.g., fitness skills) were generally positive and significant. The different PFL components were also predictors of MVPA and daily physical activity.

Another important source of validation evidence was the feedback provided by participating teachers that generally signaled a positive experience with PFL, most notably that it facilitated understanding of physical literacy and that it was useful and easy enough to access, understand, administer, and interpret. Almost a third of the responding teachers had doubts that PFL would increase their knowledge of physical literacy, change aspects of their teaching, and help them to identify gaps in and improve their students' physical literacy. This reflects some research into PE teachers' views of physical literacy (e.g., Lynch & Soukop, 2016; Stoddart & Humbert, 2017) indicating confusion and misunderstanding of physical literacy and its role in PE and the need for an easing of teachers' concerns relative to understanding, applying, and assessing physical literacy. The results of this study signal that the Grade 10–12 PFL and its teacher resources might serve to facilitate this in physical educators.

A formidable challenge in the overall assessment of physical literacy is its duration. For example, in this study almost half of the responding teachers had concerns about the amount of class time required. This is likely to be an ongoing tension, particularly in the global assessment of physical literacy as a holistic (multidimensional), embodied, personal journey (Lundvall, 2015; Whitehead, 2010) because of its size and complexity. As PFL reflects, it is likely that some aspects of physical literacy are too contextual (e.g., curricular

variations for cultural or regional considerations) and abstractly embodied (e.g., aesthetic ability, communication, and creativity) to be assessed validly by practitioners in educational settings. Lundvall (2015) summarizes this concern:

There are, however, skepticisms about the assessment of physical literacy. Skepticisms are around the legitimacy of whether the ideals expressed in the concept, such as empowerment, embodiment, values, identities, beliefs, and social relatedness, should be assessed as mechanically . . . In a school culture dominated by a performance code, it appears difficult to uphold the broad and inclusive definition of physical literacy which is characterized by an individual's potential and being in the world. Assessments related to measuring what separates people are no longer relevant and appropriate. Such measurements induce a risk of a maltreatment or misuse of the concept literacy in a goal-oriented and assessment-driven school system. (p. 116)

It is also important to acknowledge that any global assessment of physical literacy such as PFL will only partially reflect not precisely mirror it, and essentially involves “[identifying and defining] ‘specific’ characteristics of physical literacy and [developing] appropriate assessment procedures for each (as opposed to attempting to develop a ‘general’ test)” (Corbin, 2016, p. 21). The multiple components and scales of PFL reflect such an approach and provide evidence that a valid overall assessment of holistic physical literacy will require a significant duration of class time. Each of the four PFL components consisted of several essential assessments and the living skills and active participation surveys used subscales (e.g., physical activity, sedentary screen time, self-efficacy, cooperation) and often consisted of one or two Likert-style items. Although such reduction of scale items may compromise certain psychometric properties, it can and still be valid enough for use in empirical research and will increase the feasibility and authenticity for use with larger populations having limited time (Gosling et al., 2003; Horvath & Röthlin, 2018).

Since the Standards (AERA, APA, & NCME, 2014) emphasize the importance of a thorough understanding of the contextual purpose of any assessment, it is vital to recognize that PFL comprises a

set of authentic assessments, each designed to provide each student (and their teachers and parents) criterion-referenced information (not a precise summative quantity) about their progress relative to its four essential components of physical literacy to facilitate their reflection and long-term healthy active living. PFL includes the student, teacher, and parent in the information-sharing process, which is vital because many of the physical literacy outcomes are best met in a “holistic and cross-curricular way” that both the “school and its wider community can service” (Dudley, 2015, p. 238). The internal, concurrent, and predictive validity evidence from this study reinforces the sound evidence-based theoretical and structural foundation of PFL for its intended use with Grade 10–12 students in Canada (e.g., Chen, 2015; Corbin, 2016; Ennis, 2015; Giblin et al., 2014; Longmuir & Tremblay, 2016; Lundvall, 2015; Silverman & Mercier, 2015; Weiss, 2011).

Future research should continue to define and refine tools and tests for different aspects of physical literacy that can be added to an authentic large-scale assessment for learning programs such as PFL. As more longitudinal PFL data are gathered, increased analysis would be helpful into the concurrent and predictive relations, particularly by grade level or ethnic group, and to long-term healthy active living outcomes. Limitations of the study include potential confirmation bias, as the author was also involved in the design of several of the Grade 10–12 PFL assessments, and construct underrepresentation due to the low number of assessments and/or items representing each scale or component. For example, the Grade 10–12 PFL may need new or expanded assessments of some noted aspects of physical literacy such as movement functions, forms, and flows (Lloyd, 2016) and essential knowledge (Ennis, 2015), particularly in the form of rules, tactics, and strategies of movement (Dudley, 2015) since most learning outcomes in Canadian PE curricula are focused on movement skills, games, and sport technique (Kilborn et al., 2016). It would also be useful if the data sample provided more information on Grade 10–12 PFL participants with special needs and potential adaptations for them, along with more balanced representation of the constituent residents of Canada, particularly from northern regions. Nevertheless, this study provides important early validation evidence in favor of the use of PFL as an authentic,

inclusive, formative, practitioner-based, general assessment of relatively holistic physical literacy for Grades 10–12 PE in most regions of Canada.

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COACHING EDUCATION

Parents' Perceptions of Coaching Behaviors Toward Their Child With a Hidden Disability in Recreational Youth Sports

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Abstract

Athletes with hidden disabilities (HD) often exhibit behaviors that are not conducive to the sporting environment (e.g., inattentive behaviors, inability to remember plays). Coaches may label these athletes as problematic or challenging and may negatively adjust their behaviors toward these athletes. As frequent observers of their children, the parent/guardian's perception of coaching behaviors is particularly pivotal because this perception can guide that of the child, as well as whether the child continues to participate. This study sought to investigate parents' perceptions of their young athletes' experience in recreational sports. Three hundred eleven parents/guardians were surveyed; 30 indicated that their child had been tested for learning disabilities. Parents of athletes exhibiting HD behaviors reported higher frequencies of negative behaviors in coaches.

Within the United States, approximately 10% of children have a disability, which can include varying levels of deficit in the areas of

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language processing, attention, impulse control, and motor control (Centers for Disease Control and Prevention, 2015; U.S. Department of Education, National Center for Education Statistics, 2007). Examples of these disabilities include specific learning disabilities, emotional behavioral disorders, mild intellectual disabilities, and speech/language disabilities. However, common among all of these disabilities, there are no, or very few, outward or visible signs in settings outside of the educational setting, such as the athletic and recreational playing fields.

These hidden disabilities (HD) can interfere with socialization and result in poor peer relations and peer rejection (Bagwell, Brooke, Pelham, & Hoza, 2001). Individuals with HD may also have difficulty understanding and following directions, with physical coordination, remembering plays or strategies, and sustaining attention (Barkley, 1990; Harvey & Reid, 1997). However, the learning needs of athletes with HD can be addressed with proactive instruction and simple changes to the practice environment (Flores, Vargas, & Beyer, 2017). These include differentiated activities, organized and structured practice environments, clear directions, consistent language, instruction that includes modeling and visual aids, immediate and specific feedback regarding performance, emphasis on positive reinforcement rather than punishment, and goal setting.

Athletes with HD may have learning needs that differ from their peers without a disability, and a supportive environment and positive interaction with a coach is the first step toward meeting these needs. However, for athletes with HD, coaches may not always recognize a disability is present (Beyer, Flores, & Vargas-Tonsing, 2008; Vargas, Beyer, & Flores, 2015; Vargas-Tonsing, Flores, & Beyer, 2008) and thus may view the athlete as “challenging” or “problematic.” Such a perception will alter a coach’s behavior toward that athlete, often negatively, and will result in a self-fulfilling prophecy for the coach (e.g., the child is difficult, the coach yells/punishes the child frequently, the child quits trying to please/coming to practice, and the coach was correct). This can be magnified at the youth sport level where coaches are often volunteers, many times parents, and high school and college students, and where training is not always required (McCallister, Blinde, & Kolenbrander, 2000). Unless the volunteer coach is or has been a teacher, they are usually not

prepared in pedagogical skills, nor are they likely to know where to look for available resources in this area.

At the youth level, the parent/guardian is the primary advocate and supporter of the young athlete. Most parents/guardians value their children's participation in youth sports, perceive it as an important family activity, and enjoy viewing their children's progress in a sport (Na, 2015). Therefore, having a strong understanding of the parent/guardians' perceptions of coaching behaviors may be instrumental in helping educate coaches and advocating for quality coaching for all participants. In 2014, Neely and Holt found that parents believed sport to have a myriad of benefits to their child, including the exploration of abilities and building positive self-perceptions; however, they also believed that these benefits were acquired dependent on the environment established by the coach. Tsai and Fung (2009) interviewed 49 parents of individuals with intellectual disabilities. The parents interviewed sought inclusive sporting experiences, but often removed their child and "gave up" due to rejection by staff and peers. Parents also noted a lack of understanding of individuals with HD. In other research, parents noted that sports improved their child's overall functioning (Bjorklund, Moody, Beal, & Burton, 1988). Therefore, parents are frustrated when they recognize the benefits of sport for their child with HD, but have difficulty finding the coach and sporting environment that can foster these benefits. Not surprisingly, parents' levels of satisfaction, coupled with their interpretation of their young athlete's sporting experience, are an important predictor of future sport participation (Brustad, 1993). Therefore, the purpose of this study was to investigate the perceptions of parents of young athletes with HD with regard to their child's experience in recreational sports.

Method

Participants

Youth sport parents ($n = 311$) representing 29 youth sport teams participated in this study. Their children were an average age of 10 ($SD = 2.53$), had played sport for an average of 4.18 years ($SD = 2.16$), and had played for their coach an average of 1.39 years ($SD = 1.09$). Of these children, 30 had been tested for a learning disability. Children who had been tested for a learning disability (12 male, 18 female)

reported an average of 4.67 years ($SD = 1.81$) of playing experience. For 76.7% of the children, this was their first year playing for their coach.

The coaches (21 male, 8 female) of these youth sport teams were an average age of 40.42 ($SD = 9.37$) and had an average of 7.93 ($SD = 8.004$) years of experience coaching sports. Of these coaches, eight reported experience working with children with HD; however, it is unknown how the coach knew they had worked with an athlete with HD.

Procedure

Permission to conduct this study was obtained from the institutional review board for human subjects. Youth sport coaches were contacted via e-mail and their assistance in data collection was requested. With the coach's consent, a practice was selected for the researcher to speak with parents to solicit participation. Parents who agreed to participate were then given the surveys to complete at that practice. Teams with participating parents received a gift card for a pizza party.

Measures

Parents were given four questionnaires to complete: the Leadership Scale for Sports (Chelladurai & Saleh, 1980), the Coaching Behavior Scale for Sport (Côté, Yardley, Hay, Sedgwick, & Baker, 1999), a Checklist for Hyperactivity and Inattention (Centers for Disease Control and Prevention, 2015), and a demographic questionnaire.

Leadership Scale for Sports. The Leadership Scale for Sports (LSS; Chelladurai & Saleh, 1980) is a 40-item scale that measures five dimensions of leader behavior including social support (8 items), democratic behavior (9 items), autocratic behavior (5 items), training and instruction (13 items), and positive feedback (5 items). The questionnaire was modified with the stem question changed from "I" to "my child's coach," which allowed parents to complete the LSS according to their perceptions of their child's coach's behavior toward their child. Cronbach's alphas for the modified parental version were .83, .76, .83, .90, and .69, respectively. All alphas either surpassed or approached the recommended value of .70 (Nunnally, 1978).

Coaching Behavior Scale for Sport. The Coaching Behavior Scale for Sport (CBS-S; Côté et al., 1999) is a 47-item scale that measures seven dimensions of coaching behavior including physical training (7 items), technical skills (8 items), goal setting (6 items), mental preparation (5 items), competitive strategies (7 items), personal rapport (6 items), and negative rapport (8 items). The questionnaire used the stem “The coach(es) most responsible for my child’s...” to allow parents to complete the CBS-S according to their perceptions of their child’s coach’s behaviors. Cronbach’s alphas for the modified parental version were .9, .95, .94, .94, .94, .93, and .92, respectively. All alphas were above the recommended .70 (Nunnally, 1978).

Checklist for Hyperactivity and Inattention. A symptom checklist downloaded from the Centers for Disease Control and Prevention website was given to participating parents. There are two categories of behaviors: inattention and hyperactivity/impulsivity. Parents were asked to rate the frequency of the behaviors from *never* to *always* (*never, seldom or 25% of time, occasionally or 50% of time, often or 75% of time, always*). If parents rated five or more behaviors in a category as *often* or *always*, this represented an area of concern. For the purposes of this study, this checklist provided a means of coding and grouping athletes who exhibited some of the behaviors typical of children with HD.

Demographic questionnaire. A demographic questionnaire was given to parents and coaches. The parents were asked questions regarding their child’s age, gender, sport experience, and whether the child had been tested for a learning disability. Coaches were asked to indicate their age, gender, coaching experience, and whether they had experience with individuals with HD.

Data Analyses

Data were analyzed via SPSS version 22. Parents were grouped according to whether their child had been tested for a learning disability, whether their child was considered inattentive, and whether their child was considered hyperactive. A series of one-way ANOVAs were conducted and differences in perceptions of coaching behavior explored.

Results

Thirty parents (9.7%) indicated that their child had been tested for a learning disability. Twelve children (3.9%) were categorized as being inattentive, and nine youth athletes were categorized as hyperactive (2.9%). These numbers are consistent with that of the general population (Polanczyk, Silva de Lima, Horta, Biederman, & Rohde, 2007; U.S. Department of Education, National Center for Education Statistics, 2016), and due to these low numbers, the data were analyzed by item for insight into parents' perceptions.

Significant differences were found for multiple items on the LSS and CBS-S between parents' perceptions of their child's coach when their child had been tested for a learning disability and that when their child had not been tested for a learning disability. Parents' perceptions on the LSS indicated a significant difference in coaches explaining the techniques and tactics of the sport, $F(1, 242) = 10.54, p < .01$; paying special attention to the child's mistakes, $F(1, 240) = 6.49, p = .01$; and helping the child with personal problems, $F(1, 234) = 5.92, p < .05$. Parents' perceptions on the CBS-S indicated a significant difference in parents' perceptions for coaches providing specific feedback for correcting technical errors, $F(1, 239) = 5.25, p < .05$; providing visual examples to show how a drill should be done, $F(1, 239) = 4.69, p < .05$; using verbal examples that describe how a skill should be done, $F(1, 239) = 3.40, p < .05$; making sure my child understands the techniques and strategies being taught, $F(1, 238) = 6.12, p = .01$; and providing my child with immediate feedback, $F(1, 238) = 5.08, p < .05$. In all cases, parents of children tested for a learning disability reported lower means for the occurrence of these coaching behaviors.

Significant differences were found for numerous items on the LSS and CBS-S when children qualifying as inattentive were compared to children not considered inattentive. Parents' perceptions on the LSS indicated a significant difference in coaches getting my child's opinion on important matters before going ahead, $F(2, 254) = 3.87, p < .05$; lets my child share in decision making, $F(2, 259) = 3.38, p < .05$; encourages my child to make suggestions for ways of conducting practices, $F(2, 252) = 4.04, p < .05$; [coach] refuses to compromise a point, $F(2, 253) = 4.63, p = .01$; and [coach] keeps to him/herself, $F(2, 251) = 4.67, p = .01$. Parents' perceptions on the CBS-S indicated

14 items of significance. Examples of these include maintains confidentiality regarding my child's personal life, $F(2, 243) = 4.51, p < .05$; uses fear in his/her coaching methods, $F(2, 252) = 11.75, p = .00$; yells at my child when angry, $F(2, 252) = 3.82, p < .05$; shows favoritism toward others, $F(2, 253) = 4.48, p = .01$; and spends more time coaching the best athletes, $F(2, 253) = 7.51, p < .01$. With the exception of maintaining confidentiality (in which parents of children considered inattentive reported lower occurrences), parents of children considered inattentive reported higher means for the occurrence of these coaching behaviors.

Differences in perception were also found on the LSS and CBS-S between parents of children characterized as hyperactive and parents of children not considered hyperactive. On the LSS, parents' perceptions were significantly different for gets my child's opinion on important matters before going ahead, $F(2, 254) = 5.47, p < .01$; lets my child share in the decision making, $F(2, 259) = 5.92, p < .01$; lets my child try his/her own way even if they make mistakes, $F(2, 252) = 3.64, p < .05$; encourages close and informal relations with my child, $F(2, 251) = 3.81, p < .05$; works relatively independent of the athletes, $F(2, 249) = 4.15, p < .05$; and compliments my child for his/her performance in front of others, $F(2, 252) = 3.28, p < .05$. Of these results, parents of children characterized as hyperactive reported higher and more positive means on all items except for complimenting their child in front of others than their counterparts did. On the CBS-S, significant differences were found for helps my child set short-term goals, $F(2, 250) = 3.46, p < .05$; helps my child identify target dates for attaining his/her goals, $F(2, 250) = 5.62, p < .01$; has a consistent routine at competition, $F(2, 249) = 3.34, p < .05$; deals with problems my child may experience at competitions, $F(2, 248) = 3.16, p < .05$; maintains confidentiality regarding my child's personal life, $F(2, 243) = 3.89, p < .05$; uses fear in his/her coaching methods, $F(2, 252) = 3.09, p < .05$; and intimidates my child physically, $F(2, 252) = 3.20, p < .05$. Of these results, parents of children categorized as hyperactive reported higher means than their counterparts. Tables for all means and significance may be requested by contacting the authors.

Discussion

The purpose of this study was to investigate parents' perceptions with regard to their child with HD's experience with his or her coach in recreational sports. The results show that coaches engage in behaviors that are conducive to a positive learning environment (Felton & Jowett, 2013). Parents reported that coaches asked for athletes' opinions regarding important matters, considered athletes' suggestions regarding practice activities, and engaged in shared decision making. These behaviors build self-determination and have been linked to positive affect and increased self-esteem (LaGuardia, Ryan, Couchman, & Deci, 2000; Patrick, Knee, Canevello, & Lonsbary, 2007). This is beneficial for all athletes, but may be particularly important for athletes with HD, whose experiences associated with learning, such as school, that have not been successful and remedial academic activities may not provide this level of choice and shared decision making.

Athletes with HD have learning characteristics associated with language processing (understanding verbal direction, responding to questions, following verbal directions), attention (attending to directions, attending to all parts of directions or tasks), and negative experiences with repeated failure (Friend, 2014). A coaching environment that parents perceive as responsive to their child's needs would likely address these characteristics that are shared across athletes with HD. However, while this study found many positive reported coaching behaviors, parents of athletes with HD also reported coaching behaviors that would not be considered as responsive and conducive to a positive coaching environment as described by Felton and Jowett (2013).

For example, parents of athletes with learning disabilities reported lower rates of coaching behaviors that would address language processing deficits, the most common deficit of children with learning disabilities (Mercer & Pullen, 2009). Working with athletes with language processing deficits should include clear directions; however, when compared to their counterparts, parents of children with learning disabilities reported lower incidence of coaches explaining the techniques and tactics of the sport and using verbal examples to describe how to complete a skill. An approach to addressing athletes' language deficits is supplementing verbal description with visual

aids such as diagrams, pictures, or demonstrations, yet parents reported that coaches engaged in lower rates of visual examples of drill execution. While this is often common procedure within the educational system, it may not be included within coaching curriculums, and coaching educators should teach and continue to reinforce this basic concept. In addition, parents reported that coaches did not make sure that children with learning disabilities understood the techniques and strategies being taught. This relates to an affective characteristic of children with learning disabilities, which is repeated experience with failure; without the coach checking for understanding, the athlete does not receive corrective feedback that might prevent mistakes in execution. Furthermore, parents reported that coaches did not attend to their child's mistakes or correct errors. Both of these coaching behaviors increase the likelihood that athletes with learning disabilities will make mistakes and experience failure. Failure is a natural part of the learning process, but repeated failure without appropriate feedback may result in frustration and decrease interest and engagement.

Parents of children characterized as inattentive also reported coaching behaviors that would detract from positive interactions and coaching environment. The coaching behaviors described by parents of athletes who were inattentive did not include instructional behaviors to the extent reported by parents with athletes with learning disabilities. Instead, they appeared to be related to poor athlete-coach interactions. Parents reported higher rates of yelling at children and use of fear in coaching methods. Parents also reported behaviors that indicated that coaches did not prefer working with their child.

Parents of children characterized as hyperactive reported similar results. For example, they reported that coaches used fear as a coaching method more often than parents of children not considered hyperactive reported the coaches use of fear. However, this negative interaction style was more extreme as perceived by this group of parents; they reported that coaches used physical intimidation to influence their child. Parents also reported that coaches complimented their child in front of others less often than they did other athletes.

Parents' reported perceptions differed based on type of HD. Parents of athletes with learning disabilities reported issues related to learning and instruction. This might be because athletes with learning disabilities present deficits that interfere with instruction if no accommodations are available. Youth sport coaches may not be aware of learning differences or know how to address them, especially since youth sport coaches are volunteers whose training and expertise would be based on sport, not necessarily on education and instruction (McCallister, Blinde, & Kolenbrander, 2000). Parents of athletes with learning disabilities may be more likely to observe issues related to learning given their child's history of learning deficits in school. Parents of children with deficits related to attention (inattention and hyperactivity) reported issues related to aggression and hostility that parents of children with learning disabilities did not report. This may be due to the nature of behaviors displayed such as (a) athletes who are inattentive failing to follow directions more often because they do not attend to part or all of the command and (b) athletes who are hyperactive engaging in undesirable impulsive behaviors such as making inappropriate comments, or failing to follow directions because the athlete acts before thinking (Gaub & Carlson, 1997). These behaviors may be frustrating to coaches, and this could explain their hostile responses in the form of yelling, use of fear, and physical intimidation.

There are similarities among the parents' reports related to coaches' understanding and knowledge of athletes with HD's characteristics. Coaches may misinterpret the behaviors of athletes with HD. Behaviors associated with inattention and hyperactivity may be perceived as defiance, insubordination, and a threat to authority. This would not be surprising as coaches have reported lower efficacy in their ability to recognize signs of HD (Vargas-Tonsing et al., 2008). Yelling, intimidation, and inspiring fear may be an attempt by the coach to assert authority.

With regard to behaviors associated with coaching, behaviors are associated with a failure to provide instruction and a lack of preference. A lack of preference is a natural response to a coach's repeated failure to provide effective instruction. If coaches understood these behaviors in a different way, one that has a biological component or one that can be changed with instruction, they might be more

responsive. For example, if coaches understood the needs of athletes with learning disabilities and believed that athletes with learning disabilities can learn with simple changes to instruction, they may be more likely to provide these. Accordingly, if coaches understood the needs of athletes who are inattentive or hyperactive, they may change their perceptions of athletes' behaviors, which would lead to less frustration and more positive responses.

According to Neely and Holt (2014), parents believed that participation in sports was beneficial to their children, but these benefits were dependent upon a supportive environment established by the coach. The results of the current study are mixed. Parents reported supportive activities related to development of self-advocacy in the form as shared decision making and choice. However, instruction and behavior management were not described as particularly supportive for athletes with HD. Athletes with learning disabilities received insufficient instruction and feedback; the potential for repeated failure will not likely build the positive self-perceptions reported in Neely and Holt's study. The negative interactions with coaches reported by parents of athletes who were characterized as inattentive or hyperactive are not consistent with parents' hope for a supportive learning environment in youth sports (Neely & Holt, 2014).

Some of the results of this study are consistent with those found by Tsai and Fung (2009). Athletes in their study stopped participating. Their reasons for leaving included rejection and coaches' lack of understanding of their children's needs. Although, coaches in the current study included athletes in decision making, negative coaching behaviors continued. Athletes with learning disabilities did not receive instruction that reflects a coach's understanding of the characteristics associated with learning disabilities. Athletes who were characterized as inattentive were less preferred by their coaches, which would likely be interpreted as rejection. Athletes who were characterized as inattentive or hyperactive were reportedly treated with hostility and aggression, reactions that would be related to misunderstanding the nature of the athletes' behaviors.

Limitations

The study is limited in its size. Some items approached significance and may have been interpreted differently with a larger sample

size. Although the number of athletes with HD was consistent with the incidence of disabilities, future research should include larger sample sizes. The study is also limited in its approach with a one-time survey of parents. The nature of the survey research provides limited responses because parents who have a particular perception are more likely to participate. The researchers may not have captured the true reports of parents' perceptions, because the views of parents who declined participation are not included. Another limitation of this study is that information is based on parents' reports rather than observation and evaluation of coaching methods and coaches' interactions with athletes with HD. Future research should extend beyond self-report and include observation of youth sport environments. Last, this study captured parents' views at one point in time, and it is unknown how the respondents' previous experiences shaped their responses. Future research might address this with a longitudinal study in which families of athletes with HD can be followed. With a study of this type, issues related to children who discontinue sport participation may be captured, as well as conditions that encourage continued persistence in sport. Future research could also utilize qualitative components in which focus groups would elaborate upon their survey responses. For example, when parents report that their child does not receive feedback or that a coach intimidates their child, these would be better understood with details regarding why parents developed these perceptions.

Implications

Parents of athletes with HD reported that their children had mixed experiences with supportive youth sports environments. Young athletes should have sport experiences that encourage them to stay and persist so that they can reap the benefits of participation, such as the development of positive relationships with others, cooperative skills, and social skills (Holt, Kingsley, Tink, & Scherer, 2011). Including athletes in decision making and providing choice supports these potential outcomes. Other reported coaching behaviors may discourage participation. To address this, more research needs to investigate the extent to which athletes with HD's instructional and behavioral needs are met within recreational sport settings, as well as through current coaching curriculum and resources such as the National Council of Youth Sports. As youth sport coaches are often

volunteers, it can be difficult to request them to undergo additional and lengthy training, and thus, they may only receive basics such as first aid and drill examples. It is important to review the current options for volunteer coaches and to research their effectiveness and efficacy in promoting positive and effective coaching behavior. Youth sport coaches should be prepared to work with athletes who have diverse learning needs. Simple changes to instruction, practice structure, and knowledge of HD may address the issues reported by parents in this study. More research is needed with regard to practical implementation of recreational coaching preparation and training and how to best address needs with limited resources.

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METHODOLOGY

“The Stomp and
Catch Was Too Easy!”
Children’s and Teachers’ Perceptions
of Inclusive High and Low
Autonomy Motor Skills Instruction

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Abstract

Physical educators seek ways to motivate students to engage in lifelong physical activity. Research demonstrates that autonomy-supportive climates improve motor skills and competence in children. Although substantial research exists on the benefits of autonomy-supportive climates on children’s motor skills, little is known regarding the perceptions of the teachers and the children. We implemented two instructional climates—an autonomy-supportive climate (ASC) and a teacher-centered controlled (TCC) climate, both designed for learning motor skills—and asked children and teachers about their perceptions of the instructional approaches. Twenty-four children and four teachers participated. Data were collected qualitatively through informal interviews with children, in-depth interviews with teachers, and field

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observations. All researchers engaged in inductive data analysis and triangulation. The results suggest that children preferred the ASC over the TCC, found the ASC challenging, and thought the ASC facilitated independence and choice. These findings suggest an explanation for why earlier studies found positive learning outcomes in ASC.

A broad goal for teachers in all content areas is to motivate students to become lifelong learners. Likewise, physical educators constantly seek ways to motivate students to engage in lifelong physical activity. One way to get students excited about and stay involved in physical activity is the provision of instruction in a climate that is engaging and promotes autonomy (Valentini & Rudisill, 2004a). Ames (1992) asserts that instructional settings can be organized to impact a child's motivation to learn and persist. Prior research (Valentini & Rudisill, 2004a) demonstrates that autonomy-supportive climates (ASC) improve motor skills and competence in children who are typically developing (TD) and children with developmental disabilities (DD). Additionally, ASC have been shown to have lasting effects (Valentini & Rudisill, 2004b). Indeed, learning environments characterized by controlling teachers and rewards and punishments have been found to be effective only as long as the external conditions continue (Hastie, Rudisill, & Wadsworth, 2013). Once withdrawn, those contingencies are no longer motivating to the student. Thus, the purpose of this study was to compare the perceptions of teachers and children with and without DD of two instructional climates, both delivered in an inclusive setting. One climate is student centered and autonomy supportive (ASC), and one is teacher centered and controlling (TCC). Using a phenomenological framework, we specifically asked,

- What are children's experiences of two different inclusive motivational climates, one student centered and autonomy supportive, and one teacher centered and controlling?
- What are teachers' experiences of two different inclusive motivational climates, one student centered and autonomy supportive, and one teacher centered and controlling?

Autonomy-supportive instruction is grounded in achievement goal theory, which is characterized by the constructs of achievement goals and achievement behaviors (Duda & Nicholls, 1992; Xiang,

Bruene, & McBride, 2004). Achievement goals and behaviors are broken down into two types of orientations: task and performance (Ames, 1992; Nicholls, 1989). At the ends of the spectrum, a performer with a task orientation focuses on using effort to master a task, while one with a performance orientation is ego centered with an emphasis on dominance over others (Ames, 1992; Nicholls, 1984; Xiang et al., 2004). Motivation has been shown to improve when physical activities are presented in an environment that promotes task orientation (Cury, Da Fonseca, Rufo, & Sarrazin, 2002; Duda & Nicholls, 1992; Goudas, Biddle, & Fox, 1994; Halvari, Skjesol, & Bagøien, 2011). In physical education, task orientations are also associated with increased persistence and effort (Agbuga & Xiang, 2008; Guan, Xiang, McBride, & Bruene, 2006; Xiang et al., 2004).

The use of task-oriented climates in a variety of ability and grade levels has been demonstrated as effective in physical education. Barkoukis, Tsoarbatzoudis, and Grouios (2008) found that participation in high autonomy climates increased enjoyment and reduced worrying of students at the secondary level. They also found that the participants' perceived physical competence increased. An increase in perceived competence was also found for preschool- and kindergarten-aged children in studies by Robinson (2011) and Valentini and Rudisill (2004b), respectively. In addition to engagement and self-perceptions, task-oriented climates have been shown to increase moderate-to-vigorous physical activity (MVPA) and motor skills (Martin, Rudisill, & Hastie, 2009; Robinson, 2011; Valentini, Pierosan, Rudisill, & Hastie, 2017; Valentini & Rudisill, 2004a, 2004b).

Researchers (Valentini & Rudisill, 2004a, 2004b) have examined the effectiveness of high autonomy climates for individuals with developmental delays compared to low autonomy climates in a group of kindergarten-aged children (Valentini & Rudisill, 2004b). Not only did the high autonomy group outperform the low autonomy group following the intervention, they also did so 6 months later, thus demonstrating retention of the improved motor skills over time. A similar study by the same researchers found results showing a group of children with developmental delays who received a high autonomy intervention outperforming those in a controlled climate (Valentini & Rudisill, 2004a).

Although there is substantial research on the benefits of an ASC on children's motor skills (Robinson, 2011; Valentini & Rudisill, 2004a; Valentini, Rudisill, & Goodway, 1999), physical activity (Wadsworth, Robinson, Rudisill, & Gell, 2013; Wadsworth, Rudisill, Hastie, Irwin, & Rodriguez-Hernandez, 2017), and psychological outcomes (Digelidis, Papaioannou, Laparidis, & Christdoulidis, 2003), little is known regarding the perceptions of the teachers and the children of these climates. Thus, this study is the first to compare the perceptions of teachers and children with and without DD for two instructional climates: one that is student centered and autonomy supportive (ASC), and one that is teacher centered and controlling (TCC). The ASC approach allowed the children to choose the activities from a set of activity stations and to choose how long they stayed at the activity. The TCC approach employed an instructional delivery that is tightly structured, methodical, and controlled (e.g., the teachers chose the activity and how long the children stayed at the activity).

Method

Stringer (2004) stated that researchers use phenomenology to “. . . reveal meaning and to understand how that meaning is connected to a person's life experience” (p. 25). Thus, for this investigation, we utilized a phenomenological approach to capture the lived experiences of the children and the teachers. Such an approach is an appropriate way to understand participants within the contexts and experiences of their lives (Lounsbury & Mitchell, 2009).

For this investigation, we created and implemented two instructional climates, ASC and TCC, to implement in the physical activity portion of a day camp. We designed and implemented the two climates for learning motor skills and asked children and their teachers about their perceptions of the two instructional approaches.

The Camp

The day camp was 3 weeks long and held in the summer for children aged 5 to 12 with and without DD. The camp offered a variety of motor skill instruction including fine motor skills, gross motor skills, swimming, and bicycle riding. It also included instruction on computers; nutrition; and other social, cognitive, and life skills. This

study focused on the portion of the camp on physical activity and gross motor skills.

Conditions: Autonomy-Supportive Climate Day Versus Teacher-Centered Day

For the treatment condition, we chose particular aspects that together composed an ASC. Those aspects were providing children choice of (a) which station to go to and (b) how long they stayed at any given station. The climate was student centered, and the children could navigate the stations independently and modify skill level as they perceived was needed. Decision making was embedded in the choices the children made. The instructional leader and the teaching assistants facilitated safety and gave feedback, but did not influence the children's activity decisions.

For the comparison condition, the same group of children were taught via the TCC. The same stations were offered as in the ASC, but the children stayed in assigned groups and rotated on the teacher's direction. The children stayed at the station a set time determined by the teacher, and the children went to every station with their assigned group. Instructional strategies that occurred on the ASC day and the TCC day were (a) equipment variety at each station; (b) specific goal(s) for each station; (c) rigorous adherence to safety; (d) teacher demonstration; and (e) teacher feedback, praise, and encouragement. A noteworthy difference between this study and others is that we did not create a performance-oriented climate as a control. That is, we did not encourage student competition with others, did not encourage students to win or to do better than others, and did not create situations in which students were compared to other children (cf. Todorovich & Curtner-Smith, 2002). Rather, we used a TCC approach, a developmentally appropriate instructional delivery that is tightly structured, methodical, and controlled.

Fidelity Check

Two elements ensured that qualities of the two climates as described in the previous paragraph were present. First, we designed the two climates with the direction of a professor who is known as an expert in motivational climate research. Second, another professor took field notes on 6 days, which included documenting cases illustrating the ASC and TCC approaches. The audit trail created by

these two elements provides documentation that the climates were accurately created and implemented.

Daily Procedures

The daily activity sessions of the 3-week camp began with 5 acclimation days (Week 1). Children were exposed to TCC and to ASC sessions so that they were familiar with both climate conditions prior to data collection.

After the acclimation period, we continued to expose the children to the climates during the remaining 2 weeks of camp. Each participant attended nine sessions (one session per day), five sessions which we delivered using an ASC approach and four sessions a TCC approach. Throughout the treatment, we alternated which climate—the ASC or the TCC—was presented first. The same instructor and assistants taught every class. After acclimation days, we incorporated social stories (see Social Story section) into the daily routine.

The Teachers

The instructional leader, Lucas (all names are pseudonyms), was a doctoral student in physical education pedagogy with 8 years' experience teaching adapted physical education and general physical education. The assistant teachers were two faculty members (one in physical education pedagogy, Sally, and one in motor development, Elizabeth) and a doctoral student, Junho, who was getting a dual degree in physical education pedagogy and motor development. The three teaching assistants had varying levels of experience with ASC ranging from high expertise to moderate knowledge.

Stations and Tasks

Our two daily sessions were set up with stations in one large activity room (60' × 30'). Each station was designed for the performance of a motor skill or activity. At the start of each acclimation day, the instructional leader described and demonstrated each station to the children. Because the ages of most of the children ranged from 5 to 9 years old, the activities were the same as those in a developmentally appropriate elementary physical education program and were designed so that children could modify to make the tasks more age appropriate through changing equipment or difficulty level. See Table 1 for station activities.

Table 1
Station Tasks

- Crawl through tunnel
 - Ride on scooters
 - Throw at target
 - Throw and catch with partner
 - Shoot basketball at low goal
 - Jump rope
 - Jump over hurdles
 - Kick
 - Dribble with feet
 - Dribble with hands
 - Throw and catch a flying disc
 - Walk on balance beam
 - Balance and walk on stilts
 - Balance beanbags on body parts
 - Strike balloon or ball with paddle
 - Strike with bat
 - Strike with hockey stick
 - Fitness station – Roll a die to pick exercise
 - Ride on hippity hop balls
 - Navigate through an obstacle course
 - Roll down the cheese mat
 - Stomp and catch
 - Walk on stilts
-

Social Story

We wrote a social story (Gray & Garand, 1993), which was read to the children at the beginning of each session. Social stories are tools used to assist children with disabilities (usually children with autism spectrum disorder, ASD) to interact and communicate in social situations (Gray & Garand, 1993). Using the social story, we reminded the children to follow rules and directions; to respect children, teachers, and equipment; and to play safely. We also reminded the children to be kind, be safe, and have fun. The instructor, Lucas, also verbally reminded the children of the rules and protocols for the respective day.

Participants

Of the 32 children who attended the activity sessions, 24 participated in the study. Seventeen were TD, and seven had a specific disability. Most of the children were 5 to 9 years old, plus one 11- and one 12-year-old. See Table 2 for information on the children. All attended daily 60-min motor skill activity sessions during a summer camp program. Of the 32 children, 15 were interviewed (see Data Sources and Collection section). The adult participants were the instructional leader (a doctoral student) and three teaching assistants (two faculty and one doctoral student). The university institutional review board approved the research, and the parents or guardians provided consent for their children.

Table 2
Information on Children in This Study

Child's name (pseudonym)	Age/gender	Specific disability or typically developing
Robin	7/F	TD
Ayesha	7/F	TD
Sheri	6/F	TD
Philip	6/M	TD
Dallas	8/M	TD
Jeremiah	6/M	TD
Sable	8/F	Cerebral Palsy
Maggie	9/F	Noonan Syndrome
Edie	8/F	Down Syndrome
Eamon	5/M	TD
Courtney	7/M	TD
Mikella	7/F	TD
Catherine	7/F	TD
Susan	5/F	TD
Van	5/M	TD
Cooper	6/M	TD
Doug	5/M	TD
Randy	6/M	Attention Deficit Hyperactivity Disorder
Allen	6/M	TD
Sofie	5/F	TD

Table 2 (cont.)

Child's name (pseudonym)	Age/gender	Specific disability or typically developing
Kevin	7/M	Autism Spectrum Disorder
Brandon	12/M	Autism Spectrum Disorder
James	11/M	TD
Joyce	14/F	Intellectual Disability
DID NOT USE BELOW PARTICIPANTS		
	M	TD
	M	Autism Spectrum Disorder
	M	Autism Spectrum Disorder
	M	
	M	
	M	
	M	Down Syndrome
	M	TD
	F	
	F	Down Syndrome
	M	
	M	
	M	Autism Spectrum Disorder
	M	TD
	M	TD
	M	Down Syndrome
	M	Cerebral Palsy
	M	Autism Spectrum Disorder
	F	TD
	M	TD
	F	TD
	M	TD
	M	TD
	M	
	M	TD
	F	TD
	F	Down Syndrome

Note. F = female; TD = typically developing; M = male.

Data Sources and Collection

To give an accurate portrayal of the participants' perceptions about the two instructional climates and what they considered important, we gathered data from three sources. We collected data qualitatively using short, informal and formal interviews with children; two in-depth interactive group interviews (Ellis, 2004) with teachers; and field notes. All of the interviews were recorded with a Samsung Galaxy 4[®] cellular phone. The first author facilitated and later transcribed all of the interviews. Open-ended field notes were taken during the activity sessions.

Interviews with children. Fifteen of the children agreed to be interviewed ($n_{TD} = 13$, $n_{DD} = 2$). One of the children with a DD provided answers that were echolalic and thus were not usable, resulting in 14 children being interviewed. The children were given the opportunity to be interviewed individually or with a friend of their choice. All of the children knew they were in a class that was taught two different ways and knew we would be asking them about their experiences in the class.

Interviewing children brings its own particular problems to the forefront, not the least of which is the power asymmetry between the adult interviewer and the minor informant. A consequence of this lopsided relationship is that children often desire to give answers that they think will please the interviewer (Greene & Hogan, 2005). We used several strategies for putting the child at ease to obtain honest perceptions. These included

- inviting the child to be interviewed, rather than telling him or her;
- giving the child the opportunity to say no without consequences;
- giving the child the choice of being interviewed alone or with a friend;
- sitting down to keep below or even with children's eye level;
- using humor when appropriate; and
- maintaining a friendly, open demeanor intended to put the child at ease.

Another strategy important for interviewing children is phrasing the questions in an open way to elicit thoughtful answers. We

avoided questions that required a response of yes or no, and if such a question was used, the answers were considered with caution (Greene & Hogan, 2005).

For the interviews, we asked the child if he or she wanted to be interviewed, and if so we went into a quiet room with a window into the activity room. The interviews were very short—no more than about 7 min, with most being around 3 to 5 min. We probed for further answers when the responses were brief. This is the interview guide we used for the children's interviews:

- Today we used a structured rotation. Yesterday you could rotate anytime. Which one do you like better?
- What is it that you like, or do not like, about the two different ways we have activity time?
- Do you ever try a skill, or a station, that you are not very good at? Tell me more about that.
- Is there anything else you want to tell me?

Interviews with teachers. The instructional leader and the three teaching assistants sat down together two times—once for 1.5 hr and once for 1 hr—and recorded interactive interviews (Ellis, 2004) about aspects of the classes. The first author facilitated the first interview, while all instructors offered thoughts, comments, and questions about the two instructional climates. The first interview occurred after the camp ended. The interview guide for the teacher interviews included these questions:

- What was your role as a teacher?
- Was your role different from one climate to the other? If so, please talk about that.
- Let's talk about a typical day for each of the two climates.
- Talk about what you noticed about the children's actions and reactions during the respective climates.

The second interview occurred after data analysis had begun, and the teachers discussed examples of the themes that were emerging from the children's interviews. The second interview was structured around the themes emerging from the children's interviews:

- Could you see examples of a child's preference between climates?
- What were ways, if any, that children extended the tasks?

The teachers also talked at length about safety, although it was not a topic that the children talked about in their interviews.

Field notes. The first author conducted field notes on 6 of the camp days: 3 on ASC days and 3 on TCC days. Field notes also included occasional short conversations with a participant and question-and-answer sessions during introduction and closure of the activity session.

Data Analysis

Field notes, children's interviews, and teacher interviews were the three primary data sources for the study. We also had video data with which we could triangulate and, if needed, corroborate events and verify dates. We analyzed the interviews by carefully reading and rereading to uncover categories of participants' perceptions, inserting comments as appropriate (Creswell, 2013). We read through the field notes seeking further patterns and seeking actions illustrative of events observed in the field notes. We used *in vivo* names (Creswell, 2013), that is, exact quotes from participants as names for the themes. We developed and examined categories for common elements that tied them together. From the categories, we drew themes, followed by selectively coded data examples that illustrated the theme. We identified and grouped together significant quotes and events to form themes. Specifically, we sought to identify themes that emerged as meaningful from all data sources.

Trustworthiness. We achieved trustworthiness using triangulation, member checks, and an audit trail (Lincoln & Guba, 1985). We triangulated data by having three data sources that we constantly compared to ensure good fit into a category. Although the video data were not a primary data source, we used them as needed to triangulate and authenticate events. Having all researchers engage in the data triangulation contributed to confirmability and trustworthiness. Participants should be able to recognize and confirm as accurate their perspectives as captured by the researcher (Sparkes & Smith, 2014). To ensure confirmability, we transcribed and returned the teachers' interviews to them for member checking (Lincoln & Guba, 1985). We transcribed but did not member check the children's interviews, because some of the children were too young to read and all of the children had left the camp by the time the data were transcribed. The field notes, however, served to confirm the

veracity of the children's comments. We maintained an audit trail to ensure that all data could be traced to the source.

Results

The data revealed four themes: "I like it better when I have a choice" (children and teachers alike preferred the ASC), "Because I can stay at the station longer" (reasons participants preferred ASC), "The stomp and catch was too easy" (children were able to modify tasks to meet their developmental levels), and "I kind of obsess about safety" (safety).

"I like it better when I have a choice"

The consensus of the children as well as the teachers was that the ASC was preferred over the TCC. The lead instructor, Lucas, indicated that both climates had elements fitting his particular style of teaching; however, he expressed his preference for the ASC with the caveat that

I remember thinking back in the moment of doing it, on the autonomy days. I felt lazy to a certain degree. "I'm not in there intervening, I'm not interjecting my, the authority I have, how dare I!" It felt weird.

Lucas went on to say that he struggled in the beginning until he became comfortable with the seemingly chaotic environment of the ASC. Eventually, though, he developed a preference for it. The three assistants, having had previous experience with the ASC, agreed that they preferred such a climate. Elizabeth, in the interactive interview, asked Junho his thoughts and feelings about the setting, saying, "Did you feel comfortable? Did you feel like we were losing control between the two days?" He responded, "I didn't think we were losing control at all. I think the kids were more happy on the ASC days." Elizabeth agreed, "I have to say that. 'Cause we saw crying on the TCC days! And we didn't see that on ASC day." Lucas added, "It's like giving them candy. And then you say, 'no candy today!'"

As the teachers indicated in the interactive interviews, there was no question which climate the children preferred. Once the

acclimation days were over and the treatment days began, the children would rush in and ask if it was a “choice” day. The interactive interviews and field observations showed that, without exception, children squealed with delight if told that it was an ASC day and faces fell if they learned that it was a TCC day. Additionally, on nearly every TCC day, Maggie cried. One could always tell what day it was by Maggie’s unhappy outbursts. While no other children cried when one day or another was realized, Lucas suggested that the children who were TD also acted somewhat differently on TCC days. If they had to go to a “nonpreferred station it was like the effort either was not there or it was lacking.”

Consistent with these observations from the instructors, without exception the children reported that they preferred the “choice” days (ASC) over the TCC days. Several children quickly responded with a one- to two-word answer, such as Maggie saying “choices!” and Jeremiah saying “free choice!” Allen clearly expressed his preference when he said, “I like it better when I have a choice.” Philip exclaimed, “Choice thing! I like to pick what I like to do!”

The teachers noticed that time was a relevant factor. Junho said that he found himself giving more feedback on ASC day, “. . . more so than direct instruction, ‘cause on TCC there’s only so much time that you have, cause they don’t stay as long.” While the children did not articulate the aspect of time, the teacher interactive interviews indicated that the teachers noticed the impact of more time on the children’s decision to modify tasks.

“Because I can stay at the station longer”

Once they communicated their preference, we asked the children to explain their reasons for their preferences. Cooper, 6 years old, provided the quote for the above heading. Other reasons children articulated were because they could leave the station when tired or bored, they could play with their friends, and they could do what they wanted. Sally noted that the children thinking they could “do what they wanted” was interesting, because they only had two decisions to make: which station and how long to stay there. Six-year-old Sheri elaborated in her response, saying,

I like to get my choices because it sounds sort of like making my own choice, like - to choose what I want to eat, what you want to play with or do, that's why I sort of like getting my own choice.

Robin articulated her preference by saying, "Probably both [climates], but I more like choices because . . . sometimes I get bored at different stations, so when I get bored I can just go to a different station." Jeremiah summed it up succinctly, saying, "Because we get to choose our own stuff." James agreed, saying, "The free choice day, you can pretty much do anything you want. You can play with your friends if they are not in your group." Ayesha usually played with Robin, and she was clear on why she preferred the ASC:

Because you get to do it whenever you want, and you don't have to stay at the same station. Because if that station is tiring you out and you want to go to an easier station that won't, like, tire you out that much.

Alternatively, Courtney remarked how "you can stay there the whole time!" Robin and Ayesha both pointed out that they sometimes got bored at the station, and if so, they could "just go to a different station."

The TCC days often contributed to what the teachers called "on-lookers," because some children (e.g., Maggie) refused to participate if they could not choose. Kevin, too, would wander vaguely on the TCC days, whereas on the ASC days he shot basketball the whole time. Other children would participate in the stations, but Lucas noted some did not put forth as much effort as they did on the ASC days. Alternatively, on the ASC days, if a child had no interest in a task, then that child could skip it altogether. Philip, for instance, said emphatically that he was "not a big fan of jumping. I don't like to jump! It makes my legs tired!" In the ASC, he could focus on a station at which he would like to improve, such as throwing a disc.

As teachers, we pondered and discussed why the children preferred the ASC, beyond the simple explanations the children gave. Elizabeth noted, "It almost became an entitlement to them! Like they really wanted to have freedom of choice." Junho concurred, calling

it “structured freedom.” Lucas added that despite the freedom, the children understood the expectations of the tasks. Elizabeth added, “They got to make decisions.”

“The stomp and catch was too easy”

Modification of the task was especially encouraged on the ASC days. If one of the teachers saw a child struggling or, conversely, performing with ease, the teacher might query the child about making the task more or less challenging. When asked if he ever changed the task or tried to make it harder, Cooper said, “One time when we had the obstacle course with the balance beam and the hurdles and the tunnel, I starting hopping (two foot jumping) over the hurdles instead of leaping over them.” When asked if that made it harder, he replied, “Um hm [yes]. I tried hopping on one foot, too [over the hurdles].” He went on to say he was not able to do that.

When on the hippity hop balls, 5-year-old Eamon pitched forward and went right into a forward roll. Impressed, one of the assistant teachers asked him if he intended to do that, to which he replied no, that he executed a safety roll so he would not hit his head. Thus, while he did not deliberately add the challenge, he added a previously learned skill to the one he was doing when the situation called for it. After being noticed, Eamon continued to practice falling into a forward roll.

A balance station had children walking on dome cones and the balance beam as part of the task. Van and Doug made the task more difficult by walking backward on the beam, while Cooper turned and walked sideways on the dome cones. Later he reflected on another task in which he concentrated on a specific aspect of the skill: “I changed hockey where I try not to just go ‘pow!’, I like to act like a hockey player and keep it level. So it’ll go in straight.”

Extending the task can also mean making it easier. Edie, a child with Down syndrome, sought out a smaller, lighter ball when she was unable to reach the basketball goal with the ball she was using. Instructors Elizabeth and Sally looked on while Edie picked up a regular basketball, tested the weight with her hands, then put it down and picked up a lighter ball, which she promptly started dribbling, then shooting. Elizabeth remarked,

She really had a drive to get better at that skill. I don't think kids, just because they have a disability, can't figure that out. Once a person has an interest but they can't pursue it, they won't ever get good enough to do it.

One of the tasks was “stomp and catch.” This is a small board like a teeter-totter with a place on one end where a ball or beanbag can be set and a place on the other end indicating where to stomp. Doing so projects the object straight up, and the child attempts to catch it. Another task was walking on stilts, which are upside down plastic buckets on which the child stands and walks, holding taut the attached strings to keep balance. Several children combined these by walking on the stilts and stomping on the board while still on the stilts. However, sometimes seeking a challenge led to safety concerns. Junho approached Susan, Sofie, and Catherine as they made the combination, stomping the board while on stilts, and cheering for one another when successful. He inquired about what they were doing. The girls told him, and though he agreed that it was harder that way, he was concerned for their safety. They demonstrated the modification to assure him they were acting safely, and said doing only the stomp and catch was too easy!

Elizabeth would encourage extending the task by saying, “You know, that looks kind of easy [for you]. Why don't you challenge yourself?” Likewise, Junho said,

I was encouraging effort a lot on the ASC days... manipulating the task, finding ways to make it more challenging for those that could do it. For example on the stomp and catch, “see how high you can get it, see if you can clap [he claps twice] before you catch it.”

The children were usually eager to comply with the suggestions to modify, and many did so without being prompted.

“I kind of obsess about safety”

There did not seem to be any difference in safety between the two climates. When interviewed, the children did not mention safety. Lucas noted, “If they didn't talk about safety, it was telling—it wasn't an issue.” However, the teachers were consistently aware of the environment and of circumstances that might lead to an injury.

Elizabeth, one of the teaching assistants, was particularly keen on the importance of safety in an ASC:

In order to have an effect in an ASC, you have to have a safety component. They have to feel as though they can be free and move on their own and manage themselves without getting hurt by someone else who might be more skilled or aggressive or bigger.

One station of concern was the hippity hop station. We set up a “road” using a rectangular pathway of mats. The children were to stay on the mats and always to go in the same direction. On one ASC day, the children at that station were rambunctious, laughing as they were changing directions, passing one another, falling off of the balls, and going off the mats. Sally, a teaching assistant, noted that occasionally a child would interpret the ASC to mean “I can do whatever I want!” We had to stop the action and explain why what they were doing was not safe. Some children reined in their exuberance and began following the rules, while others left the station because, presumably, it was no longer fun. In the interactive interview, Lucas asserted, “The ones that would dominate by being all over the place, they were like, ‘well, if I have to do it this way, I’m going to go someplace else.’” Elizabeth agreed and remarked that after those children left or settled down, the other children came to that station: “They didn’t want to go there because they were intimidated, but then after we managed that [safety], it was interesting how we had way more kids that would go and be involved in that activity.” She went on to say, “I kind of obsess about safety.”

Perhaps the children did not notice safety issues, because of the things that happened on a regular basis. A case in point was Brandon, a child with autism spectrum disorder (ASD), who would break and run. Without warning, and before his aide could stop him, he would sprint across the room. At the wall, he would jump up and launch himself off, running back in the direction from which he came, without regard for whom he may run down in the process. Fortunately, no one was hurt (including him!) during any of those episodes. Of less concern was the presence of loose balls that might roll behind a child involved in another activity. Whether it was basketball, throwing, catching, or stomp and catch, there was never a day without

balls. Despite the virtual boundaries of the stations, balls would sometimes break free, resulting in someone tripping on one or taking the occasional inadvertent shot to the head. While the teachers fretted and attempted to be proactive about safety—for instance, placing a university student at the basketball goal to rebound—the children seemed to take such things in stride.

A salient factor with the potential to impact safety was the variance of developmental levels of the children. It was important that the younger children, those with a disability, or those who were less skillful were able to participate safely alongside a more skillful child in all conditions. For instance, at the hippity hop station, an adult assistant struggled to help Sable, a child with cerebral palsy, mount the ball. When the other children came up behind her, they stopped and waited politely and patiently until the child was able to start moving forward.

With regard to safety, Lucas noted, “I think with the population there was an expected level of chaos that everyone just dealt with.” All the instructors agreed, and while we could see the chaos, which Junho labeled “structured freedom,” the children simply participated happily, not perceiving the careful behind-the-scenes planning and on-the-spot modifications the teachers made.

Discussion

The data revealed four themes: “I like it better when I have a choice,” “Because I can stay at the station longer,” “The stomp and catch was too easy,” and “I kind of obsess about safety.” We further discuss and interpret these findings in this section.

Enjoyment

Two themes, “I like it better when I have a choice” and “Because I can stay at the station longer,” indicated the children’s preference for the ASC. Although we did not attempt to determine a relationship between preference and enjoyment, we inferred from the children’s responses that their preferences for the ASC could be due to enjoyment. Their comments that they could leave a station if they became tired or bored suggest enjoyment as a reason for preference. Likewise, field notes indicated many cases of children, such as Kevin and Edie, staying longer at a particular station. Although much research has looked into enjoyment in physical education, we

found little (e.g., Gråstén, Jaakkola, Liukkonen, Watt, & Yli-Piipari, 2012) that tracks or otherwise determines enjoyment of a particular climate. Cox, Duncheon, and McDavid (2009) investigated aspects of self-determination in physical education and how students responded. They found that relationships with peers as well as teachers facilitated self-determined motivation and related directly to the amount of enjoyment students experienced.

Challenge

Children who stay longer at a station may be doing so because they have time to work to meet a challenge or solve a problem. One of the advantages of the ASC for all children was the factor of flexible time, which meant more time for children to modify and extend a task. A child had time to practice at a station long enough to get sated, or to get to a point at which he or she was ready to modify the task. One of the modifications the children made was using the stilts to manipulate the stomp and catch boards. Making this extension meant moving equipment from one station to another, and that would not have been possible on the tightly structured TCC day. The teachers observed several cases of children focusing intently on a particular skill, such as Edie and basketball. Elizabeth noted how long Edie persisted at basketball, shooting repeatedly and making adjustments to improve her success.

Length of time at a station may also speak to the holding power of the task. Hastie, Johnson, and Rudisill (2017) identified the potential for modification and the potential for success as elements of a task that give it “holding power.” These elements motivate the child to stay and continue to practice and advance his or her skills.

Independence and Choice

On some occasions, the children seemed to interpret the two choices they had—which station and how long to stay—as blanket permission to do anything they wanted. Indeed, when asked why they preferred the “choice day,” several children said, “Because I can do whatever I want,” and several others expressed a similar reason in different words. This perception of freedom, however, rarely led to off-task behavior or safety issues, except for the rare incidents described in the results. It seemed that having the two choices was enough of a change from the TCC to facilitate greater perceptions

of independence, and that was enough to influence the children's preference. A study by Martin et al. (2009) supports this notion, as the authors affirm that "the freedom to act independently and make choices in selecting activities . . . increased effort and increased on-task behavior in these students. . ." (p. 238). Further, the ability of an ASC to promote independence is supported in the original work by Ames (1992).

Independence and choice are not concepts typically associated with children with disabilities; indeed, individuals in this group are often represented—or misrepresented—as being dependent on others. We found in this study that children with disabilities could handle high autonomy climates as well as children who are TD did, but this requires careful planning and implementation. All children must feel safe in their environment and have access to equipment without other children taking it from them, or otherwise dominating or overpowering them. If teachers structure the climate in ways that facilitate the participation of all children, then children with disabilities can succeed as well, and even thrive. Structuring for success for all children means including a variety of equipment and built-in modifications to the presented tasks. Including children with disabilities may further consist of having supports to facilitate independence, such as a one-on-one assistant with a child, social stories, peer models, and/or picture schedules.

Conclusion

Substantial evidence exists that autonomy-supportive physical education climates result in many positive learning outcomes, including improvements in motor skill learning and increased physical activity engagement (cf. Martin et al., 2009; Robinson, 2011; Valentini et al., 2017; Valentini & Rudisill, 2004a, 2004b). This study extended the research by investigating children's perceptions and preferences of an ASC compared to a TCC. Findings from this investigation suggest that children with and without disabilities perceived the climates as different from each other and preferred the ASC over the TCC. Students prefer to learn in a setting that allows for enjoyment and challenge and that promotes independent learning. The findings from this investigation provide an explanation for why earlier studies found positive learning outcomes.

Limitations

This study has a few limitations. Unlike a traditional physical education course that may last a full school year, the camp was only 3 weeks long. After a week of acclimation, we had 9 days of treatment with the two climates. In such a short time, it was likely that the element of novelty was never lost. Exposing the children to more days of each climate may have revealed different perceptions of the learning experience.

While we patterned the camp instructional sessions to resemble a physical education class, many practicing teachers would point out aspects that set us apart: we had four teachers, plus staff, to no more than 32 children; we had an abundance of developmentally appropriate equipment; and we had an air-conditioned room with an adjacent outdoor area for our use. These factors limit the transferability of the findings.

Finally, when an ASC is used, it is typically not alternated with a TCC climate. Thus, children are not usually able to compare climates on a day-to-day basis. Being able to do so may have made it easier for the children to detect differences and thus may have influenced preference.

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PEDAGOGY

Effective Teaching Strategies for Low-Skilled Students

Ulana Lysniak, Anne Gibbone, Stephen Silverman

Abstract

This study described the strategies used by expert teachers to instruct low motor skill students in physical education classes. The method was extensively pilot tested. Eleven physical education teachers took part in the study. Data were collected via observations, field notes, interviews, and nonstructured informal interviews. Two major themes emerged during the data analysis. First, specific teaching skills are important to facilitate low-skilled students' success, with subthemes of (a) teachers paying attention to low-skilled students' motor skill deficiencies and (b) teachers creating an accepting environment for low-skilled students. Second, teachers structure authentic performances in which low-skilled students can successfully participate, with subthemes of (a) teachers continually modifying game play with no scores, no winners, and everyone working together and (b) teachers recognizing decisions about equipment selection and usage for low-skilled students. The results can inform how teachers develop lessons for low-skilled students.

Teachers' effective instructional strategies are a vital component in the learning process. The strategies in physical education class can be planned, assessed, and carried out by the teacher so students acquire basic motor skills. These strategies can increase motor skills

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through the organization of instruction and assessment of students by their physical education teacher (Strand & Bender, 2011). Effective strategies can increase fundamental motor skills and may give students a foundation for participating in lifelong physical activity (McKenzie & Lounsbery, 2014), as well as increase their chances for optimal health (Van Beurden et al., 2003).

Motor skills are especially important for students in elementary school, as this is where they learn the basis for all future movement skills and physical activities (National Association for Sport and Physical Education, 2013). We know that the variables of effective instruction promote motor skill development when they are used by teachers, but we know less about how teachers are actively planning and utilizing strategies in their teaching for students at all motor skill levels. Considerable evidence shows that variables in effective instruction such as time on task, appropriate practice trials, clarity, class structure, accountability, and skill progressions have a positive effect upon motor skill acquisition (Silverman, 2005; Silverman, Kulinna, & Crull, 1995; Solmon, & Lee, 1996).

Student skill level is another component that affects the learning process. Silverman and Subramaniam (1999) concluded that the learning process is influenced by attitude, and low-skilled students with a positive attitude will want to work harder to learn activities in physical education. Mastering new skills in physical education, however, is not something that low-skilled students expect (Portman, 1995). When they feel helpless, with no control or power over their own enjoyment, their affect is negatively impacted (Subramaniam & Silverman, 2002). Their attitude changes when they experience success (Carlson, 1995; Ennis, 1996).

Teachers should provide students with successful experiences and set optimally challenging tasks. They can do this by incorporating variables such as time on task, appropriate practice trials, clarity, class structure, accountability, and skill progressions into their effective instruction (Silverman, 2005; Silverman et al., 1995; Solmon & Lee, 1996), to help create motor skill tasks that low-skilled students can do successfully. By improving students' motor skills, teachers can increase student efficacy and students' desire to continue with the motor skill tasks that they are learning (Ferrer-Caja & Weiss, 2000).

There is also a distinct need for teachers to develop strategies to instruct individual low-skilled students (Rink, 2003), because these students avoid physical skills and become even lower skilled (Hopple & Graham, 1995; Silverman, 2005). If the level of difficulty of the motor skills increases too quickly, low-skilled students may not be able to progress or execute the skills (Byra & Jenkins, 2000; French et al., 1991). These students may then not participate in physical activity, because they are excluded by their more adept classmates (Portman, 1995), and their physical education experience will not be positive (Subramaniam & Silverman, 2002; Carlson, 1995; Hopple & Graham, 1995). When their skill increases, their enthusiasm for the activity increases and their experiences become positive (Ennis, 1996). By employing effective strategies, teachers can help low-skilled students develop their motor skills more fully (Silverman et al., 1995). The ability to make decisions helps to form instruction and is a necessary tool for the teacher (Griffey & Housner, 1991) and low-skilled students to learn.

Exhibiting empathy is often overlooked, with teachers facing large class sizes as well as curricular concerns. Creating a learning environment that leads students to perceive it as nonthreatening and challenging is important (Koka & Hein, 2003), especially for low-skilled students who feel alienated and threatened. While these concerns might be valid, if teachers were to follow the strategy of having empathy for students in the class, especially low-skilled students, they could help them to develop motor skills and to have a sense of belonging (Noddings, 2005). To create this sense of belonging, teachers can care for individual students. Effective teachers are expected to carry out an ethic of care in teaching physical education (Owens & Ennis, 2005). Physical education classes offer many opportunities for teachers to demonstrate caring behaviors toward their students (Ravizza & Stratton, 2007).

Paying close attention to the progress, ability, and anything that could affect the performance of low-skilled students could be important in improving their experience in physical education (Portman, 1995). Teacher cognition, described as thought processes, influences teacher strategies. Cognition or thoughts may govern action (Roberts, 1992). Teachers hold many thought processes while making decisions about practice, engagement time, level of difficulty,

planning, and reflection on lessons, progressions, and concentration on class structure. Understanding the decisions that effective teachers make regarding strategies is an important first step in improving instruction for low-skilled students.

The way effective teachers structure practice, so that students receive appropriate practice, is paramount in motor skill acquisition. The more teachers provide for appropriate student practice, the more learning that occurs. There is a relationship between student achievement and the way teachers structure tasks (Silverman et al., 1995). Students' individual differences are shaped by teachers controlling the instructional strategies (Rink, 2003). It is valuable to learn how teachers who are effective with low-skilled students decide what strategies to use with them.

Studying successful teachers can provide insight into how they instruct low-skilled students. This insight may help teachers to optimize their own teaching methods. Low-skilled learners can have a larger capacity for gains in motor skills than high-skilled learners do (Subramaniam & Silverman, 2002). How teachers think, plan, and structure practice is important as teachers adapt a lesson to individual students (Rink, 2003). Although ample evidence points to which variables assist students to attain motor skills in physical education (Ennis, 1996; Griffey & Housner, 1991; Portman, 1995), there is little documentation about which strategies teachers employ (Riskowski, 2015), as well as what thinking processes they utilize, to elicit this learning.

The purpose of this study was to describe and compare the strategies teachers use to teach low motor skill students in physical education classes. By examining strategies of successful physical education teachers, we can acquire knowledge that could help other physical education teachers optimize their teaching methods and increase their instructional effectiveness with low-skilled students.

Method

This qualitative study employed observations, recorded structured interviews with teachers, field notes, and informal interviews to uncover the strategies that successful teachers use with low-skilled students. Prior to the study, rounds of pilot testing to frame

and support procedural decisions were completed. Each method is further explained.

Pilot Testing

Three rounds of interviews and observations were done with five teachers in urban and suburban schools in the Greater New York area. All five teachers were selected based on professional recommendations. An open-ended interview guide was developed via guidelines for interview techniques (Marshall & Rossman, 2015; Seidman, 2012), with reference to other qualitative research studies on low motor skill students in physical education (Carlson, 1995; Hopple & Graham, 1995), for an analysis of the instructional strategies teachers used with these students. The goal of the interviews was to investigate teacher cognition and effective strategies. During pilot testing, the interviews were digitally recorded, and the researcher revised interview questions, terminology, and the question sequence.

Observations also were piloted by the researcher as a nonparticipant in the naturalistic observation of physical education teachers in the gymnasium or on sport fields. The teachers wore a microphone on their lapel, which enabled the researcher to hear the teacher. During the observations, field notes also were recorded. Based on the method of formatted descriptive notes, the column on the left side of the page focused on teachers' strategies and the column on the right side consisted of comments representing the researcher's interpretations about the teachers' behavior.

Procedures

Participants. Eleven fourth- and fifth-grade teachers from public elementary schools located in suburbs of New York volunteered for the study (see Table 1). All of the participants were state certified, taught physical education for at least 5 years, and were selected based on recommendations from teacher educators, awards they received, or peer referrals. Teachers had class sizes between 20 and 25 students, and all used a multiactivity curriculum, predominantly with skill-focused lessons. Informed consent was obtained from the physical education teachers after institutional review board approval and prior to interviews and observations being conducted.

Table 1
Teacher Information

Teacher	Teacher teaching experience (years)	Teaching experience at present school (years)	Grades taught	Teaching focus
Cathy	25	25	4 th and 5 th	Lacrosse Steeplechase Field hockey
Fiona	30	20	5 th	Dancing Cross country
Heather	33	33	4 th and 5 th	Football
Hoover	12	8	4 th and 5 th	Basketball
Humarie	14	7	4 th and 5 th	Tennis Badminton Baseball
Jay	30	10	4 th and 5 th	Baseball
Jonny	20	8	4 th and 5 th	Gymnastics
Kacey	22	21	4 th and 5 th	Baseball Kickball Skipping
Moira	14	10	4 th and 5 th	Floor hockey
Portia	11	7	4 th	Dancing Cross country
Quinn	28	18	4 th and 5 th	Hurdle jumping Baseball Juggling

Interviews. Each physical education teacher participated in one semistructured interview, generally between 45 and 60 min in length, that occurred after the first two observations and before the last two observations. The researcher probed with additional questions to further explore the teachers' experiences and instruction of

the lessons (Rubin & Rubin, 1995). The researcher used the interview guide to obtain teachers' perception of skill level and strategies used in their teaching.

The first section of the guide was the introduction, which explored the teachers' training and background. The second section was the perception of skill level, including questions such as "How do low-skilled students have a special way of participating and learning in the class?" and "How do you help low-skilled students in your class?" The final section included questions on the perception of the strategies used, such as "How do you adjust your teaching so that students with different skill levels can learn the motor skills?" "If a student is low skilled, how does that influence the way you teach them?" and "Describe a unique strategy that you developed for a student." Every interview was digitally recorded and transcribed, and notes were also taken by the researcher (Seidman, 2012).

Observations and field notes. The observed physical education classes consisted of motor skill activities and took place in gymnasiums and/or on sport fields. There were two observations of each physical education teacher before their interview and two observations after their interview. At that time, field notes were taken. The researcher was a nonparticipant observer in the naturalistic observations and was situated to have a full view of the physical education teacher in the gymnasium or on the field. The teachers wore a microphone on their lapel, which enabled the researcher to hear the teacher at all times.

The teachers were told that the researcher would be observing them teaching motor skills to all skill levels. Before the class observations, the teachers would identify the students that they considered as high and low skilled in the motor skill being taught in the lesson. The students who were not indicated were considered moderate skilled.

The researcher focused on the strategies the teachers used with the identified low-skilled students to enable them to correctly practice the motor skill. Other students who were observed having difficulties with the motor skill were classified as low skilled for data collection, even if the teacher did not initially identify them.

Nonstructured informal interviews. After every observation, the researcher asked the physical education teacher informal

questions about the observed class to clarify any uncertainties. The researcher directed the teacher's attention to identifiable moments of interactions with low-skilled students. This was an opportunity for the researcher to ask about the activities in the class and about her observations of the students' motor skills in those activities and to ask questions regarding the teacher's instruction.

These informal interviews were carried out after the observation, whether directly after class, while walking to the teacher's next class, or in the physical education office between classes. The nonstructured informal interviews were digitally recorded and immediately transcribed.

Data analysis. The interviews, observations and field notes, and nonstructured informal interviews were transcribed. Cases regarding each teacher's strategies were constructed after an extensive examination of the data (Patton, 2014). Low-skilled students with difficulties in motor skills were identified through the teachers' assessment of skill level. Teachers' responses to strategies instructing those motor skills were also identified and specifically categorized. The ways teachers taught and interacted with low-skilled students were then compared to the teachers' responses to interview questions.

The data were analyzed via NVivo 8 (QSR International, Victoria, Australia) for themes and categories in each teacher's interviews. Every teacher's themes were then compared to each other, for the possibility of establishing patterns. Using descriptive field notes and interview transcripts, the researcher was able to identify themes that addressed the research questions. The themes included elements common between teachers and those that emphasized differences between the teachers.

Constant comparative analysis highlighted differences in the teachers being observed (Glaser & Strauss, 2007). Comparisons allow for themes, variations, and refinement of variations found in the data (Patton, 2014). The constant comparative method involved a systematic examination of the emergent themes about the specific strategies that teachers used with low-skilled students.

Trustworthiness and credibility. After transcribing the interviews, the researcher contacted each physical education teacher who participated in the study to do a member check. Each teacher discussed his or her transcript, reviewed his or her interview, and the

conclusions reached. The teachers offered clarifications if necessary. Any suggested changes were implemented immediately.

The trustworthiness of the conclusions was increased through triangulation (Patton, 2014; Seidman, 2012). The sources were interviews, observations, field notes, and informal interviews. The researcher used negative case checking to check for alternate themes or patterns. In this study, no negative cases were found.

Feedback was requested from a peer reviewer, a coauthor. After the conclusions were drawn, the peer reviewer was given all the transcripts and field notes. The peer reviewer was familiar with the literature in low-skilled students practicing motor skills. She reviewed and critiqued the researcher's interpretation and theme categorization, in addition to commenting extensively on the findings as they emerged from the study (Marshall & Rossman, 2015; Seidman, 2012). This process took place over several cycles as transcripts were reviewed, discussed, and disagreements resolved.

Researcher background. The first author did the primary data collection and analysis. She has a background as a teacher, as a teacher educator, and as a high-skilled competitive athlete. While she conducted this research, she was mindful of her motor elitism to ensure that she checked her bias.

Results

Two major themes emerged during the data analysis process. The first theme was that specific teaching skills are important to facilitate low-skilled students' success. This theme had two subthemes: (a) teachers paying attention to low-skilled students' motor skill deficiencies and (b) teachers creating an accepting environment for low-skilled students. The second theme was that teachers structure authentic performances in which low-skilled students can successfully participate. This theme also had two subthemes: (a) teachers continually modifying game play with no scores, no winners, and everyone working together and (b) teachers recognizing decisions about equipment selection and usage for low-skilled students.

Specific Teaching Skills Are Important to Facilitate Low-Skilled Students' Success

The physical education teachers were observed instructing high-, moderate-, and low-skilled students in various motor skills to

modified games. The physical education teachers took time to specifically work with the low-skilled students during class time. The teachers helped the low-skilled students to develop motor skills in two specific ways: (a) by paying attention to low-skilled students' motor skill deficiencies and (b) by creating an accepting climate for low-skilled students.

Teachers pay attention to low-skilled students' motor skill deficiencies. A primary way that teachers engaged low-skilled students in the motor skill was identifying them by name and continuing to use the students' names throughout the lesson. Teachers used students' names when they provided instruction, corrections, or encouragement during performance in the motor skill.

Hoover, a teacher, felt that adding their names got the low-skilled students' attention and then it motivated them. In one observation when he taught a lesson on shooting, a boy was having difficulty shooting the basketball into a basket. To get his attention and focus, Hoover called out the boy's name and told him, "Just slow your steps down to shoot, and you will be more successful than if you rush everything." The student paid attention and listened to his teacher, slowed down and carefully aimed the ball, and it went right in.

Moira also used the students' names when she complimented or provided corrective feedback. She **believed** that calling their names is "an effective teaching practice" because it "reinforces cues and gives positive attention to low-skilled students" who have trouble doing their motor skills. When other low-skilled students saw that "the teacher [was] paying attention to a student, they also [wanted] that attention. One way to do that is to please the teacher by staying on task." Heather also felt that calling her students by their individual names encouraged their "wanting to please [her] and perform" the motor skill.

The teachers called all of their students by name on a consistent basis, to make corrections or to give positive reinforcement on their performance of a motor skill. They felt that knowing their students' names was important, especially for the low-skilled students, so that no one felt forgotten or pushed aside, but rather included, in the class. In her interview, Moira pointed out that she uses their names and "[tends] to gravitate more towards the low-skilled kids . . . to

help them out . . . and . . . show them how to get involved in the activities.”

After using the students’ names, the teachers would guide them by identifying motor skill deficiencies and recommending solutions. The teachers gave their attention to the low-skilled students by noting their specific issues with a motor skill and concentrating on fixing the problems. Generally, the teachers would break the motor skill down so that the low-skilled students could understand the structure and sequence of the newly introduced task. The teachers made the motor skill clear by taking the time to explain the exercise for the low-skilled students.

Jonny was working with a student who was afraid of the vault in a gymnastics unit. He was supervising his physical education class in a gymnastics unit, when a fifth grade girl was about to do the vault. She ran up to the vault, stopped, and did not jump. The teacher told her to stand in front of the vault on the springboard and then to put her hands on the handles and jump up and down to become familiar with the equipment. He then told her to do the same thing, but now to jump up, keep her hands rigid, and land on the vault with her knees. The girl performed the task correctly. The teacher then told her to run up and do the same thing, jump and land on the vault on her knees, as before, and he would be spotting her. She did it and then got back in line. When she came up the next time, the teacher told her not only to land on her knees but also to pull her legs through, over the vault, and land on the ground. She ran up to the vault, jumped, stopped on it, had her hands on the handles, propelled her knees over the vault as she kept them tight to her chest, and successfully landed over the vault. Jonny mentioned, “Basically what it is, is just slowing things down, breaking things down step by step for the low-skilled students.” This strategy was effective for a student who was not able to put together all the steps involved in the vault as quickly as some of her classmates, without more attention or explanation.

Teachers create an accepting environment for low-skilled students. The physical education teachers established a learning environment in which students at all levels of skill, including low-skilled students, were accepted and taught. They created a supportive climate for the low-skilled students by setting up an environment

of acceptance in which no low-skilled students would feel excluded or rejected. They established an inclusive class setting that was devoid of teasing and incorporated the high-skilled students to accept the class climate and work with the low-skilled students. Teachers strived to include the participation of high-skilled students as mentoring partners for the low-skilled students.

The teachers cultivated a challenging environment that kept the high-skilled students interested in practicing a skill and that did not accept bullying or teasing. Although Quinn said her “[high-skilled students] are pretty respectful of others and their skill levels,” if she observed “the high-skilled students being disrespectful of the low-skilled students, she stops [that behavior] right there.”

In Jay’s class, a girl became unruly and began to speak out. Jay immediately went over to her and reiterated the class rules. But it was the other students who surrounded her, supported the rules the teacher stated, and calmed her down. Then after class, Jay spoke about

the social piece. They’re so willing and . . . ready to learn about friendship, about getting along with one another, not bullying. So in physical education, we cover all those areas—the social aspect, the personal aspect, the physical aspect, [and] respecting each other and the kids who are not as skilled as [you are].

When seeing any teasing, the teachers dealt with it immediately. Jonny thought that his school was

like utopia; it’s a perfect society. It’s different here. . . . They don’t hurt [low-skilled] students with nasty comments [and] words. And [the low-skilled students] don’t talk about avoidance in physical education. . . . We work on the students [and] talk to them if they are mean.

“If I catch the high-skilled students putting the low-skilled students down, I’ll have a private talk with that kid,” explained Jay. “I’ll go over what I expect from him in class, which is to use his high skills to help the low-skilled kids.”

Moira wanted her high-skilled students “thinking about personal social responsibility, rather than always focusing on the skills.” She

had developed compliment cards, which she gave to students at the end of the class

if they did something extra special as far as their effort levels go. If they really went above and beyond what was expected of them, I would tell them what they did and announce their name and give them a compliment card.

She said that she's "gotten really good feedback from the parents with these also." An example might be that "a low-skilled kid fell down during the game, and rather than the high-skilled kid wailing him with a ball, he lends his hand to let [the kid] get up and go back into position before they started playing again." She said that she "holds off and makes it a very special award" for the students.

Another way of creating an accepting environment for the low-skilled students, to help them become part of the class, was partnering them with the high-skilled students. Fiona believed that the partnering integrated the low-skilled students into the climate. She said, "We would get a really high-skilled kid and ask them to be that [low-skilled] person's partner on that day" for the advantage of both skill levels. Cathy said the high-skilled students "enjoy . . . the responsibility . . . and the teaching role." This also assimilated the low-skilled students, and they could take part in the motor skills.

Quinn noted that a "low-skilled student had a hard time throwing a strike to the batter and batting correctly." The low-skilled student barely threw the ball around the plate, but "the high-skilled student could hit it, because he . . . knows how to hit and . . . how to hold a bat. He has better eye-hand coordination." Then "when the lesser skilled [girl] gets up [to bat], the higher skilled [boy] is able to throw a strike" for the batter to hit. Her former low-skilled partner also had trouble throwing strikes for her to hit. Quinn added,

So there's more success both ways [for the students]. When the lesser skilled throws to the higher skilled, that's more challenge for him to be able to hit a ball that's low or high, or outside or inside. And [the low-skilled girl] is also more successful. The students get to work together, and they both improve.

According to the teachers, the high-skilled students would guide the low-skilled students in the activities almost immediately upon partnering. Moira started a program at her school called Guardian Angels. In the program, “the high-skilled students are partnered up with somebody who is low skilled and needs help.” The high-skilled students receive “specific instructions on how they can help [the teacher] teach [the low-skilled student].” This all started when

I was teaching [the students] skills, and I needed help. I asked them, who would like to help? We’ll call you the Guardian Angels. And the kids went berserk. They couldn’t wait to help. They were so excited, and as soon as they came in, they would go over, sit next to [the low-skilled students], and . . . help tremendously, because immediately the kids felt like they had a friend . . . someone that they . . . could trust and rely on.

The low-skilled students relied on the high-skilled students to help them learn the new skill. The low-skilled students were observed participating in class.

Teachers Structure Authentic Performances in Which Low-Skilled Students Can Successfully Participate

The physical education teachers would design authentic performances to encourage students’ learning. They would organize these performances (a) by modifying game play so that games would be played with no scores, no winners, and everyone working together and (b) by recognizing decisions about equipment that the low-skilled students selected and used. The students could use certain equipment to help them accomplish the motor skill.

Teachers continually modify game play with no scores, no winners, and everyone working together. If a game was played, it would be a modified game, with no score and no winners, or all the teams winning, and the students working together. The teachers wanted the low-skilled students to be included and to be successful at the motor skill being taught. The teachers were concerned that in other schools the low-skilled students were sometimes excluded in game play because they did not have the skill to play. Teachers did not want that to occur in their gymnasiums, so they worked hard to

restructure game play so that the low-skilled students then experienced success.

Teachers redefined game play by structuring games so that everyone could participate. Kacey explained that the immediate typical reaction from “high-skilled students” is “Can we play a game? Can we play a game?” In the observed class, Kacey tried to get them to understand that “it’s not all about the game, so . . . they have to accept that they can’t always have their shining moment.” The teachers believed that when students did not play full games in physical education classes, it was a “great equalizer.”

Other teachers also believed in redefining games. Hoover said that his students were pretty low skilled in the sport skills, so he “might not get to games, because [his students] are not even close . . . to be able to play a game of basketball.” In his case, he “gears [his class lesson] toward what he has,” that is, motor skills with no scores and no winners. Heather and Cathy taught motor skills, and when their students were able to execute the skills, they played lead-up games. The low motor skill students were observed being able to practice their motor skills with the class.

Cathy said that teaching the skill before the lead-up games excited her class. The students were then observed playing some sideline lead-up games. In the interview, Cathy stated, “I will call out three girls. Two will be attack, and one will be defense. We try to . . . learn how to pass and dribble and shoot at the goal, but very, very simple.” She

sets up . . . a lead-up game situation of three versus two, so they learn to pass to the open player . . . do back passes, and to shoot [when there is an] angle to [take a shot]; we’ll try to teach all that.

By being skillful, the low motor skill students could participate in a redefined game. Jonny said the teachers “want [their low-skilled students] . . . to feel comfortable. If [they] can demonstrate that [they] can do [the motor skill], then [they] can try this.” The low motor skill students could then continue practicing “that for a little while, and then we’ll make another modification, and then so they have something [new to try] in front of them, something to look forward to, and something to [move] on to.” Kacey stated that in her program

the emphasis is no competition. We don't keep score here. I don't even own a scoreboard. Over the years we've created a program where the kids feel safe, and they don't mind asking for help, and because the emphasis isn't on competition, they don't feel self-conscious when they get up at bat or something.

She added, if the low motor skill students feel “confident with some good skill . . . they will participate.”

The teachers felt that experiencing success in motor skills was important for the low motor skill students. According to Humarie, if the low motor skill students did not experience success in the motor skills, they “shut down”:

They won't want [to] play the next couple times they come to class. They may come unprepared, because they know that they won't have to play [games] . . . I tend not to have too many of those kids, because I'll try to [make them] feel successful.

Heather thought that the low motor skill students showed “a willingness to stay with [the modified games] . . . because of the success” they experienced in practicing their motor skills.

When low motor skill students have success, Quinn emphasized,

giving them a challenge that's reachable, giving a step by step [plan of] what they can reach, so as soon as they find success, you challenge them with the next step. It keeps them going, but they have to find success in order to step ahead, otherwise if they keep getting knocked down, they're not going to want to be challenged . . . keeping it moving, keeping it positive, and having them find success [will] make it successful for them.

Teachers recognize decisions about equipment selection and usage for low-skilled students. Teachers used equipment in different sizes, shapes, weights, and textures based on their experience with low-skilled students. Humarie was observed when one of her low-skilled students was having trouble serving a tennis ball after learning the skill. The student told her teacher that her racket

was too heavy. So the teacher went and exchanged her racket for a lollipop racket. Humarie repeated all the steps of the serve to the girl, had her practice her toss, and even had her swing without the ball. Humarie mentioned after class, “Once she got the correct racket, she could perform all the steps necessary to serve the ball.” She stated, “I change [the equipment] for the students, so they can be successful in their skills and comfortable with it.” She added about low-skilled students,

Almost every class I will change equipment for a student. I make it clear to them that there is nothing wrong about using different equipment. They know that if they can do the skill with the equipment I give them, they can then do the skill with the equipment that the rest of the class is using.

In another of Hoover’s classes, two boys who were low skilled and were partnered up were having a lot of difficulty with the chest and bounce passes. Both passes would often end up at the knees of the receiver. The teacher initially tried to get them to pass the balls harder. But then he got them a smaller and lighter ball. He told the boys,

Try doing both passes with this smaller ball. You’ll both be able to work on doing the passes correctly without worrying about the heaviness of the ball. Learning the correct form is the most important thing, because you could put that form to use with any ball.

The ball reached each boy with much more force than before and was easier to catch because now it arrived at waist height. The boys were able to pass with a ball that made them successful. Appropriate equipment allowed more opportunities for the low-skilled students to learn and practice the new motor skills.

Teachers instructed their classes that it was important to have equipment exchange. Heather did not make it known to the class that the students with different equipment were the low-skilled ones: “I am careful about telling the entire class that I will arbitrarily pick students to try different equipment that we are considering for future use.”

When given the choice, low-skilled students chose equipment on their own. During an observation, Quinn's class was given a choice between using beanbags or scarves in a juggling exercise. After initially choosing the more difficult beanbags, a couple of low motor skill students asked to exchange their beanbags for scarves. After the students practiced with the scarves, juggling became easier for them, and soon they switched back to the beanbags on their own.

Discussion

The strategies that teachers use to teach low motor skill students in physical education can influence what students do in the gymnasium. This study shows a sequential and succinct method of various strategies used for low motor skill students. Expert teachers using strategies with low-skilled students have not been examined in the literature. While the literature explores various elements that contribute to effective teaching, it does not focus on the strategies that can be transferred to instruction in physical education.

These strategies that teachers used in this study allow for effective motor skill development. These motor skills may be an important link in students' future physical activity (Stodden et al., 2009). For some low motor skill students, the physical education class in which they are involved is their main, and sometimes only, source of being physically active. This is especially important for low motor skill students as it has been shown that they have different experiences in physical education (Carlson, 1995; Silverman, 2005). Therefore, understanding the various instructional strategies necessary for low motor skill students can prove useful in laying an important foundation for effective motor skill acquisition.

As this study shows, changing the level of difficulty of the task to meet the needs of the students is an effective instructional tool (Rink, 2003). Students of various skill levels and potential for achievement should master each skill level before progressing (French et al., 1991). How the class is taught will affect whether students learn motor skills (Silverman, 2005). The learning of tasks can be adapted to the characteristics of the students. This is especially important when practice progressions are inappropriate for students, as there is a possibility of regression in their motor skill performance (Silverman, 1990). When teachers incorporate strategies that allow individual

differences, the chance for success increases for low motor skill students (Silverman, 2005).

While the literature shows that skill progressions are important, especially for low motor skill students who might not understand the steps to complete the skill, teachers often overlook these skill progressions. A common mistake in physical education is for teachers to move students too quickly into games, before they have sufficient practice (Bernstein, Herman, & Lysniak, 2013; Bernstein, Phillips, & Silverman, 2011). Students may be more successful at motor skills if complexity is gradually increased, because they become more competent at their tasks (Silverman, 2005). As this study shows, teachers proactively provided strategies for simple to complex progressions. Paying close attention to the progress, understanding, ability of low motor skill students, and anything that could affect their performance could be important factors in improving physical education for them (Portman, 1995). This strategy may allow the low motor skill students to achieve appropriate practice and progress in their motor skills.

One way that appropriate practice was promoted was through modified equipment usage options that allowed a strategy to differentiate instruction while supplying appropriate practice opportunities. This attention to the modification of equipment kept the students actively participating and acquiring skills throughout the lesson. As appropriate practice trials have been shown to be related to achievement (Silverman et al., 1995), the implementation and strategic use of modified equipment during instruction for low-skilled students enhances practice, and teachers in this study used it often.

Effective teachers are expected to carry out an ethic of care in teaching physical education (Owens & Ennis, 2005). As this study demonstrates, physical education classes can offer opportunities for teachers to demonstrate caring behaviors toward their students (Larson & Silverman, 2005; Ravizza & Stratton, 2007). This study highlighted several strategies that teachers can use to exhibit these caring behaviors. This is important because understanding the strategies that teachers use can augment teacher instruction, especially for students who do not feel cared for due to their lack of skill (Carlson, 1995; Portman, 1995). Giving rise to a caring gymnasium, interacting with students and having caring moments are important

parts of the low-skilled students' learning process (Noddings, 2005). Therefore, as a result of this study, we can see theories of caring being carried out successfully in physical education.

While teachers in this study showed students empathy, they also expected a level of accountability from the students they helped. The literature (Silverman et al., 1995) has shown that accountability is an important part of the teaching process. It refers to the way the teachers make sure students complete the task in physical education (Solmon & Lee, 1996). When students are held accountable, motor skill learning is more likely to take place. If the teacher does not hold the students accountable, learning is less likely chance to occur (Silverman et al., 1995).

This study showed successful strategies that teachers used to hold students accountable. Low motor skill students often do not understand how to improve in skill acquisition, because they lack that foundation. The strategies the teachers in this study used allowed them to embed accountability and keep their students on task, and these students remained active. These strategies can lay a foundation for these skills by creating a solid base of fundamental motor skills that can be applicable to various lifelong activities. When teachers educate their students, the chance of lifelong physical activity increases (Cothran & Kulinna, 2005). Therefore, it is important that educators incorporate the effective strategies that were found into practice. There would be important implications for research if we could ascertain not only the subject matter knowledge and instructional strategies but also the exact circumstances in which teachers could absorb that knowledge and put it into practice (Dodds, 1994).

In line with the research on teacher effectiveness (Rink, 2013), caring and empathy (Noddings, 2005), accountability (Solmon & Lee, 1996), skill progressions (Ferrer-Caja & Weiss, 2000), and modified equipment were important elements for these teachers to influence low motor skill students. During instruction, the teachers understood progressions in motor skills and worked to emphasize

them. From this study, it was apparent that teachers were taking active steps of applying content knowledge and strategies that allowed low motor skill students to be more successful and engaged with class tasks. A limitation of this study was that the teachers understood that their effective instruction was being observed; however, they did not know that the focus was on low-skilled students.

The teachers in this study reflected what the research on effective teaching suggests teachers can do to facilitate low motor skill students in developing motor skill. If all students are to learn, then strategies that improve their practice success and attitude must be used. Teachers can influence learning, and the results of this study suggest successful expert teachers plan and execute strategies that affect low motor skill students.

Recommendations for Teaching Strategies

Research has shown that low motor skill students do not often find success in physical education, but rather humiliation, isolation, and alienation. They avoid learning new motor skills, announce failure in advance, and feel helpless. This study, however, highlighted that expert teachers used strategies and found ways to help low-skilled students maximize their abilities and experience.

Expert teachers using strategies with low-skilled students have not been examined in the literature. When teachers incorporate these strategies that allow individual differences (see Table 2 for a list of strategies identified in the study), the chance of success increases for low-skilled students. These recognized teachers might serve as an example for how all teachers can incorporate some of these strategies into their instruction. Strategies such as creating a class environment in which all students are accepted, motor skill deficiencies are identified and improved, students are allowed to pick their own modified equipment, and tasks are created for individual success can be recommended in instruction of low-skilled students.

Table 2*Strategies Identified for Teaching Low-Skilled Students*

Theme	Strategies
Specific teaching skills are important to facilitate low-skilled students' success	Paying attention to low-skilled students' motor skill deficiencies
	Identifying low-skilled students and calling them by name
	Identifying motor skill deficiencies and recommending solutions
	Creating an accepting environment for low-skilled students
	Not allowing teasing of low-skilled students
	Partnering the high-skilled students with the low-skilled students
Teachers structure authentic performances in which low-skilled students can successfully participate	Teachers continually modify game play with no scores, no winners, and everyone working together
	Teachers redefine game play
	Success is experienced by low-skilled students in game play
	Teachers recognize decisions about equipment selection and usage for low-skilled students
	Teachers made equipment exchange an important part of physical education class
	Teachers involved the low-skilled students in equipment exchange

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PEDAGOGY

Learning to Integrate Movement in Elementary Classrooms: Field Experiences of Preservice Classroom Teachers

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Abstract

Given that preparing preservice classroom teachers (PCTs) for movement integration (MI) has gained traction in recent years as a focus of policy and research related to children's school-based physical activity (PA) promotion, the purpose of this study was to examine PCTs' field experiences of learning to integrate movement in elementary classrooms. PCTs (N = 23) who enrolled in a university course focused on school PA promotion participated in the study. Participants' MI-related field experiences were investigated through focus group interviews, PCT reflections, researcher field notes from observations, and PCT-developed MI plans. Data were qualitatively analyzed for themes pertaining to challenges, successes, and lessons learned. Findings show challenges with planning and preparation, lack of experience, and classroom management. Successes were characterized by positive elementary pupil responses and learning from experience. Lessons learned included to plan extensively and that MI is easy to learn and beneficial. This study highlights the value of field experiences

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in PCTs' learning to integrate movement and identifies aspects of such experiences that should be considered in preservice training.

While it is recommended that children participate in at least 60 min of physical activity (PA) each day, many fall short of meeting this guideline (Troiano et al., 2008). PA is important to children's health as it can help to build and maintain healthy bones and muscles, reduce the risk of the development of chronic diseases such as diabetes and cardiovascular disease, and promote psychological well-being (U.S. Department of Health and Human Services, 2008). Furthermore, PA can enhance children's school performance, including on-task behavior in the classroom and academic achievement (Centers for Disease Control and Prevention, 2010).

Schools are identified as a natural point of intervention in the promotion of children's daily PA (Institute of Medicine, 2013). Children typically spend more than half of their waking hours at school, and the school infrastructure contains numerous resources (e.g., space, facilities, equipment, teachers) that can be harnessed to foster a supportive environment for children's PA. Also, given the positive role of PA in children's academics, schools can benefit from promoting children's PA amid increased pressures to produce high test scores. Unfortunately, instead of promoting PA, many schools limit children's PA to provide more time for academic instruction. For example, only 4% of elementary schools provide daily physical education (Lee, Burgeson, Fulton, & Spain, 2007) and less than half of U.S. schools offer recess (Lee, Miller, Fulton, Borgogna, & Zavacky, 2013).

Movement Integration

One strategy that can be effective in helping children to meet PA and academic goals is movement integration (MI), which involves the incorporation of PA into general education classrooms during normal classroom time (Webster, Russ, Vazou, Goh, & Erwin, 2015). Recommended approaches to MI generally include providing PA breaks between academic lessons (e.g., taking 5 to 10 min to lead students through an exercise routine) or infusing PA into academic lessons (e.g., having students jump the answers to addition problems). MI is not in itself a curriculum, but rather a concept that has spurred the development and implementation of a wide range of

“prepackaged” programs (e.g., Energizers, Take 10, ABC for Fitness) containing activity breaks and/or active lessons. Intervention studies in which teachers have used such programs or developed their own MI activities or lessons have generally resulted in positive student outcomes, including increased PA; reduced sedentary time; and improvements in fitness, classroom behavior, cognitive function, effort in the classroom, and academic test scores (Webster, Russ, et al., 2015).

MI is viewed as an essential part of multifaceted and coordinated efforts that schools use to increase children’s PA (Institute of Medicine, 2013). A leading conceptual model to guide such efforts is the Comprehensive School Physical Activity Program (CSPAP), which identifies numerous PA opportunities before, during, and after school (Centers for Disease Control and Prevention, 2013). Physical education is positioned as the cornerstone component of the model, given its central focus on developing the knowledge, skills, and dispositions of youth for long-term engagement in PA and on maximizing youth PA during scheduled lessons. Ideally, MI can not only extend children’s PA opportunities during the school day but also build on the educational and health-enhancing value of a quality physical education program by bridging body and mind in the development of the whole child.

Despite the benefits of MI, teachers may face challenges with respect to incorporating it into their classroom routines. In previous research, classroom teachers perceived numerous barriers to using MI, such as limited space and time constraints related to other responsibilities with instruction, academic testing, supervision, and extracurricular duties (Cothran, Kulinna, & Garn, 2010; Gately, Curtis, & Hardaker, 2013). However, these challenges are not insurmountable. Several factors may help to facilitate classroom teachers’ use of MI (Michael et al., 2015). Prominent among such factors are teachers’ MI-related beliefs and perceptions. Teachers’ self-reported MI was positively and directly correlated with their perceptions of personal MI competence (Webster, Buchan, et al., 2015), self-efficacy beliefs with respect to using MI (Parks, Solmon, & Lee, 2007), and perceived attributes of using MI, including its compatibility with the teachers’ educational skills and philosophy, its

simplicity of use, and its observable benefits (Webster, Caputi, et al., 2013).

Importance of Learning to Integrate Movement During Preservice Education

Fostering adaptive beliefs and perceptions toward MI among classroom teachers should be a focus of professional training for inservice and preservice teachers. According to the U.S. National Physical Activity Plan, requiring preservice and continuing education in MI for elementary classroom teachers constitutes a key tactic for providing children with access to high-quality, comprehensive school PA programming (National Physical Activity Plan, 2016). Preservice education presents an important context for intervention, because teachers' notions about teaching and learning, as well as their habits of instructional practice, may be more pliable and dynamic at earlier versus later career stages. Preparing preservice classroom teachers (PCT) with knowledge and skills for MI might help to establish dispositions and behavioral patterns that prioritize and help to secure MI as part of routine classroom practices in schools.

Previous studies with PCTs support the value of preservice education in promoting positive beliefs and perceptions about MI. PCTs who had taken university coursework in school-based PA promotion reported higher perceived competence for MI than PCTs who had not taken such coursework (Webster, Monsma, & Erwin, 2010). Additionally, when PCTs were trained to use MI, positive changes were found in participants' attitudes toward MI, perceived competence for MI (Webster, 2011), feelings of empowerment to implement MI (Goh et al., 2013), efficacy beliefs related to MI, perceived barriers to MI, and willingness to integrate MI (Webster, Erwin, & Parks, 2013). While these results are promising, further insight into PCTs' MI learning experiences could elucidate specific aspects of learning to integrate movement that either present challenges for PCTs or facilitate early MI planning and implementation efforts and support growth toward MI competency. Such information can inform best practice recommendations for preservice training related to MI.

Role of Field Experiences in Learning to Integrate Movement

Field experiences have long been considered a critical element in preservice teacher preparation (Cruickshank & Armaline,

1986). The teacher education literature offers various conceptualizations of field experiences in terms of when the experience occurs in a teacher education program (e.g., early field experiences, student teaching), the purpose of the experience (e.g., to experiment with progressive educational approaches, to apply technical skills of instruction and management), the setting for the experience (e.g., professional schools or clinical laboratories based at the university, P–12 public schools), and the types of responsibilities involved for the preservice teacher (e.g., classroom observation, tutoring, whole-class instruction; McIntyre, Byrd, & Fox, 1996). However, an underlying assumption common to the design of most field experiences is that they present an unparalleled opportunity for preservice teachers to apply educational theory learned in the university setting to teaching practice within the real-world environment of P–12 schools (Allsopp, DeMarie, Alvarez-McHatton, & Doone, 2006).

To date, no studies have investigated field experiences as a possible mechanism to facilitate PCTs' learning about MI. Examining PCTs' MI planning and implementation experiences in elementary classrooms can yield new and valuable insights about the pedagogies and processes involved with learning to integrate movement. For instance, while the goal of field experiences is usually the promotion of the educational philosophies, dispositions, and skills that the university program espouses, learning about teaching while situated in field placements can reinforce dominant policies and practices within the school culture that oppose the program agenda (Feiman-Nemser & Buchmann, 1985). Thus, while field experiences offer a unique and powerful platform for learning to teach, it is vital to understand preservice teachers' learning experiences within, and in relation to, formal assignments conducted in schools so that teacher education programs can develop evidence-based approaches to preservice training. Field experiences may be critical to helping PCTs identify effective strategies to implement movement in elementary school classrooms, despite facing possible challenges related to the learning process and the existing school culture. The purpose of this study, therefore, was to examine PCTs' field experiences in K–5 general education classrooms. Specifically, a qualitative single case study design, in which one class of PCTs enrolled in a school PA promotion course was treated as the case, was used to answer three

research questions: (a) What challenges do PCTs experience related to group-based planning and implementing of MI in elementary school classrooms, (b) what successes do PCTs experience related to group-based planning and implementation of MI in elementary school classrooms, and (c) what do PCTs identify as the major lessons learned from group-based planning and implementation of MI in elementary school classrooms?

Method

Participants

Participants in this study were 23 PCTs ($M_{\text{age}} = 20.70$, 22 female) enrolled in a 15-week university course (Fall 2014 academic semester) that had as a focus on school-based PA promotion for classroom teachers. The course is required for all preservice teachers majoring in early childhood education (leading to certification for teaching prekindergarten to Grade 3) and elementary education (leading to certification for teaching Grades 2 to 6) at the researchers' university. Undergraduate PCTs in their sophomore, junior, and senior years, and graduate PCTs in their first and second years of a 2-year master's degree program are eligible to enroll in the course. Participants included 12 early childhood education majors and 11 elementary education majors, including 11 sophomores, 11 juniors, and one senior. Three of the PCTs had taken or were simultaneously taking other educational coursework related to children and PA. On average, participants had 24 hr of experience conducting observations in schools, 3 hr of experience tutoring or teaching small groups of children, and 3 hr of experience teaching whole classes of children, before taking the course. Fourteen participants indicated they had "very little experience" with lesson planning, and nine participants indicated they had "a moderate amount of experience."

Description of the University Course

The course in which participants were enrolled consisted of a university-based component and a field-based component. The university-based component involved class meetings at the university campus, during which PCTs were taught about the importance of schools as a setting for PA promotion, especially in regard to comprehensive approaches that include MI (e.g., CSPAPs). Class meetings

also focused on practical ideas for school-based PA promotion, with particular emphasis on MI strategies (e.g., implementing movement breaks, teaching academic lessons that incorporate PA) and resources (e.g., websites, online activity cards or lesson plans). Readings, lectures, discussions, instructor demonstrations, and PCT presentations (e.g., peer teaching) with instructor and peer feedback were the primary instructional formats used in the university-based component of the course.

The course instructor attempted to guide the PCTs in their construction of personally meaningful understandings of MI. During class discussions, the instructor used inquiry-based teaching to draw out the PCTs' existing knowledge and experiences related to MI, then introduced PCTs to prevailing PA discourses (e.g., policies, recommendations, guidelines, research) and symbols (e.g., CSPAP model) employed at the intersection of the education and public health fields. When introducing new content, the instructor highlighted and explained areas of overlap and divergence when juxtaposing the students' current understandings with established conceptualizations in the literature. In this manner, the instructor intertwined the multiple truths underpinning each class discussion and scaffolded students' reflective thinking as well as the social context for the class.

The field-based component consisted of field experiences in which PCTs were asked to apply content learned in the university classroom setting to actual elementary school classrooms. Four local public schools (two urban and two suburban) from the Greater Columbia, South Carolina, area agreed to host the field experiences, based on having an established relationship with either the course instructor or one or more of the PCTs in the class (therefore, some PCTs already had experience and familiarity with the schools or classrooms they went to for the field experiences, while others did not). School characteristics were diverse across sites. School enrollment ranged from 394 to 719, student-teacher ratio in general education classrooms ranged from 17.5:1 to 21.1:1, the percentage of students served by gifted and talented programs ranged from 6.5% to 20.9%, the percentage of students receiving free and reduced lunch ranged from 12.46% to 80.24%, and the percentage of students with disabilities ranged from 12.6% to 17.0%. The breakdown for student race/ethnicity ranged from 14.5% to 73.5% African American, 0%

to 0.01% American Indian, 0.01% to 13.0% Asian/Hawaiian/Pacific Islander, 0.02% to 22.8% Hispanic, and 19.2% to 77.7% White. MI field experiences were completed in six classrooms, one in each grade (K–5).

Each PCT participated in four MI field experiences. In groups of three to five, the PCTs planned and implemented two movement breaks and two active lessons. The movement break assignments required PCTs either to select or to design a 5- to 10-min developmentally appropriate PA opportunity for children to be presented before or after an academic lesson. The PCTs could use movement breaks to review academic content or simply to transition from one classroom task or lesson to another. The active lesson assignments required PCTs to develop a 15-min academic lesson with infused PA opportunities. Active lessons were to be aligned with the state standards and grade-level performance indicators in health and safety education, based on state legislation requiring elementary classroom teachers to teach at least one health and safety lesson each week. PCTs were provided with a structured lesson plan template to guide their planning for the active lessons. The course instructor allocated class time for group planning and provided PCTs with feedback on their plans before they implemented the movement breaks and active lessons.

To plan and implement the movement breaks and active lessons, PCTs participated in collaborative learning through group work, which was a major emphasis in the course design. The purpose of having students work in groups was to enable students to develop a shared understanding of MI as the basis for constructing appropriate movement opportunities and applying these opportunities to elementary classrooms. A key aim of having students work in groups was to build PCTs' collective efficacy; it was expected that if the PCTs overcame MI challenges together and shared the experience of professional growth in planning and implementing MI, they would gain confidence in their ability as a professional group in schools (i.e., classroom teachers) to provide movement opportunities effectively and affect children positively. In previous research, PCTs perceived fewer barriers to MI, with their collective efficacy increasing during a semester-long school PA promotion course (Webster, Erwin, & Parks, 2013).

Each group of PCTs implemented two movement breaks and two active lessons in one classroom across two visits (one movement break and one active lesson per visit). PCTs either self-selected (with their groups) a classroom or were assigned a classroom for the field experiences. During the 15-week semester, PCTs made their first school visit in Weeks 9 and 10 and their second visit in Weeks 12 and 13. Implementations were scheduled on various days and times, based on the schedules of the PCTs and the cooperating classroom teachers. The researchers took turns conducting live observations of the implementations when possible (due to the wide range of implementation times and limited resources to conduct the study, not all school visits could be observed). Seven observations were conducted in all, with each group of PCTs being observed during at least one full visit (i.e., during both the movement break and the active lesson). During observations, field notes were taken to document and reflect on aspects of the classroom environment (e.g., number of students, physical layout of furniture or materials), the activities or lesson content presented, the PCTs' presentation skills (e.g., clarity of instruction, classroom management), and the responses of the students (e.g., level of enjoyment, level of PA) and the cooperating teacher (e.g., level of support or engagement). Field notes were expanded directly after each observation, with detail and insight added about the field experiences.

PCTs individually completed two written reflections (one for the movement break and one for the active lesson) following each classroom visit. For the movement break reflection, PCTs were asked to summarize the activity presented, identify what went well and what could be improved, discuss unexpected circumstances, and suggest modifications for implementing the activity with older or younger children. For the active lesson reflection, PCTs were asked to discuss the "things that worked" and the "things that did not work," offer explanations for these outcomes, identify the most and least enjoyable aspects of the experience, consider areas for improvement, and discuss aspects of planning and implementing MI they felt confident leading in the future as an inservice teacher. PCTs were prompted in their reflection assignments to focus on the planning and implementation phases of their MI field experiences. PCTs' reflections were graded by the course instructor, based on the level of thoroughness

and insight in the response to each question. In addition to completing the written reflections, PCTs were prompted to share and reflect on their implementation experiences during class discussions following each school visit.

At the end of the semester, each PCT group participated in a focus group interview about their MI field experiences. The purpose of the interview was to understand the PCTs' perspectives on their experiences collaboratively planning for and implementing MI in elementary classrooms. The researchers worked in pairs to conduct the interviews, with one researcher serving as moderator and the other serving as note taker and assistant as needed (Bertini, 2012). A semistructured interview protocol was used. The protocol included preplanned questions but allowed for flexibility in the order in which the questions were asked and also allowed for the possibility of exploring related topics of interest if they emerged during the interview. Interview questions both paralleled and extended those asked in the reflection assignments. Questions focused on the PCTs' successes, challenges, and lessons learned in relation to the MI planning and implementation assignments. Specifically, PCTs were asked general questions about their experiences (e.g., "What are the major success stories from your perspective?"), followed by more specific prompts (e.g., "What enabled you to be successful in these situations [school environment, team membership, available resources, etc.]?"). Additional questions were also used with the aim of extending the breadth and depth of the PCTs' responses. These questions focused on what PCTs liked and disliked about their MI planning and implementation experiences (e.g., working in groups), suggested areas for improvement (e.g., instructor guidance and support), asked about their willingness to use MI in the future as an inservice teacher, and inquired about their feelings about the role of classroom teachers in school-based PA promotion. Interviews lasted 27.16 to 44.25 min. All interviews were audiotaped and later transcribed verbatim for analysis. The interview factored into the PCTs overall course grade; however, the grade for the interview was based solely on attendance. PCTs were informed that their comments during the interview would not be a factor in their grade and were encouraged to speak candidly about their MI planning and implementation experiences.

Sources of Data and Issues Related to Power Dynamics

Multiple sources of evidence were used in this study. Permission was obtained from the researchers' university ethics committee to use the PCTs' course assignments and focus group interviews as data sources. Data sources included six focus group interview transcripts (one per teaching group), 92 written reflections, seven sets of expanded field notes, and 24 written implementation plans.

Because the data were collected from PCTs in the context of a required course within their academic program, issues related to power dynamics in this study must be critically examined. Of particular note is the issue of dominance (Brinkmann & Kvale, 2005). The researchers had a clear motive to learn about the PCTs' experiences in the course, and they set the study's agenda, designed the interview questions, and led the interviews. Furthermore, their stance toward MI was transparent, given their interest in conducting the study and their published work on the topic. The PCTs likely perceived the researchers as authorities on MI. Thus, a researcher-dominated power structure was established with the participants (Brinkmann & Kvale, 2005). This asymmetrical balance of power might have pressured the PCTs to craft responses they felt would align with the researchers' priorities or divulge information they were not comfortable sharing, particularly in light of the research experiences being situated within the course requirements. Alternatively, the PCTs might have shifted the power relations by choosing to withhold information during the interviews (Brinkmann & Kvale, 2005). The researchers attempted to address the issue of dominance by using strategies to build rapport and mutual trust with the participants before conducting the interviews. Specifically, the researchers spent the first few minutes of each interview learning the PCTs' names, asking the PCTs questions about their other courses, making small talk, and trying to make the participants feel comfortable.

Data Analysis and Trustworthiness

Data analysis was guided by established constant comparison procedures (Dey, 1993; Goetz & LeCompte, 1981) and involved an iterative process of reducing and triangulating the data to draw out themes in the PCTs' MI field experiences. Data sources were evenly divided and distributed across the four researchers. Each researcher

read through his or her assigned interview transcripts, reflections, field notes, and implementation plans several times to inductively identify and summarize (i.e., code) excerpts (i.e., data bits) from the text that seemed useful in answering the research questions. For example, the excerpts “kids are talking over the PCTs” and “no protocols for noise level” (identified in the field notes from one of the observations) were viewed as relevant to the first research question (“What challenges do PCTs experience related to group-based planning and implementation of MI in elementary school classrooms?”) and was coded as “lack of activity protocols.” The researchers individually compiled a list of the codes and then met as a group to cross-check each other’s work (i.e., trace another researcher’s identified codes to their source in the raw data); discuss and reach consensus about codes that should be retained, revised, or eliminated; and organize and synthesize the codes for each research question according to their salient conceptual features. This latter step served to categorize and conceptualize meaningful chunks of the data for further analysis. For example, the researchers created a category labeled “establishing and maintaining classroom order” to group the code used in the example above with similar codes such as “some of the kids are off task,” “trouble keeping kids’ energy under control,” and “losing control of the class.” They then compared and refined categories by searching for underlying consistencies and commonalities in the data. This process allowed the researchers to identify themes in the PCTs’ field experiences relative to each research question.

Trustworthiness was addressed in several ways, based on prevailing recommendations (Lincoln & Guba, 1985). First, the use of multiple data sources allowed the researchers to triangulate the data to increase the credibility of the findings. Second, the data were collected at multiple points across most of an academic semester (~10 weeks), thereby helping to ensure that the findings thoroughly and accurately reflect the participants’ views about challenges and successes involved with planning and implementing MI. Third, researcher triangulation increased the confirmability of the findings (i.e., reduced the chances that the findings are based on any one researcher’s biases). Fourth, detail was provided about the nature of participants, the course, and the school contexts, which allows readers to make an informed judgment about the transferability of the

findings of this study to other contexts or settings. Finally, the data collection procedures and protocols are reported in detail, which allows for replication of the study and thus increases its dependability.

Results

Overall, seven major themes in the PCTs' field-based MI learning experiences were identified from data analysis. Specifically, three themes were identified for challenges (Planning and Preparation, Classroom Management, and Lack of Experience), two themes were identified for successes (Elementary Pupils and Learning From Experience), and two themes were identified for lessons learned (Plan Extensively, and MI Is Easy to Learn and Beneficial). This section discusses the themes for each research question in more detail. Citations for supporting examples are organized as follows: data source (IT, interview transcript; MBR, movement break reflection; ALR, active lesson reflection; EFN, expanded field notes), followed by an assigned number for the data source (1 or 2) and a participant and/or group identifier. For example, a quote by PCT6 in Group 2 derived from the second movement break reflection assignment would be cited as MBR2, PCT6, Group 2. Within quotes, "fillers" (e.g., like, um) were removed for brevity and several grammatical and mechanical errors were corrected for clarity.

Challenges

Planning and preparation. Many of the challenges PCTs experienced revolved around issues with planning and preparation. In particular, PCTs' implementation plans for the first movement break and active lesson were underdeveloped. One of the main problems was being underprepared for the elementary pupils' questions and current level of understanding related to the academic content. This problem was evidenced by statements the PCTs made, such as "We were not prepared for some of the in-depth questions that we received" (ALR1, PCT1, Group 1) and "Another reason the activity didn't run as smoothly as anticipated was that we, as guest teachers, did not know how much the students had already covered on the subject" (ALR1, PCT2, Group 1). The PCTs gave little consideration to the array of resources available (including the classroom teacher) for selecting appropriate activities and academic content.

Another planning and preparation issue was the lack of detail the PCTs provided in their plans. Despite the structure provided in the active lesson plan template, few details were evident in the plans with respect to classroom management (e.g., start/stop signals for activities, protocols for using materials, explicit directions for transitions), instruction (e.g., communication strategies, content development), or selected/designed activities. Regarding classroom management, one researcher observed, “The group had to ask the teacher when they were supposed to finish” (EFN3, Group 6), and one PCT admitted, “Looking back on it we should have done a practice run to make sure the students understood where to go and how to move” (ALR1, PCT18, Group 5). The lack of detail related to the physical activities led to time management issues and limited PA for students. One PCT indicated,

We did not necessarily plan out the different types [of actions] and when it came time to give the students a new physical action, we started to run out towards the end. It could have transitioned better if we would have had ten different physical actions set up ahead of time. (ALR1, PCT21, Group 6)

Another PCT stated, “Some of the poems did not have much action in them; this prevented the students from doing actions during the poems” (ALR1, PCT15, Group 4). Researcher observations confirmed that limited PA was an issue: “Little activity by students—group member read the poem very quickly and no students marched. There was limited activity” (EFN, Group 4).

Part of the challenge of adequate planning and preparation for the implementations concerned working effectively as a peer group. The PCTs did not collaborate with their group mates enough before doing their implementations. The field notes reflected this issue: “Group stood in main office [of school] and talked a little bit about what they were going to do (e.g., who would present first, what standard they were supposed to be teaching to). They were confused about the standard” (EFN7, Group 6). The struggle to collaborate traced in part to PCTs not feeling that they could depend on their group mates to do assigned work. One participant indicated, “It is hard depending on each other to know that everyone gets [the assignment] in on time and planning it all together to work” (IT4, PCT12, Group 4).

Collaboration also demanded coordination among group members, which proved to be a challenge, as evidenced in statements such as “As much as we worked well together, it is stressful to plan a lesson and implement it between four people” (IT1, PCT2, Group 1); “To me the hardest part was coordinating with everyone” (ALR1, PCT11, Group 4); and “I thought it was a challenge with essentially four teachers because we all had to look at each other constantly to make sure we were all on the same page” (ALR1, PCT4, Group 1).

Classroom management. PCTs’ lack of ability to anticipate challenges made it difficult for them to solve problems during implementations. This was most prominently evidenced in PCTs’ struggle to manage the classroom environment when implementing their movement breaks and active lessons. Classroom management challenges were likely related to the other themes for this research question (planning/preparation and lack of experience). The biggest challenge for PCTs was dealing with students’ high energy and excitement. According to one participant,

One thing we did not anticipate was how rowdy the students would get. They were running wild and getting a little aggressive during the game. I think that if there were more boundaries set in place for the game that this rowdiness would be able to be controlled. (MBR1, PCT4, Group 1)

Similarly, another PCT stated, “Management of the movement lesson was tricky. We had a very excited group of third graders and they were very active” (ALR1, PCT22, Group 6).

Other management issues had to do with the organization of space, students, materials, and time. For example, the researchers observed, “They could have moved tables to create more space . . . no management system established . . . no protocol for noise level” (EFN4, Group 1); “There was not a clear signal to get the students attention” (EFN6, Group 6); and “Group didn’t have students raise hands or ensure each student had a chance to answer” (EFN7, Group 6). These management issues appeared to be related to the PCTs’ lack of success dealing with the elementary pupils’ high energy level. During their visits, as PCTs progressed with their movement breaks and active lessons, the pupils became increasingly energetic and rowdy. One PCT mentioned, “As we kept going it took longer

and longer for us to get the children's attention so we could tell them the next activity" (MBR1, PCT7, Group 2). Another group had to cut their activity short due to the rising noise level of the pupils, because academic testing was going on in some of the neighboring classrooms.

Lack of experience. PCTs had limited experience with MI, and in some cases classroom teaching in general, and this presented challenges in the planning and implementation of the movement break and active classroom lesson assignments, particularly with respect to the first school visit. Some of the PCTs had limited to no experience planning a classroom lesson. One participant stated, "The lesson plan was kind of different because I never did a lesson plan before" (IT3, PCT8, Group 3). For other PCTs, the challenge had more to do with a lack of teaching experience, as shown in the following quote: "It was a nerve-racking experience because I had never done it [teach] before" (ALR1, PCT23, Group 6). The novelty of not only teaching a lesson but also integrating PA into the lesson proved challenging for a number of PCTs. For example, participants made comments such as

It was hard . . . just [being] thrown into a class teaching a lesson that we had no idea about . . . that was our first time teaching a lesson to a class and it was kinda difficult not only teaching a lesson to a class the first time but also adding in physical activity. (IT6, PCT21, Group 6)

Successes

Elementary pupils. Children were eager to participate in MI lessons and activities and enjoyed the opportunity to learn from the PCTs. While student excitement contributed to PCTs' challenges with classroom management, positive student responses also played an important role in the PCTs' successes with the MI field experiences. Some of the PCTs perceived that the children were not only excited but also well behaved and on task, and this contributed to the PCTs' enjoyment of the implementation experiences. One participant said,

I definitely think the kids in the classroom played a really big part [in our success] because they were a great group of

kids, they were so well behaved and listening to everything we said; they were so excited about everything. (IT6, PCT20, Group 6)

Similarly, another PCT stated, “Our class rocked. They were just so well behaved and excited about everything we wanted to do and say, and that made it really enjoyable” (IT2, PCT5, Group 2).

PCTs noticed that the elementary children were receptive to the new activities. This perspective was apparent in comments such as “The students were extremely receptive and they were willing to move and be active and have fun with it” (ALR1, PCT11, Group 4) and “The children were very excited about having a new group of people teach them and also excited since it was in game form” (ALR1, PCT9, Group 3). In their observations, the researchers also indicated the children’s enthusiasm with comments such as “Kids seemed to have a good time” (EFN3, Group 6) and “A team member asked the students if they liked the activity. I only heard positive remarks from the students—‘Yes, a lot, fun’ was an example of things I heard” (EFN5, Group 4). Several of the PCTs were pleasantly surprised by the enthusiastic response they received from the elementary students, as evidenced in statements such as

I really enjoyed when we went back, when we first came in they all cheered they were so excited and then we told them to get up and that we were going to do another movement break and they were like, oh, that was so fun the last time. They’re just so excited about it. (IT1, PCT1, Group 1)

It was particularly encouraging that the children not only enjoyed the activities but also seemed to favor the activities over their usual classroom routines or lesson formats. One participant stated, “[The children] seemed to enjoy getting up and being active as opposed to sitting and learning the lesson” (ALR2, PCT3, Group 1). Another participant commented,

At the end of the activity, we asked the students what they had learned and if they preferred an active lesson to a sedentary lesson. The students quickly responded that they really enjoyed the lesson and wished there were even more

movements incorporated into the poems. (ALR1, PCT13, Group 4)

Concurrent with PCTs' learning to integrate classroom movement opportunities, elementary children developed an appreciation for such opportunities.

Learning from experience. Gaining real-world experience planning and implementing the first movement break and active lesson with their groups facilitated a more successful second MI field experience for PCTs. Experience planning the first implementation assignments enabled PCTs to approach planning the second implementation assignments with more confidence and competence. One participant indicated,

I struggled with the first lesson plan. I was like, I don't know how to do this; I don't know how to take a lesson and how to think of an activity for that lesson. But by the second one I was able to think of one. (IT3, PCT8, Group 3)

PCTs capitalized on their increased understanding of the classroom context to plan and implement more successful MI. For example, one participant said, "We already had a feel of how the students act, [which] made the game run smoothly as well" (MBR2, PCT5, Group 2), while another participant commented, "I believe the lesson went a lot smoother the last time because we knew the space we had to work with and were more prepared on the information of the lesson we were teaching" (ALR2, PCT3, Group 1). Developing an awareness of the classroom context informed PCTs' approach to classroom management. A researcher observed, "There was a clear signal to get the students' attention" (EFN6, Group 5). Additionally, one PCT mentioned,

The second time the directions were clear and detailed. Based on our first experience, we made sure we had them in groups by table so there would be no confusion. I think it helped going [again], and learning from the mistakes we made in the first one. (IT5, PCT17, Group 5)

Experience taught the PCTs about the importance of collaboration during the planning phase of their assignments. One participant

claimed, “We were more prepared this time. We had a better idea of how in depth we had to go. Our team met up beforehand to go over everything so that we were more prepared” (ALR2, PCT1, Group 1), while another participant commented, “The active classroom lesson definitely went much better than the last . . . I definitely think it was because we were much more prepared . . . we all took time to know our part beforehand” (ALR2, PCT14, Group 4). Ultimately, recognizing that they had learned from and improved upon their first implementations helped the PCTs to feel more competent and confident in their ability to use MI. This was evidenced in statements such as “I feel comfortable with all aspects of planning and implementing active lessons like this in my own classroom” (ALR2, PCT14, Group 4) and

I feel confident that I can effectively lead a class in a physically active lesson that would be enjoyable for the students. I think I can lead an activity that gets students moving and also makes them learn. I know I can effectively connect an activity with a topic to make the active lesson truly matter. (ALR2, PCT4, Group 1)

Lessons Learned

Plan extensively. The importance of thoughtful and extensive planning for MI surfaced as a key lesson for PCTs during the semester. Specifically, PCTs learned that attention to detail and planning for contingencies are critical to successful classroom teaching experiences, including MI. PCTs discussed the necessity of extensive planning, as shown in the following quote: “After actually going into the classroom, I realized how much more planning we should have done in order to make sure we knew when exactly we were going to do everything” (ALR1, PCT23, Group 6). At the same time, the participants realized that part of effective planning also involves preparing for things to turn out differently than expected. For example, PCTs made comments such as

Everyone just thinks that teachers just walk into the classroom and open the book, but clearly after our experience you have to plan a lot, I mean you have to plan for what if this happens, what if that happens. So it is not just one strict lesson plan,

you have to have all of these things just in case something crazy happens. (IT6, PCT21, Group 6)

In some cases, the participants geared their comments toward the specific aspects of the classroom environment that need to be attended to with flexibility when planning for MI. For instance, one PCT focused on the elementary students, stating,

[You have to plan for] distractions, different energy levels because your students aren't going to have the same energy every day—some days you're gonna be more rambunctious than others. I think just planning for everything [is important] so that when something goes offbeat you can find your way back pretty easily, [it is] planning to be spontaneous. (IT1, PCT2, Group 1)

Another PCT focused on planned activities, commenting, “It is so important to fully write out a lesson plan before implementing it into the classroom. Teachers should also have backup activities in case problems arise” (ALR2, PCT13, Group 4).

MI is easy to learn and beneficial. At the end of the semester, PCTs expressed adaptive beliefs about MI. PCTs indicated that MI is easy to learn and beneficial, as illustrated in the following quote:

It's not that hard to incorporate [physical activities] into a lesson. I know a lot of teachers think it will take away from what they're teaching and distract students, but I think it really helps the students overall . . . At first I did [think it would be hard] 'cause I didn't understand how to even incorporate [physical activities]. But after doing a few of them, now I think it would be simple. (IT2, PCT5, Group 2)

PCTs felt that MI can be part of everyday classroom routines without disrupting the academic focus of the classroom environment. One participant stated, “I don't think it took any more time than it would've if we didn't [use MI] . . . maybe a couple of minutes longer but not like enough to where it would overall affect [students] negatively” (IT2, PCT7, Group 2). Participants realized the feasibility of reconceptualizing classroom teaching as part of elementary children's PA promotion. One participant noted,

It doesn't have to all be sit-down education. I think that practicing and learning about the importance [of MI] and really how easy it is, there's misconceptions about that fact that oh, it's so much extra effort to get my kids active, but this class showed me I can do that pretty easily. (IT5, PCT16, Group 5)

Similarly, another PCT said, "I have thoroughly enjoyed being able to incorporate physical activity into academic lessons in the classroom. This whole experience has given me a different outlook on how things in the classroom can be done" (ALR2, PCT21, Group 6).

While PCTs recognized numerous benefits of MI, the findings in this theme tended to focus on the benefits of MI for elementary children. Participants discussed the advantages of providing children with MI during regular classroom time. One PCT commented,

I think [MI] makes it more exciting for [children] . . . It gets them excited and makes them more eager to learn stuff than if they're just sitting there and listening to the teacher talk, or doing a worksheet, or drawing on a piece of paper. (IT2, PCT6, Group 2)

Another PCT said,

It was a big difference, 'cause I watched the class and watched the teacher just make them sit at the table versus what we did [and] it was a whole new perspective on how they acted—the ones that had problems, I never thought that they would get up and actually talk. (IT4, PCT12, Group 4)

One participant recounted seeing the increasing restlessness in the children after too long a period of inactivity and contrasted this to the positive effects that MI had on the children's classroom engagement:

We saw them in that midafternoon part of the day when they were starting to drag and lunch was over and they were waiting for recess—they were just really getting impatient. So I think it was really good for us to see how much more into the lesson they became when it was physically active. (IT1, PCT3, Group 1)

Finally, the PCTs learned that MI can have advantages in terms of obesity prevention and health promotion, as shown in the following quote:

I think overall that movement and being physically active is really important in schools and with obesity and stuff and it being more common and younger kids getting diabetes and being diagnosed with these illnesses, it's really important to incorporate movement in schools and just keep kids active to prevent that kind of stuff from happening. (IT2, PCT6, Group 2)

Discussion

While field experiences are generally deemed to be an indispensable part of preservice teacher education, authors have cautioned against the potential of such experiences to negate and even subjugate the educational ideas and practices taught in university classrooms as part of teacher education programs (Feiman-Nemser & Buchmann, 1985). This study examined field experiences of PCTs learning to integrate movement in elementary school classrooms. Although the findings reveal several challenges for PCTs learning to integrate movement in elementary classrooms, it seems that the field experiences enabled PCTs to persevere in their efforts to provide classroom-based PA opportunities, improve their approach to planning and implementing MI, and learn to appreciate the feasibility and advantages of MI.

The PCTs initially struggled to prepare adequately for their movement break and active lesson assignments. They lacked experience teaching in real-world elementary classrooms and were therefore unable to mentally construct contextually rich representations of such an environment that would enable them to anticipate problems and adequately plan for an optimal implementation experience (Putnam & Borko, 2000). Moreover, although the intention was for PCTs to work in groups to plan and implement the assignments, the extent of group interaction and collaboration was minimal. This lack of group cohesion and peer support seemed to be foundational to, or to exacerbate, the other challenges identified in this study (e.g., classroom management, lack of experience).

Constructivist learning theory would suggest that learning is enhanced through opportunities for students to co-construct meaning relative to real-world contexts (Beck & Kosnik, 2006). Interactions with peers of varying experience and skill levels strengthen students' ability to critically examine learning experiences and develop strategies to negotiate contextual demands successfully (Vygotsky, 1978). Therefore, in limiting their collaboration with other group members, the PCTs might have neglected using a critical resource (i.e., their peers) in their initial approach to the MI assignments. Future efforts to foster group collaboration with PCTs learning to use MI should include opportunities for working groups to conduct initial observations of the classrooms where they will implement MI. Group-based observations would allow PCTs to extend their classroom-based interactions to the field setting, get to know one another through a shared classroom-based experience, and approach planning with an intersubjective understanding (Rogoff, 1990) of contextual affordances and constraints. More structure may also be needed to guide and support PCTs' in their approach to working in groups. For example, the course instructor could assign specific MI planning and implementation roles to different group members (Rau & Heyl, 1990). This might increase each group member's perceptions that he or she is integral to the success of the whole group.

After completing the first implementations, the PCTs learned to adopt a more collaborative approach to complete the second movement break and active lesson assignments. Again, from a constructivist perspective, this latter approach may have helped to generate more positive learning experiences for the PCTs, enabling PCTs to take advantage of each other's interpretations and insights and socially construct effective strategies to improve MI planning and implementation (Beck & Kosnik, 2006). Through collaborative learning, the field experiences promoted positive beliefs about MI, particularly that it is feasible and important for children from a number of perspectives. Ultimately, the field experiences supported, rather than antagonized, the goals underpinning the PA promotion course in which the PCTs were enrolled.

There may also be other reasons for the apparent effectiveness of the field experiences in reinforcing PCT learning toward course goals. First, PCTs' rapid growth in MI competency may have

fostered favorable attitudes toward MI. The findings show that PCTs made improvements in their MI planning and implementation in just two classroom visits and felt afterward that learning to integrate movement is easy. These findings may be related to PCTs' positive dispositions about using MI and their advocating for MI at the end of the course. In line with diffusion of innovations theory, a previous study (Webster, Caputi, et al., 2013) showed that perceived simplicity of MI was positively associated with self-reported frequency of using MI in a sample of elementary classroom teachers. Furthermore, McMullen, Kulinna, and Cothran (2014) found that elementary and high school classroom teachers preferred MI activities that were easy to manage.

Second, seeing the benefits of MI for children firsthand could have facilitated the desired learning outcomes for the PCTs. Data from this study emphasized the importance of positive student responses in the success of PCTs' MI field experiences. In an MI intervention with inservice classroom teachers, Cothran et al. (2010) and Kulinna (2012) reported results that indicated that adaptive changes in teachers' beliefs were based on the teachers first trying new educational practices (e.g., as part of an intervention program) and then observing positive changes in their students' learning. In another intervention, classroom teachers identified positive student responses as one factor that influenced the extent to which they used MI (Naylor, Macdonald, Zebedee, Reed, & McKay, 2006). More recently, McMullen et al. (2014) also reported findings that support the key role of student reactions in classroom teachers' use of MI. According to the authors, "Whether the students enjoyed the activities had a strong influence on the teachers' decision to use the break again or not" (p. 520). The apparent influence of the PCTs' learning experiences on elementary children's learning experiences in the present study also emphasizes the constructivist-aligned idea that changes in one learner are inextricably tied to changes in other learners within a shared learning environment (Richardson, 1997).

Third, it is possible that the reflection assignments aided in the promotion of intended outcomes for the PCTs. Guided reflection is a recommended tool in constructivist-based student learning (Beck & Kosnik, 2006). Moreover, the teacher education literature highlights the key role of reflection in successful field experiences (McIntyre

et al., 1996). The reflection questions used in this study directed PCTs' attention to aspects of their own and their group's teaching (e.g., instruction and management decisions), the MI activities they used (e.g., developmental appropriateness for children), and their beliefs about MI (e.g., whether classroom teachers should be involved in school-based PA promotion). These questions were designed to guide and challenge PCTs' thinking about MI and schools through various reflective approaches (e.g., descriptive, explanatory, evaluative, hypothetical, critical) and may have served to strengthen PCTs' metacognition (Parsons & Stephenson, 2005) and, ultimately, assimilation of core values and recommended practices taught in the course.

Finally, the positive outcomes of the MI field experiences in this study may be a function of the relatively short length of the experiences, which afforded PCTs enough time to try MI, improve their MI planning and implementation skills, and see the benefits of MI. However, longer term field engagements, such as student teaching, may result in different outcomes for PCTs. Such engagements would situate PCTs more squarely in the day-to-day routines and politics of schools, which could introduce new pressures that undermine PCTs' efforts to use MI. For example, in previous studies, researchers found that factors such as lack of administrative support and time devoted to other responsibilities and commitments at school can act as barriers to classroom teachers' MI (Webster, Russ, et al., 2015).

This study has several limitations. First, the study was conducted in the context of an academic course in which PCTs' work was graded, and this may have influenced their reflections, classroom behaviors, and interview responses. Although PCTs were encouraged to be honest and candid in expressing their views and were told their beliefs and opinions would not be a factor in their grades, the possibility remains that the data reflect social desirability. Second, due to limited resources, all classroom visits could not be observed. Additional data collected from more classroom visits may have enriched, expanded, or altered the findings of this study. Third, data were analyzed after the course was finished, which made exploring and pursuing negative cases in the data unfeasible. Fourth, the study was conducted with only one class of PCTs working with a small number of classrooms. Future research should examine learning

experiences of a larger sample of PCTs working in diverse classroom settings. Finally, this study was limited to investigating only two field experiences. Further investigation could enhance understanding of the challenges and successes of PCTs asked to integrate movement on a more frequent schedule throughout the semester or during longer term field placements, such as student teaching.

In conclusion, this study adds to the developing line of research that examines preservice preparation for MI, based on evidence that MI is beneficial to children's health and education and on recommendations to incorporate MI into preservice training for classroom teachers. Overall, the findings suggest that elementary classroom-based field experiences can facilitate learning to integrate movement. Additionally, the findings point to constructivism as a suitable theoretical framework to explore in future research on preservice preparation for MI. Constructivist-based learning experiences, such as having opportunities to reflect on MI-related field experiences, as well as collaborating in peer groups to plan and implement MI, may be important elements of instructional design in university coursework aimed at preparing future elementary classroom teachers for school-based PA promotion. Additionally, seeing the benefits of MI for elementary students firsthand and discovering that MI is easy to learn may be powerful motivators for PCTs to want to adopt and continue using MI.

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PEDAGOGY

Perceptions of Learning to Teach in a Constructivist Environment

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Abstract

A constructivist approach to learning in teacher education has been widely accepted. Yet little is known about constructivist environments within physical education teacher education (PETE). The purpose of this study was to examine the perspectives of PETE preservice teachers with respect to instructional strategies designed to reflect constructivist learning. Specifically, students' views of the pedagogical aspects employed were explored. Data sources included focus group interviews with 13 members of a field-based PETE methods class grounded in constructivist principles and course artifacts. Responses to interview questions were analyzed via open, axial, and selective coding. Trustworthiness was established through a researcher journal, an audit journal, and triangulation. Data analysis revealed four pedagogical aspects that contributed to these students' learning: relationships, feedback, time, and active learning. Relationships included meaningful connections with class members and instructors. Feedback was described as timely insight about their teaching and work with young people from both instructors and peers. The amount of time engaged in learning was acknowledged as being significant. Engagement with elementary school students provided active learning that allowed for the translation of theory into practice. These students' positive views of creating knowledge by applying it with elementary children may suggest a constructivist approach as a viable and powerful

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means for framing effective PETE programs. Furthermore, there may be an increased potential for these students to utilize similar strategies when teaching, and the cultivation of relationships may counteract the occupational socialization of beginning teachers.

Background

Pedagogical approaches that support constructivist approaches to learning have been widely accepted in multiple educational contexts (i.e., math, science, language arts, and physical education; Richardson, 1997). Constructivism as a learning theory acknowledges the connections among knowledge, meaning, and learning among students (Azzarito & Ennis, 2003; Fosnot, 2005). It is “a psychological theory of learning that describes how structures, language, activity, and meaning-making come about, rather than one that simply characterizes the structures and stages of thought, or one that isolates behaviors learned through reinforcement” (Fosnot, 2005, p. 34). As a learning theory, constructivism offers major implications for instructional delivery.

Constructivism

Constructivism is based on the philosophical perspective that knowledge is constructed rather than discovered (Fosnot, 2005). This paradigm is most widely associated with the works of Piaget (1950), Piaget and Inhelder (1962), and Vygotsky (1997). Piaget emphasized that new knowledge is built on prior knowledge as learning is developed through exploration, and on individual construction of meaning (Pritchard & Woollard, 2010). Constructivism from this perspective describes how individuals process information to build knowledge and understanding within their environment (Pritchard & Woollard, 2010). Extending Piaget’s work, Vygotsky (1997) emphasized the importance of social interaction and cooperative learning in the construction of knowledge while groups engage with each other. He contended that collective social experiences within various social environments affect the social orientation of individuals that ultimately influences their cognitive functions. It is suggested that new knowledge and skills are created as learners interact with each other and make sense of differences between their current knowledge and new experiences (Brackenbury, 2012).

It is commonly agreed that although teaching methods that support constructivist learning hold promise, some issues may occur when students regulate their own learning (MacPhail, Tannehill, & Goc Karp, 2013; Sigler & Saam, 2007). Therefore, due to the sophistication of teaching approaches designed to foster constructivist learning, students may need to possess better metacognitive skills to gain desired outcomes (Sigler & Saam, 2007). While learning theory does not provide a recipe for learning environments, it constrains the design of an effective learning environment (National Research Council, 1999b).

Three major principles describe a constructivist approach to learning. First, learners construct knowledge in relation to their prior knowledge. As such, learning is situated in opportunities for learners to become critical thinkers, problem solvers, and decision makers. Second, learning is an active process. This active process allows learners to recognize the meaning of past experiences and apply new knowledge during authentic opportunities. Third, knowledge is socially constructed. Learners become intentional and interactive participants in the content among each other to develop a deep, holistic, meaningful, well-connected understanding of content (Rovegno & Dolly, 2006).

Prior knowledge can be described as the way an individual understands information by making connections between knowledge already learned and new information through a process of questioning, critical thinking, and accepting or discarding old information and beliefs (Good & Brophy, 1994). With regard to learning, Palincsar (1998) believed that individuals working in pairs or groups to achieve or structure knowledge, that is, utilizing the collective memory, could reach more success than those working alone. Furthermore, Azzarito and Ennis (2003) found that the holistic learning of an individual occurred with students who reflected on prior knowledge and built on new knowledge and that they were more likely to construct new and accurate meaning. Although prior knowledge affects learning, evidence in research on teacher education points to both positive (accurate knowledge) and negative (inaccurate knowledge) results (Rovegno & Dolly, 2006).

One aspect of constructivism is the notion of active learning strategies or learner-centered teaching. According to Qualters (2012), the

use of active learning strategies with university students resulted in positive and negative perceptions. Positive aspects included a favorable attitude toward learning, enhanced ability and efficiency in studying, an improved learning environment that gave students a better understanding of individual ways of learning. Negative perceptions of active learning were described as the amount of in-class time taken for these activities, fear of not covering all the material in the course, and anxiety about changes in classroom expectations. Despite these drawbacks, the active learning these students experienced was generally positive. Brackenbury (2012) posited, “The constructivist nature of learner-centered teaching promotes learning that is created by individuals and groups, as the result of their current knowledge/thoughts/beliefs interacting with new experiences” (p. 23). The resulting outcome of learner-centered teaching methods allows for students to construct knowledge.

Social learning occurs in the context of social interactions and engagement with others in an effort to create knowledge and higher levels of reasoning and learning (Palincsar, 1998). An effective aspect of a constructivist environment occurs in a social setting where individuals have an opportunity to resolve conflicting ideas and discuss or share ideas among each other, thus creating knowledge (Glaserfeld, 1995). Furthermore, other social interactions that include discourse, cultural aspects, and context are necessary for the construction of knowledge (Pritchard & Woollard, 2010). Acceptance and valuing peers’ differences to limit students’ feelings of alienation, disconnection, and isolation are also important (Azzarito & Ennis, 2003).

Pedagogical Approaches to Support Constructivist Learning

Pedagogical approaches that support constructivist learning among students in higher education have been documented in the literature (Hussain, 2012; Kalchman, 2011; MacPhail et al., 2013) and have shown promise in developing students’ confidence, creativity, and critical thinking skills. Although several studies generally have focused on expert teachers teaching physical education to children and adolescents in physical education contexts (Chen, 2002; Chen & Rovegno, 2000; Dyson, 2002; Ennis & Chen, 1995), other studies have addressed teachers learning to teach using constructivist perspectives and have focused on teacher learning (McCaughtry & Rovegno, 2003; Rovegno, 1991). In particular, the use of questioning

and open-ended tasks was prominent among several physical education teachers using constructivist teaching practices (Rovegno, 1998).

Constructivist learning environments have shown promise with in-service teachers (K. Patton, Parker, & Pratt, 2013) and the recent application of pedagogical approaches to the education of preservice teachers (PSTs) has shown potential for the construction of knowledge within physical education contexts (MacPhail et al., 2013). It has been found that through the use of several pedagogical strategies in teacher education courses (i.e., activities such as critical friends' discussions, problem solving, and group challenges), the PSTs "moved from feelings of fear and apprehension to being confident as they recognized their own development" (MacPhail et al., 2013, p. 110). Another example of the effects of constructivist teaching on PSTs included a group of students enrolled in an undergraduate elementary mathematics methods course that recognized the value and impact of constructivism for all (Kalchman, 2011). Furthermore, teacher educators may consider guiding PSTs to study instructional strategies of expert teachers such as how to ask open-ended questions, identifying students' problems and successes, and offering suggestions (Chen, 2002).

Physical education teacher education (PETE) desires to develop teachers who can teach for higher order and conceptual learning. If so, this notion would imply that PETE PSTs, then, are taught via instructional strategies designed to promote the same type of learning. The rationale for this investigation was to determine if the pedagogy employed within a physical education elementary methods course promoted constructivist learning that contributed to the development of future teachers. Therefore, the purpose of this study was to examine the perceptions of PETE PSTs with respect to instructional strategies designed to reflect a constructivist approach to learning.

Method

Participants

This study was conducted at a 4-year midsize liberal arts university in the Intermountain West of the United States. Participants included 12 undergraduate PETE PSTs (6 female, 6 male) and one postbaccalaureate male who were enrolled in a field-based physical

education methods course. This was a third-year required teacher licensure course that included a significant field experience. The course and the participants were chosen because of the coverage of a variety of topics related to instructional aspects of teaching and best practices in elementary physical education and because previous students had anecdotally reported the power of the learning experience provided.

Course Design

The course was designed to employ pedagogical principles that support constructivist learning. The intent was to deepen the participants' knowledge concerning learning to teach elementary physical education students. The first eight weeks were dedicated to classroom time in which participants engaged in learning theoretical and pedagogical content based on local district standards that derived from a skill themes approach to teaching (Graham, Holt/Hale, & Parker, 2013). Instructional design embraced a constructivist theoretical approach to enhance participants' learning. For instance, small-group discussions that prompted critical thinking and problem-solving tactics were necessary for students to construct new meaning based on prior knowledge. Knowledge constructed during the classroom portion of the semester was later applied in an 8-week elementary school field-based experience. Participants were randomly assigned a partner within the course and co-taught elementary-age learners in a supervised experience at a local elementary school. There was one cooperating physical education teacher at this elementary school. Participants were responsible for developing five standardized lesson plans and teaching each lesson to approximately 12 elementary-age students. During each teaching episode, at least one faculty member of the course and the cooperating teacher were present to observe the participants' teaching and then provide immediate feedback. Feedback was facilitated through a series of questions designed to situate the participants' construction of knowledge based on prior knowledge.

Instructors' Background

Three instructors were present during all facets of the design, implementation, and facilitation of the elementary physical education

methods course. Two faculty members were responsible for teaching the physical education methods course. One professor had taught this course for 13 years and had been a physical education teacher educator for more than 3 decades, and one teacher assistant was concurrently a doctoral candidate and had 4 years of high school physical education experience. The third instructor was the cooperating elementary physical education teacher who had 8 years of teaching experience.

Data Sources

Data sources included focus group interviews, artifacts, and field notes. First, for a more in-depth understanding of how these students learned in an environment designed to promote constructivist learning, four focus group (range of 2–5 participants) interviews were conducted with class members via open-ended, semistructured questions that led to probing questions. The interviews ranged from 40 to 65 min and were designed to solicit participants' understanding regarding learning to teach in a constructivist environment. Topics concentrated on events, people, contexts, and circumstances salient to their learning. For instance, open-ended questions such as “What were your thoughts about the social and sometimes informal nature of the interactions with peers and teachers?” or “What do you feel has contributed to that growth as a teacher?” were designed to have students interrogate their learning in relationship to the experiences designed for them. Interviews occurred at the end of the semester and were conducted by a teacher assistant not responsible for student assessment; the course instructor did not see or hear any interview data until after grades were submitted. All interviews were digitally recorded and transcribed verbatim. Relevant artifacts, such as participant group projects, and observational field notes of class debriefs between the course faculty members and participants, and between the cooperating physical education teacher and the course faculty members and participants were examined.

Data Analysis

Data were analyzed utilizing inductively derived categories from this data set and deductive categories based on a priori constructs from relevant literature. Open, axial, and selective coding (Corbin & Strauss, 2008) were used in the interpretation of the data and

development of categories representing participants' perceptions of instructional strategies designed to reflect constructivist learning. During the open and axial coding phase, interview transcripts were individually read several times, with notations made in the margins. From each transcript, significant phrases or sentences that pertained directly to aspects affecting learning within this environment were identified. Open coding involved the process of conceptualizing, defining, and developing categories of results in terms of their properties and dimensions (Corbin & Strauss, 2008). Also during this phase, notes were written about possible meaning, or what Creswell (2007) refers to as memo writing. These memos consisted of questions, comments, and ideas about evolving categories. At this stage, individual analyses were compared, insights shared, and interpretations challenged. The goal of the axial coding was the systematic development and seeking out of the relationships between concepts and categories.

In the selective coding phase, clusters of data were related to each other and themes were formed, and dominant categories were determined. This was done through an interrogation of the initial data categories to determine which category encompassed the most data from the perspectives of all participants. The most relevant excerpts from each category obtained by inductive coding were integrated to portray these participants' perceptions of an environment designed to support constructivist learning. Direct quotes were identified from participants' interviews; all participants are identified by pseudonym.

Trustworthiness

Trustworthiness was established through several techniques. First, triangulation employing multiple investigators and multiple data sources confirmed the findings (Merriam, 2009). Data were triangulated for analytical purposes across both data sources (interviews and artifacts). Investigator triangulation occurred through the use of three investigators analyzing data. In addition, member checking improved the credibility of this study. While formal member checks are the primary goal of the research process, the researchers also incorporated informal member checks (Creswell, 2007; Lincoln & Guba, 1985). During interviews, the researchers interpreted the participants' responses back to them, seeking accurate analysis of

the participants' perceptions, attitudes, and experiences. Next, the researchers kept a journal to purposefully search for variations in participants' perceptions of the facilitation process (Merriam, 2009). Finally, an audit trail in the way of a transparent description of the research steps taken from the start of a research project to the development and reporting of findings (M. Patton, 2002) was made available for a colleague who was at a higher academic rank and understood constructivist learning and PETE but was not part of the project. This colleague served as a peer debriefer who could challenge the logic behind the researchers' interpretations (Lincoln & Guba, 1985).

Results

Data analysis resulted in the identification of four themes with respect to instructional strategies designed to reflect constructivist learning. For these participants, (1) relationships with peers and instructors, (2) feedback, (3) time, and (4) active learning influenced their understanding of learning to teach.

Relationships: “Kinda like a team”

The instructional strategies implemented in this course were perceived to contribute to the building of relationships and proved to be the most salient result for these PSTs. These relationships involved not only members of the class but also the instructors. For the students, it was as if the students and the teachers were a bonded unit, “kinda like a team, we were all going through it together . . .” (F1), in learning to teach elementary physical education:

. . . it was just the environment; it wasn't just class. I feel sometimes we go to class and we just go to class, we don't really create relationships or anything. The people who were in this class, now those are the people who if I have a question I will ask. But I won't go to any other teachers and ask them or people in other classes. I'll figure it out. (F1)

These students recognized the informality of the environment as essential to their comfort level and the subsequent relationship building. A student indicated, “You know other classrooms the teacher tends to just stand in the front of the classroom, there is no

personal relationship. There's no exchange of ideas, they just stand there" (M3). In turn, this environment allowed them "to make connections and build relationships" (F1). For them, "it didn't matter about what the situation was or who it was, you could go up to almost anybody" (F2). This relaxed and relational environment that emphasized and supported the social nature of learning through the development of relationships revealed four aspects: comfort and security, accountability, balance, and transfer to teaching and learning.

Fundamentally, the relationships developed allowed students to feel safe in their learning. At a basic level, it "was good to have someone there to pick you up if you need it." A particular female student who began as a very unsure learner, stated,

I started to form bonds with people in my classes. Once I did that, that allowed me to engage in class, but before I didn't really know anyone, I felt like the dumbest person. In all of my classes, I didn't want to speak up, because my classmates would be like 'why is that girl talking?' Just the relationships that were formed [here]. I mean I'm sure people think that [that she is dumb] now, but at least I'm OK with that! (F2)

The safeness students felt with each other was obvious to instructors. Students felt safe in sharing not only the high points learning to teach but also the low points. Instructor field notes revealed,

I walked out in the hall after the first lesson and there I found Sharon and Jamie. Sharon was in tears—her lesson had not gone as she had wanted and she particularly struggled with management. Jamie knew of her insecurities and vulnerability; he was amazing. He listened, comforted, reassured in a way that I never would have been able to.

Others indicated what this relational comfortableness allowed them: "With either of you two [the instructors] we feel comfortable we can come with almost anything at any time and you're willing to help and there's that comfortable setting that you get. I think it does make a difference" (F4).

On a pragmatic level, these relationships "held them more accountable" (M1). At one level, this accountability included "getting the assignments done" (M1); it provided a motivation beyond

themselves and grades, that is, a responsibility to another person. An older undergraduate student indicated,

When you are by yourself you don't really collaborate as much and you also don't maybe plan as much. I felt like I planned a lot more because of the cooperative experience and I planned in much more detail. Usually when I am teaching by myself it is a little flashcard that, you know, okay, this is what you're are doing first, this is what you're doing second, but here we both had to be on the same page. I think it made our teachings better as well . . . (M3)

At another level, there was an accountability to teach well; at times, these two areas of accountability became the balance as well. One student recognized,

Jeff and I brought different things to the table. He helped me with the writing assignments, but at the same time I helped him with the teaching. His management skills aren't so strong; he doesn't manage as well. So I would step in and kinda help him; so we kind of helped each other out. (M1)

This interaction allowed the students to balance and enhance each other's individual way of learning while holding each other accountable for the necessary work.

They recognized that collaborative thinking was not a weakness, but allowed them to develop thoughts and plans beyond their own ideas. One student stated,

We really worked well together by feeding off each other and learning from each other; you can't know everything yourself as an individual. You learn so much more when you have someone there to go through it with who is doing the same thing. You may look at something the exact same and he might see one perspective and you may see another. When you see it like that you may get to see twice as much compared to when you see it by yourself. (F1)

These students were able to translate the learning environment they were experiencing to the teaching of elementary school students. One undergraduate student indicated about his learning,

I think I learned that you can have fun with the kids. It's more about the relationships that you build with the kids and the connection with the kids that is more powerful than the actual lesson plans itself. You need to force those relationships and build up trust because kids will respond to you if you have that. (M4)

They began to recognize certain instances in the university classroom that broke the artificial teacher–student barrier, such as the instructor “giving Angela a hard time about a cell phone . . . It's evident that it's not by-the-book type of thing” (M4) and how these might translate to the elementary school setting. Simple strategies such as “listen to their recess stories” (M4) and “look at their tee shirts” (M1) clearly established that building relationships was an ongoing and important step. Such strategies allowed them to know their students “interests or things that they're good at or that they like; things that motivate them give them challenges accordingly, which they will like because it has to do with what they are their interested” (F2).

Feedback: “It wasn't like we had to wait”

The perceived feedback given in this environment was different to that given in other environments. Feedback involved multiple aspects regarding students' teaching experiences and work with young children that came from a variety of sources, and it clearly was a critical component of the learning process. One student indicated, “The biggest contributor for myself was the feedback that was given from both of you [instructors] and the cooperating teacher” (F1). Another student said, “Having a partner I was able to get more feedback” (F2). Receiving feedback was not sufficient in itself; however, the timing in which it was given “helped with student growth” (M1). One student explained, “Both of you [instructors] being there all the time watching us teach allowed for immediate feedback, as well as the cooperating teacher” (M1). This immediate feedback encouraged students to instantly reflect on their teaching: “It wasn't like we had to wait and think what is she [instructors] talking about, it was fresh and on our minds” (M3). Because relationships had developed among these students, it led to even more immediate feedback. One one undergraduate student indicated,

My classmates can give us feedback too, so that was good because that was feedback that we can get almost all of the time whenever we are working or even if we called them or sent them a text message or if we e-mailed you all [instructors] we knew that we would hear back, but it was even more immediate. (F4)

For these students, having their peers' immediate response and shared ideas created for more exciting lessons. One student made this clear: "You can be just so much more creative, because you have two people's brains going on at the same time. People are creatures of habit and so when you have two people, that can help kind of spice things up" (F3).

Not only did sharing perspectives with one another lead to more enjoyable lessons, but it also allowed students to use that feedback the next time they taught. An older undergraduate student explained,

Using that feedback and applying it is what helped me learn the most and getting direct feedback about lessons and then trying to apply that feedback during the very next teaching helped me grow the most from the first teaching to the end. (M2)

Students could recognize the relevance of feedback and look beyond to the bigger picture. One student articulated,

We make mistakes and people [instructors, cooperating teacher, class peers] are there to tell us, like, you did this wrong, and to give us ways to fix it. But if you all [instructors, cooperating teacher, class peers] are not here to give us feedback, then this [learning experience] is pointless because we're not in "the real world," we're still "just students." (M5)

The multiple aspects and sources of timely feedback, however, led to something bigger than being "just students" (M1); they provided students with the skills to be effective communicators in a job in "the real world" (M1). One student explained,

When you get a PE job, you're not going to be by yourself and you're going to need to be able to know how to ask other people or just be able to know how to collaborate with others

and bounce ideas off of one another, share ideas, and see how there are more than one way of doing things. (M1)

Time: “Five days a week”

The instructional strategies in this course were unique not only in the amount of time spent in class but also in how time was situated. The PSTs perceived that this instructional strategy was beneficial and contributed to their learning. This course met 5 days a week, 3 days in 1-hr sessions and 2 days in 2-hr sessions. These students acknowledged that the time they were engaged in learning was significant in terms of the number of times the course met per week with peers and the time spent teaching elementary students. One undergraduate student described the 5-day-a-week course meeting schedule as positive: “I’d rather have it [class] five days a week for shorter periods of time than two days a week for [longer]” (F3). Another undergraduate student agreed that the time allowed for continuity of the course and was beneficial: “It allows it [course content] to stay fresh [so you can] transfer from piece to piece [and it] helps a lot to apply it to another situation” (F1). The time spent in class was instrumental in allowing the students to interact on a regular basis with one another and to develop as PSTs.

One undergraduate student shared how the frequent class meetings affected her ability to engage with others within the course, which ultimately affected her learning: “We felt comfortable with each other because we’ve been together for so long. We pretty much lived with each other, so it made it more comfortable to ask each other questions” (F2). The structure of the course allowed these students to spend a considerable amount of time working and teaching alongside one another. One student stated, “Having class five days a week definitely helped, we knew what was going on in people’s lives, so we felt more comfortable to ask questions” (F1). Another student said, “When you are leaving class, you are, like, see you tomorrow, and you know you will see them tomorrow and the next day and the next day” (M3). The time spent in this course led the students to being comfortable and thus assisted in the learning process for these students.

Overall, the time spent in the course was described as much different from other classes these students attended. An undergraduate student shared the effectiveness she felt during class:

Something that is drastically different from the [previous] two courses is that you actually teach the same kids more than once. In [another] course, it's like plan a lesson for 30 minutes and try to teach these kids, but you only spend 20 minutes because of management and then reflect what this lesson would have been like, whereas in [this course] we had time to correct our mistakes with the same people. (F1)

Another student similarly explained how he was able to grow into a more effective teacher from having more time in class:

Just the amount of experience we got with everything that we did, that was probably the most change. [We] developed a whole lesson or unit opposed to a 20-minute lesson a couple of times. We got to see how the kids developed and change your future lesson plan based on how they did. That more experience in a classroom was good. (M3)

The increased amount of time during this teaching experience allowed students to refine and reflect on their lessons. One undergraduate student stated, “You had time to teach this group of kids and then reflect how all of that went and you can change or keep it the same, whereas before it was a one-time shot because we always had different kids. So being able to have more real-life but not all the way real-life teaching was helpful” (M2). Overall, the design of the course allowed for more practical teaching time in schools and was well received and appreciated by these students.

Active Learning: “It’s another thing to know how to do it”

The creation of an active learning environment was an intentional instructional strategy employed. The practical and authentic nature of learning for these students was paramount while they learned about teaching. At one level, they appreciated being actively engaged in the university classroom while they learned about teaching. A

male student indicated that his way of learning was different than others': "I learn by stating what I think, having that challenged" (M1). Yet it was the 8-week supervised school teaching experience, "just being in the school setting with kids" (M1), that provided what they saw as a piece of reality allowing for the translation of theory into practice. The postbaccalaureate student stated,

I think for me, since I came here after doing a bachelor's degree, I see the difference in programs. This one has much more of an applied experience versus the one I came from. I think I definitely have grown a lot as a teacher because of that experience, being in the schools, observing more, seeing and interacting with teachers more. I think I have definitely developed more of a confidence in myself teaching through those experiences and through the progression from elementary to secondary schools. (M2)

In essence, it was the active experiences that provided the opportunity for students to connect conceptual knowledge so that they could self-assess the extent of their learning. One undergraduate student explained,

We sat through a lot of management stuff and teaching things. You think you know it until you get into the classroom and realize it's one thing to know it and it's another thing to know how to do it. (F4)

Active learning became important while these PSTs engaged in the teaching process. They recognized that "unless you can apply theory it means nothing" (F4). They readily acknowledged that in "every class we go to, kids learn differently at different rates, blah, blah" (F4), but now we "go in and actually see that and apply it" (F4). Implementing active learning with elementary students revealed for them the power of these experiences in student learning. One undergraduate student shared,

So when you actually give students the control to do something and they can take ownership and they can get excited about it because, like, you're still guiding them in the correct direction, we're not telling them they are going

to dribble the basketball five times, so you're giving them the freedom. (F3)

Discussion

The purpose of this study was to examine the perceptions of PETE PSTs with respect to instructional strategies designed to reflect a constructivist approach to learning. With this in mind, several pedagogical strategies that support the tenets of constructivist learning were employed. First, learners constructed knowledge in relation to their prior knowledge. Lesson reflections in peer groups situated them in opportunities to become critical thinkers, problem solvers, and decision makers. Second, learning was an active process. The PSTs designed their own lessons, taught them to young learners, and then reflected on them. By doing such, they actively engaged in their own learning process and could draw from past experiences and apply their knowledge during new, authentic opportunities. Third, knowledge was socially constructed, in large through the social contextualized process of providing feedback. The work with a teaching peer and the peer observers allowed these beginning teachers to become intentional and interactive participants and to learn from and with each other to develop a deep, holistic, meaningful, well-connected understanding of content (Rovegno & Dolly, 2006). The students in this study expressed positive responses with this instructional approach in regard to their learning, which aligned with each principle of constructivism.

The results from this study indicated a powerful learning experience for all members, who described notable differences compared to traditional methods of teaching in their other classes. Students enjoyed and valued the practical nature of the course and the immediate feedback received from the instructors, peers, and cooperating teacher. The establishment of personal and meaningful teacher and student relationships was instrumental and necessary for students to feel comfortable asking the instructors and their peers questions (Pritchard & Woollard, 2010; Vygotsky, 1997). Building these unique relationships, however, took time. Faculty not only allowed time for PSTs to grow and develop their own learning, which led to constructing their own views of teaching, but the course design of 5 days a week provided frequency coupled with quantity. Conscious efforts

were made between the instructors and students, as well as among the students, when they were given the opportunity to establish positive relationships.

This study adds to an increasing body of evidence suggesting pedagogies that support a constructivist approach to learning are a viable and powerful means for framing effective teacher education programs. Loughran (2006) explained that the art of teaching is confined to two aspects of knowledge and practice: teaching about teaching and learning about teaching. In this particular study, the instructors' knowledge with respect to teaching how to teach created a sense of awareness around the importance of implementing strategies that support constructivist learning principles. Essentially, this creation of knowledge existed with the students as well, which was built upon the practical implications of bridging theory into practice (Loughran, 2014). Knowledge and practice of teaching teaching must go beyond the rhetoric of the sheer dissemination of pedagogical knowledge; rather, Loughran (2014) stated, "teaching teaching is about thoughtfully engaging with practice beyond the technical; it is about using the cauldron of practice to expose pedagogy (especially one's own) to scrutiny" (p. 5).

The establishment of a constructivist conceptual framework within teacher education programs that is based on shared discoveries during practical teaching and learning experiences can ultimately lead to a mutual understanding about teaching how to teach and learning to teach. If such environments are achieved, teacher education practices "can begin to bring to the surface the sophisticated thinking, decision making, and pedagogical reasoning that underpins pedagogical expertise so that it might not only be recognized but also be purposefully developed" (Loughran, 2014, p. 5). Though these sentiments are contradictory to the current structures of higher education (e.g., cost efficiency, high class enrollment, and online learning contexts), these principles that support constructivist learning have been reported to enhance student learning and sense of belonging (Richards & Gaudreault, 2017) and are plausible for teacher educators to implement into their teacher education programs. Furthermore, because pedagogies that promote constructivist learning enhance critical thinking and reflection, they can serve to encourage preservice teachers to challenge their initial

assumptions regarding teaching and learning in physical education. The result may well be developmentally appropriate school-based physical education designed to meet the needs and interests of children and adolescents.

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PHYSICAL ACTIVITY

Relationship Between Physical Activity and Stress Among Junior High School Students in the Physical Education Environment

David C. Barney, Francis T. Pleban, and Terrance Lewis

Abstract

The purpose of this study was to explore grade-level differences (7th, 8th, and 9th) among junior high school students' perceptions of the effects of participation in physical education (PE) class on individual environmental stress. The role of physical activity as a stress reduction tool has been well documented. However, physical activity as a stressful event in the school and PE environment has been less established, particularly in junior high school students. Study participants comprised 872 junior high school students, 585 males (67%) and 287 females (33%), enrolled in four junior high schools. Stratified by grade, 315 seventh-grade (228 males, 87 females; $M = 1.28$, $SD = .448$), 281 eighth-grade (204 males, 77 females; $M = 1.27$, $SD = .447$), and 276 ninth-grade (153 males, 123 females; $M = 1.45$, $SD = .498$) students responded. By grade level, significant differences ($p < .05$) were reported for five of the 12 scaling questions. In general, seventh graders were more likely to respond they could better handle stress after participating in PE class, to look forward to coming to their PE class, to report lower stress levels before arrival to PE class, and to report lower stress levels after participation in PE class than were eighth and ninth graders. Altogether, follow-up qualitative findings

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reported three major themes regarding the PE environment and stress. PE acted as a stress mitigation mechanism and an opportunity for social bonding. Qualitative findings also referenced classmates as a negative stress mechanism in the PE environment.

Every person, at some point in time and at varying degrees, experiences stress. According to Grant et al. (2003), stress has been defined as "...environmental events or chronic conditions that objectively threaten the physical and/or psychological health and well-being of individuals of a particular age in a particular society" (p. 462). Because stress is an inevitable part of life, an individual needs to be equipped with healthy mechanisms to combat stressors. Physical activity is one positive stress management method for individuals to address life stressors (Aherne, 2001; Barney, Benham, & Haslem, 2014; Haugland, Wold, & Torsheim, 2003).

Literature specific to the relationship between physical activity and stress has indicated that physical activity is a likely mediator between stress and health (or illness; Gill, 1994). Physical activity has been associated with a reduced psychological stress response (Rejeski, Thompson, Brubaker, & Miller, 1992) and decreased physiological responsiveness to physical and psychosocial stressors (Blumenthal et al., 1989; Dishman, 1994; Peronnet & Szabo, 1993; Rimmele, 2007), resulting in psychological and physiological benefits enabling individuals to cope with stress more effectively (Fleshner, 2005; Taylor, 2000). Conversely, less active or nonactive individuals tend to experience more susceptibility to the adverse influences of life stress (Crews & Landers, 1987), increased illness when experiencing negative life events (Brown, 1991), and slower recovery from stressful events (Crews & Landers, 1987).

Stress Response to Physical Activity in the Physical Education Environment

Physical activity levels, through participation in sports or structured physical activities, and stress levels were investigated in a sample of Norwegian adolescents. Results indicated that changes from low physical activity levels to moderate or high physical activity levels were associated with lower levels of reported stress (Moljord, Moksnes, Ericksen, & Espnes, 2011). Haugland et al. (2003) surveyed adolescents and compared their perceived school-related stress and

leisure-time physical activity outside of school. Participants who reported school-related stress were less likely to report health complaints if they participated in leisure physical activities every week.

Research has also investigated physical activity on stress in college-aged students. Barney et al. (2014) investigated 350 college students' perceptions regarding the effects of participation in physical activity courses on life stressors. Study findings suggested that a college student's participation in physical activity classes helped to mediate life stressors. Specifically, college students felt that participation in physical activity courses helped them to accomplish other academic assignments. As well, this sample perceived that participation in physical activity helped them to better handle other life stressors (Barney et al., 2014).

In adolescence, physical activity can be used as the vehicle to better control personal stress. For many adolescents, common life stressors include bullying (O'Neill, 2017), family dynamics (Aherne, 2001), peer influences (Allan & Lawless, 2003), perceived expectations of self and from others (Deutsch & Schmertz, 2011), and difficulty in time management (Gonzalez, Hooper, Lee, & Lin, 2010). Yet, within the school context, physical education (PE) classes provide students with opportunities to be physically active, possibly helping to mitigate daily stress. Lang et al. (2016) developed a PE stress coping program for German-speaking vocational students in Switzerland titled Effects of a Physical Education Coping Training (EPHECT). The primary purpose of EPHECT was to foster resilience through the development of an individual and adequate coping repertoire. PE teachers in the EPHECT program completed eight modules specific to module implementation into their regular PE lessons. Students were instructed to perform motor learning tasks followed by a short reflection moderated by the PE teacher. Findings suggest implementation of the EPHECT program in PE classes can make positive contributions to help vocational students develop adaptive coping (Puhse & Gerber, 2005).

Physical Activity as a Stressful Event in the Physical Education Environment

The role of physical activity as a stress reduction mechanism has been well documented. However, physical activity as a stressful event in the school and PE environment has been less established.

Little research has addressed PE in the school environment as producing student stress, nor ways to decrease its stressful effects (Back, 2015; Blankenship, 2013; Currie & Sumich, 2014; Gerber, 2009; Ho, Chiang, & Lin, 2016; Ishii & Osaka, 2010; Lang et al., 2016; Lee, Kang, & Kim, 2017; Marraffa, 2015). Table 1 presents systematic review findings of studies addressing student exposure to stress in the PE environment across primary and secondary grade levels.

Across all grade levels, Currie and Sumich (2014) outlined several strategies for reducing stress and anxiety in PE, in general. They suggest positive class climate, promoting humanistic values, tolerance, individual expression, student choice, and self-evaluation for reducing PE stress. A number of studies that addressed stress and PE were identified (Back, 2015; Lee et al., 2017). Back (2015) reported a negative correlation between academic stress and school PE in high school students, with a partial mediating effect between the relationship of attitudes toward PE and psychological well-being. Lee et al. (2017) reported a correlation between high stress and athlete satisfaction and burnout.

Other studies that addressed stress in PE class and junior high school students (sixth to ninth grades) were identified (Blankenship, 2013; Gerber, 2009; Ho et al., 2016; Ishii & Osaka, 2010; Marraffa, 2015). Ho et al. (2016) identified stress related to athletic training and competition in junior high PE, and Ishii and Osaka (2010) identified exercise in and of itself as a stress-inducing agent. Additionally, Ishii and Osaka reported that junior high school students who disliked PE and sport did not benefit from the stress-reducing potential of PE. Gerber (2009), similar to Ishii and Osaka, identified that stressful junior high school PE experiences negatively affected positive attitudes toward physical activity and PE. Junior high school PE experiences leading to increased class stress included issues with a teacher or classmates, psychological and physical violence, pain or discomfort, poor classroom organization and class structure, and low perceived ability or consistent feelings of failure (Gerber, 2009).

Blankenship (2013), similar to Currie and Sumich (2014), addressed several methods of reducing stress during junior high PE, including creating developmentally appropriate tasks, private practice sessions, the use of stations, practice sessions, creating a motivational climate, and changing student perceptions of demands and abilities.

Table 1*Student Exposure to Stress in the Physical Education Environment Across Primary and Secondary Grade Levels*

Title	Citation	Study country	Study design	Grade level/age	Sample size	Assessment method	Outcomes
Changes in Satisfaction With Physical Education and Intrinsic Sport Motivation as a Function of Chronic Stress Experiences in Physical Education Classes	Gerber, 2009	Switzerland	Cross-sectional	Junior high (6th to 9th grade)	302 boys and girls	Survey	Stress negatively affected intrinsic motivation and contributed to reduced PE satisfaction levels. Stressful experiences in PE affected positive attitudes toward physical activity and PE: <ul style="list-style-type: none"> • problems with teacher or classmates • psychological and physical violence • pain during or after PE • poor organization and class structure • low perceived ability or consistent feelings of failure
Physical Education and the Degree of Stress	Ishii & Osaka, 2010	Japan	Cross-sectional	Junior high	268 (129 boys, 139 girls)	Survey	Students who disliked physical education and sports did not benefit from stress-reducing potential of exercise and sport. Exercise may be a stress-inducing agent.
The Stress Process in Physical Education	Blankenship, 2013	USA	Review	7th grade	N/A	N/A	Reducing stress during PE: <ul style="list-style-type: none"> • Create developmentally appropriate tasks • Arrange private practice sessions • Use stations • Maximize practice • Create a task-involved motivational climate • Identify students with low perceived competence/high trait anxiety • Change student perceptions of demands and abilities • Teach relaxation techniques

Table 1 (cont.)

Title	Citation	Study country	Study design	Grade level/age	Sample size	Assessment method	Outcomes
Creating Stress-Free Learning Environments for Sport and Physical Education	Currie & Sunich, 2014	Australia	Review	All grades/ not identified	N/A	N/A	<ul style="list-style-type: none"> Reducing anxiety in PE: Ensure positive class climate with zero tolerance for bullying Promote humanistic values Build tolerance Encourage free, creative, individual expression Establish 80% success rate to build confidence Allow student choice or offer activities rated high enjoyment Permit students to self-evaluate and measure results
What Is the Effect of Yoga Compared to a Physical Education Class on Stress Reactivity for Sixth-Grade Students?	Marraffa, 2015	USA	Review	6th grade	30 (17 boys, 13 girls)	N/A	<p>Yoga did not provide significant differences in stress reactivity.</p> <p>Yoga may be beneficial in coping with stress.</p>
The Mediating Effects of Hope Between Attitude Toward School Physical Education, Academic Stress, Ego-Resilience, and Psychological Wellbeing of High School Students	Back, 2015	Korea	Cross-sectional	High school (ages 14 to 18 years)	780 ^a	Survey	<p>Positive correlation toward school PE: attitude toward school physical education, academic stress, ego-resilience, and psychological well-being.</p> <p>Negative correlation toward school PE: academic stress.</p> <p>A partial mediating effect between youth attitude toward school PE and academic stress, ego-resilience, and psychological well-being.</p>

Table 1 (cont.)

Title	Citation	Study country	Study design	Grade level/age	Sample size	Assessment method	Outcomes
Stress Management in Physical Education Class: An Experiential Approach to Improve Coping Skills and Reduce Stress Perceptions in Adolescents	Lang, Feldmeth, Brand, Holsboer-Trachsler, Puhse, & Gerber, 2016	Switzerland	Review	Vocational	131 ^a	Survey	<ul style="list-style-type: none"> Examined intervention effects between pre- and postintervention, and postintervention and 6-months follow-up. Referencing the control group, the intervention group showed improved coping skills from pre- to postintervention. Postintervention to follow-up, stress decreased for the intervention group. Indirect effect on stress perception at follow-up via improved adaptive coping skills. Support "Effects of a Physical Education-based Coping Training" (EPHECT) as a positive contribution to the development of adaptive coping skills.
A Study on Relationship Between Stress and Coping Strategies of Junior High School Students in the Physical Education Programs	Ho, Chiang, & Lin, 2016	Taiwan	Cross-sectional	Junior high	589 boys and girls	Survey	<p>Junior high student stress in PE related to PE athletic training and competition.</p> <p>Significant differences in gender, grade, competition level, sports, and experience in physical education programs. Positive correlation between stress identification and application of coping strategy.</p>

Table 1 (cont.)

Title	Citation	Study country	Study design	Grade level/age	Sample size	Assessment method	Outcomes
Relationships Among Stress, Burnout, Athletic Identity, and Athlete Satisfaction in Students at Korea's Physical Education High Schools: Validating Differences Between Pathways According to Ego Resilience	Lee, Kang, & Kim, 2017	Korea	Cross-sectional	High school	332 (225 boys, 107 girls)	survey	High stress correlated with burnout, and high levels of burnout negatively related to athletic identity and athlete satisfaction.

Note: N/A = Not Applicable.

^aGender not identified.

Method

This study used the salutogenic approach conceptual framework (Quennerstedt, 2008). The salutogenic conceptual framework is not about what health is, but pays attention to resources in the creation, preservation, and development of health. Quennerstedt (2008) stated,

Physical activity and movement can be regarded as something more than mere protection against disease or overweight, and by posing salutogenic questions we can enrich our understanding of the relation between physical activity and health, and in consequence richness to the perspective of health in physical education. (p. 277)

For this study, the resource was the PE class. It is implied that PE class can help students maintain and control their stress. The purpose of this study was to investigate the extent of grade-level differences (seventh, eighth, and ninth) among junior high school students' perceptions of the effects of participation in PE class on individual environmental stress.

Participants

For this study, 872 junior high school students (585 males, 287 females) from four intact junior high schools, three from Utah and one from California, were sampled. Student ages ranged 11 to 15 years. Grade levels for all four junior high schools encompassed of seventh, eighth, and ninth grades. Stratified by grade level, 315 seventh-grade (228 males, 87 females), 281 eighth-grade (204 males, 77 females), and 276 ninth-grade (153 males, 123 females) students responded to the survey instrument.

Instrumentation

Through a literature review, the investigators did not identify an instrument specific to PE class and stress related to junior high school students. For this study, a 12-question survey instrument was developed. The survey consisted of six questions with response options of yes, no, and sometimes (two of these questions contained qualitative follow-up), three questions with Likert scale response options (1 = *low*, 2 = *medium*, 3 = *high*, and 4 = *very high*; one of these

questions contained qualitative follow-up), and three demographic questions. For face validity, junior high-aged students reviewed survey questions for clarity and understanding. Face validity is commonly viewed as the degree to which representative respondents or users judge that the scaled items of an assessment instrument are appropriate to the targeted assessment objectives (Nevo, 1985). Participants answered questions regarding PE and stress indices (Questions 3 to 8), self-reported stress levels before and after PE class (Questions 9 and 10), and self-perception of participation in PE for daily stress management (Question 11).

Procedures

Convenience sampling was employed for data collection in this study. Before study implementation, investigators contacted the junior high physical educators to explain the study and survey. After securing agreement from the physical educators, the researchers had them administer the surveys to their student. Before survey administration, the physical educators explained the study to their students. Prior to data collection, the physical educators were instructed on survey administration. Completion of survey, explanation, and administration took approximately 15 min.

Prior to survey distribution and data collection, the university institutional review board (IRB) reviewed study protocol and granted approval for the study to be conducted. All participants were subsequently assured that their voluntary decision to participate or not participate in the study would not affect their grade in class or class standing. A 98% survey response rate was recorded.

The school's classes ran on a block schedule, A-day/B-day with class lasting approximately 80 min, from bell to bell. Quantitative and qualitative data were analyzed regarding junior high school students' experiences with PE class and individual stress. Only observed data were used for quantitative and qualitative analyses.

Quantitative Research Design

The study had a quasi-experimental, mixed-methods design. Data were collected from a survey of 872 participants (junior high school students), 585 males (67%) and 287 females (33%), enrolled in four junior high schools. Stratified by grade level, 315 seventh-grade (228 males, 87 females), 281 eighth-grade (204 males, 77 females),

and 276 ninth-grade (153 males, 123 females) students responded to the survey instrument.

The following survey questions were considered for analyses:

1. When I come to this physical education class, I forget about what is stressing me out. (Question 3)
2. After participating in the class activities, I feel I can handle what is stressing me out. (Question 5)
3. I look forward to coming to my physical education class. (Question 6)
4. Rate your stress when you arrive to your physical education class. (Question 9)
5. Rate your stress after you have finished participation in your physical education class. (Question 10)

The response choices given for Question 6 were yes, no, and sometimes. The Likert scaling response choices given for Questions 9 and 10 were 1 = *low*, 2 = *medium*, 3 = *high*, and 4 = *very high*.

Quantitative Data Analysis

Analyses were performed on student response data to the survey instrument. Quantitative data analysis consisted of Pearson's chi-square tests and measures of central tendency and dispersion. Chi-square tests compared stress in the PE environment stratified by grade level. Levels of significance ($p < .05$) for the chi-squares were reported for all significant effects. SPSS 21 was used for analyses. Only observed data values were used for these summaries. Significant differences for grade level were reported for five (Questions 3, 5, 6, 9, and 10) of the nine scaling questions.

Chi-square tests showed a statistically significant difference by grade level in questions related to PE and stress. Question 3, "When I come to this physical education class, I forget about what is stressing me out," indicated an association by grade level. Students in seventh grade (37.1%) were more likely to forget about stress when coming to PE class than were students in eighth (36.5%) and ninth (26.4%) grades. The chi-square test for Question 3 was reported as seventh graders ($M = 1.70$, $SD = .877$), eighth graders ($M = 1.96$, $SD = .782$), and ninth graders ($M = 2.02$, $SD = .903$), $\chi^2(4, N = 872) = 12.53$, $p < .01$. Cramér's V effect size was .085, representing a small effect (Figure 1).

Question 5, “After participating in the class activities, I feel I can handle what is stressing me out,” indicated an association by grade level. Students in seventh grade (41.7%) were more likely to respond that they could better handle stress after participating in PE class than were students in eighth (31.5%) and ninth (26.9%) grades. The chi-square test for Question 5 was reported as seventh graders ($M = 1.66, SD = .856$), eighth graders ($M = 1.92, SD = .772$), and ninth graders ($M = 2.16, SD = .906$), $\chi^2 (4, N = 872) = 17.41, p < .01$. Cramér’s V effect size was .100, representing a small effect (Figure 2).

Question 6, “I look forward to coming to my physical education class,” indicated an association by grade level. Students in seventh grade (38.0%) were more likely to look forward to coming to their PE class than were students in eighth (36.5%) and ninth (26.4%) grades. The chi-square test for Question 6 was reported as seventh graders ($M = 1.50, SD = .838$), eighth graders ($M = 1.40, SD = .805$), and ninth graders ($M = 1.78, SD = .940$), $\chi^2 (4, N = 872) = 25.23, p < .0001$. Cramér’s V effect size was .120, representing a small effect (Figure 3).

Question 9, “Rate your stress when you arrive to your physical education class,” indicated an association by grade level. Students in seventh grade (38.8%) reported lower stress levels before arrival to PE class than did students eighth (33.3%) and ninth (27.9%) grades. The chi-square test for Question 9 was reported as seventh graders ($M = 1.68, SD = .798$), eighth graders ($M = 1.69, SD = .798$), and ninth graders ($M = 1.93, SD = .959$), $\chi^2 (4, N = 872) = 23.54, p < .001$. Cramér’s V effect size was .116, representing a small effect (Figure 4).

Question 10, “Rate your stress after you have finished participation in your physical education class,” indicated an association by grade level. Students in seventh grade (38.7%) also reported lower stress levels after participation in PE class than did students in eighth (34.8%) and ninth (26.5%) grades. The chi-square test for Question 9 was reported as seventh graders ($M = 1.45, SD = .766$), eighth graders ($M = 1.47, SD = .820$), and ninth graders ($M = 1.71, SD = .911$), $\chi^2 (4, N = 872) = 21.04, p < .01$. Cramér’s V effect size was .110, representing a small effect (Figure 5).

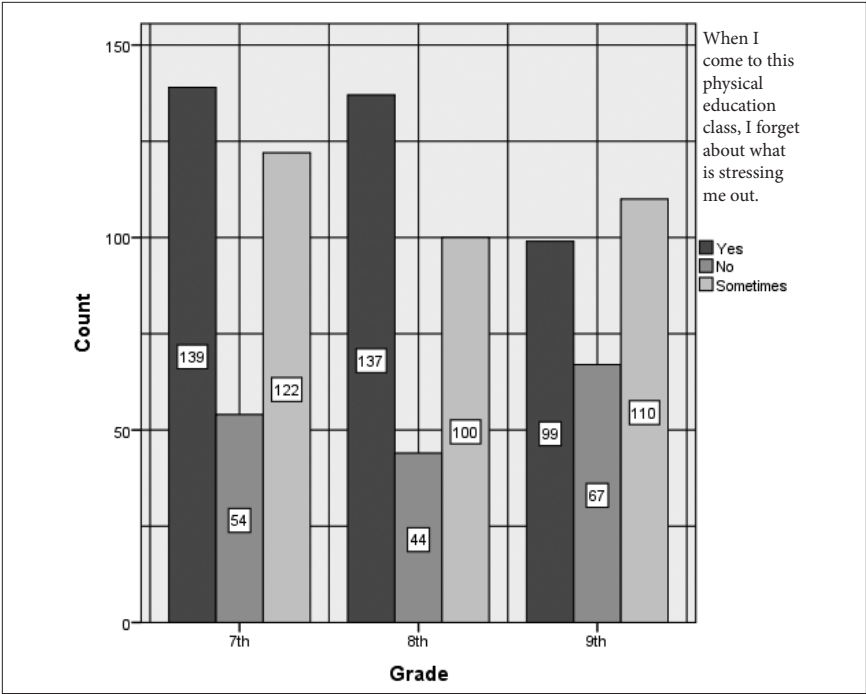


Figure 1. Response rates by grade level for Question 3.

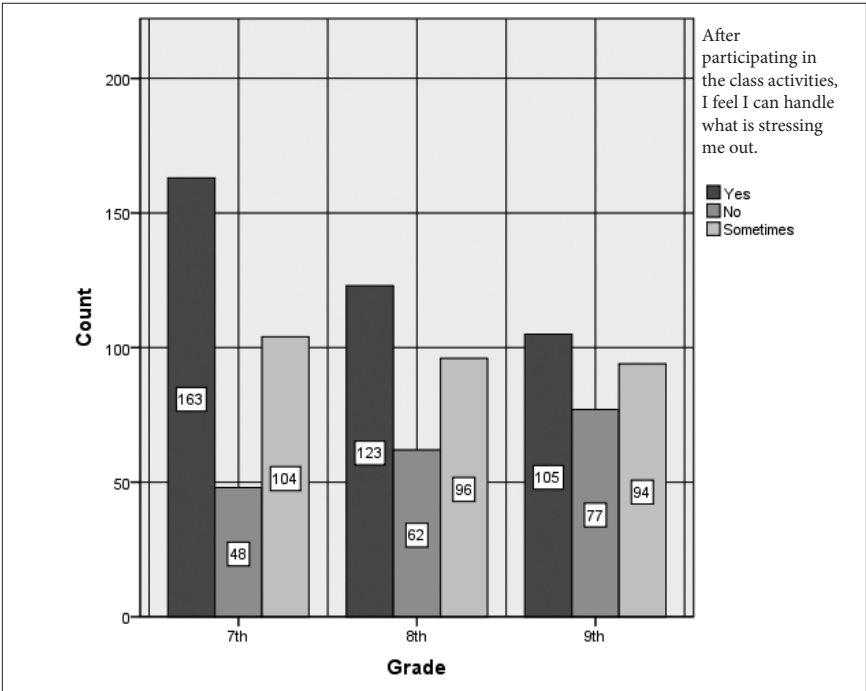


Figure 2. Response rates by grade level for Question 5.

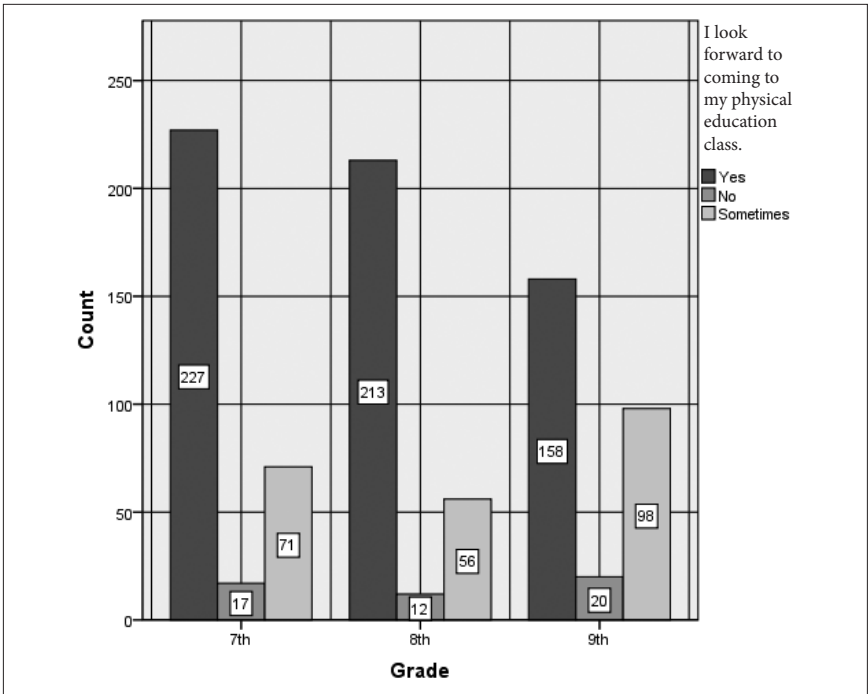


Figure 3. Response rates by grade level for Question 6.

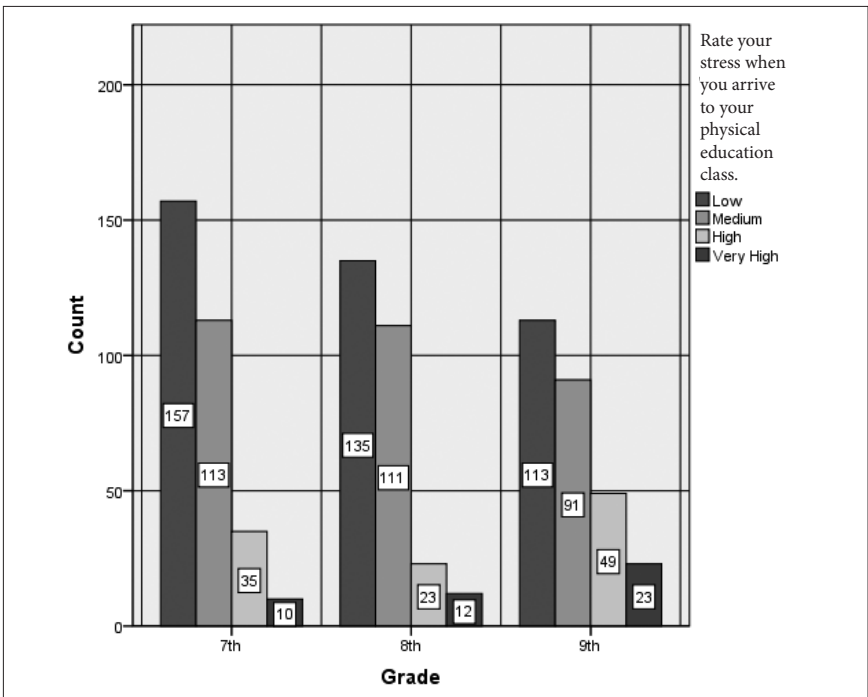


Figure 4. Response rates by grade level for Question 9.

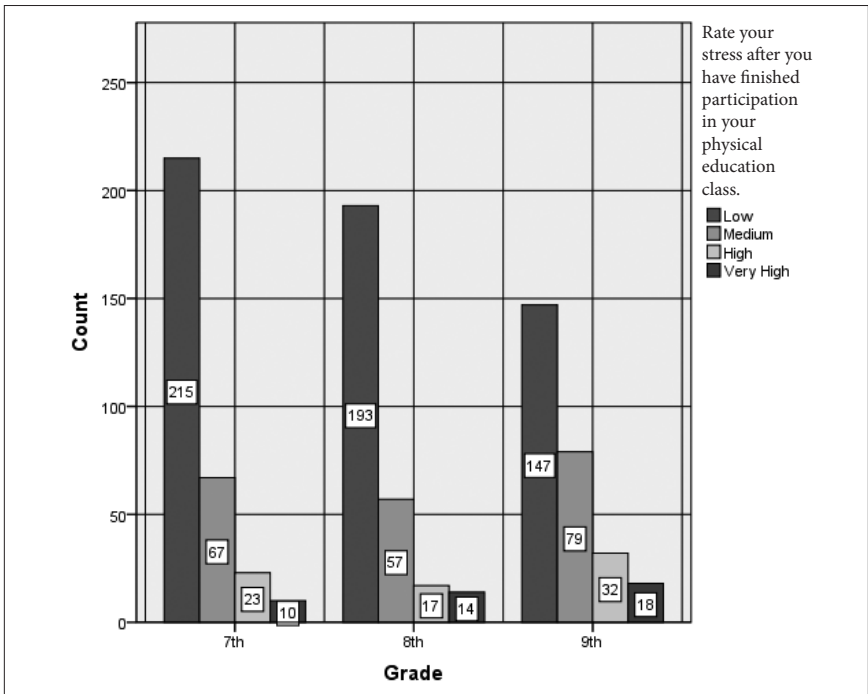


Figure 5. Response rates by grade level for Question 10.

Qualitative Follow-Up Data Analysis

Additional data results were comprised of short-answer responses from the study participants. Thematic analysis and findings are reported for four of the 12 survey questions (Questions 4, 7, 8, and 11). Participants were asked to explain and expound their responses to the four open-ended questions. Thematic content analysis was performed on open-ended responses. Referencing qualitative analysis, the investigators read and reread the content until common themes became evident for each survey question. Responses were first examined through inductive content analysis (Lincoln & Guba, 1985; Sarvela & McDermott, 1993) and emerging themes identified. A constant comparative method (Glaser & Strauss, 1967) was employed, with each unit of information first categorized and then compared and contrasted with all other units of information with the intent of linking those with similar meanings (Patton, 2002).

Participants answered questions regarding stress indices: stress after completion of PE class (Question 4), stress reduction after participation in PE class (Question 7), stress from participation in

PE class (Question 8), and participation in PE class in managing life stressors (Question 11). Analysis revealed three major themes: (a) stress mitigation from PE, (b) social bonding from physical education, and (c) PE classmates as negative stress in PE (Figure 6).

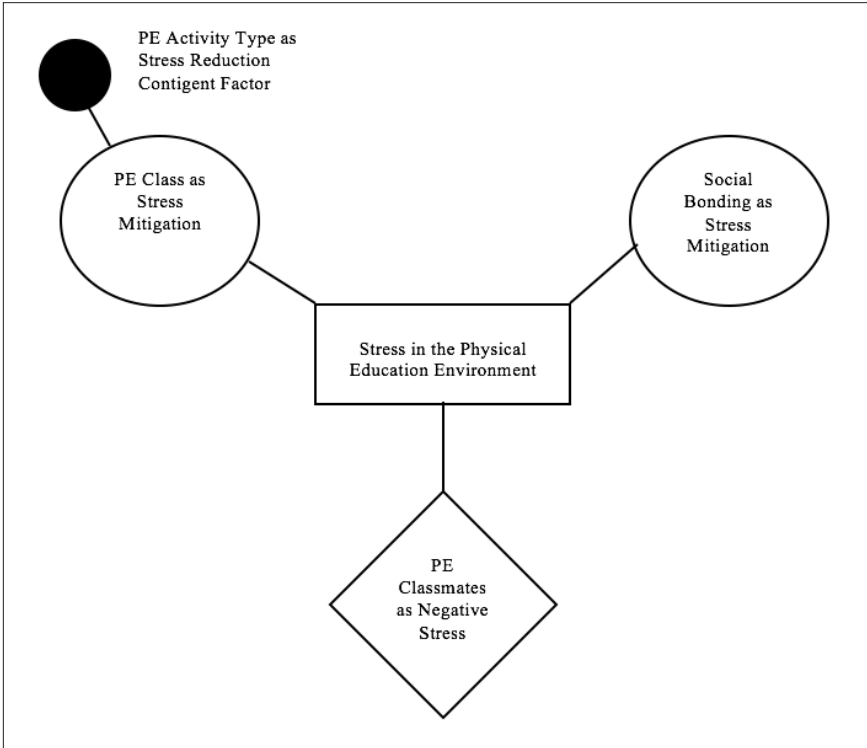


Figure 6. Stress in physical education: Major and minor themes.

Stress mitigation after participation in the physical education environment. Participant responses focused on the mitigation of stress after participation in PE: “Sometimes I forget about my stress, often doing fun things in PE”; “Yes, because I think physical activity is healthy and when I run or do physical activities, it helps get my mind off things and is like therapy”; “When I have fun I forget about the things that stress me”; “Running makes me calm”; and “After working out, my brain is empty and refreshed and ready for the next class.”

Social bonding as stress reduction in the physical education environment. For social bonding as a stress reducer, responses

included “Because I can talk to friends, and physical activity can help me forget about stress”; “I get to hang out with my friends and talk to them about life”; and “I talk to my friends and play sports.”

One minor theme that arose from this theme was that for stress reduction during class, stress reduction in PE was contingent on activity type. Statements included “If I enjoy the activity and get into what’s happening during PE, it occasionally takes my mind off of my stress” and “Depends on what we do in PE class.”

Classmates as negative stress in the physical education environment. Conversely, for the major theme of social bonding, participant responses focused on classmates as producing stress in the PE environment: “Classmates are too much,” “I don’t like some kids in my class,” and concise responses such as “Bullies!”

Discussion

The purpose of this study was to explore grade-level differences (seventh, eighth, and ninth) among junior high school students’ perceptions of the effects of participation in PE class on individual environmental stress. Findings suggest PE class helps junior high school students with stress in their lives, particularly seventh-grade students. In general, seventh graders were more likely to respond they could better handle stress after participating in PE class, to look forward to coming to their PE class, to report lower stress levels before arrival to PE class, and to report lower stress levels after participation in PE class than were than eighth and ninth graders. Overall, follow-up qualitative findings also help support quantitative results. For reference, when students left PE class, they felt their participation in class activities helped them “be more calm,” “distracted me from my worries,” and helped get “their mind off things.” Moljord et al. (2011) studied the relations of physical activity, stress, and happiness in a sample of Norwegian adolescents, 13 to 18 years old. Moljord et al. found that adolescents with moderate or high physical activity levels reported lower stress and higher happiness than did adolescents with lower physical activity levels.

Another point of discussion references participants expressing their feelings and thoughts in regard to PE class helping them lessen stress experienced from daily stress. Sharp and Barney (2016) studied the effects of stress in students attending a university that did not require physical activity classes for graduation and in students

attending a university requiring students to take physical activity classes for graduation. Students participating in physical activity classes recorded the following statements, “I still have stress, but physical activity helps”; “I would be more cranky and restless without it”; “I feel I am in a better mood and can handle situations better”; and “It relieves my stress and problems so I can encounter them.” Findings parallel with previous research and add to the literature supporting one potential beneficial mechanism for adolescents to address stress.

One of the main goals of PE is to make activities and games fun and enjoyable (National Association for Sport and Physical Education, 2009). Yet historically physical educators have used inappropriate instructional practices in activities and games that have not been fun and enjoyable for students, thus possibly creating or adding stress for the student. Barney et al. (2016) studied exercise as punishment in PE class and its effects on former students’ attitudes. Participants were interviewed about their past PE experiences and the use of exercise as punishment. Participants were asked, “Was the overall classroom environment affected when students had to exercise as punishment?” Overwhelming, participants reported yes, the classroom environment was negatively affected. Additional statements included “The atmosphere usually became tense,” “It’s awkward to watch,” “It scares the group or makes them feel uneasy,” and “It made us fear the teacher.” Student responses did not specifically address stress from exercise and punishment, yet the responses alluded to the notion that these experiences did not create a positive learning environment.

Implications for Physical Education Teacher Education Programs

The salutogenic conceptual framework states, “Understanding of the relation between physical activity and health, and in consequence richness to the perspectives of health in physical education” (Quennerstedt, 2008). Data and thematic content analyses show that junior high school students participating in PE class tend to report better stress management. Another implication from this study is that PE teachers should be mindful of activities students can participate in that will be most beneficial in helping students relieve stress in their lives. Table 2 outlines PE teacher education (PETE) program guidelines and their proposed associated effects on student stress in the PE environment.

Table 2*Physical Education Teacher Education Program Guidelines Impacting Stress in the Physical Education Environment*

Stress-promoting experiences in physical education	<ul style="list-style-type: none">• Problems with teacher or classmates• Psychological and physical violence• Pain during or after PE• Poor organization and class structure• Low perceived ability or consistent feelings of failure (Gerber, 2009)
Stress-mitigating experiences in physical education	<ul style="list-style-type: none">• Create developmentally appropriate tasks• Arrange private and maximize practice sessions• Use of stations• Create a task-involved motivational climate• Encourage free, creative, individual expression• Ensure positive class climate with zero tolerance for bullying• Identify students with low perceived competence/high trait anxiety• Establish 80% success rate to build confidence• Allow student choice or offer activities rated high enjoyment• Change student perceptions of demands and abilities• Permit students to self-evaluate and measure results• Teach relaxation techniques• Promote humanistic values• Build tolerance (Blankenship, 2013; Currie & Sumich, 2014)

Additionally, Pangrazi and Beighle (2013) suggested that when students enter class, they should be engaged in activity with active teacher interaction.

One last implication of this study is that in the preparation of their PETE majors, PETE faculty need to emphasize that student participation in class activities can result in stress management. When PETE majors graduate and teach their own classes, they can use this information to better inform parents, administrators, and the classroom teachers of the benefits of the student's activity in PE class and throughout the student's life.

Limitations

The researchers noted limitations to this study. Four junior high schools from two states participated in this study. Because the participants came from certain locales and grade levels, it may not allow a representative sampling of participants from other schools, from other grade levels, or in other geographic regions, thus limiting the generalizability of the findings. Thus, themes, conclusions, and implications are mostly applicable to those participant demographics. Research on refining PETE and the PE environment needs to be continued in new meaningful directions. PETE research should continue to incorporate diverse investigation methodology to better examine the environmental factors in the PE environment (Hassandra, Goudas, & Chroni, 2003). For more robust causal relationships between stress and physical activity to be identified, a longitudinal study design would be needed.

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PHYSICAL FITNESS

Influence of Visual and Auditory Stimuli on Exercise Intensity Among School-Age Children

Patricia Sandoval, Amanda Staiano, Holly Kihm

Abstract

*This pilot study tested the efficacy of auditory and visual stimuli to increase children's exercise intensity while exercising in a classroom. Nineteen children aged 6 to 12 years participated in four exercise conditions (treadmill with and without music; cycling with and without video) with heart rate monitored continuously. This study used *t* tests to compare % HR above rest between conditions. Children met levels of vigorous intensity in all conditions. There was a small but nonsignificant effect in % HR for treadmill (94 ± 18 with music vs. 87 ± 18 without music, Cohen's $d = 0.39$) and cycling (49 ± 25 with video vs. 59 ± 30 without video, Cohen's $d = 0.37$). Children reached vigorous-intensity levels regardless of auditory or visual stimulus. Future research should test positive and negative effects of auditory and visual stimuli on children's exercise intensity within a school setting.*

Patricia Sandoval was a research assistant on the project study and key contributor to the manuscript. Amanda Staiano is an assistant professor and director, Pediatric Obesity and Health Lab, Pennington Biomedical Research Center. Holly Kihm is an associate professor and director of the Interactive Physical Activity Lab, Southeastern Louisiana University. Please send author correspondence to amanda.staiano@pbrc.edu

Childhood obesity in the United States affects 18.5% of children and adolescents between the ages of 2 and 19 years, far surpassing the Healthy People 2020 goal of having the childhood obesity rate at 14.5% among American youth (Hales, Carroll, Fryar, & Ogden, 2017). Childhood obesity can result in the early onset of detrimental health risks such as cardiovascular disease and type 2 diabetes (Daniels et al., 2005), placing a significant financial burden on U.S. families. Children with obesity incur an estimated \$19,000 in lifetime medical costs more than normal weight children (Finkelstein, Graham, & Malhotra, 2014). If left untreated, nearly 80% of overweight adolescents will remain obese into adulthood (Daniels et al., 2005). With 39.8% of adults in the United States classified as having obesity (Hales et al., 2017), more prevention measures need to be implemented for a reduction in the high prevalence of obesity among the U.S. population.

Exercise interventions can be an effective method to improve a child's body composition (i.e., increase lean body mass and reduce body fat percentage; Kelley & Kelley, 2013; Vasconcellos et al., 2014). However, many physical education teachers and clinical health educators are finding it difficult to motivate children to engage in exercise. While national and international guidelines call for children and adolescents to engage in at least 60 min of daily moderate-to-vigorous physical activity (2018 Physical Activity Guidelines Advisory Committee, 2018; World Health Organization, 2017), it is evident that most youth are not motivated to meet these physical activity guidelines consistently. Three quarters (75.2%) of today's youth do not engage in the exercise levels needed to maintain long-term health promotion (Fakhouri et al., 2014).

Prior studies in adults have indicated that auditory and visual stimuli have increased the intensity and motivation to exercise among observed populations (Hutchinson, Karageorghis, & Jones, 2015; Lin & Jing-Horng, 2013; Rhodes, Warburton, & Bredin, 2009; Waterhouse, Hudson, & Edwards, 2010; Yim & Graham, 2007). For instance, in one study of 12 male college students, participants were asked to cycle while listening to music (Waterhouse et al., 2010). Researchers manipulated the tempo of the music and observed that decreasing the tempo resulted in a decrease in participants' heart rate and total mileage cycled, whereas an increase in tempo resulted

in the participants producing more power with each pedal stroke and completing more miles in the same time duration.

The purpose of this pilot study was to test the efficacy of auditory and visual stimuli on increasing the intensity of exercise among children between the ages of 6 and 12 years. With limited research on the effect of these potential motivational factors among young children, results gained from the study may serve as guidance for physical education teachers and public health professionals working to combat childhood obesity.

Method

Participants

During the spring of 2016, 19 children between the ages of 6 and 12 years attending an elementary school in southeastern Louisiana were recruited and enrolled into an after-school exercise program located at a local university laboratory (Kihm, Staiano, & Sandoval, 2017). Prior to children engaging in study-related activities, staff members obtained written informed consent from parents and verbal informed assent from participants who were under the age of 10 years. Participants 10 years and over provided written informed assent. The institutional review board approved the study protocol and all other study-related materials and handouts.

Instruments

Quantitative data collected for the two exercises performed were recorded on data sheets by the undergraduate students and then handed in at the end of each session to the lab graduate assistant, who then entered data into an excel spreadsheet. Each child's heart rate was tracked by a Polar GoFit heart rate monitor (Polar Electro, Kempele, Finland) that the children wore while exercising. Polar GoFit is an online program that syncs with heart rate monitors to provide physical educators with an overview of students' heart rate in real time. While there are limited published data on Polar GoFit (see Pettit, 2016), the Polar heart rate devices are considered a gold standard instrument for measuring heart rate and have been validated against other heart rate monitors (Boudreaux et al., 2018). Exercise intensity was determined based on the child's heart rate at the end of each exercise condition. Data were downloaded onto the Polar GoFit

app, which was saved at the end of each lab session. Total distance walked/jogged or cycled by each child was recorded in miles.

Procedure

Program sessions were held in the Interactive Physical Activity Lab (I-PAL) for 13 weeks during the Spring 2016 semester. The lab was held in a classroom in the university's Department of Family and Consumer Sciences building. The I-PAL was equipped with various child-sized pieces of exercise equipment such as stationary bikes, pedal desks, treadmills, exergaming consoles, and a tread-wall. Six undergraduate students collected data while supervised by the principal investigators, course instructor, and two graduate students. The undergraduate students enrolled in a research methods course and received 2 weeks of training on the protocol, and these students were also trained and certified in research methodology by the Collaborative Institutional Training Initiative certification. Participants attended the program after school, with the option of attending up to three 2-hr sessions per week.

At each session, a different exercise activity was used in the assessment of each participant's exercise levels. Before the children commenced with the activity, each child's resting heart rate was recorded. A moistened Polar heart rate monitor was placed around the child's chest, right below the chest muscles. The graduate assistant then instructed the children to relax and sit quietly for 1 min, after which their heart rate was read from the Polar GoFit app on the classroom iPad. At the end of the lab session, all data collected from the Polar GoFit app were downloaded and saved to the Polar website.

After the resting heart rate data were collected, the children were randomly divided into groups of three to four children; one or two undergraduates led each group. The children took part in a 5-min warm-up before engaging in the daily activity. During the daily activity, the undergraduate students monitored and recorded each participant's results. When all the children had completed the experiment, the undergraduate students led the group in a 5-min cooldown. The treadmill and cycling activities described next were only performed once during the 13-week program.

The treadmill activity with auditory stimuli was performed during Week 4 of lab with the aim of observing if music could positively affect a participant's exercise performance. The activity consisted

of four bouts of exercise (3.0 mph, 4.5 mph, 3.0 mph, 4.5 mph) per round. Each participant completed two rounds of the activity. Depending on the child's assignment, some participants listened to Taylor Swift's song "Shake It Off" during Round 1, while other participants listened to the song during Round 2. No participant listened to the song during both rounds. Children were told, "For this activity, you will jog and walk on the treadmill for a short period." Each round consisted of a 1-min warm-up (pace of 3.0 mph), then a 1-min jog (pace of 4.5 mph), followed by a 2-min walk (pace of 3.0 mph), and ending with a 1-min jog (pace of 4.5 mph). At the end of each round, the child's heart rate and total distance jogged/walked were recorded. A 1-min water break was given between Rounds 1 and 2. While all the rounds had a set speed, if a child decided to go slower than the assigned speed, or to stop before all rounds were completed, they could do so. In that case, the undergraduate student performing the observation noted the child's decision to deviate from the established protocol.

The stationary bicycle activity with visual stimuli was performed during Week 5 of lab. The aim of the exercise was to test if watching a video of a virtual bike path through Yellowstone National Park while riding a stationary bike would increase a child's exercise level more than cycling without watching the video. This activity took part over an entire week. On the first day, all children cycled for 10 min with the video projected on the screen at the front of the room. On the second day, all the children cycled for 10 min with no video. During each day, the bicycle resistance was kept at the lowest setting and children could pedal as fast or as slow as they desired. Children were encouraged to pedal for the entire 10 min, but if the child decided to stop before the time was up, he or she was not penalized.

Data Analysis

The primary outcome variable was % HR above rest during the exercise conditions. Secondary outcome variables included HR above rest, HR, and % HR_{max} , as well as distance traveled. The formula $208 - (0.7 * Age)$ was used to calculate age-predicted maximal heart rate (HR_{max} ; Mahon, Marjerrison, Lee, Woodruff, & Hanna, 2010; Tanaka, Monahan, & Seals, 2001), and vigorous-intensity exercise was classified as $> 60\% HR_{max}$ (Pescatello, 2014).

Independent-samples *t* tests were calculated and outcomes between condition for each modality (treadmill or cycling) compared, and confirmatory paired-sample *t* tests were calculated among the subset of children who completed both conditions. Cohen's *d* was calculated and effect size estimated.

Results

In total, 19 children had complete data for the cycling activity (16 with video and 10 without video; 7 completed both conditions) and 14 children had complete data for the treadmill activity (11 with music and 13 without music; 10 completed both conditions). Data were missing due to student absences. Table 1 shows descriptive characteristics.

Table 1
Descriptive Analysis of Sample Size (n = 19)

Descriptive statistic	<i>M</i> ± <i>SD</i>	%
Age, years	7.8 ± 1.3	
Female		82
Race		
White		71
Black/African American		12
American Indian		12
Filipino		6
Weight, kg	35.9 ± 15.7	
Height, cm	130.1 ± 9.0	
BMI, z-score	0.98 ± 0.99	
Obese		26
Overweight		26
Normal weight		47

Note. BMI = body mass index.

Table 2 reports the exercise intensity of children during the treadmill activity. There was a small effect size between conditions (Cohen's *d* = 0.39) for % HR above rest, though the difference was not statistically significant. There was no difference between conditions for

the secondary outcomes of HR above rest, HR, % HR_{max}, or distance traveled. Effect size was small for HR above rest (Cohen's $d = 0.19$) and not statistically significantly different from the others. Results were similar in the subset who completed both conditions, based on paired-sample t tests. Both treadmill conditions met criteria for vigorous intensity based on % HR_{max} (84% met vigorous intensity with music and 84% met vigorous intensity without music). All children met criteria for vigorous-intensity exercise when running on the treadmill with music versus 91% without music.

Table 2

Children's Performance With and Without Music During the Treadmill Activity

Dependent variable	With music <i>M</i> ± <i>SD</i>	Without music <i>M</i> ± <i>SD</i>	Cohen's <i>d</i>
Heart Rate Above Rest, %	94 ± 18	87 ± 18	0.39
Heart Rate Above Rest, bpm	82 ± 14	79 ± 18	0.19
Heart Rate, bpm	170 ± 20	169 ± 24	0.05
Heart Rate, % max	84 ± 10	84 ± 12	0.00
Distance, miles	0.3 ± 0.03	0.3 ± 0.08	0.00

Note. Values are for full sample.

There was a small effect between conditions in % HR above rest in the cycling activity (cycling without video vs. cycling with video, Cohen's $d = 0.37$), though there was no statistically significant difference. There was no difference between conditions for the secondary outcomes of HR above rest, HR, % HR_{max}, or distance traveled. Effect size was small for HR above rest (Cohen's $d = 0.26$) and small or trivial for the others. Results were similar in the subset who completed both conditions, based on paired-sample t tests. See Table 3. Seventy-one percent of participants reached their maximum heart rate while taking part in the cycling activity with the video versus 66% without the video.

Table 3

Children's Performance With and Without Video During the Cycling Activity

Dependent variable	With video	Without video	Cohen's <i>d</i>
	<i>M</i> ± <i>SD</i>	<i>M</i> ± <i>SD</i>	
Heart Rate Above Rest, %	49 ± 25	59 ± 30	0.37
Heart Rate Above Rest, bpm	44 ± 22	50 ± 25	0.26
Heart Rate, bpm	136 ± 24	138 ± 23	0.08
Heart Rate, % max	67 ± 12	68 ± 11	0.09
Distance, miles	2.1 ± 1.1	1.9 ± 1.2	0.18

Note. Values are for full sample.

Discussion

The purpose of this pilot study was to test the efficacy of auditory and visual stimuli on increasing the intensity of exercise among school-age children. There were small effects, whereby children engaged in higher intensity activity while listening to music on the treadmill versus no music, whereas children engaged in lower intensity activity while cycling with a video versus without a video, though no effects were statistically significantly different. Across all four exercise bouts, children reached vigorous-intensity levels of exercise.

Few studies have tested the motivational effects of auditory and visual stimuli on children. The results from the auditory trial support previous findings by K. Lee (1987), in which upbeat music tempo positively influenced children's ability to exercise on the treadmill. However, it was surprising that the visual stimuli of the video produced a lower heart rate while children cycled; the subject and tempo of the video (cycling through a national park) may not be sufficiently stimulating to increase children's intensity. Research needs to test under what circumstances auditory and visual stimuli can elicit improved exercise performance among children, including lengthening exercise bouts and increasing intensity of exercise, and if there are unintended negative effects as observed in the video condition of cycling. Given the Lee trial was performed over 30 years ago, future research should investigate incorporating new technology

into PE classrooms such as music played on a smartphone while children run, a fast-paced video played on a tablet while children cycle, and exergames that use auditory and visual stimuli in an engaging environment during structured exercise.

It is estimated that young people spend an estimated 7 hr 38 min/day consuming different modes of media (Rideout, Foehr, & Roberts, 2010). Much of that media usage is centered on listening to music (2 hr 38 min) and playing video games (1 hr 13 min; Rideout et al., 2010). Through these two popular forms of media usage during exercise bouts, children and adolescents may be more likely to engage in different modes of exercise that would grab their attention and potentially motivate them to exercise at moderate-to-vigorous activity levels. Therefore, auditory and visual stimuli may contribute to creating successful exercise interventions in physical education classrooms. Early childhood experts believe that when used appropriately, technology and interactive media can support learning and physical development among children and adolescents (National Association for the Education of Young Children & Fred Rogers Center for Early Learning and Children's Media at Saint Vincent College, 2012).

Limitations of the study include a small sample size that limited the power to detect potential differences between auditory and visual stimuli conditions. Resting heart rate was taken over a 1-min duration, which follows the American Heart Association (2018) and is used by physicians (Rabbia et al., 2002); it is recognized that a longer duration of rest is ideal but challenging in a real-world classroom environment. It is possible that the students in each group may have affected each other's effort levels, though children could not see each other's progress or heart rate during the exercise bouts. Furthermore, the exercise bouts were brief and occurred only once per condition; future studies should investigate the role of auditory and visual stimuli on children's motivation to exercise over a longer duration of time.

Visual and auditory stimuli are two low-cost initiatives that schools can incorporate into their gym class routines. With only 3.8% of elementary schools nationwide following the Surgeon General's recommendation of 150 min/week of physical education (S. Lee, Burgeson, Fulton, & Spain, 2007) and nearly half of school

administrators cutting gym time to keep up with the demands of No Child Left Behind (Kohl & Cook, 2013), physical educators need to make the most use of their limited class time. Providing students with fast-paced music and exercise videos or games while in gym may be one solution. Future research studies should build on these initial data to determine whether and in what ways visual and auditory stimuli can appeal and prompt children to exercise at a moderate-to-vigorous intensity. With school as a prime setting to successfully reach a greater population of children (Harvard T. H. Chan School of Public Health, n.d.; Office of Disease Prevention and Health Promotion, 2014), physical education classes would serve as an outlet for these future research interventions to be conducted and implemented. While a significant amount of research has been conducted on the benefits of auditory and visual stimuli among adults (Hutchinson et al., 2015; Lin & Jing-Horng, 2013; Rhodes et al., 2009; Waterhouse et al., 2010; Yim & Graham, 2007), this pilot study supports the need for more research to be performed among children and adolescents.

In summary, both exercise activities demonstrated the potential for children to reach a vigorous intensity when supplied with motivating conditions such as auditory and visual stimuli, though the children engaged in vigorous-intensity exercise regardless of the presence of the stimuli. Exercise needs to be fun and stimulating for children, and viewing exercise as a monotonous routine makes it difficult for youth to engage in at least 60 min of daily moderate-to-vigorous exercise. The results obtained in these trials may serve as a foundation for future research that tests the efficacy of auditory and visual stimuli to increase the intensity of exercise among children and adolescents.

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PHYSICAL FITNESS

Zumba in the Postindustrial Midwest: Minority Women and Access to Physical Fitness

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Abstract

Historically, minority women have had limited access to health care resources. Healthy People 2020 identified the promotion of activity and wellness as a key for eliminating health disparities in ethnic minorities, as minority women are not significant consumers of exercise programming. This study explored participation of a sample of underserved African American women in an individualized Zumba exercise program. The underserved sample was taken from a postindustrial Midwestern city. Participants ($n = 35$, $M_{age} = 45.75$) completed a 4-month aerobic intervention program offered through an accessible gym. At program completion, they responded to a semistructured survey that gauged reasons for participation, perceived enjoyment, and effectiveness. In addition, the survey prompted recommendations and suggestions for future programming. Low cost and entertainment aspects were the most commonly cited reasons for participation. Most participants found the program enjoyable and effective and expressed interest for participating in similar events in the future.

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Cardiovascular disease is the number one cause of death in the United States, and African American women are particularly at risk for cardiovascular disease, with an age-adjusted rate of cardiovascular disease 72% higher than that of White women (Centers for Disease Control and Prevention [CDC], 2016). African American women are also twice as likely as White women to have a heart attack (American Heart Association, 2016). On average, 82% of African American women are classified as overweight (Burwell, Frieden, & Rothwell, 2015). Regular physical activity prevents risks for developing cardiovascular disease and obesity (Berra, Rippe, & Manson, 2015). Nevertheless, physical inactivity is an ongoing challenge in the United States, particularly among minorities and women (Ward, Clarke, Freeman, & Schiller, 2013). In the United States, African American women aged 20 to 59 years accumulate an average of only 20 daily minutes of moderate to vigorous physical activity (Troiano et al., 2008), and 63% fail to meet the recommended physical activity guidelines (Burwell et al., 2015).

These statistics are interesting given that African Americans are regarded as a segment with high sport consumption behaviors (Bilyeu & Wann, 2002). Specifically, in professional sports, many mainstream healthy, fit, athletic African American athletes create a strong image for this demographic. There are 3 million to 6.5 million African American television viewers from ages 10 to 49 years old (Nielsen Holdings N.V., 2014, p. 17). These highly publicized athletes create strong viewership of sport and lead to higher sport consumption (Nielsen Holdings N.V., 2014). However, the strong viewership of sport for the African American segment, in general because sport consumption is a gendered experience (Tang & Cooper, 2012), has not translated to high sport and physical activity participation in African American women (Bassuk & Manson, 2004 ; Nies, Vollman, & Cook, 1999).

Of particular relevance to this study, pertaining to physical activity behaviors in African American women, data from public health research indicated limited child care opportunities, exercise partners, space at home or at work, motivation, and feelings of fatigue among the major barriers to being physically active (Joseph, Ainsworth, Keller, & Dodgson, 2015; Nies et al., 1999; Van Duyn et al., 2007). Other data sources have also cited lack of time, high

cost, and “feeling out of place” in exercise facilities outside of their neighborhoods (Walcott-McQuigg, 2005) as barriers to physical fitness. Recent research in health behavior has revealed that African American women may find particular appeal in long-term, comprehensive, and structured programs that address both exercise and nutrition and keep them motivated by means of ongoing support by their “buddies” (Thomas et al., 2009). Finally, barriers such as low socioeconomic status may be a cause of the increased prevalence of sedentariness (Burwell et al., 2015) and should be considered within initiatives of promoting activity in any community (Cohen et al., 2013).

To that end, community programs with goals to engage racially diverse populations in physical activity have highlighted the importance of involving the target community early, tailoring the physical activity programs to suit the predominant race, and creating partnerships among diverse groups (Bank-Wallace & Conn, 2002; Kumanyika, 2001; Schulz et al., 2005; Tanjasiri, 2005; Yancey et al., 2004). Consistent with the unique barriers these communities may be experiencing, these approaches have also emphasized the importance of select social determinants of health behaviors including levels of income, racial segregation, and social support.

Consequently, for this secondary market to gain further interest in physical activity programs, it may be imperative that insights into the psychological and contextual factors that facilitate physical activity behaviors are gathered from community members. In fact, understanding psychological and contextual correlates of physical activity behavior among African American women is necessary for designing comprehensive programs that particularly appeal to this community (Fleury & Lee, 2006).

Though associations have been made between physical activity behavior and several psychological and contextual factors, much remains unknown about the relationship between these correlates and regular physical activity participation, particularly in low-income, African American populations (Andersen, Gustat, & Becker, 2015). This study (1) identifies psychological and contextual correlates of physical activity participation among African American women in a low-income neighborhood in the rural Midwest and (2) advances

practical implications and recommends future directions for physical activity programming to appeal to this population.

Method

Design

Given the limited knowledge on potential physical activity participation and sport consumption behaviors of African American women (Hamner & Wilder, 2010), this study used a semistructured survey with greater emphasis on qualitative items. Open-ended questionnaires can help discover how participants in a study make sense of events and assign meaning to their experiences (Rubin & Babbie, 2016). In addition, through an explorative approach to inquiry, qualitative investigations can help reveal complex human experiences. Specifically, a qualitative approach emphasizes the consideration of several realities in the interpretations of social events (Fletcher & Arnold, 2011). Consequently, the rationale was that collecting data from various perspectives could promote greater understanding of diverse correlates of physical activity participation, such as the behaviors and preferences inherent in this segment. To that end, the researchers used an open-ended, semistructured questionnaire to prompt the perspectives and experiences of those who have participated in a physical activity program within a community facility.

Participants

The researchers used a homogeneous sampling technique to focus and simplify potential participant recruitment to members of a particular community center (see Patton, 2005). Specifically, following institutional review board approval, potential participants who were already using the center were contacted via flyers sent home through local schools, radio advertisements, and word of mouth. These communicants informed them about the purpose of the study, defined what participation would entail, and solicited participation. Overall, program attendance ranged from 60 to 90 participants per session: 32% males and 68% females and 100% African American racial classification. For the purposes of this study (i.e., achieving an in-depth understanding of African American women's experiences),

the sample of interest included 35 African American women ($M_{age} = 45.75$). Of the 35 women who responded to the survey, only 12 completed its qualitative section. Nonetheless, 12 was considered an appropriate number given that as the data collection progressed, new themes and coding failed to emerge, hence the occurrence of data saturation (Burmeister & Aitken, 2012; Guest, Bunce, & Johnson, 2006).

Procedure

Subsequently, the researchers presented information about the study at a selected community center both verbally and via participation packets, which were handed to participants. For the purposes of this study, participants engaged in rhythmic aerobics (i.e., Zumba) two times per week for 3 consecutive months within the local community center. Classes were free of charge. Each class took 60 to 70 min. Complimentary meal samplings followed each exercise session. Free babysitting services were provided as well, and due to the center's proximity to the participants' residences, minimal to no transportation was required. The researchers offered a fitness-based incentive to encourage twice weekly attendance. Zumba Basic Level 1 instructor certification was available for anyone who attended 24 out of 32 exercise sessions (75% of sessions). Eight out of 90 participants were eligible and became certified Zumba instructors through the incentive program. At the completion of the program, a 20-min, semistructured questionnaire was administered.

Semistructured Questionnaire

Initially, a preliminary interview was conducted with the center's manager so that the researchers could ensure that the comprehensive questionnaire addressed the relevant areas of sport and physical activity behaviors in the participants. This preliminary interview enabled the researchers to refine the items for the semistructured questionnaire used in this study. Specifically, drawing upon this interview, questionnaire items were finalized to achieve a deeper understanding of the participants' subjective experiences with the program (for a review, see Biddle, Markland, Gilbourne, Chatzisarantis, & Sparkes, 2001).

A semistructured questionnaire (see Figure 1) that investigated the thoughts and recommendations of the participants about the program was developed. Using a multiple-choice and open-ended format, the first section of the questionnaire asked participants to select two reasons why they initially chose to participate in the program. This section allowed the researchers to gain an insight into the motives behind these individuals' reasons for participating in a physical activity program. Using a Likert-type rating scale with anchors ranging 1 (*not at all*) to 5 (*very much*), the second section explored levels of enjoyment and perceived effectiveness associated with the program, as well as participants' potential interest in doing Zumba in the future. This section allowed the researchers to gain an insight into the potential of the program to truly change behavior and result in sustainability in the future. Using an open-ended format, the last section of the questionnaire encouraged participants to elaborate on any recommendations and/or comments related to the program, as well as preferences and requests for the future. This section allowed the researchers to identify important cues on what makes a program appealing to this segment and how this can inform upcoming practices.

Data Analysis

Mixed methods were utilized for analyzing the data from the qualitative survey. Data and the data analysis process of qualitative survey research can be described as “the rectangular variable by case matrix structure of the data set” and the consequential form of analysis by column inventory and consequential analysis “by matching variation in one variable with variations in other variables, which is an application of grounded theory” (de Vaus, 2002, p. 6). The qualitative survey does not aim to establish frequencies, means, or other parameters, but to determine the *diversity* of some topic of interest within a given population (de Vaus, 2002). In doing so, coding the open-ended responses with quantitative measures establishes a meaningful variation within the population. In addition, descriptive analyses were run in the Statistical Package for Social Science (SPSS) 19 for the scores associated with numerical data. Statistics of frequency, percentage distributions, mode, median, and standard deviations were computed pertaining to the motives for program participation, level of enjoyment, perceived effectiveness, and likelihood of doing

Zumba in the future. Data were organized in tables based on the respondents' answers to survey questions.

Results

Through Glasser's (2017) coding technique, categories of meaning emerged that had internal convergence and external divergence. Specifically, three consistent categories that are distinct from one another held deep meaning for participants. These referred to further initiatives participant would like to see offered and included additional Zumba classes, alternative courses, and suggestions related to nutritional components (see Table 1). Four general categories emerged in the respondent's narrative recommendations for the current program and/or upcoming programs (see Table 2): no changes, instructional recommendations, recommendations related to facilities, and suggestions for nutritional component.

Table 1

What Other Health-Behavior-Related Initiatives Would You Like to See Offered?

Category	Recommendations
Alternative courses	"Weights" "Any, I appreciate it all" "Maybe kids classes" "More Zumba!" "Dance club" "Piloxing and stretching" "Step aerobics"
Higher frequency of offered classes	"Just more of anything physical"
Nutrition	"Healthy cookies" "Recipes for the meals" "Nutrients guide"

Table 2*How Could the Program Have Been Better?*

Category	Recommendations
Instructional recommendations	“Step aerobics”
	“Different routines”
	“Provide clearer instruction when beginning the session”
	“Longer sessions”
	“I want to be able to do it more on my own time”
Nothing more...	“Very satisfied”
	“Please continue workouts like this one”
	“It was awesome. I’m glad I heard about it”
	“Everyone was very nice and informative”
	“Nothing, good program”
Nutritional component	“Please continue workouts like this one”
	“The food provided was very good. I feel it was all healthy and gave me some ideas to cooking at home”
	“It reminded me to promote good health at home”
Facilities	“Air conditioning”

Of descriptive analysis, Table 3 lists the frequencies of participants per survey item, reporting how much they enjoyed Zumba, to what extent they found it helpful, and how likely they are to continue participation in the future. Of 35 participants, 19 responded to the first item and 20 to the other two items. On a scale ranging 0 (*not at all*) to 5 (*very much*), on average participants reported very high enjoyment and perceived effectiveness associated with the program and very high likelihood of doing Zumba in the future. Table 4 lists the frequencies of participants per primary reasons of joining the program. Most participants reported joining the program because they found it either fun or cost effective, while some reported joining because they found it convenient.

Table 3*Frequency of Participants Reporting Primary Reasons for Joining the Program*

Primary reason	Frequency	%	Valid %	Cumulative %
Fun	14	40.0	40.0	40.0
Cost	15	42.9	42.9	82.9
Valid Informative	1	2.9	2.9	85.7
Convenient	5	14.3	14.3	100.0
Total	35	100.0	100.0	

Table 4*Frequency and Ratings of Participants for Perceptions Associated With the Program and Future Intentions*

Perception	N	Min	Max	M	SD
Enjoy Zumba	19	5	5	5.00	.000
Helpful for physical activity and nutrition	20	2	5	4.55	.887
Likely to do in the future	20	4	5	4.90	.308
Valid N (listwise)	19				

Discussion

The high levels of inactivity and the persistent disparity in cardiovascular disease underscore the need for better programming focused on enticing African American women to increase physical activity (American Heart Association, 2016; Burwell et al., 2015) due to the large number of African American women who struggle to participate in regular physical activity (Webb, Khubchandani, Hannah, Doldren, & Stanford, 2016). This study delineated psychological and contextual facilitators of physical activity participation among African American women in a low-income neighborhood in the rural Midwest and accordingly advances practical implications and recommendations for attempts to appeal to this population.

These findings suggest that strategies with the most appeal to low-income African American women are entertaining, cost effective, and convenient. Specifically, the participants placed high value on being active with others from the community, having

classes available at low or no cost, and having easy access to the facility, which best accommodated their work and family schedules. Dornelas, Stepnowski, Fischer, and Thompson (2006) completed a similar study. They attempted to engage minority women (African Americans and Hispanics) into regular physical activity by conducting two 10-week aerobic fitness programs that were offered in both a women's health care clinic and a church. The study concluded that considering age and target population is vital to identifying a setting that best fits urban-minority women. Location can be a large factor in the underserved's willingness and ability to participate in physical activity. The current study supports that conclusion, as 100% of the participants reported convenience as a primary reason for their participation. In addition, Dornelas et al. suggested that places of religious practice are being underused as a convenient location for physical activity. Community religious buildings provide a setting where underserved women already feel comfortable and familiar with (Campbell et al., 2007; Young & Stewart, 2006). Places of worship often have a strong social network in place, and strong social support is directly correlated with compliance to physical activity and a fitness schedule (Heath et al., 2012). For creating a fitness program for urban minority women, it is important that research explores what locations have deep roots in the community and will translate to a more comfortable exercise experience for minority women. As in the current study, where 20 out of 35 participants indicated they would participate in the activity again, Dornelas et al. (2006) received a similar response: 31 out of 34 (91%) of participants said they would participate again if the class was offered.

Earlier reports have also proposed that to increase the appeal of health promotion activities, activities need to be modified to the unique sociodemographic characteristics of the community (Kong, Tussing-Humphreys, Odoms-Young, Stolley, & Fitzgibbon, 2014) and cognizant of considerations such as time and financial restrictions (Conn, Chan, Banks, Ruppap, & Scharff, 2013). Earlier marketing research has also recommended that although intimidating for some (Miller & Miller, 2010), ideally, activities to increase physical activity participation among minorities should be group-focused, hands-on, purposeful, and inclusive of more than family and friends (Van Duyn et al., 2007).

Thus, based on the present results, marketing efforts would benefit from attempts to build fun and entertainment value into these programs, decrease associated costs, and increase access to places for physical activity. Consistent with early recommendations, researchers in this study partnered with community leaders to best overcome common barriers to physical activity including lack of infrastructure, transportation, and access (Schulz et al., 2005). These partnerships should remain an integral part of similar efforts in the future. To that end, this approach seemed to benefit from integrating an existing local facility that was easy to reach, safe, and available for the type of program offered, as well as extending free child care services for participating members and offering a Zumba instructor certification for the those who regularly attended.

Noteworthy, many of the participants reported high enjoyment and high satisfaction with the program. Of these participants, most reported that they are likely to do Zumba in the future. This feedback is important because negative affects toward physical activity preclude participation (Ekkekakis, Hall, & Petruzzello, 2008), while positive affects help facilitate it (Williams et al., 2008). In fact, positive affects were shown to help adherence to health behavior in African Americans in general (Ogedegbe et al., 2012). Although the primary focus of this study was the physical activity portion of the program, a combination of physical activity and nutritional education programs is integral to increasing community health behaviors (American Heart Association, 2016) and active living environments in communities (Stirling, Lobstein, & Millstone, 2007; Viswanath & Bond, 2007). Consistent with this view, the participants found it beneficial when both activity and nutrition programs for their overall health and continued health behaviors were offered.

Finally, findings from this study reinforce the notion that low-income African American women have low rates of physical activity participation. Therefore, understanding the unique correlates to activity in this population is vital and could lead to the design of programs and interventions that effectively appeal to them (Resnicow et al., 2000). Few studies have examined low-income African American women's perceptions toward and experiences with physical activity (Ainsworth, Wilcox, Thompson, Richter, & Henderson, 2003; Jackson et al., 2016).

Taken together, these findings indicate that (a) psychological correlates of physical activity likely influence participants' decision to engage in a program; (b) if properly addressed, unique contextual barriers to a community, such as cost of physical activity, commitments including child care, and lack of convenient facilities, can become distinctive strengths and facilitate recruitment of the community's members; and finally, (c) although not specifically tested herein, early partnership with community leaders, as well as focus groups with local residents, can help these programs to meet their goals. Thus, they should be diligently considered when research targets these relatively unexplored second markets.

Critical recommendations could therefore include a number of tactics to expand the Zumba market. Expanding the market past the traditional target market of Caucasian women can indeed lead to more diversity, inclusion, and opportunities for growth. Creating Zumba programs to service this population and fulfill their physical activity needs and promote health is a cause-related marketing perspective. Specifically, when sport programs have a focus or cause, it creates a synergy for increasing awareness and participation for achieving a common goal. Thus, the focus is a point of differentiation from other physical activity programs because it exhibits how this Zumba program specifically meets the client's needs. If a program meets the needs of the participants before, during, and after the activity, then the participant is more likely to stick to the plan in the long term (Fjeldsoe, Neuhaus, Winkler, & Eakin, 2011). Thus, participants incorporating the Zumba program into their lifestyle could result in higher consumption rates, and the opportunities for partnership/sponsorship relationships could grow with the participant base. Obtaining these relationships would offset program expenses and participant expenses while benefiting the sponsor by providing exposure to their company, brand, or product. All of these opportunities in this sport business model provide a means of creating and growing a sustainable fitness program that serves African American women as a viable secondary market.

Limitations and Recommendations for Further Research

During this research effort, the researchers found that the unique barriers and facilitators that promote physical activity participation were relatively unexplored among low-income African American

women. The results are not representative of a broader population due to the nonrandom recruitment strategy, small sample size, and use of mostly qualitative rather than quantitative research methods. Another drawback of the study was its primary focus on physical activity participation and its limited discussion of the nutritional component. The nutritional portion of this program was not standardized, as it consisted instead of sampling foods and providing nutritional pamphlets for participants to take as they desired and read at their convenience. Other studies, however, have shown that programs with structured physical activity and nutritional education components can be highly effective in similar communities (Resnicow, Taylor, Baskin, & McCarty, 2005; Resnicow et al., 2000; Wadden et al., 1990). Thus, our primary focus may have precluded an investigation of the effectiveness of other components such as the unstructured nutritional educational piece and their combined effect on overall health behavior change.

However, the strategies discussed remain evidence-based and are likely to benefit upcoming programs within same or similar demographics. Although not emphasized within the framework, it appears that nutritional education is an important determinant of these initiatives and deserves more attention in future research. Thus, future investigations with a more complete and structured set of components could possess particular promise to identifying the unique correlates of health behavior engagement in this market. Upcoming studies might include other variables such as more targeted instructive pieces and could obtain measures of those to determine if or how they contribute to the appeal of the program within a given community.

Collectively, these findings emphasize the usefulness of community-based interventions as means to enhance physical activity behavior in underserved communities. From a theoretical standpoint, these results provide further support for tailoring interventions to a specific community's cultural needs (Heath et al., 2012). From an applied standpoint, these findings provide practitioners with further tools to design and implement interventions within minority settings. This finding is particularly relevant in that there is an ongoing need for designing appealing and effective programs for minorities given their lower levels of physical activity (Lewis, Napolitano, Buman, Williams, & Nigg, 2017).

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SPORT EDUCATION

Analysis of the Sport Education Tactical Model in Badminton University Physical Activity Courses

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Abstract

*The purpose of this study was to investigate the impact of the Sport Education Tactical Model (SETM) on game performance, content knowledge, and physical activity levels of university students enrolled in badminton. Thirty-eight university students completed 19 lessons. Pre- and posttests consisted of a 15-min, video recorded singles badminton match, plus a 50-question content knowledge test. Game performance was measured via the Game Performance Assessment Instrument. Physical activity levels during each SETM lesson were measured via Actigraph GT3X triaxial accelerometers. Paired-samples *t* tests revealed significant increases between pre- and posttest scores for game performance and content knowledge. Participants achieved 60.10% (9.03) in moderate to vigorous activity during badminton lessons. In conclusion, the SETM was effective in improving game performance and content knowledge while helping participants meet the recommended 50% moderate to vigorous physical activity level.*

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According to the American College Health Association (2012), 34.3% of students on college campuses are overweight or obese and 50.6% of college students meet the weekly recommended amounts of moderate to vigorous physical activity (MVPA). With obesity trends continuously increasing and physical activity decreasing as people age, college students need availability of and accessibility to education and opportunities to be physically active. One such opportunity is an effective higher education physical activity (PA) instructional program. The National Association for Sport and Physical Education (NASPE, 2009) provides guidelines for higher education PA programs. NASPE (2009) stated, “Appropriate instructional practices in physical activity programs are those that recognize each student’s development of movement abilities, as well as his or her individual differences” (p. 2).

Effective teaching in a PA program is key to encouraging students to continue to be physically active and live a healthy lifestyle once completing any course offered in the program. To have effective teaching, PA teachers should be required to choose an appropriate instructional model to deliver the course content. An instructional model is a “blueprint” for the teacher to follow and teach the content to the students (Metzler, 2011). Eight instructional models can be utilized in physical education, whether it is a K–12 or college/university setting (Metzler, 2011). One of the more popular instructional models is the Sport Education model (SEM). The SEM was designed for students to become competent, literate, and enthusiastic in the activity being taught (Siedentop, Hastie, & van der Mars, 2011). To reach this goal, the SEM has six characteristics to be followed: (1) season, (2) affiliation, (3) record keeping, (4) formal competition, (5) culminating event, and (6) festivity. Research in SEM has discovered many positive learning outcomes of the instructional model, such as more opportunities to learn for students with lower skill levels (Hastie, 1998a, 1998b), minimal off-task behaviors by students (Hastie, 1996), and opportunities for MVPA with SEM in floor hockey (Hastie & Trost, 2002) and basketball (Perlman, 2012). Researchers have found an increase in game-playing abilities through use of the SEM in different activities (Hastie, 1998b; Hastie, Sinelikov, & Guarino, 2009; Ormond, Christie, Barbieri, & Schell, 2002; Pritchard, Hawkins, Wiegand, & Metzler, 2008; Pritchard,

McCollum, Sundal, & Colquitt, 2014) and students were more motivated to participate in physical education (Wallhead, Garn, & Vardini, 2014). With so many positive learning outcomes of the SEM at the middle and high school levels, it is worthwhile to investigate the impact of the SEM in PA programs at the college/university level.

Research of college/university PA programs that utilized the SEM revealed that university students perceived they learned more in the SEM class than any other PA class, and 90% of those students would take another course taught via the SEM (Bennett & Hastie, 1997). Mohr, Sibley, and Townsend (2012) found that students' ratings of progress were high and ratings of teaching effectiveness were high compared to published norms in university PA courses that utilized the SEM.

There are different versions of the SEM such as the original SEM (Siedentop et al., 2011), the Pedagogical Approach to Sport Education (Bulger, Mohr, Rairigh, & Townsend, 2007), and the Sport Education Tactical Model (Pritchard & McCollum, 2009b). Pritchard and McCollum (2009b) described the integration of the original SEM with the properties of the Tactical Games Model (TGM) to form the Sport Education Tactical Model (SETM). The goal of the SETM is the same as the original SEM, but the instruction provided to students is different. The SETM combines the properties of the SEM and the TGM to teach students the skills necessary to solve the tactical problem being taught during the lessons. Mitchell, Oslin, and Griffin (2013) recommend using the SEM components within the TGM "to organize teams, equipment, and games to help students develop game play and sport behaviors" (p. 41). Hastie and Curtner-Smith (2006) were the first to investigate a hybrid model of SEM and TGM with sixth-grade students. Students responded well to problem solving, game play appreciation, and executing skills/tactics of the batting/fielding games. Research demonstrated an increase in game performance among fifth-grade students for soccer (Farias, Mesquita, & Hastie, 2015) and middle school students in basketball coeducational classes and single-gender classes (Pritchard et al., 2014). Little research has been conducted on the SETM at other levels including the college/university level. The purpose of this study was to investigate the impact of the SETM on game performance,

content knowledge, and PA levels of university students enrolled in PA badminton courses.

Method

Participants and Setting

The investigation was administered in two university PA badminton courses at a public university in the southeastern United States. The badminton courses met during the university summer session for 80 min each day, 4 days a week over 5 weeks, for 19 lessons. On the first day of class, the teacher went over the course syllabus and discussed the study. This day was not included in the 19-lesson season. Participants were 38 university students (23 male, 15 female) with an age range of 19 to 33 years ($M = 21.71$, $SD = 2.29$). Participation was voluntary, and no extra credit was provided. The Institutional Review Board for the Protection of Human Subjects approved the investigation prior to data collection.

Instrumentation

Game Performance Assessment Instrument. The Game Performance Assessment Instrument (GPAI; Oslin, Mitchell, & Griffin, 1998) was developed to measure “game performance behaviors that demonstrate tactical understanding, as well as the player’s ability to solve problems by selecting and applying appropriate skill” (p. 231). To characterize game performance in net wall games, the researchers identified observable components including (1) decisions made, (2) skill execution, and (3) base. The decisions made category consisted of participants making appropriate choices about skills to use including the clear shot to push the opponent back, the drop shot to bring the opponent forward, and a smash to win the point. For example, if the opponent was playing up near the net, then the participant would want to hit a clear shot to push the opponent to the baseline to set up the next shot. If the opponent was at the baseline, then the participant would want to hit a drop shot since the open area of the badminton court is near the net. The participant could also hit a smash to win the point if the shuttle is high and near the net, which would make it difficult for the opponent to hit a return shot. If the participant made a correct decision on the type of shot to attempt, a tally mark was written in the appropriate decision

made column. If the participant made an incorrect decision on the type of shot to attempt (e.g., attempt a drop shot when opponent was at the net), a tally mark was written in the inappropriate decision made column.

In the skill execution category, the participant had to execute the skill proficiently for the researchers to code the skill as appropriate. In the case of the clear shot, it had to be high and deep for it to be coded as appropriate. If the clear shot was not high enough or deep enough on the court, the researchers coded the skill as inappropriate. For the drop shot, the shot was coded appropriate when the drop shot was short and low, so the opponent had trouble getting to the shuttle. If the drop shot was not low or short, then the researchers coded the skill execution as inappropriate. For the smash shot, the researchers coded it as appropriate if the smash was hit hard and down toward the court. If the smash was not hit hard and down, then the shot was coded as inappropriate.

The last behavior of game performance assessment was the base category. The researchers used this category to assess if the participant returned to home position between skill attempts. For the researchers to code the base category as appropriate, the participant had to return to the appropriate position on the court to be ready for the next shot. If the participant did not return to this base position, the researchers coded the behavior as inappropriate.

The researchers computed overall game performance scores by dividing the number of appropriate codes by the total number of codes within each category, then multiplying this by 100, resulting in percentage scores for (1) decisions made, (2) skill execution, and (3) base, as recommended by Mitchell, Oslin, and Griffin (2013). The average of these three scores served as an overall game performance score for each participant.

Content knowledge. The researchers used a 50-question multiple-choice test to measure badminton content knowledge. They chose questions from the test bank by McGee and Farrow (1987). The knowledge test had no data quality coefficients, but other researchers have effectively used the test bank (French, Werner, Rink, Taylor, & Hussey, 1996; French, Werner, Taylor, Hussey, & Jones, 1996; Pritchard et al., 2008). Safrit and Wood (1995) considered the test bank “the best source of test items for sport” (p. 421). The number

of questions answered correctly on the content knowledge test was multiplied by 2 for a score out of 100%. The test was administered to physical education teacher education (PETE) majors the semester before data collection for the current study and was evaluated by an outside researcher, which further established content validity.

Physical activity. PA was measured during the badminton lessons via Actigraph GT3X triaxial accelerometers (ActiGraph, Pensacola, FL). Accelerometers were attached to a belt with monitors positioned on the right hip, and data were acquired in 1-min intervals. Participants wore the accelerometers during each lesson except Lesson 1, which was the day the badminton class syllabus was introduced, the purpose of the study including consent forms was presented, and pretest data were collected. The researchers downloaded accelerometer data using Actilife software (ActiGraph, Pensacola, FL) to determine the amount of time participants spent in MVPA (≥ 3 METS) and vigorous activity (≥ 6 METS), using triaxial vector magnitude cut points established by Sasaki, John, and Freedson (2011).

Teacher and Data Collector Training

The teacher was a university professor who was part of the research team and had over 10 years of experience implementing different versions of the SEM including the SETM. The teacher had taught badminton in previous years at the university level, utilizing the SETM to provide experience and expertise in the activity and sport. To ensure the SETM was appropriately implemented, the researchers followed the teacher and student benchmarks of the SEM and TGM described by Metzler (2011), because the SETM combined the characteristics of both models (Pritchard & McCollum, 2009b). Another researcher was present during the badminton lessons observing the implementation of the SETM during the badminton lessons.

Two researchers who did not teach the badminton lessons analyzed the game performance scores and were trained to use the GPAI prior to starting the research study. Training required the researchers to score performance using the GPAI badminton instrument while observing badminton games played in a PETE methods course. These games were video recorded via the same protocol as the current study. Game performance was scored using the GPAI

by the primary researcher and the other two researchers for each participant of the PETE course. Interobserver agreement of at least 80% was achieved for GPAI scores during the training period. For the current study, the two trained researchers coded the participants' game performance during game play episodes of each testing occasion, and interobserver agreement scores were calculated, with an average of 87%.

Procedures for Data Collection

Participants were given the content knowledge test on Day 1 of the badminton season. Immediately after, they were given a short tutorial on the rules of playing badminton. After the tutorial, participants played a 15-min game of singles badminton. Posttesting occurred on the last day of the badminton season via the same protocol as pretesting except without the short tutorial. All participant games were video recorded pre- and postseason to later be analyzed via the GPAI by the researchers.

Badminton Season

The badminton season was broken down into three phases consisting of the preseason, midseason, and postseason (see Table 1). During the preseason, participants were placed on teams based on playing ability ranked by the teacher. Participants conducted daily roles (i.e., coach, fitness trainer, equipment manager, statistician, substitute, and reporter) for each phase of the season. In the preseason lessons, the teacher taught the tactics and skills by employing a play, teach, play format. At the beginning of the lesson, the participants assigned as fitness trainers warmed up the teams while coaches met with the teacher to review the coaching plan. The coaching plan comprised the rules of the first modified game, which was designed to encourage participants to think about the tactic being taught in the lesson. Once the modified game was completed, the teacher asked participants about the tactical problem and how one would solve the problem by utilizing specific skills. The teacher taught the badminton skill to solve the tactical problem and then provided movement tasks. Participants practiced the skill during the movement tasks. When the tasks were completed, participants played a second modified game to reinforce the tactic and skill that was practiced. A lesson

closure reviewing the tactic learned in the preseason lesson and the cues of the skill to solve the tactic was provided.

Before the midseason and postseason lessons began, coaches ranked their teammates playing ability using a ranking system of 1 to 6, with 1 representing the most skilled. When one team played another team in the midseason or postseason, the number 1 seeds played each other, the 2 seeds played each other, and so on, which ensured participants played someone with similar ability. During the midseason and postseason, teams competed against one another to earn points for the overall championship. Points were awarded for wins and losses during the midseason and postseason, and teams could also earn points by wearing team colors, performing the team cheer, and performing daily roles. The team with the most points at the end of the season was the champion of the badminton season. The champions received certificate awards at the end of the badminton season, along with individual awards (e.g., most improved, team before self) being given to players on any team.

Table 1

Badminton Sport Education Tactical Model Season Plan

Lesson	Topic
1	Preassessment of badminton playing ability and content knowledge
2	Introduction of Sport Education Tactical Model (SETM); team affiliation
3	Creating space using forehand overhand and forehand underhand clears
4	Creating space using backhand overhand and backhand underhand clears
5	Creating space using forehand and backhand drive shots
6	Winning the point using drop shot and smash shot
7	Starting the game using underhand serve and backhand serve
8	Attacking and defending as a pair; doubles play
9	Statistics and chair umpiring; singles play
10–16	Midseason round-robin tournament
17–18	Postseason tournament with consolation rounds
19	Festivity day: Championship with awards ceremony, postassessment of badminton playing ability and content knowledge

Data Analysis

Paired-sample *t* tests were performed in IBM SPSS Statistics for Windows version 23 (IBM Corp., Armonk, NY), and pre- and posttest scores of the following dependent variables were compared: (1) game performance, (2) decision making index, (3) skill execution index, (4) base index, and (5) content knowledge. The Bonferroni corrected alpha was .01.

PA mean levels were calculated and the amount of MVPA participants engaged in when participating in the badminton season was determined.

Results

Table 2 shows the descriptive statistics generated on the dependent variables, including game performance and content knowledge, for the SETM assessment point. Table 3 provides descriptive statistics on activity time.

Table 2

Descriptive Statistics for Content Knowledge Test and Game Performance

Dependent variable	Pretest <i>M (SD)</i>	Posttest <i>M (SD)</i>
Game Performance	39.08 (11.11)	62.99 (11.37)
Decision Making Index	41.02 (14.07)	66.52 (8.86)
Skill Execution Index	48.14 (20.04)	67.38 (8.88)
Base Index	28.07 (17.64)	55.08 (27.96)
Content Knowledge	33.74 (10.14)	79.21 (9.50)

Note. Each mean score is out of 100.

Table 3

Physical Activity Levels During the Sport Education Tactical Model Season

Activity level	% <i>M (SD)</i>
Light	40.25 (8.88)
Moderate	50.15 (10.08)
Vigorous	9.96 (5.95)
Moderate to Vigorous (MVPA)	60.10 (9.03)

Game Performance

A paired-samples t test revealed a significant increase in game performance scores from pre- to posttest, $t(37) = -13.152$, $p < .01$. Cohen's effect size ($d = 2.13$) suggested a high practical significance. When game performance was separated into the sub-categories, paired-samples t tests revealed a significant increase from pre- to posttest scores for the decision making index, $t(37) = -10.086$, $p < .01$, with a Cohen's effect size ($d = 1.64$) suggesting a high practical significance. The skill execution index, $t(37) = -6.177$, $p < .01$, had a significant increase in pre- to posttest scores with Cohen's effect size ($d = 1.00$) suggesting a high practical significance. The base index, $t(37) = -7.969$, $p < .01$, had a significant increase in pre- to posttest scores with Cohen's effect size ($d = 1.29$) suggesting a high practical significance.

Content Knowledge

A paired-samples t test revealed a significant increase from pre- to posttest scores for the content knowledge test, $t(37) = -20.573$, $p < .01$, including a high practical significance Cohen's effect size ($d = 2.05$).

Physical Activity Time

Based on mean activity time during the badminton season, participants spent 60.10% ($SD = 9.03$) of their PA time in MVPA. The mean activity time the participants spent in MVPA was higher than the 50% of time to spend in MVPA during physical education lessons recommended by the Centers for Disease Control and Prevention (2010).

Discussion

The findings of this study demonstrate that participants made significant gains in game performance and content knowledge while meeting the required 50% MVPA level during the SETM badminton season.

Game Performance

The significant increase in game performance scores over time demonstrates participants were making better decisions on shot selection, the skill execution of shots was efficient, and participants

returned to base position after each shot. During the preseason of the SETM, the teacher emphasized the tactics of badminton while teaching the skills needed for students to improve in badminton. The play, teach, play format encouraged participants to think about the tactics and the skills necessary to improve game performance. French, Werner, Taylor, et al. (1996) utilized the traditional TGM using a play, teach, play format to demonstrate how effective the model is in improving badminton skills and game performance for ninth-grade students. Hastie et al. (2009) found similar results with significant improvements in skills tests, game play, and tactical knowledge in badminton following a SEM intervention with eighth-grade students. The difference in the Hastie et al. study and the current study was the type of SEM intervention. This study incorporated the TGM within the SEM, while Hastie et al. used a traditional SEM. The SETM (Pritchard & McCollum, 2009b) incorporates the properties of the TGM and SEM to allow students to learn both the tactics and the skills of the activity being taught. This study demonstrated that the SETM is effective in improving badminton game performance. By having participants play in modified games during the preseason, this study allowed participants to execute skills in a game play environment.

Content Knowledge

Content knowledge scores significantly increased over time for badminton following the SETM. These findings are supported by other SEM research measuring an increase in content knowledge for other types of activities (Pritchard, Hansen, Scarborough, & Melnic, 2015; Pritchard et al., 2008). This increase in scores can be attributed to the presentation of content in classes via the SETM. The SETM requires participants to conduct roles during the season. One role is the coach who is responsible for peer teaching content provided on the coaching plan. The coaching plan, provided by the teacher, had information on the previous lesson content and on the current lesson modified game. The content in these coaching plans incorporated rules, cues of skills taught in class, and any other information that one would need to learn to play badminton. By incorporating this material from the coaching plan and from the content being taught by the teacher, the participants significantly improved their content

knowledge scores from the beginning to the end of the badminton season.

Physical Activity Time

PA time during the SETM badminton season exceeded the goal of 50% MVPA during physical education lessons. This PA time can be attributed to several factors. The first factor was the setup of the badminton lessons. Once participants entered the gym and class time officially started, they immediately went to their teams' home court to warm up with the team using a fitness card. This class management protocol ensured participants immediately engaged in PA at the beginning of each lesson. The second factor that influenced PA levels was the inclusion of modified games in the SETM during each lesson. Each preseason lesson included two modified games. The first modified game let participants play with modified badminton rules to enhance a tactical problem. After the first modified game, participants practiced the skill necessary to solve the tactical problem. The second modified game occurred after skill practice, allowing participants to use the learned skill in a game situation. Modified games allow participants to play, instead of practicing skills in isolation to improve MVPA levels (Van Acker, da Costa, De Bourdeaudhuij, Cardon, & Haerens, 2010). Middle school students in Harvey, Song, Baek, and van der Mars's (2016) study met the goal of 50% MVPA in physical education via the TGM with the sport of soccer. Harvey and García-López (2017) broke down the TGM to investigate the MVPA in the three phases of a TGM lesson. The middle and elementary students did not meet the MVPA requirements during the first modified game, skill practice, or second modified game of basketball lessons (Harvey & García-López, 2017). For the SEM, the 50% MVPA guideline was met in floor hockey (Hastie & Trost, 2002) but not in basketball (Perlman, 2012). Pritchard and McCollum (2009b) combined SEM and TGM to form the SETM to improve instruction while students learn to play while practicing the skills needed to play the game. Mitchell et al. (2013) recommend using the SEM components within the TGM for team organization, equipment, and modified games. By having students on teams early in the season and performing daily roles (e.g., fitness trainer), the teacher does not waste lesson time by grouping students to play modified games or prepare equipment at the beginning of class. The routines associated

with SETM are built into lessons, so management time is decreased, thus increasing the opportunities for participants to increase MVPA.

The third factor influencing PA levels was the setup of the practice tasks. Participants practiced skills that would benefit them in learning to play badminton such as clear shots, drop shots, serves, and smashes. The teacher designed tasks so participants had to move when practicing their skills, as described by Pritchard and McCollum (2009a). For example, when participants practiced the underhand clear, the hitter would run and touch the baseline after hitting the shuttle using an underhand clear. The hitter would run back to base position for the next attempt. This hit-and-move technique (Pritchard & McCollum, 2009a) allowed participants to move between attempts, instead of the traditional standing between skill attempts. The last factor influencing PA levels was the setup of the midseason and postseason. During the midseason and postseason, teams played one another in singles and doubles play. Each class had three teams. Each team seeded team members with seed 1 being the most skilled player, seed 2 was next skilled player, and so on to Seed 6. The midseason round-robin tournament had number 1 seeds playing one another, 2 seeds playing one another, and so down the line. This seeding system ensured that participants played others with similar abilities. Playing participants with similar abilities encouraged longer rallies and more movement by players.

Conclusion

The results of this study demonstrate the SETM improves badminton game performance and content knowledge while helping students exceed the 50% MVPA recommended by the Centers for Disease Control and Prevention (2010). If the goal of a university PA class is to improve student learning while incorporating MVPA, the SETM is a model a teacher could utilize.

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SPORT EDUCATION

Enhancing Student Learning in Sport Education Through the Manipulation of Need-Supportive Instruction

Nicholas Washburn, Oleg A. Sinelnikov, K. Andrew R. Richards

Abstract

Though motivationally nurturing instruction has been linked to numerous desirable outcomes, its presence and impact on student learning, particularly in models-based practice, is largely absent in the literature. Grounded in self-determination theory, this study examined the efficacy of an intervention aimed at increasing the provision of psychological need-supportive instruction and the associated impact on learning within Sport Education. This study included one preservice teacher, Jason, and the 58 students in his fifth-grade class. Jason first taught one season of floor hockey. During this season, Jason's need-supportive behaviors were coded and his students were tested in the cognitive (pre, post, retention) and psychomotor (pre and post) domains. Following a workshop seeking to increase his provision of need support, Jason then taught a season of pickleball to the same class, and identical data collection procedures were used. Relative to the preintervention season, Jason exhibited significantly more need-supportive behaviors in the form of autonomy support ($p = .006$), structure ($p < .001$), and relatedness support ($p = .004$) in the postintervention season.

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Analysis of variance tests revealed significant improvements in cognitive scores during both seasons from pre- to posttest; however, only during the postintervention season were scores significantly higher from posttest to retention, $t(53) = 2.20$, $p = .033$, $d = .22$. Though significant improvement in students' contextual skill performance was observed in both seasons, t-test results using change scores indicated significantly more progress was made during the postintervention season. Significant improvement in decontextualized skill performance was comparable across seasons. Collectively, these results suggest not only that preservice teachers' motivating styles are malleable, but also that increased provision of need support in physical education may facilitate improvements in student learning.

Congruent with the perspective that student motivation serves as a cornerstone to understanding and improving physical education (PE; Standage, Duda, & Ntoumanis, 2003), a significant body of research has focused on contextual motivational processes at play (e.g., Ntoumanis, 2005; Perlman, 2013; Sulz, Temple, & Gibbons, 2016). Largely, this inquiry has recruited self-determination theory (Deci & Ryan, 2008) as a mechanism for understanding the construct of motivation. This theory delineates motivational quality based on the extent to which the source of the catalyzing force for behavior is internalized (Ryan & Deci, 2000). Fundamental to self-determined behavior is satisfaction of the psychological needs for *autonomy* (volition), *competence* (efficacy), and *relatedness* (belonging).

The sentiments and behaviors physical educators exude during instruction constitute their interpersonal styles. These styles have been shown to influence the quality of student motivation in PE (Haerens et al., 2013). Teachers using a more autonomy-supportive interpersonal style facilitate the process of *internalization* (i.e., the transition from more controlled to more autonomous forms of motivation) in their students by supporting their students' psychological needs. For example, they support students' needs for autonomy (*autonomy support*) by affording choice on how to practice a skill, competence (*structure*) by allowing students to work at their own pace, and relatedness (*relatedness support*) by using students' names. Collectively, these strategies comprise need-supportive instruction (NSI; Haerens et al., 2013). Contrarily, teachers who recruit a more

controlling interpersonal style impede the process of internalization by thwarting their students' psychological needs. A teacher, for example, can thwart student autonomy by dictating the order and pace of practice tasks, competence by providing unclear instructions and expectations, and relatedness by dismissing student perspectives.

Relative to their counterparts taught by more controlling teachers, students taught by more autonomy-supportive teachers experience a host of benefits including, for example, more autonomous forms of motivation (Perlman, 2013), heightened engagement (Lonsdale, Sabiston, Raedeke, Ha, & Sum, 2009), admirable affective reactions (Vazou-Ekkekakis & Ekkekakis, 2009), and increased intent to engage in physical activity outside of class (Chatzisarantis & Hagger, 2009). Teachers feel the benefits of autonomy support as well. Teachers who increasingly support student autonomy have reported more autonomous forms of motivation for teaching, greater teaching skill, and teaching well-being (Cheon, Reeve, Yu, & Jang, 2014). Notwithstanding these benefits, many PE teachers continue to rely on controlling styles of instruction (Reeve, 2009). Fortunately, interpersonal styles appear to be malleable, as interventions aimed at cultivating more autonomy-supportive styles of instruction among inservice (Aelterman et al., 2013; Reeve & Cheon 2016; Tessier, Sarrazin, & Ntoumanis, 2010) and preservice (Perlman, 2011b) PE teachers have reported successful results.

In addition to the teacher's interpersonal style, implementation of the pedagogical model appears to influence student motivation in PE (Ennis et al., 1999; Metzler, 2011; Perlman, 2011a). Particularly, the goals and structure of Sport Education (SE; Siedentop, Hastie, & van der Mars, 2011) have been successful in helping teachers further support students' motivational capacities (Hastie, Snelnikov, & Guarino, 2009; Perlman, 2011a; Perlman & Goc Karp, 2010; Snelnikov, Hastie, & Prusak, 2007; Spittle & Byrne, 2009). In pursuit of the development of sporting competence, literacy, and enthusiasm, SE gradually shifts the decision-making process from teacher to student, allowing for greater student ownership of learning (Snelnikov et al., 2007). The model resembles the progression of an authentic sport season and includes six distinguishable features: (a) a season format, (b) affiliation, (c) formal competition, (d) record keeping, (e) a culminating event, and (f) festivity (Siedentop

et al., 2011). Notwithstanding its mandated features, SE still affords the teacher a level of space for variation (Kirk, 2013). From a motivational perspective, this means that the teacher can still manipulate the class climate within the autonomy-supportive structure of SE (Sinelnikov & Hastie, 2010a). More autonomy-supportive teachers may, for example, provide students with a clear outline of the season plan, along with a rationale for each phase at the beginning of the season, thus providing structure to assist with students' need for competence. Also, students of a more autonomy-supportive teacher may be given a choice of format for the formal competition phase. Contrarily, controlling teachers using the SE model pick teams on their own or neglect to provide students with a rationale for the way points are awarded. Though principally absent from the interpersonal styles literature, autonomy-supportive interventions within models-based practice (e.g., the hybrid SE–Tactical Games Model; Pritchard & McCollum, 2009) can be successful (Perlman, 2015), as initial evidence suggests.

While teachers' provision of autonomy support in PE may have motivational and other benefits to them and their students, the ultimate measure of the utility of an interpersonal style may rest with its influence on student learning. However, this outcome variable, which conceivably is the most important, is generally absent from the literature on motivation in PE. Preliminary evidence indicates that a more autonomy-supportive interpersonal style among inservice teachers brings about higher levels of game performance and involvement among secondary students in a unit of volleyball taught via the traditional method (Perlman, 2014). Additional inquiry is needed to determine if this impact extends to the elementary level, different activities, discrete skill performance, and the cognitive domain. Moreover, beyond Perlman's (2015) insightful work with preservice teachers, little is known about the potential to enhance undergraduate PE majors' provision of autonomy support.

Therefore, the purpose of this study was to (1) determine the efficacy of an intervention in changing a preservice teacher's provision of autonomy support in SE and (2) examine the impact of that change on student learning. Specifically, we hypothesized that

the provision of autonomy support would increase postintervention (H1) and, as a result of increased autonomy support, greater student learning would occur (H2).

Method

The university institutional review board approved the study protocols. Additionally, the school district, school, and participants provided appropriate consent and assent.

Participants and Setting

The participants for this study included one Caucasian male preservice teacher, Jason (pseudonym), and the students in his intact fifth-grade PE class ($N = 58$). At the time of data collection, Jason was 21 years of age and completing the student teaching portion of his undergraduate PE teacher education (PETE) program. He was purposefully recruited for participation because of his exposure to what Curtner-Smith, Hastie, and Kinchin (2008) referred to as “high-quality PETE” (p. 111). That is, throughout his teacher education program, Jason received “plenty of exposure to and supervised practice of [Sport Education] during [early field experiences] and teaching practices” (p. 111). Further, Jason’s assimilation of the values promoted by his program’s faculty with regard to effective teaching and models-based practice led the research team to identify him as being more oriented toward teaching PE, as opposed to coaching extracurricular sport (Curtner-Smith et al., 2008). His experience in a PETE program of this nature coupled with his teaching orientation suggested he would implement the “full version” of SE (Curtner-Smith et al., 2008). Table 1 provides a brief descriptive account of SE seasons that Jason conducted prior to teaching the seasons in this study. As noted in the table, in addition to learning about the model in his PETE program, Jason had taught seven full seasons of SE with different students (fourth through eighth grades) and in different contexts over 2 years. His teaching responsibilities in each season had progressively increased to the point at which he was able to independently design and teach the seasons.

Table 1

Jason's Experience Teaching Sport Education

Class/season information	Soccer	Track and field	Ultimate	Soccer	Soccer	Volleyball	HRF	
Grade	7/8 coed	6 coed	6 coed	7 coed	8 coed	7/8 coed	4 coed	
Class size	50	37	45	30	35	54	72	
Season length	650 min (13 × 50 min)	1070 min (17 × 60 min)	1200 min (20 × 60 min)	1200 min (20 × 60 min)	1080 min (18 × 60 min)	1080 min (18 × 60 min)	480 min (16 × 30 min)	
Team selection	CT	CT	Student-driven	Student-driven	Student-driven	CT	CT	
Number of teams	5	6	5	5	5	5	10	
FC	Round robin	Event	Round robin	Round robin	Round robin & Single Elim.	Round robin & Single Elim.	Event	
Constant teams?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Season phases	TC PSGs FC CE	TC NCEs Olympics/CE	TC PSGs FC CE	TC PSGs FC CE	TC PSGs FC CE	TC PSGs FC CE	HRF training NCEs FC CE	
Team roles	Coach Warm-up leader Manager Statistician	Coach Warm-up leader Equipment manager Recorder	Coach Warm-up leader Manager Statistician BLM commissioner	Coach Warm-up leader Manager Statistician BLM commissioner	Coach Warm-up leader Manager Statistician BLM commissioner	Coach Warm-up leader Manager Statistician BLM commissioner	Coach Warm-up leader Manager Statistician Publicist	Coach Warm-up leader Manager
Duty team roles	Official Scorer	Announcer Judge Timer Measuring judge	Official Scorer	Official Scorer	Official Scorer	Official Scorer	Head judge Lane judge	Routine judge
Fair play?	Yes	Yes	Yes	Yes	Yes	Yes	Yes	
Responsibilities	Co-teach a designed season	Co-teach a designed season	Teach a designed season	Design and co-teach with preservice teacher	Design and co-teach with preservice teacher	Self-design and teach	Self-design and teach	
Supervision	PETE faculty	PETE faculty	PETE faculty	CT & partial PETE faculty	CT & partial PETE faculty	PETE faculty	PETE faculty	

Note. CT = cooperating teacher; Single Elim. = single elimination; TC = training camp; PSGs = preseason games; FC = formal competition; CE = culminating event; NCEs = nonconsequence events; HRF = health-related fitness; BLM = board league member.

The students in Jason's class ranged between 9 and 11 years of age and primarily identified as Caucasian ($n = 30$, 51.7%) or African American ($n = 15$, 25.9%). Some students identified as Asian ($n = 5$, 8.6%), Mixed ($n = 4$, 6.9%), Other ($n = 3$, 5.2%), and Hispanic ($n = 1$, 1.7%).

Data collection took place at a public elementary school in the southeastern United States serving students in Grades 1 to 5 who were selected from other schools in the district for their academic achievement. Thirty-nine percent of the school's students are eligible for the free or reduced lunch program. The school's student population is 50% Black, 42% White, 5% Asian, 2% Hispanic, and 2% of other ethnicities. PE facilities include a large gymnasium with a stage, a large field surrounded by a walking/running track, and a concrete basketball court. SE was the primary instructional model in place in the school's PE program, likely preventing Jason from experiencing a lack of support, which has been observed to be one contextual barrier to SE implementation (Ko, Wallhead, & Ward, 2006).

Research Design

In this quasi-experimental study, Jason taught one SE season of floor hockey. Following the season, Jason participated in a self-determination theory-based workshop designed to increase his provision of NSI. Subsequent to the workshop, Jason then taught an SE season of pickleball to the same class. We assessed students' learning gains through pre- and posttest sport-specific cognitive, decontextualized, and contextualized skill assessments. Per the recommendations of Mesquita, Farias, and Hastie (2012), the students completed a third iteration of the cognitive exam approximately one month after the conclusion of each season, which we used to investigate any effect of time. For each of his videotaped lessons, Jason wore a wireless lapel microphone. Using these tapes, the lead researcher coded all of his teaching for provision of NSI.

Model Fidelity

Considering the focus (i.e., increasing NSI in SE) of this study and the possible misalignment between teachers' planning and implementation in SE (Ko et al. 2006), it was crucial that Jason was, in fact, implementing SE as it was intended to be implemented. Adhering to Hastie and Casey's (2014) guidelines for ensuring model fidelity in

reporting research on a pedagogical model, we provide (a) a description of curricular elements of the unit, (b) a detailed validation of model implementation, and (c) a description of the program context.

Table 2 displays the content as well as Jason's and his students' roles throughout both SE seasons and describes the curricular elements of the season (Hastie, 1996). Lessons took place on Monday, Wednesday, and Friday and were 45 min in length. Two researchers who are experts in models-based instruction completed validation of both SE seasons. To ensure implementation validation, we routinely compared Jason's instruction to the checklist of Sport Education Specific Pedagogical Behaviors (Ko et al., 2006; Sinelnikov, 2009). The validation procedure included experts reviewing the lesson plans and videotaped lessons of both SE seasons. Upon observation of a particular teacher or student behavior that corresponded with categories outlined in the Sport Education Specific Pedagogical Behaviors instrument, the film was paused and experts discussed the observed behavior. Upon 100% agreement relative to the nature of the behavior and its applicability to one of the categories in the instrument, a check mark was placed in the instrument data sheet, indicating the presence of the category.

Of the 23 behaviors comprising the SE model, Jason demonstrated 20 (87%) during the floor hockey season and 21 (91%) during the pickleball season, indicating high fidelity to the model. Specifically, during the floor hockey season, Jason did not (1) establish a level of accountability for student performance in nonplaying roles; (2) provide the team captains with task sheets during practices; and (3) promote clear team identification (while each team did have a name, they were not easily recognizable, because they did not wear common t-shirts or colors). During the pickleball season, he satisfied the same 20 criteria as he did in the floor hockey season and also provided team captains with task sheets. Considering Jason's relatively high level of the model fidelity during the first season, he was not provided feedback prompting him to exhibit SE-specific behaviors after each lesson or after a season.

Table 2*Content and Teacher and Student Roles for the Floor Hockey and Pickleball Seasons*

Lesson	Content	Teacher role	Student role
Floor Hockey Season			
1	Team selection/skills testing		Skill development
2	Training camp/skills testing		Skill development
3	Training camp/skills testing		Skill development
4	Team practice/posters	Assisted coaches	Coach-led practice
5	Team practice/nonplayer roles	Nonplayer role instruction	Practice
6	Scrimmage	Assisted coaches	Playing & nonplaying
7	Regular season	Monitored/assisted duty teams	Playing & nonplaying
8	Regular season	Monitored/assisted duty teams	Playing & nonplaying
9	Regular season	Monitored/assisted duty teams	Playing & nonplaying
10	Playoffs	Announced teams/assisted duty teams	Playing & nonplaying
11	Playoffs	Announced teams/assisted duty teams	Playing & nonplaying
12	Playoffs	(Jason absent)	Playing & nonplaying
13	Championship/awards/posttesting	(Jason absent)	Playing & nonplaying
14	Posttesting		Performer
15	Posttesting		Performer

Table 2 (cont.)

Lesson	Content	Teacher role	Student role
1	Team selection/skills testing	Pickleball Season	Skill development
2	Training camp/skills testing		Skill development
3	Team practice/posters	Assisted coaches	Coach-led practice
4	Team practice/role instruction	Nonplayer role instruction	Coach-led practice
5	Scrimmage	Monitored/assisted duty teams	Playing & nonplaying
6	Regular season	Monitored/assisted duty teams	Playing & nonplaying
7	Regular season	Monitored/assisted duty teams	Playing & nonplaying
8	Regular season	(Jason absent)	Playing & nonplaying
9	Regular season	Announced teams/assisted duty teams	Playing & nonplaying
10	Postseason	Monitored/assisted duty teams	Playing & nonplaying
11	Postseason	Monitored/assisted duty teams	Playing & nonplaying
12	Playoffs	Monitored/assisted duty teams	Playing & nonplaying
13	Playoffs/championship/awards	Monitored/assisted duty teams	Playing & nonplaying
14	Posttesting		Performer
15	Posttesting		Performer

Note: Adapted from “Student Role Involvement During a Unit of Sport Education,” by P. Hastie, 1996, *Journal of Teaching in Physical Education*, 16(1), pp. 88–103.

The Intervention

The intervention consisted of a three-phase workshop that was designed and led by the first author. At the time of data collection, the first author had known Jason for approximately one year, having assisted him in learning about SE and teaching middle school students during a secondary methods course paired with an early field experience. After studying and writing about SDT and NSI for 2 years, the first author designed the workshop according to recommendations set forth by Su and Reeve (2011) and Sinelnikov, Kim, Ward, Curtner-Smith, and Li (2016). Prior to intervention, experts in the fields of professional development and SDT were consulted about the appropriateness of the workshop. During the first phase, Jason was presented with a slideshow lecture on the basic tenets of SDT, need-supportive versus need-thwarting interpersonal styles, and specific behaviors teachers can exhibit that have been empirically shown to nurture students' motivational capacities. During the second phase, Jason watched video of his own teaching from the first SE season (floor hockey), identifying and engaging in discussion about specific situations in which he demonstrated both need-supportive and need-thwarting behaviors. After observing the video, Jason and the expert engaged in role-play, providing opportunity to practice implementing various need-supportive behaviors in common scenarios. Then in the third phase, Jason answered a set of questions designed to assess his level of comprehension with respect to NSI. When Jason scored at or above 95% on the assessment, the workshop was complete (Sinelnikov et al., 2016). Finally, to maximize the possible effectiveness of the workshop, the first author provided Jason with sustained, immediate, and situated support throughout the postintervention SE season (pickleball) in the form of observations and briefing and debriefing sessions (Sinelnikov, 2012).

Data Collection

Need-supportive instruction. The first author video-recorded all of the lessons that Jason taught during both seasons. While teaching, Jason wore a lapel microphone, allowing his voice to be heard through the video recording. From these recordings, Jason's need-supportive teaching behaviors exhibited in every lesson were quantified via the Need-Supportive Teaching Behaviors in PE

observation instrument (NSTB-PE; Haerens et al., 2013). Specifically, the instrument identifies 21 need-supportive behaviors reflecting the three need-supportive dimensions (autonomy support, structure, and interpersonal involvement). The researcher observed the frequency of each behavior that exhibited Jason during a 5-min interval. At the end of the interval, the researcher assessed the frequency of that behavior during that interval using a 4-point scale, ranging from 0 (*never observed*) to 3 (*observed all the time*). Interval scores were then summed for each behavior and a behavioral sum score for the entire lesson was created. Behavioral sum scores for all behaviors were summed within each dimension of need support and an overall score for each need-supportive dimension (i.e., autonomy support, structure, and relatedness support) in each lesson was created.

Prior to analysis, we calculated measures of interrater agreement and intrarater reliability to ensure data reliability. To ensure the former, we had a trained NSTB-PE instrument observer who was not a part of the research team randomly select and code 33% of Jason's lessons. By comparing these results to those of the lead researcher's for corresponding intervals, we computed interrater reliability by dividing the total number of agreements by the total number of observations, then multiplying the quotient by 100. The interrater agreement reached 94%. We also calculated intraobserver reliability to prevent the observer from deviating from initial training procedures over time and modifying the coding definitions, a phenomenon known as *observer drift* (Smith, 1986). In this process, the lead researcher randomly selected and recoded one third of Jason's lessons, again dividing the total number of agreements by the total number of observations and multiplying by 100. Intrarater reliability reached 97%. Both measures of reliability exceeded the recommended 80% threshold for behavioral sciences (van der Mars, 1989).

Student learning. Student learning was measured in the cognitive domain through pencil-and-paper exams and in the psychomotor domain through decontextualized and contextualized skill assessments.

Cognitive assessments. Because we were unable to locate validated cognitive exams for fifth-grade students in two content areas (floor hockey and pickleball), two multiple-choice tests were developed around what Ward (2009) referred to as *common content*

knowledge. In particular, common content knowledge comprises the knowledge and skills one needs to perform a task successfully. This level of knowledge includes rules, etiquette, techniques, and tactics (Ward, 2009). Following procedures outlining creation of a common content knowledge test (Devrilmmez, Dervent, Ward, & Ince, 2019), a panel of experts (two PETE faculty and two PE teachers) created 32 questions that were instructionally aligned (S. Cohen, 1987) to contents of floor hockey and pickleball units. Each common content knowledge construct measure initially included eight multiple-choice questions, each with four answers, but only one correct answer. Identical to the procedures that Devrilmmez et al. (2019) outlined, and for content validity to be further established, questions were reviewed by four PETE faculty and two PE teachers who have expertise in invasion and net/wall games and have taught both contents. Questions considered too difficult for elementary students were removed and the wording to remaining questions was refined. This procedure resulted in a measure that presented 12 questions, three questions for each construct (rules, etiquette, techniques, and tactics) for floor hockey and pickleball. For example, three questions assessed a tactical construct of a game of pickleball and three questions assessed the same in floor hockey. This is consistent with accepted psychometric methodology in which a minimum of three items measuring the same construct are necessary for the researcher to adequately explore the construct and perform psychometric tests (Lloret-Segura, Ferreres-Traver, Hernández-Baeza, & Tomás-Marco, 2014). While the face and content validity of the measure were sufficiently established by following procedures that Devrilmmez et al. (2019) set forth, the establishment of construct validity, reliability, and psychometric tests was beyond the scope of the study. Thus, we acknowledge that their absence poses a limitation of this study.

Decontextualized skills assessment. Decontextualized skills necessary for success in both activities were assessed at the beginning (before training camp) and end (after the culminating events) of both seasons. Based on the work of Hastie and Trost (2002), we used six isolated tests to assess decontextualized hockey skills: (1) dribble and shoot, (2) speed dribble, (3) agility dribble, (4) shot accuracy, (5) rapid fire, and (6) flicking the ball. We used a seventh test, assessing slap shot speed with a radar gun, because puck velocity is

influenced by skill level (Wu et al., 2003). We used Wasem's (1994) service, forehand, and backhand tests to assess decontextualized skills in pickleball.

Contextualized skills assessments. We used the previously validated floor hockey and pickleball assessments from the South Carolina Physical Education Assessment Program (South Carolina Department of Education, 2010a, 2010b) to document student gains in a more authentic environment. The floor hockey assessment was carried out for a 2-v-1 (offense-to-defense) game played on a 24' × 24' playing area. Trained observers coded one member on offense for 60 s and assigned the student a score of 0 to 4 for three offensive components, namely (1) movement without the ball (i.e., support), (2) passing, and (3) receiving. We used the aggregate of these three scores to quantify contextualized skill performance. The pickleball assessment included two students playing a 3-min cooperative game of pickleball, switching sides halfway through. Using the same scoring scale as with the floor hockey assessment, the observers evaluated performances based on ability to (1) execute forehand and backhand shots, (2) return to the center of the court during a rally (i.e., positioning), and (3) maintain a rally. Interrater reliability for floor hockey and pickleball was 94% and 93%, respectively (van der Mars, 1989).

Data Analysis

Data analysis began with standard screening and cleaning procedures (Tabachnick & Fidell, 2013). We used paired-samples *t* tests to detect changes in Jason's provision of each need-supportive dimension between corresponding lessons pre- to postintervention. We used a 3 × 2 (Time × Sport) factorial ANOVA with Bonferroni post hoc analysis to compare changes in cognitive performance from the beginning of each season through approximately one month after the conclusion of each season. We used a 2 × 2 (Time × Sport) factorial ANOVA to examine changes in contextualized skill performance between pre- and posttest in both seasons. We used an independent-samples *t* test to detect significance in the magnitude of learning growth between floor hockey and pickleball. Given that

the decontextualized skills assessments administered during floor hockey and pickleball differed in number and unit of measurement, the ability to compare decontextualized skill performance across seasons was not appropriate. Changes in performance on each decontextualized skill test were, however, assessed within each season via paired-samples *t* tests. We used partial eta squared as a measure of effect size in the factorial ANOVA models (Warner, 2012) and Cohen's *d* to estimate effect size for *t* tests (J. Cohen, 1992).

Results

To test the hypothesis that the workshop would affect Jason's provision of NSI, we performed paired-samples *t* tests for autonomy support, structure, and relatedness support. Table 3 displays the results of these tests. Within the structure of SE, Jason significantly increased his provision of all three dimensions of need support from pre- to postworkshop. Figure 1 shows his average provision of need support, by dimension, across seasons. These results support the hypothesis that there would be a significant increase in Jason's provision of NSI during the pickleball season (postworkshop) relative to the floor hockey season (preworkshop), indicating the efficacy of the workshop.

Table 3

Descriptive Statistics and t Test Results for Each NSI Category

NSI category	Sport		<i>t</i>	<i>p</i>	<i>d</i>
	FH <i>M (SD)</i>	PB <i>M (SD)</i>			
AS	21.44 (9.77)	38.78 (11.29)	3.74	.006*	1.64
Structure	48.67 (9.91)	95.11 (25.84)	5.89	< .001**	2.37
RS	67.00 (12.35)	87.89 (9.96)	3.98	.004*	1.86

Note. FH = floor hockey; PB = pickleball; AS = autonomy support; RS = relatedness support.

p* < .05. *p* < .001.

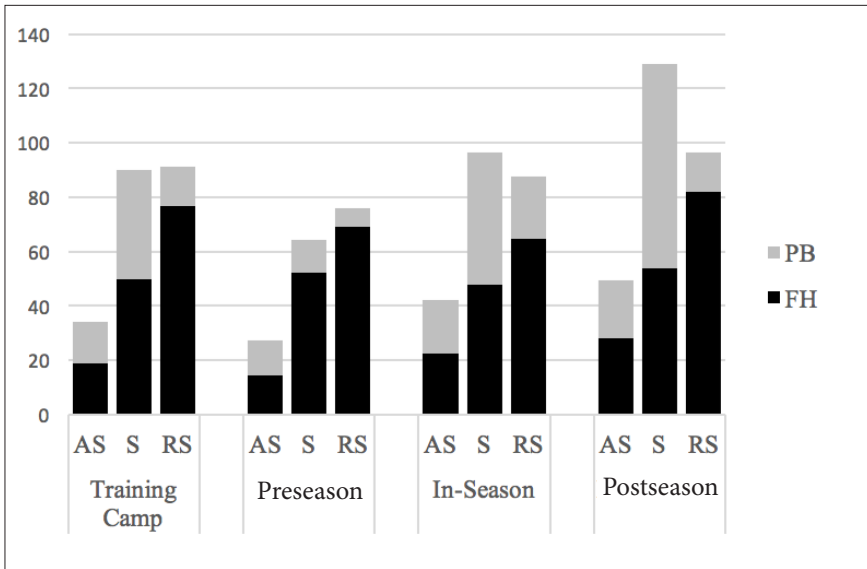


Figure 1. The average frequencies of Jason’s autonomy-supportive (AS), structure (S), and relatedness-supportive (RS) instructional behaviors by season phase from pre- to postworkshop. Pickleball (PB) values are in addition to floor hockey (FH) values.

Differences in Student Learning

Given the effectiveness of the workshop in increasing Jason’s provision of NSI, it was necessary to examine the ANOVA results comparing cognitive and contextualized skill learning pre- and post-workshop. We present the results of the cognitive and contextualized assessments first, followed by those for the decontextualized assessments.

Cognitive and contextualized skill learning. Table 4 contains descriptive and ANOVA results for the cognitive and contextualized skill assessments. Additionally, Figure 2 shows means plots for cognitive and contextualized data. With regard to cognitive performance, significant main effects were observed for Sport, $F(1, 53) = 61.14$, $p < .001$, partial $\eta^2 = .536$, and Time, $F(2, 106) = 109.94$, $p < .001$, partial $\eta^2 = .675$. Scores for floor hockey were generally higher than those for pickleball, and significant growth from pretest to retention test was observed in both seasons. While students’ cognitive scores significantly increased from pre- to posttest in both seasons, post hoc analysis revealed differences across seasons from posttest

to retention test. Only during pickleball did students' scores increase significantly from posttest to retention test, $t(53) = 2.20, p = .033, d = .22$. Contextualized skill data revealed a significant main effect for Time, $F(1, 57) = 113.15, p < .001$, partial $\eta^2 = .665$, and a significant Time \times Sport interaction effect, $F(1, 57) = 11.25, p = .001$, partial $\eta^2 = .165$. Students contextualized skill performance increased significantly during floor hockey and pickleball. Independent-samples t -test results between floor hockey and pickleball change scores indicated significantly more improvement during the pickleball season than the floor hockey season, $t(114) = 3.19, p = .002, d = .59$.

Table 4
ANOVA Table for the Measures of Student Learning by Season and Time

Variable iteration/ factor	Sport		ANOVA statistics		
	FH <i>M (SD)</i>	PB <i>M (SD)</i>	<i>F</i>	<i>p</i>	Partial η^2
Contextualized					
Pre	4.34 (1.98)	4.10 (1.36)			
Post	5.55 (1.73)	6.28 (1.99)			
Time**			113.15	< .001	.665
Sport			1.66	.202	.028
Interaction**			11.25	.001	.165
Cognitive					
Pre	68.15 (12.19)	52.87 (13.14)			
Post	84.59 (10.71)	71.74 (14.53)			
Retention	83.69 (11.99)	75.17 (15.42)			
Time**			109.94	< .001	.675
Sport**			61.135	< .001	.536
Interaction*			3.29	.047	.058

Note. FH = floor hockey; PB = pickleball.

* $p < .05$. ** $p < .001$.

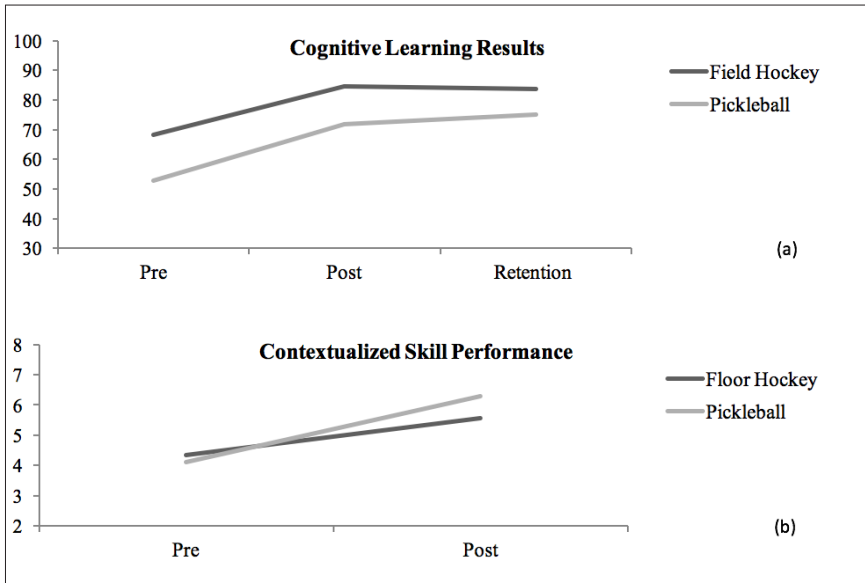


Figure 2. Means plots for students (a) cognitive and (b) contextualized skill performance during floor hockey and pickleball.

Decontextualized skill learning. Table 5 shows paired-samples *t*-test results comparing students' scores on the individual components of the contextualized skill assessment and decontextualized skill assessments from beginning to end in each season. While students' overall scores for the contextualized skills assessment significantly improved during both seasons, in an examination of the individual components of the assessment the results suggest that students experienced more holistic improvement during pickleball than during floor hockey. Students' scores improved significantly from pre- to posttest for all three components of the pickleball contextualized skills assessments (forehand/backhand use, positioning, and rally length), whereas significant improvements were discovered for one of the three components in the floor hockey contextualized skills assessment (support). With reference to the decontextualized skills assessments, scores significantly improved in five of seven floor hockey decontextualized skills, namely, speed dribble, agility dribble, shot accuracy, shot speed, and rapid fire. Postintervention, students significantly improved from pre- to posttest in serving and backhands.

Table 5

Descriptive Statistics and Paired-Samples t-Test Results for Contextualized and Decontextualized Skills Assessments

Assessment	Pre <i>M (SD)</i>	Post <i>M (SD)</i>	<i>t</i>	<i>df</i>	<i>p</i>	<i>d</i>
Floor Hockey						
Decontextual Assessment						
Dribble and Shoot	3.88 (1.14)	4.18 (1.02)	1.61	56	.114	.28
Speed Dribble**	7.63 (1.72)	6.62 (1.62)	8.54	50	< .001	.60
Agility Dribble**	12.56 (3.24)	11.40 (2.43)	5.22	50	< .001	.41
Shot Accuracy**	7.07 (3.67)	9.23 (4.19)	3.63	55	.001	.55
Rapid Fire**	6.25 (2.45)	8.10 (2.28)	4.29	57	< .001	.54
Shot Speed**	31.23 (7.00)	40.26 (9.83)	7.45	57	< .001	1.06
Flicking	11.17 (6.13)	12.57 (4.26)	1.69	57	.096	.27
Contextual Assessment**	1.74 (.67)	2.46 (.73)	7.24	56	.001	1.03
Support*	1.49 (.72)	2.20 (.73)	6.50	54	.005	.98
Passing	1.62 (.80)	1.80 (.68)	1.46	54	.090	.24
Receiving	1.47 (.77)	1.65 (.75)	1.40	54	.159	.24
Pickleball						
Decontextual Assessment						
Serve*	9.56 (6.57)	11.95 (6.96)	2.33	56	.024	.35
Forehand	5.91 (3.92)	7.04 (4.49)	.88	56	.381	.27
Backhand**	3.65 (3.00)	6.07 (4.34)	3.76	56	< .001	.65
Contextual Assessment**	1.67 (.66)	2.62 (.81)	14.15	57	< .001	1.29
Forehand/Backhand**	1.33 (.57)	1.95 (.76)	8.49	57	< .001	.92
Positioning**	1.60 (.65)	2.41 (.80)	8.98	57	< .001	1.11
Rally Length**	1.17 (.38)	1.91 (.76)	8.19	57	.001	1.23

* $p < .05$. ** $p < .001$.

Discussion

While interventions with a similar objective have proven successful internationally (Aelterman et al., 2013; Reeve & Cheon, 2016; Tessier et al., 2010), it seems inappropriate to generalize the applicability of findings from other countries, because PE perspectives and practices may differ between cultures (Curtner-Smith et al., 2008). In the only study of this nature working with preservice teachers,

Perlman (2015) reported the success of an online intervention in bringing about an increase in 31 preservice teachers' provision of autonomy-supportive instruction in the United States. Nonetheless, for teachers to fully nurture their students' motivational capacities, their instructional styles should, theoretically, also nurture their students' needs for competence and relatedness through the provision of structure and relatedness support, respectively. In concert with previous findings (Ko et al., 2006; Sinelnikov et al., 2016) reporting on effective workshops within PE, the findings from this study provide empirical support for determining the efficacy of an NSI intervention in changing one preservice teacher's provision of autonomy support, structure, and relatedness support within the SE model. After the floor hockey season, instructional observation data indicated that Jason's instruction was already appreciably need supportive. This was not surprising in light of his familiarity with SE, a model that is inherently motivational for students (Perlman, 2012; Perlman & Goc Karp, 2010; Sinelnikov & Hastie, 2010a). However, as a result of the workshop described in this study, Jason provided significantly more autonomy support, structure, and relatedness support to his students in the pickleball season postintervention than in the floor hockey season preintervention. Having established the increase of the teacher's NSI postintervention, we then examined the impact of the increase in Jason's NSI on student learning in the subsequent SE season. As noted, student learning in this study was measured through paper-and-pencil exam score (pre, post, and retention) and contextual (game play) and decontextual skill performance (skill tests), both pre and post.

Cognitively, student performance increased significantly from pre- to postiterations of the cognitive assessment. While cognitive scores on the floor hockey test decreased from the postiteration to the retention iteration, they increased significantly between the same two iterations following the pickleball season. This finding supports previous research (Mesquita et al., 2012) and suggests that need-supportive instruction fosters learning on a deeper level that is capable of attenuating a time effect. This significant finding is compounded by previous research demonstrating students' deeper understanding accrued in models-based practice lasting

years beyond contact with SE (Sinelnikov & Hastie, 2010b; Wahl-Alexander, Sinelnikov, & Curtner-Smith, 2017).

A large body of literature on student learning within SE approach confirms that students can achieve significant gains in learning (cognitive and psychomotor) by participating in quality SE seasons (Araújo, Mesquita, & Hastie, 2014; Hastie, de Ojeda, & Luquin, 2011). While our study supports previous findings, this is the first study that empirically demonstrates important avenues by which teachers can have a greater impact on student learning within SE seasons. In other words, we knew that students learn over time with SE, but our findings demonstrate that the learning can be greater if the teacher uses NSI within SE. This is a particularly significant finding, one that needs to be further examined, perhaps with other pedagogical models such as Teaching Games for Understanding (Oslin & Mitchell, 2006), Cooperative Learning (Casey & Dyson, 2012), and Personal and Social Responsibility (Hellison, 2011), among others.

With respect to contextualized skill performance, significant improvements in both seasons were observed. This finding is congruent with a significant body of research on student learning in SE (Hastie, Calderón, Rolim, & Guarino, 2013; Hastie et al., 2009), demonstrating the ability of the model to foster learning. The results of the *t* tests in the present study indicate, however, that students' contextualized skill performance increased more so postworkshop than preworkshop, suggesting that increased NSI may further promote contextual skill learning. We can partially attribute this finding to students' satisfaction of autonomy, competence, and relatedness through Jason's increased provision of autonomy support, structure, and interpersonal involvement.

Finally, decontextualized skill performance increased significantly in approximately the same percentage of assessments between both seasons. Students significantly improved in five of seven floor hockey decontextual assessments (71%) and in two of three pickleball assessments (66%). Though comparisons across the seasons were not possible given the incompatibility of the decontextualized assessments, these results indicate that a teacher can, essentially, do no harm to students' learning skills by being more need supportive. Moreover, with the other two measures of learning as a frame of

reference, student learning appears to occur more holistically and on a deeper level when the teacher provides more need support in class.

Conclusion

One of the important findings of this study was that while students experienced gains in both seasons, a greater increase was observed in the pickleball season (postintervention). This suggests that with respect to authentic performance in physically active settings, student learning may increase with the instructor's provision of NSI. The exact nature of this relationship, however, remains unclear and warrants additional investigation. Perhaps NSI aids student learning to a point, before its effects attenuate.

Worthy of mention are the limitations of this study. First, the inclusion of only one preservice teacher who taught at a middle school in which students were familiar with SE limits the generalizability of the findings. Future research needs to determine the impact of a similarly designed workshop on the NSI of preservice teachers working at elementary and high school levels in schools more unfamiliar with the model for implementation. Second, the preservice teacher in this study possessed a teaching orientation. Added inquiry focused on determining the impact a similar intervention can have on the instruction of more coaching-oriented preservice teachers seems warranted. Third, though face and content validity were established for our cognitive exam, future measures of cognitive knowledge should include evidence of construct validity to further ensure that questions are related to the constructs of interest. Finally, in support of previous recommendations (Perlman, 2015), future studies focusing on enhancing NSI in PE should strive to include a qualitative approach to gain a more thorough understanding of preservice teachers' perceptions of the workshop, its impact on their teaching, and how this process can be improved.

The Society of Health and Physical Educators (2014) touts the profession of PE as being predicated on the notion that a physically active lifestyle is preferential to one characterized as being primarily sedentary. Quite simply, the motivation to learn about and engage in physical activity precedes the volitional decision to engage in such. PE serves as a suitable context for fostering this motivation. Within this context, the teacher is in a position to influence the extent to which this motivation is fostered (Taylor & Ntoumanis, 2007). This

logic highlights the need for continued investigation into the most effective means of equipping preservice teachers and teachers alike with the pedagogical strategies necessary for maximizing their students' motivational capacities. It is evident from this study that it is possible for teachers to increase their NSI during teaching using a models-based approach and that students experience greater gains in learning when teachers use NSI within the SE pedagogical model.

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YOU AND THE LAW

Canadian Court Rules Physical Education Teacher Negligent

Tonya L. Sawyer

Hussack v. Board of School Trustees of School District No. 33 (Chilliwack), November 18, 2010 (2011) 306 BCAC 289 (CA); 2011 BCCA 258

According to the court records, the Plaintiff (Devon Hussak), a 13-year-old boy in the seventh grade, was hit in the face with a field hockey stick while playing a field hockey game in a physical education (PE) class. He suffered a concussion, which developed into a serious somatoform disorder. The Plaintiff sued the school board, alleging negligence on the part of the PE teacher for allowing him to participate in the field hockey game without previous experience or basic instruction regarding the necessary skills of the game.

Judicial History

The British Columbia Supreme Court (BCSC), in a decision reported (*Devon Hussack v. School District No. 33, 2009*), allowed the action. The court held the PE teacher breached his duty of care by permitting the Plaintiff to play field hockey without having progressively attained the necessary skills. The court found that the somatoform disorder was caused by the accident. Damages of \$1,365,000 were awarded. The school board appealed. The Plaintiff cross-appealed the court's ruling.

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The British Columbia Court of Appeal (BCCA) allowed the appeal in part. The court reduced the past wage loss award to \$150,000 and the future income-earning capacity award to \$785,000. The court dismissed the cross-appeal.

Complaint

The trial transcript indicated that the Plaintiff sued the school district for negligence because the PE teacher failed to progressively teach and coach the Plaintiff in the necessary skills to play field hockey. In doing so, the Plaintiff argued that the school exposed him to being struck in the face by another student's stick during the course of a game.

The school district argued that it had met the necessary standard of care in instructing and supervising the student in PE class. In addition, the school district argued that even if the PE teacher did fall below the standard of care, the student's level of dysfunction and somatoform illness were not caused by the accident, but were a combination of preexisting conditions.

Background

According to court records, the Plaintiff had a history of chronic absenteeism. He had missed over one third of the school year at the time of the accident. In particular, the Plaintiff had missed the entire 3-week long field hockey unit when he was allowed to play in the "Round Robin" game on the last day of the unit. The unit was designed to take 3 weeks of the school term comprised of six to seven classes. The classes were 68 min in length and included approximately 40 minutes for instruction and practice of field hockey skills.

The PE teacher testified that on April 17, 1998, he encouraged the Plaintiff to join the class. He thought this would be a good opportunity for the Plaintiff to participate in the PE class and would help the Plaintiff obtain a passing grade for the school year. Court records indicated a passing grade in PE was a mandatory requirement for the Plaintiff to be promoted to the next grade level.

The trial transcript indicated that prior to the accident the Plaintiff had no field hockey experience. The Plaintiff did, however, have a background in ice and floor hockey. At trial, two competing

field hockey experts put forward evidence about whether having a background in other types of hockey sports would be an advantage or disadvantage in being able to have a basic set of skills to play field hockey. The court found, based on the testimony of the experts, that the Plaintiff did not have the basic requisite skills to play field hockey.

The testimony at trial revealed that the PE teacher divided the students into four relatively equal teams. Prior to the class, the teacher reminded the students about the four basic rules of the game: (1) not using the back of the stick, (2) not using their feet, (3) not lifting the sticks about their knees, and (4) not checking from behind. When the games commenced, the teacher assumed a position in the middle of the field to supervise the two games. At the midpoint of the class, one student had a break-a-way toward the goal. Devon chased her down and attempted to check her from behind. The student swung her stick and struck Devon in the nose. He was taken to the hospital emergency room.

The court record indicates a few weeks after the injury, Devon complained of weakness, tiredness, altered concentration, sleep disruption, and mild photophobia. However, the injury did not result in a brain injury. As the weeks went on, Devon complained of new and worsening symptoms. On his father's insistence, Devon did not undertake any counseling, psychiatric, or psychological treatment despite his doctor's recommendations.

Court Analysis of the Case

In this case, the court ruled that the standard of care to be exercised by school authorities is that of a "careful or prudent teacher." The test, as outlined by the court, contains four main factors to consider:

- "Whether the activity was suitable to the age and mental and physical condition of the student;
- Whether the student was progressively trained and coached to do the activity properly and to avoid the danger;
- Whether the equipment was adequately and suitably arranged; and
- Whether the performance, having regard to its inherently dangerous nature, was properly supervised." (p. 263)

In applying this test, the court noted,

Canadian courts have generally ruled that the standard of care is case specific and cannot be applied in the same manner and to the same extent in every case. Further, the court stated its application will vary from case to case and will depend upon the number of students being supervised at any given time, the nature of the exercise or activity in progress, the age and the degree of skill and training which the student may have received in connection with such activity, the nature and condition of the equipment in use at the time, the competency and capacity of the students involved, and a host of other matters which may be widely varied but which, in a given case, may affect the application of the prudent parent-standard to the conduct of the school authority in the circumstances. (pp. 263–264)

According to the court, essentially, the simple question to be answered in this case was whether it was reasonable for the PE teacher to allow Devon to participate in the field hockey class, knowing Devon had no exposure to the sport despite having considerable hockey experience. The court answered this question by finding that the actions of the PE teacher were unreasonable in that the PE teacher failed to “progressively train and coach” the student in field hockey. The school district was held liable. The court ruled that Devon lacked the necessary “skills building blocks” that were put in place during his absences from all the previous classes. Thus, the PE teacher breached his duty of care to Devon. The court rejected the assumptions made by the teacher. The PE teacher testified that he was not concerned with Devon participating on the final day of the field hockey unit after having been absent for the previous three weeks. He stressed that almost all the students were beginners at field hockey. In his view, there was no need for any special skills to be progressively taught that Devon needed to participate safely in the game that day.

Devon was awarded \$1,365,000 in damages. This included \$125,000 for nonpecuniary damages; \$200,000 for past loss of income; \$1,000,000 for future loss of income earning capacity; and \$40,000 in future care costs.

Risk Management Discussion

The decision in this case demonstrates the significance and importance of safety when students are engaged in a PE class participating in a contact physical activity, such as field hockey in this case. However, it could have been floor hockey, lacrosse, or ice hockey. When preparing future physical educators, it is imperative that teachers emphasize the significance and importance of safety. Therefore, the following points are important for teachers to teach skill and methods classes:

- The teacher lesson plans must outline clearly the progression for each skill to be taught, the skills to be learned before participation is allowed in a game situation, and the evaluation method for acceptable skill levels.
- Students must demonstrate acceptable proficiency in each skill area before being allowed to participate in a game situation.
- Students who have not been through all of the preliminary classes teaching the basic skills and progressions for each skill should not be allowed to participate in a game situation in class and must demonstrate acceptable skill proficiency.

If a student is in danger of failing a class because absences, excused or not, exceed the minimum number required to pass, then the PE teacher should work with the administration and student to work out a plan for the student to make up the absences to complete the class successfully.

References

Devon Hussack v. School District No. 33 [Chilliwack] Supreme Court of British Columbia, June 26, 2009, 2009 BCSC 852, Docket L023833.

Hussack v. Board of School Trustees of School District No. 33 (Chilliwack), November 18, 2010 (2011) 306 BCAC 289 (CA); 2011 BCCA 258.

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The Physical Educator

Author manuscripts must be submitted online (<http://js.sagamorepub.com/pe/information/authors>) and meet the following guidelines:

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