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Two Studies Conceptualizing Physical Literacy for Assessment of High School Students in the United States

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TWO STUDIES CONCEPTUALIZING PHYSICAL LITERACY FOR ASSESSMENT OF HIGH SCHOOL STUDENTS IN THE UNITED STATES

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ABSTRACT

Purpose: Toward the advancement of physical literacy (PL) in the United States, the purpose of this dissertation was to operationalize the construct and work toward a foundational framework to which PL can be assessed. The purpose of Study 1 was to develop an operational conceptualization of PL via a modified Delphi approach. The purpose of Study 2 was to expand upon the findings from Study 1 by exploring adolescents' perceptions of PL using repertory grid analysis (RGA).

Methods: Study 1 used a sequential, mixed methods design. Participants (N=22) were national and international PL academics with peer-reviewed publications on PL or identified by professional organizations as the PL expert. The Delphi employed two rounds of data collection. The first round was an open-ended questionnaire, analyzed qualitatively. The second round was a questionnaire with Likert scale rating based upon the results of the first round. Study 2 also employed a mixed-methods design. Participants (N=17) were a convenient sample of adolescents (ages 14-17) in U.S. high schools. A structured interview protocol was used to collect data in line with established RGA methodology. The interview included (a) polarized questions regarding participants' activity preferences (i.e., most/least favorite), choices (i.e., choose most/least often), and ideal (i.e., haven't tried but would/wouldn't try); (b) triadic elicitation (i.e., compare/contrast) of activities; (c) semantic and opposite identification; (d) rating activities on 6-point personalized scale. Elements (i.e., activities) and constructs (i.e.,

perceptions of activity) were analyzed with frequency count, descriptive statistics and qualitatively analysis.

Results: For Study1, qualitative analysis revealed two overarching themes: *PL is* and *PL is not.* Within the theme of *PL is,* three subthemes emerged: *autonomous application of movement, cognition, and response to adversity.* Within the theme of *PL is not* there were two subthemes: *determinants/outcomes of PL* and *determinants of physical activity* (PA). For Study 2, a total of 88 elements and 123 constructs were identified. Constructs were organized into 23 construct categories. The most elicited construct category was *active* (i.e., participants' perceived energy exertion). Participants preferred engaging in activities favored in the construct categories of *familiarity* (i.e., perceived comfort), *identification* (i.e., perceived suitableness), *enjoyment* (i.e., perceived fun) and *activity competence* (i.e., perceived good/bad at activity). In the element category *PA choice*, participants highly favored *familiarity*, *activity competence*, *enjoyment* and *outcomes* (i.e., perceived benefit). In the element category *PA ideal,* participants favored the construct category *freedom* (i.e., perceived level of control).

Discussion/Conclusion: Overall, the results of this dissertation support an operational conceptualization of PL as an autonomous application of movement, constructed by the individual's conception of movement and response to adversity. Study 2 built upon Study 1, exploring adolescent perceptions on what activities they choose to engage in / refrain from and why they choose to engage or refrain from PA. The results of Study 2 show emerging evidence of adolescents' PL profiles, allowing future research to build upon this framework and establish an evidence-based PL assessment that is inclusive of all

abilities and non-contextual in relation to age, skill, or location among U.S. high school students.

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LIST OF ABBREVIATIONS

APA.....American Psychological Association

ASC.....Australian Sport Commission

CAMSA .....Canadian Agility and Movement Skill Assessment

CAPL .....Canadian Assessment of Physical Literacy

CDC .....Center of Disease Control

CEPLAY .....Centre of Excellence in Physical Literacy and Active Youth

CFA.....Confirmatory Factor Analysis

CSAPPA .....Child's Self-Perception of Adequacy & Predilection for Physical Activity

FICCI .....Federation of Indian Chamber of Commerce and Industry

HALO .....Healthy Active Living and Obesity Research Group

HIIT.....High Intensity Interval Training

IPLA.....International Physical Literacy Association

IRB.....Institutional Review Board

JTPE.....Journal of Teaching in Physical Education

LTAD.....Long-Term Athlete Development

METS.....Metabolic Equivalents

NPAP .....National Physical Activity Plan

PA .....Physical Activity

PACER.....Progressive Aerobic Cardiovascular Endurance Run

PAQ.....Physical Activity Questionnaire

PCA ..... Principle Component Analysis

PHE ..... Physical and Health Education

PL ..... Physical Literacy

PLOT ..... Physical Literacy Observation Tool

PLAY ..... Physical Literacy for Active Youth

Pre-PLAY ..... Preschool Physical Literacy Assessment Tool

RGA ..... Repertory Grid Analysis

SHAPE ..... Society of Health and Physical Educators

SOLO ..... Structure of Observed Learning Outcomes

UNESCO ..... United Nations Educational, Scientific, and Cultural Organization

U.S. ..... United States of America

CHAPTER 1

INTRODUCTION

1.1 PHYSICAL LITERACY TODAY

Physical literacy (PL) has become a relevant focus for promoting physically active lifestyles because of its holistic nature, bridging the physical, psychological, and environmental constructs (Edwards, Bryant, Keegan, Morgan, & Jones, 2017; Sprake & Walker, 2013). The Australian Sports Commission (ASC) defines PL as,

> "Physical Literacy is a lifelong holistic learning acquired and applied in movement and physical activity contexts. It reflects ongoing changes integrating physical, psychological, cognitive, and social capabilities. It is vital in helping us lead healthy and fulfilling lives through movement and physical activity. A physically literate person is able to draw on their integrated physical, psychological, cognitive, and social capacities to support health promoting and fulfilling movement and physical activity- relative to their situation and context- throughout their lifespan." (ASC, 2017)

In a sense, PL is a holistic, internalization process of movement where personal interest, context, and purpose unite together (ASC, 2017; Chen, 2015; Mandigo & Holt, 2004; Whitehead, 2001, 2007, 2010).

The concept of PL is emerging in the fields of physical education and public health (Dudley, 2015). Countries such as Australia, Wales, and Canada have implemented PL initiatives as part of their national and/or local PA policies (Giblin,

Collins, & Button, 2014). National PA plans, reflect the adoption of PL in PA policy, clearly stating the development of PL as part of such plan (e.g., Active Canada 20/20 - Spence, Faulkner, Bradstreet, Duggan, & Tremblay, 2015; Creating an Active Wales - Wales, Welsh Assembly Government, & Health Challenge Wales (Initiative), 2009; England Everybody Active, Every Day - Varney, Brannan, & Aaltonen, 2014).

Additionally, PL as an outcome of quality physical education is attractive because PL combines behavioral goals (e.g., PA) with educational goals (e.g., lifelong, meaningful PA engagement – Roetert, Ellenbecker, & Kriellaars, 2018; Sprake & Walker, 2015). For example, Flemons (2013) argued: "physical education ideology should ensure that learners leave school having made progress on their individual physical literacy journeys" (p. 193). Schools, particularly through quality physical education programming, can play a major role in the development of PL in children and adolescents (Castelli, Centeio, Beighle, Carson, & Nicksic, 2014; Corbin, 2016; Jurbala, 2015; Kirk, 2013).

Important strides have been made to more fully address PL development through school programming. For example, Australia, Canada, India, United States, and Wales (Federation of Indian Chamber of Commerce and Industry [FICCI], 2018; Keegan, Keegan, Daley, Ordway, & Edwards, 2013; Mandigo, Harber, Higgs, Kriellaars, & Way, 2013; Society of Health and Physical Educators [SHAPE] America, 2015; Spengler & Cohen, 2015; Wales et al., 2009) have implemented PL, in collaboration with national sport and physical education organizations, as part of national PA promotion initiatives (Giblin et al., 2014). A global survey by United Nations Educational, Scientific, and Cultural Organization (UNESCO; McLennan & Thompson, 2015) found school physical

education began to adopt the holistic ideology of PL as a physical education curriculum model. Today, this adoption is reflected in the language of physical education reform, clearly stating PL as an outcome of the national curriculum (FICCI, 2018; New South Wales, 2016; SHAPE America, 2015; Vass, Boronyai, & Csányi, 2017).

1.2 Physical Literacy, Physical Activity, and Physical Education

It is important to distinguish the identities of PL, PA, and physical education (Lounsbery & McKenzie, 2015). The roles which each entity portrays integratively contribute to the physical health of children in the United States (Cairney, Dudley, Kwan, Bulten, & Kriellaars, 2019). Physical education is the curricular space in which students build physical skills, knowledge, and fitness (SHAPE America, 2015). The physical education classroom is a vehicle for the development and advocacy of PL (Green, Roberts, Sheehan, & Keegan, 2018; James Mandigo et al., 2013; Roetert & MacDonald, 2015; Andy Sprake & Walker, 2013). Physical education provides a pivotal opportunity to influence PL positively (Fox, 2010; Sprake & Walker, 2015; Whitehead, 2010) because it is an integrated social environment inseparable from academic and PA contexts (Mandigo, Francis, Lodewyk, & Lopez, 2009; Roetert & Jefferies, 2014).

PA is a measurable construct determined by metabolic equivalents (METS - Jetté, Sidney, & Blümchen, 1990). The intensity of activity equates to the amount of oxygen consumption (i.e., milliliters of oxygen) multiplied by body weight (i.e., kilograms), multiplied by minutes of activity, divided by an average resting MET of 3.5 (Jetté et al., 1990). Research shows that age and weight impact resting oxygen consumption, which impacts variability in activity intensity (Byrne, Hills, Hunter, Weinsier, & Schutz, 2005). Experts recommend children and adolescents exert energy at a moderate to vigorous

intensity for at least one hour a day (2018 Physical Activity Guidelines Advisory Committee, 2018). Adult PA recommendations are scaled back to 150 minutes at a moderate-intensity or 75 minutes at vigorous-intensities per week (2018 Physical Activity Guidelines Advisory Committee, 2018).

PL, different from physical education or PA, is a multi-faceted construct centered upon individual internal processing features (e.g., motivation - Chen, 2015; confidence - Fox, 2010; embodiment - Whitehead, 2007). However, the rise in PL has generated multiple definitions and applications (A. Chen, 2015; L. C. Edwards et al., 2017; Shearer et al., 2018; Whitehead, 2013). Internationally, how PL is understood is dependent upon what country you are attempting to apply the concept (Canadian Sport for Life, 2015; Keegan et al., 2019; Spengler & Cohen, 2015; Sport New Zealand, 2015; Wainwright, 2013). The inauguration of PL in the United States defined and applied PL synonymously with physically educated (Lounsbery & McKenzie, 2015; SHAPE America, 2015). The varying definitions and applications resulted in confusion among physical educators, creating an obstacle for implementing PL (Lynch & Soukup, 2016; Robinson, Randall, & Barrett, 2018).

1.3 The Health of United States Youth

One in five school-aged children in the United States is obese (Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018). The risk for children who are overweight (ages 6-8, 32.8%; ages 16-19, 41.5%) or obesity (ages 6-8, 25.3%; ages 16-19 34.5%) increases greatly among adolescent years (Skinner et al., 2018). Adolescents are a high-risk population for overweight and obesity (Skinner et al., 2018). In the last decade (2007-2016), the prevalence of overweight and obesity in late adolescence (ages 16-19)

has risen nearly 20% (overweight +10.7%; obesity +8.4%) (Skinner et al., 2018). Whereas children ages 2 -15 have only seen a 5.5% increase in the prevalence of overweight and obesity (Skinner et al., 2018). These staggering numbers draw red flags for concern.

The clear majority (73%) of adolescents fail to meet recommendations for health-enhancing PA (Center for Disease Control [CDC], 2017). Concurrently, 25% of adolescents engage in a significant amount (+3 hours) of sedentary behavior (e.g., watching television; CDC, 2017). Throughout adolescence participation in sport decreases (Strong et al., 2005), and sedentary behavior increases (Bassett, John, Conger, Fitzhugh, & Coe, 2015). Evidence suggests positive associations and experiences in PA and physical education during these years lead to increase PA behaviors concurrently and in adulthood (Thompson, Linchey, & Madsen, 2013). Additionally, adolescents who seek engagement in organized PA tend to have higher PA behaviors as adults (Bélanger et al., 2015; Mäkelä, Aaltonen, Korhonen, Rose, & Kaprio, 2017).

The adolescent years provide a unique transitional position between childhood and adulthood. Pubescent changes in the limbic and prefrontal cortex of the adolescent brain enable vulnerability and influence (Sharma et al., 2013). During this time of neurological rewiring, adolescents tend to seek out social acceptance and emotion generating behaviors (Steinberg, 2005). Adolescents' sense this transient reality and evolve into social roles and personal identities (Dahl, 2004). These identities play an important part in an adolescent's PA behavior as movement ability, and PA is socially constructed (Hay & Macdonald, 2010; Kendzierski, Furr, & Schiavoni, 1998; Macdonald, Kirk, & Braiuka, 1999). Research shows that, globally, adolescent PA is

socially and culturally constructed into the domains of physical education, recreational or leisure PA, fitness or exercise, and sport (Hulteen et al., 2017; Martins, Marques, Sarmento, & Carreiro da Costa, 2015).

Efforts to increase youth PA have focused a great deal on increasing PA opportunities, improving education about PA, and providing interventions to increase fitness levels (Guerra, Nobre, da Silveira, & Taddei, 2014; N. Pearson, Braithwaite, Biddle, van Sluijs, & Atkin, 2014; Prince, Saunders, Gresty, & Reid, 2014). These efforts have had little to no effect on sustainable PA behavior (Metcalf, Henley, & Wilkin, 2012). The challenge for interventionists (e.g., researchers; teachers; coaches) is being able to cultivate the internalized resources adolescents' need not only to adapt but also to sustain an active lifestyle. PL may provide to be an outlet for understanding for such cultivation.

PL takes a different approach to PA promotion, emphasizing the individual as a whole, not just the individual's physical behaviors. PL has been defined as "a disposition acquired by human individuals encompassing the motivation, confidence, physical competence, knowledge and understanding that establishes purposeful physical pursuits as an integral part of their lifestyle" (Almond & Whitehead, 2012, p. 68). PL is the authentic development of health-promoting habits. Physically literate individuals seek opportunities to be physically active, enjoy PA, and have a higher quality of life (Almond, 2013; Morgan, Bryant, & Diffey, 2013; Whitehead, 2010).

However, PL through the transitional ages of adolescence is not well understood (Longmuir & Tremblay, 2016). PL initiatives have been predominately focused on children under 12 (Edwards et al., 2018). These PL initiatives are often centered upon

developing motor competence, an important foundation for movement (Edwards et al., 2018). Understanding PL through the adolescent years can help researchers, educators and policymakers build initiatives toward enhancing PA concurrently and into adulthood (Dudley, Cairney, Wainwright, Kriellaars, & Mitchell, 2017; Longmuir & Tremblay, 2016)

CHAPTER 2

LITERATURE REVIEW

2.1 HISTORY OF PHYSICAL LITERACY

The conceptual development of PL throughout the 21st century traces back to Margaret Whitehead's scholarly works (Edwards et al., 2017). Whitehead (2010) defined PL as follows: "Appropriate to each individual endowment, physical literacy can be described as the motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout the lifecourse" (p. 11-12). However, often PL is misunderstood because its multidimensionality as a construct makes it challenging to define – PL theory (e.g., Whitehead, 2010) explicitly refers to integrated, holistic combinations of concepts that are traditionally studied separately, and asserts that such a 'reduction' into parts is inappropriate (Edwards et al., 2017).

The various perspectives of PL represent two major schools of thought: Whiteheadian PL (Whitehead, 2010) and the Long-Term Athlete Development (LTAD) approach (Balyi, Way, & Higgs, 2013). Whiteheadian PL embraces the philosophical foundations of the construct, including monism (i.e., oneness), existentialism (i.e., interaction), and phenomenology (i.e., perception; Whitehead, 2010). Whitehead (2010) described the philosophical roots of PL as a holistic, mind-body experience of the world, which emphasized both an integrated, holistic experience, and, by consequence, highly individualized and unique experiences of PL. Conversely, the LTAD approach asserts that to be physically literate is to be skillful in many movements, and to have associated

'pre-disposing' attributes such as motivation and confidence for participation in PA (i.e., Kriellaars & Robillard, 2014; Way et al., 2016). LTAD PL concepts are applied to skill development and knowledge, often construed as occurring in stages, building toward athletic development (Longmuir et al., 2015). This isolation of separate components, as well as the invocation of consistent, normative stages, is a marked contrast to Whitehead's approach. Of these two approaches to conceptualizing PL, LTAD PL has been more successful in making its way into assessment practice, and as a result, existing assessments of PL lack philosophical grounding (Edwards et al., 2017).

2.2 Philosophy of Physical Literacy

Whiteheadian' conceptualize PL as a personal, lifelong journey to enlightenment where physical movement is embodied (Whitehead, 2010). Whiteheadian' embrace the philosophical foundations of PL including monism, existentialism, and phenomenology (Whitehead, 2010). Whitehead (2010) describes the philosophical roots of PL as a holistic, mind-body experience of world. The philosophical foundations of PL include monism, existentialism, and phenomenology (Whitehead, 2010). Each philosophical foundation presents a metaphysical truth through ontology and epistemology positions (Guba & Lincoln, 1994). Ontology is situated knowledge of beliefs where reality emerges (Guba & Lincoln, 1994). Epistemology is the justification of ontological knowledge (DePaul, 2001).

The ontology of monism is a continuity of the world and knowledge of the world (Jackson, 2008). Monism is a philosophical stance of universal oneness (Montero, 2002; Schaffer, 2010). The epistemology of monism is the construction of self-generated

meaning through routine interactions (Montero, 2002). Monism is described as holistic, mind-body concept with interactions and relations to the world (Whitehead, 2010).

Existentialism (Sartre, 2007) ontology is a formulation of self and knowledge through experience and interaction with the sociocultural and physical world (Crowell, 2017). Existential epistemology presents the self in a constant state of intentionality (Searle, 1983), perceiving and responding to elements of the world. In describing existentialism, Whitehead (2010) stated, "Our existence is an ongoing dialogue played out between ourselves and our surroundings" (p. 24).

The ontology of phenomenology (Husserl, 1983) is the creation of the self through personal experience (Smith, 2018). Phenomena change the self, creating meaning, truth, and knowledge, thus, situating the starting point from where interaction with the world occurs (Merleau-Ponty & Bannan, 1956). The epistemological position of phenomenology is encountered through each phenomenon, unique to that moment (Smith, 2018). Amid phenomenology and existentialism is the position of embodiment, a mere unity of internal (Husserl, 1983) and external (Merleau-Ponty & Bannan, 1956) forces that shaped the lived experience (Smith, 2018).

2.3 Defining Physical Literacy

PL is a widely contested term (Edwards et al., 2017). The past decade has seen a proliferation of over ten separable definitions of PL (*see Table 2.1*) used among educational, public health, and sports organizations across the world (ASC, 2017; Shearer et al., 2018). Additionally, there are over 20 different concepts used to comprise PL in the literature (*see Table 2.1*; Edwards et al., 2017). Among the most common are 'motivation,' 'confidence,' 'physical competence,' 'knowledge and understanding'

(Edwards et al., 2017). Each defining concept is complex and multidimensional, adding ambiguity to PL. Hesitation lingers when tasked with describing what PL is (e.g., Tremblay et al., 2018). Alacrity is immense when tasked with describing what a physically literate person can do (e.g., ASC, 2017; Dudley, 2015; Healthy Active Living and & Obesity [HALO] Research Group, 2014).

There are two widely used definitions of PL: Whitehead's (2010; 2016) "PL is the motivation, confidence, physical competence, knowledge, and understanding to value and take responsibility for engagement in physical activities across the lifecourse" (p.11-12); and Mandigo et al. (2009) "PL is the ability to move with competence and confidence in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person." Organizations have adopted modified versions of the Whitehead (2010) definition (e.g., Canadian Sport for Life, 2015; Sport New Zealand, 2015), the Mandigo et al. (2009) definition (e.g., SHAPE America, 2015) or have shaped an independent definition of PL (e.g., ASC, 2017) (Shearer et al., 2018).

The existence of varying definitions and applications of PL is healthy with regard to encouraging scientific debate (e.g., Edwards et al., 2017) yet simultaneously problematic from the viewpoint of practitioners seeking to implement a coherent framework (Corbin, 2016). Scientific advancement depends on comparing, evaluating and refining competing approaches (Popper, 2002), but from the point of view of governments and organizations seeking to implement PL initiatives, such differences are confusing and can appear arbitrary, potentially confusing or even preventing implementation efforts (Spengler & Cohen, 2015). For example, the SHAPE America (2015) adoption of PL merely replaced the words "physically educated" with "physically

literate", creating a synonymous conceptualization of PL (Lounsbery & McKenzie, 2015). The linguistic semantics surrounding PL provide barriers in the pathway toward the advancement of PL (Hyndman & Pill, 2018). This highlights the need for conceptual clarity in the efforts to study PL in the U.S. (Castelli, Barcelona, & Bryant, 2015; Lundvall, 2015). Currently, conceptualizations of PL tend to be inconsistent – incorporating many different constructs, often without clear consideration of how these constructs can be combined – because existing literature on PL typically provides ambiguous, wide-ranging perspectives of the construct (Edwards et al., 2017).

2.4 Assessing Physical Literacy

Since the growth of PL, the call for valid and reliable assessments is growing (i.e., (Corbin, 2016; Giblin et al., 2014; Longmuir & Tremblay, 2016; M. Tremblay & Lloyd, 2010). PL assessments available today include Physical Literacy Assessment for Youth (PLAY - Kriellaars & Robillard, 2014), CAPL (Longmuir et al., 2015, 2018), Observed Learning in PL Rubric (Dudley, 2015), Preschool PL Assessment Tool (Pre-PLAy - Cairney et al., 2018), Physical Literacy Observation Tool (PLOT - Clark, Jewitt, & Bruce, 2017).

PLAY (Kriellaars & Robillard, 2014) originated out of the LTAD framework and sponsored by Canada's Sport for Life (Sheehan, 2018). Six assessments measure youth (ages 8-12) PL: (1) PLAYfun, (2) PLAYbasic, (3) PLAYself, (4) PLAYparent, (5) PLAYcoach and (6) PLAYinventory. PLAYself, PLAYparent. PLAYcoach assesses the child's physical development by each titled party (e.g., the coach uses PLAYcoach). PLAYinventory is a collection of activity variety over a year. PLAYbasic and PLAYfun

Table 2.1. *Definitions of Physical Literacy in the literature*

Source	Definition
1. Castelli, Centeio, Beighle, Carson, & Nicksic, 2014, p. 96	Physical literacy is the embodiment of personal well-being and positive relationships across the lifespan that includes self and social awareness, self-regulation, and responsible decision-making (Whitehead, 2007 [in text citation])
2. Chen, 2015, p.127	Becoming physically literate is that behavioral change in the physical domain overrides the cognitive. "I have to do" but moving to "I want to do"
3. Corbin, 2016; Higgs et al. 2005; Jurbala, 2015; MacDonald & Enright, 2013; Tremblay and Lloyd, 2010; Way et al., 2014	Physical literacy is the foundation of skills necessary to participate in physical activity and sport for lifelong enjoyment and success
4. Corlett & Mandigo, 2013; Whitehead, 2010	Physical Literacy included components of knowledge, confidence, self-competence, motivation to use movement potential, reading and responding to various physical environments, all with some sense of self and linkage to local culture and personal ability
5. Higgs, Balyi, Way, Cardinal, Norris, & Bluechardt, 2005, p. 5	"…the development of fundamental movement skills and fundamental sport skills that permits a child to move confidently and with control, in a wide range of physical activity, rhythmic (dance) and Sport situations. Physical literacy also includes the ability to read what is going on around them in an activity setting and react appropriately to those events"
6. Jurbala, 2015, p. 372	PL has been defined as a set of competencies or a toolkit required for access to a more physically active, hence healthy, life
7. Keegan, Keegan, Daley, Ordway & Edwards, 2013, p. 1	Physical literacy is a concept capturing: 1. the ability to move effectively; 2. the desire to move; 3. the perceptual abilities that support effective movement; 4. the confidence and assurance to attempt movement challenges; and 5. the subsequent ability to interact effectively with their environment and other people
8. Keegan, Keegan, Daley, Ordway & Edwards, 2013, p.17	Physical literacy - in the form of movement proficiency, motivation to move, and appreciation of the value of moving - is a more inclusive and holistic approach
9. Lundvall, 2015, p. 114	Physical literacy describes embodied experiences that are aimed to enhance or improve physical performance aspects of movements that enable a particular goal to be achieved, or elements of movement that need attention (Whitehead, 2001[in text citation])
10. Lundvall, 2015, p. 115	Physical literacy is a principle, a construct that organizes our understanding of the experience of learning and performing of a wide range of activities and the whole person
11. MacDonald & Enright, 2013, p. 7	Manifested in a curriculum, Whitehead and her colleagues (see, for example, Murdoch & Whitehead, 2013; Whitehead,

	2013; Whitehead & Almond, 2013) suggest that physical literacy includes the valuing of: poise, confidence, competence and efficiency in purposeful and culturally relevant movement; basic movement patterns that lay a foundation for experiencing a repertoire of purposeful physical activity or movement forms across environments; knowledge and understanding of movement across the life course and as it relates to health; and including all, building self-esteem and empowering students to take responsibility for their own learning
12. Mandigo, Francis, Lodewyk, & Lopez, 2012, p. 4	Physical literacy is "the ability to move with competence and confidence in a wide variety of physical activities in multiple environments that benefit the healthy development of the whole person"
13. SHAPE America, 2014, p. 11	The physically literate person is one who "has the knowledge, skills and confidence to enjoy a lifetime of healthful physical activity"
14. Spengler & Cohen, 2015, p. 9	Physical literacy is "the ability, confidence, and desire to be physically active for life"
15. Whitehead, 2001 p. 131	Physical literacy is not a pure 'bodily' capacity; rather it describes a holistic engagement that encompasses physical capacities embedded in perception, experience, memory, anticipation and decision-making
16. Whitehead, 2007 p. 291-292	Physical literacy is the ability to use our motility to the greatest effect and we accept that everyone's motile potential will be specific to him/herself, and then physical literacy itself will differ to some degree in nature for each individual. All can achieve physical literacy, but the scope of this will differ for each individual
17. Whitehead, 2007, p. 294; 2013, p. 29	In addition the individual has the ability to identify and articulate the essential qualities that influence the effectiveness of his/her own movement performance, and has an understanding of the principles of embodied health, with respect to basic aspects such as exercise, sleep and nutrition
18. Whitehead, 2010, p. 5	As appropriate to each individual, Physical Literacy is a disposition acquired by human individuals encompassing the motivation, confidence, physical competence, knowledge and understanding to maintain physical activity throughout the life course; establishes purposeful physical pursuits as an integral part of their lifestyle, regardless of physical endowment
19. Whitehead, 2010, p. 12	"Physical literacy can be described as a disposition characterized by the motivation to capitalize on innate movement potential to make a significant contribution to the quality of life"
20. Whitehead, 2010, p. 163	Physical literacy is a fundamental human capability which creates a 'sound platform' for lifelong adherence to physical activity and provides an 'ideal springboard for those who have exceptional potential with respect to this capability'
21. Whitehead, 2013, p. 26	To describe physical literacy as identifying a human capability that affords us "the ability to identify, understand, interpret, create, respond effectively and communicate, using the embodied human dimension, within a wide range of situations and contexts"

are observational assessments performed by trained professionals. A trained professional is an individual trained in movement analysis.

CAPL, now CAPL2 (Gunnell, Longmuir, Barnes, Belanger, & Tremblay, 2018), assesses 8-12-year old children in four domains: *physical competence*, *daily behavior*, *motivation and confidence*, and *knowledge and understanding* (Gunnell, Longmuir, Barnes, Belanger, & Tremblay, 2018). The CAPL-2 reduced *Physical competence* from seven to three tests (Gunnell et al., 2018): (a) the Canadian Agility and Movement Skill Assessment (CAMSA - Lloyd, Colley, & Tremblay, 2010), (b) timed plank (Boyer et al., 2013) for muscular endurance, and (c) Progressive Aerobic Cardiovascular Endurance Run (PACER - Scott, Thompson, & Coe, 2013). Two tests assess *Daily behavior* with (a) step counts (Craig, Tudor-Locke, Cragg, & Cameron, 2010) and (b) self-reported PA (Milton, Bull, & Bauman, 2011). Four tests, previously five, assess *Motivation and confidence* with (Gunnell et al., 2018); (a) benefits to barriers, (b) adequacy using the Children's Self-Perception of Adequacy in and Predilection for Physical Activity (CSAPPA - Hay, 1992), (c) predilection using CSAPPA, and (d) self-perception of skill level. Five tests, originally ten, assess *Knowledge and understanding* with answering questions pertaining to the knowledge of the; (a) Canadian Physical Activity Guidelines for Children and Youth (Tremblay et al., 2011), (b) definition of cardiorespiratory fitness, (c) definition of muscular strength, (d) comprehension of PA, and (e) improving sport skills. The strongest domain factor loadings of PL were *daily behavior* and *motivation and confidence* (Gunnell et al., 2018).

Observed Learning in PL (Dudley, 2015) is influenced by the Structure of Observed Learning Outcomes (SOLO) taxonomy (Biggs & Collis, 1982). SOLO

taxonomy includes five levels of understanding: (a) no understanding (pre-structural), (b) understanding of one element (uni-structural), (c) understanding of multi-elements but not the relationship between the elements (multi-structural), (d) understanding the relationship between elements (relational) and (e) understanding of elements relationship with other contexts and concepts (extended abstract). The four core elements of PL inform the rubric (Dudley, 2015): (a) movement competencies, (b) rules, tactics, and strategies of movement, (c) motivation and behavioral skills of movement and (d) personal and social attributes of movement. Educators evaluate the rubric (emphasis in primary school, children ages 6-12) in the movement domains (e.g., physical education teachers, coaches), where the evaluator records the observed student according to the SOLO taxonomy by the PL core elements (Dudley, 2015).

PrePLAy (Cairney et al., 2018) is an observational assessment of children (ages 2-4) using 19 tests over four domains: (a) movement competencies, (b) coordinated movements, (c) motivation and enjoyment and (d) overall PL. Movement competencies include ten tests (a) sending upper body, (b) sending lower body, (c) sending with equipment, (d) receiving upper body, (e) receiving lower body, (f) receiving with equipment, (g) transporting upright, (h) transporting prone, (i) body control stationary, (j) body control moving. Four tests assess coordinated movements (a) use of moving vehicles, (b) use of playground equipment, (c) move in space, without obstructing stationary objects, or (d) moving objects. Four tests assess motivation and enjoyment: (a) child choose activity over stationary, (b) when active uses a variety of movement competencies and appears confident, (c) hesitation in playing new games/activities which use a variety of competencies, (d) Enjoy being active and using a variety of movement

competencies. Overall, one test assesses PL: Rate the child PL (combined movement skills, coordinated actions, motivation, and enjoyment) compared to their peers.

The PLOT assessment is in early development, and information about the assessment is sparse. PLOT, according to Green et al. (2018), is an observational tool for parents and caregivers to assess children from 1 to 6 years. The tool was designed to increase awareness and understanding of PL, specifically the development of motor skills and providing stimulating environments.

Current PL assessments measure several facets of motor competence and fitness to measure PL with little to no association with affective or cognitive elements of the construct (Edwards et al., 2018). These tools provide PA or fitness data that align with public health objectives that provide funding to many programs (Edwards et al., 2018). However, these tools are an incomplete representation of PL. Moreover, existing PL assessments tend to be labor-intensive and time-consuming, making them unrealistic for school-based assessment practice. For example, the first version of the CAPL (Longmuir et al., 2015), took 90 minutes to complete with five instructors (HALO Research Group, 2014, p. 8). Many physical education classes meet for less than 90 minutes and rarely have five instructors (Kahan & McKenzie, 2018; SHAPE America, 2015).

The conceptual and practical limitations of current PL assessments have implications for surveillance studies aimed at capturing PL profiles of school-aged youth. Generating a descriptive research base on the PL of children and adolescents in different countries and contexts will require appropriate assessment methodologies. Whitehead (2013), states that PL assessments should be ipsative (p. 33) or continuation of individual growth based on previous iterations or performances. Edwards et al. (2018) provide

recommendations for the development of future PL assessments, stating that such assessments should be philosophically grounded, validated based on empirical methods, and feasible to implement for school professionals such as physical education teachers. Green, Roberts, Sheehan, & Keegan (2018) extends on this, giving guidance to assessment tools measuring PL with 5 characteristics: (a) nature of judgement – behavioral changes, (b) form of judgement – appropriate to individual, (c) purpose of judgement – aligned to the intention of PL, (d) participant – self, (e) gathering evidence and recording – qualitative and quantitative methods.

An inclusive conceptualization, honoring both philosophical and practical perspectives, combined with practical assessment techniques that can be feasibly used by individuals and school professionals, is where PL assessment efforts can be most valuable. In line with recent recommendations (e.g., Edwards et al., 2018; Green et al., 2018), this dissertation will encompass two studies aimed at developing and using a new PL measure to document PL profiles of high school students in the U.S. This dissertation aims to answer the following research questions:

1. What is the operational definition of PL for use in the United States?
2. Using the operational definition, what is the state of PL among adolescents in the United States?

Specifically, the purpose of Study I was to present a novel operational conceptualization of physical literacy. Study I is complete. The manuscript is now in print as an article in the Journal of Teaching in Physical Education (JTPE) special issue on PL (Shortt, Webster, Keegan, Egan, & Brian, 2019). Study II builds off Study I by examining U.S.

high school students' perceptions of PL. Underpinning the purpose of Study II were the following research questions:

1. When given the autonomy to engage in or refrain from PA, what activities do adolescents choose?
2. Why do they choose to engage in or refrain from PA?

The results of both studies will inform the development of future assessments that can be feasibly used by teachers to provide meaningful data on students' PL.

CHAPTER 3:

OPERATIONALLY CONCEPTUALIZING PHYSICAL LITERACY: RESULTS OF A DELPHI STUDY[1]

[1] Shortt, C., Webster, C.A., Keegan, R.K., Egan, C.A., & Brian, A. (2019). Operationally conceptualizing physical literacy: Results of a Delphi study. *Journal of Teaching in Physical Education, 38*(2), 91-104.
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3.1 ABSTRACT

Purpose: This study aimed to operationally conceptualize PL for application in the United States, using a modified Delphi approach, with PL academics. **Method**: A sequential, mixed-methods, modified Delphi research design was employed, consisting of three phases: (a) literature analysis; (b) Delphi Survey I (22 participants); and (c) Delphi Survey II (18 participants). Data were analyzed using qualitative coding and descriptive frequency statistics. **Results:** PL academics' conceptions of PL suggested a multi-dimensional, non-contextual, personal, holistic learning process. Qualitative analysis generated two themes: (a) 'PL is' and (b) 'PL is not'. Quantitative results aligned with the qualitative findings. PL concepts that achieved unanimous agreement were: application of knowledge to PA'; 'value of PA'; 'autonomous participation in PA'; 'enjoyment of PA'; and 'ability to participate in PA independently'. **Discussion/Conclusion:** PL was operationalized as an autonomous application of movement, constructed by the individual's conception of movement and response to adversity.

Key Words: Physical education; physical activity; sport; schools; survey

3.2 Introduction

PL is a widely contested term (Edwards et al., 2017). The past decade has seen a proliferation of over 10 separable definitions of PL used among educational, public health, and sport organizations across the world (ASC, 2017; Shearer et al., 2018). Additionally, there are over 20 different concepts used to comprise PL in the literature (Edwards et al., 2017). Among the most common are 'motivation', 'confidence', 'physical competence', 'knowledge and understanding' (Edwards et al., 2017). Each defining concept is complex and multidimensional, adding ambiguity to PL. To describe what PL is, hesitation lingers (e.g., Tremblay et al., 2018). To describe what a physically literate person can do, the alacrity is immense (e.g., ASC, 2017; Dudley, 2015; HALO Research Group, 2014).

PL adoption is reflected in language that clearly states the development of PL as part of national PA plans (e.g., Active Canada 20/20 - Spence et al., 2015); Creating an Active Wales (Wales et al., 2009); England Everybody Active, Every Day (Varney et al., 2014). National sport and physical education organizations have taken on the role of implementing national PA plans (e.g., Keegan et al., 2013; SHAPE America, 2015; Wales et al., 2009), which has contributed to the varying conceptualization of PL (Giblin et al., 2014). The existence of varying definitions and applications of PL is healthy with regard to encouraging scientific debate (e,g., Edwards et al., 2017) yet simultaneously problematic from the viewpoint of practitioners seeking to implement a coherent framework (Corbin, 2016). Toward this end, the current study set out to operationally conceptualize PL for subsequent development of an assessment tool for individuals and practitioners within the United States (Longmuir & Tremblay, 2016).

In the U.S., SHAPE America adopted PL as the overarching goal of physical education (SHAPE America, 2015). PL as an outcome of quality physical education is attractive because PL combines behavioral goals (e.g., PA) with educational goals (e.g., lifelong, meaningful PA engagement – Roetert et al., 2018; Sprake & Walker, 2015). For example, Flemons (2013) argued "physical education ideology should ensure that learners leave school having made progress on their individual physical literacy journeys" (p. 193). Schools, particularly through quality physical education programming, can play a major role in the development of PL in children and adolescents (Castelli et al., 2014; Corbin, 2016; Jurbala, 2015; Kirk, 2013). However, the SHAPE America (2015) adoption of PL merely replaced the words "physically educated" with "physically literate", creating a synonymous conceptualization of PL (Lounsbery & McKenzie, 2015). The linguistic semantics surrounding PL provide barriers in the pathway toward the advancement of PL (Hyndman & Pill, 2018). This highlights the need for conceptual clarity in the efforts to study PL in the U.S. (Castelli et al., 2015; Lundvall, 2015). Efforts toward a national collaborative agreement on the conceptualization of PL are already present in Canada (Canadian Sport for Life, 2015) and Australia (ASC, 2017), thus allowing PL to become a focal point for promoting physically active lifestyles as part of their national and/or local policies (Giblin et al., 2014; Keegan et al., 2013; Sprake & Walker, 2013; Tremblay, 2012)

As noted above, scientific advancement depends on comparing, evaluating and refining competing approaches (Feyerabend, 1975; Lakatos, 1970; Popper, 2002), but from the point of view of governments and organizations seeking to implement PL initiatives, such differences are confusing and can appear arbitrary, potentially confusing

or even preventing implementation efforts (Spengler & Cohen, 2015). When discordance surrounds a topic, a Delphi technique is recommended (Linstone, Turoff, & Helmer, 1975; Powell, 2003). The Delphi technique involves the expertise of professionals to weigh in on an often-debated topic with a specific objective (Delbecq, Van de Ven, & Gustafson, 1975; Powell, 2003). In recent research, the Delphi technique has been a selected methodology to operationalize multifaceted constructs similar to PL (e.g., (Rodríguez-Mañas et al., 2013). Currently, conceptualizations of PL tend to be inconsistent – incorporating many different constructs, often without clear consideration of how these constructs can be combined – because existing literature on PL typically provides ambiguous, wide-ranging perspectives of the construct (Edwards et al., 2017).

An inclusive conceptualization, honoring both philosophical and practical perspectives, is where PL efforts can be most valuable. Operationalizing PL can be approached through the logical analysis of experienced professionals. The purpose of this study, therefore, was to operationally conceptualize PL for application in the U.S., through a Delphi study. In line with this purpose, the specific research question pursued in this study was "How do PL academics, within the Western hemisphere, conceptualize and operationalize PL?"

3.3 Methods

Participants

The selection of PL academics for the survey followed Delphi "expert" nomination recommendations (Delbecq et al., 1975; Green, 2014). Using references from the literature analysis in Phase 1 of the study, a list of targeted survey participants (n=53) was created. Information about these individuals that was available online (e.g.,

curriculum vitae) was used to establish their PL expertise. Although the results of this study are geared toward application in the United States, PL academics across the Western hemisphere was invited to participant to ensure pertinent ideologies were captured. Relevant information that informed participant selection included evidence of active involvement (e.g., leadership appointments) in PL organizations (e.g., International Physical Literacy Association, SHAPE America, Aspen Institute); contributions to PL books and bulletins (e.g., *Physical Literacy: Throughout the lifecourse*, International Council of Sport Science and Physical Education Bulletin); and authorship in PL conceptual/theoretical (e.g., *Quest*), empirical (e.g., *Pediatric Exercise Science*) and/or professional literature (e.g., *Journal of Physical Education, Recreation and Dance*).

Approval to conduct the study was obtained from the lead author's Institutional Review Board. All individuals on the list were then sent individual emails inviting them to respond to the survey using the email service software, Mail Merge. Eight email addresses returned as errors. The survey remained open for two weeks and a follow-up email was sent after the first week to maximize participation. Ten individuals did not open the email communication and 13 individuals opened the email but did not participate. The survey closed with a 42% response rate (*n=22*).

The participants represented a broad make-up of Western countries/regions (Australia, *n=2*; United Kingdom, *n=7*; Canada, *n=4*; Central Europe, *n=3*; and the United States, *n=6*) and, via their work, demonstrated established expertise related to PL. Specifically, a total of 15 participants were actively involved in PL organizations, while 14 participants had contributed to PL books/bulletins and 14 participants were authors on conceptual/theoretical, empirical, and/or professional publications. For organizational

involvement, 13 participants had been appointed PL expert status by national organizations (e.g., appointed member of a government or organizational group of experts), and 11 participants had given PL keynotes at national or international conferences. Contributions to books/bulletins included pedagogical texts or chapter authorship for five of the participants, concept or position papers for seven of the participants, and papers submitted to journal bulletins for 10 of the participants. In total, the survey respondents had generated 30 conceptual/theoretical and empirical publications, after removing duplicates. Nearly all (93%) of the articles were published in the last five years. In a Google Scholar search of "physical literacy", using recent time parameters (2017- 06/2018), ten participants were involved in 15 (30%) of the first 50 articles. This provides relevant evidence for a participant pool that is not only prominent but also current in the field and topic of PL (Green, 2014). Additional evidence of the participants' expertise was derived from one of the survey questions, which asked participants to rate their own level of PL expertise on a five-point scale (5="expert" status). The mean response to this item was 4.14 perceived expertise rating (SD=±.*64*).

Design

This study sought the collective judgement of PL academics to operationalize PL in an effort to increase clarity surrounding PL (Pill, 1971; Powell, 2003). Traditional Delphi studies, which work to obtain full group consensus, have been shown to lead to participant dropout due to participant exhaustion (Schmidt, 1997) or opposing group ideologies (Bardecki, 1984) and false consensus due to the social pressures of group conformity (Averch, 2004; Woudenberg, 1991). To authentically achieve the study objective, a modified Delphi approach was used to obtain data from each individual,

anonymous from the group (Rowe & Wright, 1999), in two sequential surveys (Boulkedid, Abdoul, Loustau, Sibony, & Alberti, 2011) without the expectation to reach consensus (Murray, 1979; Powell, 2003). Delphi alternatives are widely accepted and used and, depending on the research question, can offer a superior methodology over the traditional Delphi (Averch, 2004). In this study, we used a sequential, mixed-methods (*see Figure 1*), modified Delphi research design, which approaches data collection and analysis in phases with each phase informing the next (Onwuegbuzie & Johnson, 2006). The study consisted of three phases: (a) literature analysis, (b) Delphi Survey I, and (c) Delphi Survey II (*see Figure 1*).

Procedures

Phase 1: Literature analysis. The purpose of the literature analysis was to construct a preliminary operational conceptualization of PL (Goddard & Villanova, 2006). Edwards et al. (2017)systematic review was used to guide the literature selected for the analysis. The analysis took place from February 2017 to July 2017 and spanned 60 articles (*see Table 3.1*) from Whitehead (2001) to Corbin (2016) and obtained from the reference list in Edwards et al. (2017).

Initial analysis involved a thorough reading of the literature, highlighting and extracting PL definitions and conceptions (Crabtree & Miller, 1999). Keywords, such as ‘is’, ‘as’, ‘to’, or ‘define’, following a known PL concept (Edwards et al., 2017) were used to establish a definition context. For example, original text from Ennis (2015) read as follows:

> Although skills necessary to compete expertly in team sports will continue to be an important component of physical literacy, additional opportunities to explore a

> range of physical activities of interest to students will challenge PE educators through this decade and beyond. In each instance physical competence to perform safely and with enthusiasm must be paired with knowledge, social justice, and innovative competences to enhance access and design new opportunities. (p. 121)

Extracted text from Ennis (2015) included "…skills necessary to compete expertly in team sports will continue to be an important component of physical literacy" (p. 121), and "…physical competence to perform safely and with enthusiasm must be paired with knowledge, social justice, and innovative competences to enhance access and design new opportunities" (p.121). The extracted text then was synthesized and reduced to distill a distinct list of PL concepts (Hopkins & Antes, 1985). A frequency chart was created to document the PL concepts that appeared most often in the literature (*see Table 3.1*).

Phase 2: Delphi Survey I. The purpose of the first Delphi survey was to gather PL academics' perspectives of PL in response to the results of our literature analysis, which were used to develop the survey questions (Goddard & Villanova, 2006). A pilot version of the survey was tested with a convenience sample of individuals (*n=4*) who have authorship in the PL literature base. Each question had the option to leave feedback and panelists were encouraged to do so. After taking the survey each panelist had a one-to-one informal conversational interview (Gall, Gall, & Borg, 2002) with the lead researcher to further explore the panelist's opinion and reactions to the items. The panelists had autonomy to inquire about the linguistics, relevance or objective of an item as necessary. The questioning protocol allowed for the panelists to generate an authentic response to the Delphi items based on their conceptions of PL (McNamara, Chur-Hansen,

& Hay, 2008). Edits were made based on panelist feedback to enhance the content and face validity of the survey.

The survey consisted of 20 open-ended questions intentionally designed to capture the participant's judgement and rhetoric about the facets of PL (Keeney, Hasson, & McKenna, 2001). Examples of questions used in the survey are, "What role does 'motivation' play in the definition of physical literacy?" and "What does 'poise and economy' look like; how would you operationalize this?"

Phase 3: Delphi Survey II. At the close of Delphi Survey I, open-ended responses were aggregated by survey question with participants' identifying information removed and replaced with an anonymous identification number. Participant responses in the first Delphi survey guided the item construction for the second Delphi survey (*see Table 3.2*). Delphi Survey II consisted of 30 closed-ended questions and two open-ended questions. Closed-ended questions focused on the importance of each proposed concept to the operational definition of PL using a 4-point Likert-type scale (Keeney et al., 2001): 4=very important; 3=important; 2=somewhat important; 1=not important (*see Table 3.2*). Directions to the survey read: "Please identify the following items that are most important to the operational definition of physical literacy". Examples of question items are: "Knowledge of a variety of specific sport skills and tactics" or "Application of knowledge to various physical activities" (*see Table 3.2*). Open-ended questions focused on PL (i.e., PL journey) allowing participants to express additional thoughts, comments, or questions. One open-ended question read, "How would you operationalize the physical literacy journey?" The second survey was sent out to the 22 respondents from the first

survey. The response rate for the second survey was 82% (*n=18*). Responses to the second survey were integrated into the developing conceptualization of PL.

Data Analysis

The lead author conducted a qualitative analysis of the responses to the open-ended items from both surveys. The coding process followed in line with the definitions, terms, and procedures (e.g., code book, rounds of coding, types of codes) used in Saldaña (2016). The responses to each question were coded *in vivo*, with information direct from participant quotes. Next, descriptive coding was employed. This involved attaching a paraphrased word (or code) to a segment of text (Saldaña, 2016). An iterative process then ensued, in which additional rounds of coding were employed to progressively refine, strengthen, and connect the codes based on multiple perspectives (e.g., alignment with PL concepts, emotive qualities in the participants' responses - Glesne, 2016). Coding continued until further analysis revealed no additional insights into the meanings and connections within and across participants' responses. At this point, distinct and robust themes, subthemes, and categories in the data were evident.

Trustworthiness. Several different methods were employed to maintain trustworthiness of the data. Important to the credibility of the results, the following text describes the research audit trail and decision trail used in the qualitative analysis (Powell, 2003). First, the researcher kept detailed analytic memos (e.g., researcher explanation to codes, reflections after coding rounds), alongside the coding process (Glesne, 2016). Second, a codebook was kept with definitions (e.g., code "throughout life" – text referring to time across years of life), inclusion and exclusion criteria (e.g., code "throughout life" inclusion: lifelong, lifespan, over time, young-old, journey;

exclusion: no text reference to time across years of life) alongside any changes to codes that occurred (Bazeley, 2013). Third, an external audit was conducted by an external qualitative researcher (Creswell & Poth, 2018), and was administered after the first round of coding, prior to Delphi II, and after Delphi II. The external audit involved the external researcher (outside of the research team) reviewing the codes, themes, and categories. Fourth, concurrent with the external audit and at the conclusion of the data analysis, peer debriefing (Glesne, 2016) by an internal (i.e., fourth author) qualitative researcher was conducted. Lastly, the qualitative analysis of Delphi I and Delphi II, combined with the closed-ended responses from Delphi Survey II, provide both methodological and data triangulation of the results (Creswell & Poth, 2018).

Researcher positionality. The qualitative analysis was led by the first author. The author is a certified physical education teacher, having taught in the U.S. public school system from 2011-2016. Like many physical education teachers in the U.S., the author's first awareness of PL was brought upon by the change of language in the national physical education standards (SHAPE America, 2015). As Lounsbery & McKenzie (2015) shared, 'physically literate' to a physical education teacher was synonymous with 'physically educated'. Currently, the first author is a doctoral student working on a Ph.D. and studying PL as part of the dissertation requirement for degree completion. The author assessed the qualitative data in a post-positivistic manner (Crossan, 2003) using critical multiplism (Cook, 1985). The positionality of the researcher is from the lens of a high school physical educator, trying to comprehend 'what is PL?' and 'what does it mean for physical education?' based on the existing literature and the perspectives of the PL academics in this study.

3.4 RESULTS

Qualitative findings yielded 547 lines of code generating two themes: '*PL is'* (343 codes across 22 participants) and '*PL is not'* (204 codes across 22 participants). Closed-ended responses from the second Delphi survey (*see Table 3.2*), for which frequency analyzes were performed, are laced throughout the presentation of the qualitative findings. For the closed-ended responses, agreement was determined as unanimous, majority, or no agreement (Diamond et al., 2013). *Unanimous agreement* was defined as all participants ranking the item as either: important (3) very important (4) *or* not important (1) somewhat important (2) to operationalizing PL. *Majority agreement* was defined as was when less than three participants (16.7%) disagreed about the importance of a given PL concept (Diamond et al., 2013). *No agreement* was defined as a lack of majority agreement on an item.

PL is. The theme *PL is* embodied the Delphi participants' conceptions of PL. These conceptions reflected the idea that PL is a multi-dimensional, non-contextual, personal, holistic learning process. For example, when asked about the role of purposeful physical pursuits in operationally conceptualizing PL, one participant stated: "Very important, without purpose the engagement in physical activity will be lost over time. We need to move young people toward their own physical literacy purpose... such that [they] do actually participate" (Delphi I, Participant 12). *PL is* included the subthemes *autonomous application of movement* (117 codes across 22 participants); *cognition* (134 codes across 22 participants); and *response to adversity* (80 codes across 21 participants).

The first subtheme, *Autonomous application of movement*, emphasized choice and freewill in relation to participation in different movement contexts. For example, "…

just because I prefer to move in one context doesn't make me physically illiterate. This is my choice and I am free to make that decision" (Delphi I, Participant 2), "You could capture all of this [PL], by referring to participating in physical activity out of autonomous reasons." (Delphi I, Participant 13), "…if the person chooses to participate in regular physical activity, then that is sufficient evidence that they value it [PA]… we have ultimate responsibility for our choices to be physically active or not." (Delphi I, Participant 12), and "…think about including [PL] items… that capture the broader reasons of why people choose to be physically active." (Delphi II, Participant 22). Participants unanimously agreed that "participating in PA autonomously" and "the ability to participate in PA by oneself" were important (*see Table 3.2*).

PA engagement (81 codes across 22 participants) and *personal context* (36 codes across 12 participants) were the primary categories in this subtheme. *PA engagement* was defined by the participants' referral to movement in relation to its personal, holistic, or autonomous implications. Participant responses supporting *PA engagement* are captured in the following statement: "The holistic aspect of the movement experience plays an important role in physical literacy" (Delphi I, Participant 16). From the second Delphi survey, majority agreement was reached for the closed-ended item focusing on "identifying movement as part of one's self" as important to operationalizing PL (*see Table 3.2*). *Personal context* focusing on movement as a personal choice was exemplified by statements such as, "valuing physical activity is imperative… things that we value are hierarchically prioritized and will be a focus on a daily basis" (Delphi I, Participant 10). Closed-ended responses from Delphi II indicated unanimous agreement for having "personal value of movement through daily PA" and majority agreement for having

"personal reasons to participate in PA" as important concepts for operationally conceptualizing PL (*see Table 3.2*).

The second subtheme *cognition of movement* encompassed the participants' responses that referred PL to as learning, understanding, or comprehension in relation to movement. American Psychological Association (APA) defines cognition as "all forms of knowing and awareness, such as perceiving, conceiving, remembering, reasoning, judging, imagining, and problem solving" (VandenBos, 2007, p.187). An example that alludes to this is "[PL journey is] Desire, motivation and competence in movement and physical activity gained and learned over the lifespan" (Delphi II, Participant 17). Another example is:

> One's physical literacy is not defined by any one, or group of, specific physical activities. The physically literate person can enjoy and appreciate participation in multiple physical activities, sports, or endeavors. In addition, a person that enjoys and appreciates a morning walk could be considered 'physically literate' in the context and environment that stimulates the mind and body to appreciate the relaxation or physical fitness acquired from this simple activity. (Delphi I, Participant 2)

Comprehension of movement (88 codes across 22 participants) and *affective response to PA* (45 codes across 16 participants) were the leading categories from the *cognition of movement* subtheme. *Comprehension of movement* reflected participants' perspective of the learning processes as it pertains to moving the physical body. The following participant response supports this category: "To operationalize [the PL journey] it is about your understanding of the movement with the application of self.

Know and understand your movement and the importance of this movement for development of you" (Delphi I, Participant 15). Consistent with this perspective, the closed-ended responses revealed unanimous agreement for "application of knowledge to various PA" and majority agreement for "perceived motor competence" as an important concept for operationalizing PL (*see Table 3.2*). *Affective response to PA* reflected to participants' references to learning processes as they pertain to the emotional aspects of movement. A participant response illustrating this category is "[PL is] Knowing how to derive enjoyment from PA, but not unconditionally enjoying it" (Delphi I, Participant 1). Closed-ended responses revealed unanimous agreement for "personal enjoyment in PA" and majority agreement for "internal motivation" and "personal recognition of affective response to PA" as important to operationalizing PL (*see Table 3.2*).

The third subtheme, *response to adversity*, was defined by the participants' referencing PL with overcoming obstacles. For example, one of the participants wrote, "in reality as people go through the lifespan their choice of PA is likely to change based upon movement capacity and cultural context" (Delphi I, Participant 12). Related to overcoming obstacles, participants closed-ended responses indicated majority agreement for "achieving personal PA goals" as important to operationalizing PL.

Adaptability (48 codes across 22 participants) and *resiliency* (32 codes across 12 participants) were the primary categories rising out of *response to adversity*. *Adaptability* was defined by the participants' reference to changing movement or behavior patterns, as evidenced in the following quote: "one's ability to adapt to challenges to movement across the lifespan. Think of it [PL Journey] as a 'durability' measure" (Delphi II, Participant 3). Closed-ended responses revealed majority agreement for "adapting motor

skills to various contexts" as important to operationalizing PL (*see Table 3.2*). *Resiliency* captured participants' reference to responding to barriers. For instance, one participant said: "Without confidence people are worried to do unknown movements or unknown activities. Confidence must be developed through various physical activity challenges" (Delphi I, Participant 4). Another said: "This [PL Journey] also refers to being able to face challenging circumstances. The PL journey is more rewarding and enriching if the individual has navigated twists and turns along the way" (Delphi II, Participant 20). Closed-ended responses indicated majority agreement for "PA that may challenge oneself" as important in operationalizing PL (*see Table 3.2*).

Figure 2 presents a visual representation of the relationships among qualitative data in *PL is.* Interconnectedness between the *PL is* subthemes were detected through multiple codes represented in the same highlighted text. A demonstration of this connectedness is exemplified in this quote:

We do not choose to participate in a behavior (PA for example) unless it affords us positive contingencies. Having an understanding of these benefits is the first step in reinforcing these repeated behaviors, however, it is not sufficient. Individuals have to evaluate the rewards that best serve their goals for PA and this changes across individuals and throughout the lifespan" (Delphi I, Participant 12)

Autonomous application of PA suggested the greatest interconnectedness (33 codes across 18 participants) with *cognition* (19 codes across 15 participants) and *response to adversity* (14 codes across 10 participants).

PL is not. The theme *PL is not* was defined by participant statements about previously defined PL constructs that are not part of PL but rather may lead to (i.e.,

determinants) or be a result of (i.e., outcomes) PA or PL. A quote that illustrates this theme is: “Motivation is a determinant of PL and PA. It is important to adherence to PA but it is not a primary factor that defines PL, in my opinion. Worth of mention as part of the process of achieving PL but not a major PL product factor” (Delphi I, Participant 11). *PL is not* generated two subthemes *determinants and outcomes of PL* (142 codes across 21 participants) and *determinants of PA* (56 codes across 19 participants).

The first subtheme, *determinants and outcomes of PL*, reflects the participants’ discussion of concepts that lead to PL, or are outcomes of PL, but are not, themselves, PL (*see Figure 3*). Examples reflecting this subtheme are,

> Someone who was unable to move through disability - for example - could still develop a form of PL despite perhaps never developing motor competence - so it [physical competence] is not a *defining* feature but rather an important element forming many and diverse connections to other elements in the integrated development of PL (Delphi I, Participant 1).

> Learning to move in multiple contexts and environments enables physical literacy as one accomplishes moving with competence and confidence in varying conditions and circumstances. It is a path toward becoming physically literate. That said, and as indicated earlier, just because I prefer to move in one context doesn't make me physically illiterate… (Delphi I, Participant 2).

Additional examples include: “I can be physically literate by participating regularly in one form of physical activity which does not always require extensive movement complexity” (Delphi I, Participant 12). “This [fundamental motor skill] is a building block that enables people to access a greater number of 'organized' physical

activities but isn't necessarily the determining factor for people engaging in physical activity per se" (Delphi I, Participant 10). "Motivation to move or be active is best seen as an outcome or byproduct of an individual's physical literacy" (Delphi I, Participant 22). "A positive disposition [of PA] is the outcome of making progress on one's PL journey. It's the outcome, not part of the definition" (Delphi I, Participant 20). Closed-ended responses revealed no agreement among "demonstration of transferability of skill to various environments" and "efficient movement" as being important to operationalizing PL (*see Table 3.2*).

Determinants and outcomes of PL included the category *Stakeholders of PL* (58 codes across 22 participants), which was defined as the participants' reference to outside agents that could contribute to PL (i.e., teachers; coaches; curriculum; policy). For instance, one of the participants stated, "motivation plays a very important role as the service providers need to make sure that the physical activities, they are providing stimulates the interest of their participants" (Delphi I, Participant 16). This example highlighted the role of the provider and curricula in supporting PL. Closed-ended responses indicated there was no agreement about, "family support", "community support", "external accountability", and "peer groups" as outside agents that could contribute to PL (*see Table 3.2*).

The second subtheme, *determinants of PA*, reflected the participants' discussion of concepts that were viewed as precursors to physically active lifestyles (*see Figure 3*). This is evidenced in the following quotes, "…it [confidence] is an important determinant and factor that helps adherence [to PA] but I do not see it as a major PL component" (Delphi I, Participant 11). "One who is more competent in a variety of activities is more

likely to be active in the lifespan" (Delphi I, Participant 9). Closed-ended responses supported the inclusion of these themes under *PA is not,* for which no agreement was met about operationalizing PL with "actual motor competence" and "knowledge of variety of physical activities" (*see Table 3.2*).

Figure 3 presents a visual representation of the qualitative codes in *PL is not.* The greatest determinants among PL and PA were "motivation" (30 codes across 11 participants), "confidence" (20 codes across 12 participants), "knowledge pertaining to the benefits of PA" (16 codes across 11 participants), "PA competence" (14 codes across 10 participants) and "fundamental motor skills" (13 codes across 9 participants). The PL concepts which were coded as *PL is not* the least frequently (1-2 codes) include "embodied knowledge", "embodied movement", "value", "taking responsibility", "interpreting the environment", "PA engagement", "PA enjoyment", and "PA behavior".

3.5 Discussion

This study aimed to operationally conceptualize PL through a Delphi study. The results help to clarify essential components of PL by distilling core ideas and concepts that comprise the construct (i.e., *PL is*) and delineating these from variables that may be more appropriately viewed as determinants and outcomes of PL (*PL is not*). Overall, findings suggested that PL most closely reflects an autonomous application of movement, which encapsulated both the personal (Whiteheadian - Whitehead, 2010) and behavioral (LTAD - Balyi et al., 2013) perspectives of PL. Autonomy entails free will and personal choice (Deci & Ryan, 1985), which have been the cornerstones of Whiteheadian conceptualizations of the construct (Whitehead, 2010), while application focuses on PA behavior, which is central to LTAD definitions (Castelli et al., 2014; Chen, 2015; Corbin,

2016; Dudley, 2015; Lundvall, 2015; M. Tremblay & Lloyd, 2010). Furthermore, autonomous application is augmented through experience (i.e., PA engagement); with experiential learning (e.g., phenomenology) being another hallmark of existing PL perspectives (Jurbala, 2015; Lussier, 2010; Whitehead, 2007, 2010). Furthermore, PA engagement was strongly represented in this study as an appropriate concept for the operational conceptualization of PL.

The *PL is* subthemes *cognition of movement* and *response to adversity* surrounding movement exhibited a bidirectional relationship with the subtheme *autonomous application of movement*. These findings parallel the previous conceptions of PL as a holistic, unity of physical, cognitive, and psychological domains (ASC, 2017; Dudley et al., 2017; Whitehead, 2010). Cognition of movement was different from propositional knowledge (e.g., motor skills, rules of sport); rather, it was the personal conception of movement and his/her understanding to how s/he responds to movement (Arnold & Nicholson, 1991; Tan & Hunter, 2002). *Response to adversity* completed the triadic relationship. *Adaptability* and *resiliency* are categories housed in the *response to adversity* subtheme. *Adaptability* is defined as the ability to transform or change within a given state, often as a response to resiliency (Bordoloi, Cooper, & Matsuo, 2009; Walker, Holling, Carpenter, & Kinzig, 2004). *Resiliency* was defined as the ability to cope with perceived instabilities caused by external stress and conflicts (Adger, 2000; Gallopín, 2006). The individual's ability to overcome obstacles, both tangible and perceptual, is *response to adversity*.

In contrast, *PL is not* represented the environmental, educational, and/or social contexts which could aid in an individual's PL but were not, in and of themselves, PL

(Pot & van Hilvoorde, 2013). The theme *PL is not* highlighted fundamental motor skills, physical competence, knowledge pertaining to the benefits of PA, and knowledge pertaining to a variety of PA as determinants and outcomes of PL. This was divergent from the LTAD PL perspective that PA behavior and PA engagement are restricted by physical skill and knowledge (Jurbala, 2015; Tremblay et al., 2010). The study results did not support PL as being expedited by being skillful or knowledgeable. Thus, what have traditionally been referred to as PL concepts (e.g., physical competence, motivation, confidence, knowledge) (Mandigo et al., 2009; Roetert & MacDonald, 2015; Whitehead, 2010) may need to be re-conceptualized as determinants or outcomes of PL.

Together, *PL is* and *PL is not*, exposed the core of PL. *PL is* differs from previous operational conceptions of PL where prerequisite factors, such as skill and knowledge (e.g., (Dudley et al., 2017), have dominated (Edwards et al., 2018). The *PL is* operational conceptualization is individualized and non-contextual, allowing the application of movement to be versatile across age, ability, location, and socioeconomics.

3.6 Conclusion

The results of this study inform future directions for PL measurement (i.e., *PL is* and *PL is not*). It seems that, given the subthemes that comprised the theme *PL is* (*autonomous application of movement*, *cognition of movement*, and *response to adversity*), two fundamental questions should drive assessment and evaluation of the construct: "What do you choose to do?" and "Why do you choose to do it?" *Autonomous application of movement* could be measured by investigating what individuals do as movers during their leisure time (i.e., via self-report, accelerometry, or other established methods). *Cognition of movement* and *response to adversity* could be measured with

psychometric assessments. Examples of question items might pertain to perceived barriers to movement (e.g., weather, time), perceived motor competence, and an awareness of one's own interests/dislikes related to movement. In all cases, future research should aim to measure PL as a non-contextual, individualistic construct, separate from its determinants or outcomes, as focusing on the latter may fail to capture the essence of PL, risk comingling core variables with exogenous factors, or constrain investigation to singular domains (i.e., physical, psychological, or cognitive; Edwards et al., 2018).

As with all research, this study had several limitations. The study was limited to individuals whose contact information was available online and who chose to participate (less than half of the identified PL academics responded to the initial survey), which may have led to the omission of qualified PL experts from this study. Future research may seek to build on the results of this study by investigating the perspectives of other PL stakeholders and professionals, such as physical education teachers, sports coaches, and youth enrolled in physical education and/or involved in organized/recreational PA. Another limitation of this study was that participants represented Western nations and did not include the perspectives of PL academics from other parts of the world.

Despite its limitations, this study was informed by the perspectives of a sizeable, prominent, contemporary, and multinational panel of PL experts (Powell, 2003). The *PL is* operational conceptualization places importance on the individual's autonomous application of movement, conception of movement and response to adversity. *PL is* provides a unique conception to PL due to its non-contextual and personal attention. One of the participants in this study eloquently captured this perspective: "You will find

definitions of physical literacy by investigating empirically what people do in its name" (Delphi II, Participant 22).

Table 3.1. *Literature Analysis Frequency Chart*

Literature	Physical Literacy Concepts																
	Confidence	Disposition	PE & Sport	Embodiment	PA Enjoyment	Motor Skills	Health	PA Knowledge	Lifelong PA	Motivation	Poise-economy	PA Behavior	Competence	Responsibility	Understanding	Valuing PA	Environments
Alagul et al., 2012								X									
Almond, 2013a		X	X									X					
Almond, 2013b	X	X	X	X				X	X			X	X	X	X	X	X
Almond, 2013c	X						X	X	X	X				X	X	X	
Aspen Institute, 2015	X								X								
Canadian Sport for Life, 2015	X							X	X	X				X	X	X	
Caput-Jogunica et al., 2009	X					X	X					X					
Castelli et al., 2014			X		X		X		X								
Chen, 2015	X	X		X	X	X	X		X	X		X	X		X	X	X
Corbin, 2016	X		X			X	X	X	X	X		X	X	X	X	X	X
Corlett & Mandigo, 2013	X		X	X		X	X	X		X	X	X	X		X		X
Dudley, 2015	X	X	X		X	X		X	X	X		X	X	X	X	X	X
Ennis, 2015	X	X		X			X	X	X		X	X	X		X		X
Flemons, 2013		X		X					X	X			X	X	X	X	
Giblin et al., 2014				X		X			X				X				
Hastie & Wallhead, 2015	X		X	X				X	X	X	X	X	X		X		X
Higgs et al., 2008			X			X			X			X					
Hylton, 2013	X	X							X	X		X	X			X	
Jurbala, 2015	X	X	X	X		X	X	X	X	X	X	X	X		X		X
Keegan et al., 2013	X	X	X	X		X		X	X	X	X	X	X	X	X	X	X
Kentel & Dobson, 2007				X	X							X					
Kirk, 2013	X	X	X	X					X	X	X	X					X
Kriellaars, 2013	X			X									X				
Lo´pez de D'Amico, 2013												X					X
Lounsbery & McKenzie, 2015	X		X					X	X	X		X	X		X	X	
Lundvall, 2015	X		X	X	X	X		X	X	X	X	X	X		X		X
Lussier, 2010				X		X		X					X			X	
Lynch, 2015							X		X						X		
MacDonald & Enright, 2013	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X
MacDonald, 2015								X		X			X		X		
Mandigo & Holt, 2004	X	X		X				X			X						X
Mandigo et al., 2009	X		X	X		X	X	X	X	X	X	X	X		X		
Mandigo et al., 2012	X					X	X						X				X
Marsden & Weston, 2007	X		X	X				X				X	X				X
McCaffery & Singleton, 2013	X			X	X		X	X	X	X	X	X	X		X	X	X
McKee et al.,, 2013				X		X								X			
Moreno, 2013	X		X			X		X	X	X		X	X	X	X	X	
Pot & Hilvoorde, 2013	X					X		X	X	X		X	X		X		
Roetert & Jefferies, 2014	X	X	X	X		X	X	X	X	X		X	X	X	X	X	X
Roetert & MacDonald, 2015	X	X	X		X	X		X	X	X		X	X	X			X
SHAPE America, 2014	X		X				X	X	X			X	X		X	X	X
Sheehan & Katz, 2013	X					X							X				
Silverman, 2015	X					X		X	X	X		X	X				
Sport Northern Ireland, 2009														X			
Sprake & Walker, 2013	X	X	X	X				X	X	X		X	X		X	X	
Sprake & Walker, 2015	X	X						X	X	X		X	X		X	X	
Sun, 2015		X		X			X	X		X		X	X		X	X	
Tremblay & Lloyd, 2010			X			X	X	X	X			X			X		
Tremblay, 2012			X														
Way et al., 2014			X		X	X			X			X					

Whitehead, 2001	X	X		X			X	X		X		X				X	
Whitehead, 2007	X	X		X		X	X	X	X	X	X	X		X		X	
Whitehead, 2010	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	
Whitehead, 2012	X	X					X	X	X			X		X			
Whitehead, 2013a	X	X	X		X		X	X	X	X	X	X	X	X	X		
Whitehead, 2013b	X	X					X	X	X		X		X	X	X		
Whitehead, 2013c							X				X			X			
Whitehead 2013d	X	X	X	X		X	X	X	X			X	X		X	X	
Whitehead & Almond, 2013	X				X		X			X		X	X		X	X	

Table 3.2. *Results from Delphi Survey II*

Agreement	Questions	Not Important 1	Somewhat Important 2	Important 3	Very Important 4
Unanimous Agreement	Personal enjoyment in PA	0	0	4	14
	Application of knowledge to various physical activities	0	0	4	14
	Value of movement through daily PA	0	0	4	14
	Ability to participate in physical activity by oneself	0	0	5	13
	Participating in PA autonomously	0	0	5	13
Majority Agreement	Identifying with movement as a part of one's self	0	1	2	15
	Transfer of motor skills to variety of contexts	0	1	4	13
	Internal motivation for PA	0	1	4	13
	Perceived motor competence	0	1	5	12
	Physical educator as support in PL journey	1	2	1	14
	Personal reason to participate in PA	0	2	7	9
	Personal recognition of affective response to PA	1	2	5	10
	Positive physical education experience	1	2	5	10
	Personal goals geared toward PA	0	3	8	7
	Participate in activities that challenges oneself	1	2	8	7
	Meeting/achieving personal PA goals	1	2	9	6
	Health enhancing movement to improve/maintain fitness levels	1	2	10	5
	Sport specialization	10	5	2	1
No Agreement	Knowledge of a variety of specific sport skills/ tactics	0	4	5	9
	The PL journey	2	2	1	13
	Coach as support in PL journey	1	3	5	9
	Actual motor competence	0	4	6	8
	Positive sport experience	2	2	6	8
	Demonstration of transferability of skill to various environments	0	4	9	5
	Efficient movement	0	4	9	5
	Supporting others in PA settings	0	6	6	6
	Participate in new activities	0	6	7	5
	Family/Peer support of PA	2	4	5	7
	Community/Facility support of PA	2	3	9	4
	Structure of accountability for PA	2	6	5	5
	Choosing peers because of personal identity in PA	3	7	7	1

Note. 4 pt. Likert scale response to items [very important = 4; important = 3; somewhat important = 2; not important = 1]. Agreement is responses on one half (4, 3) or the other (2, 1). Unanimous agreement = 100% (*n =18*). Majority agreement = 83.3% (*n >14*).

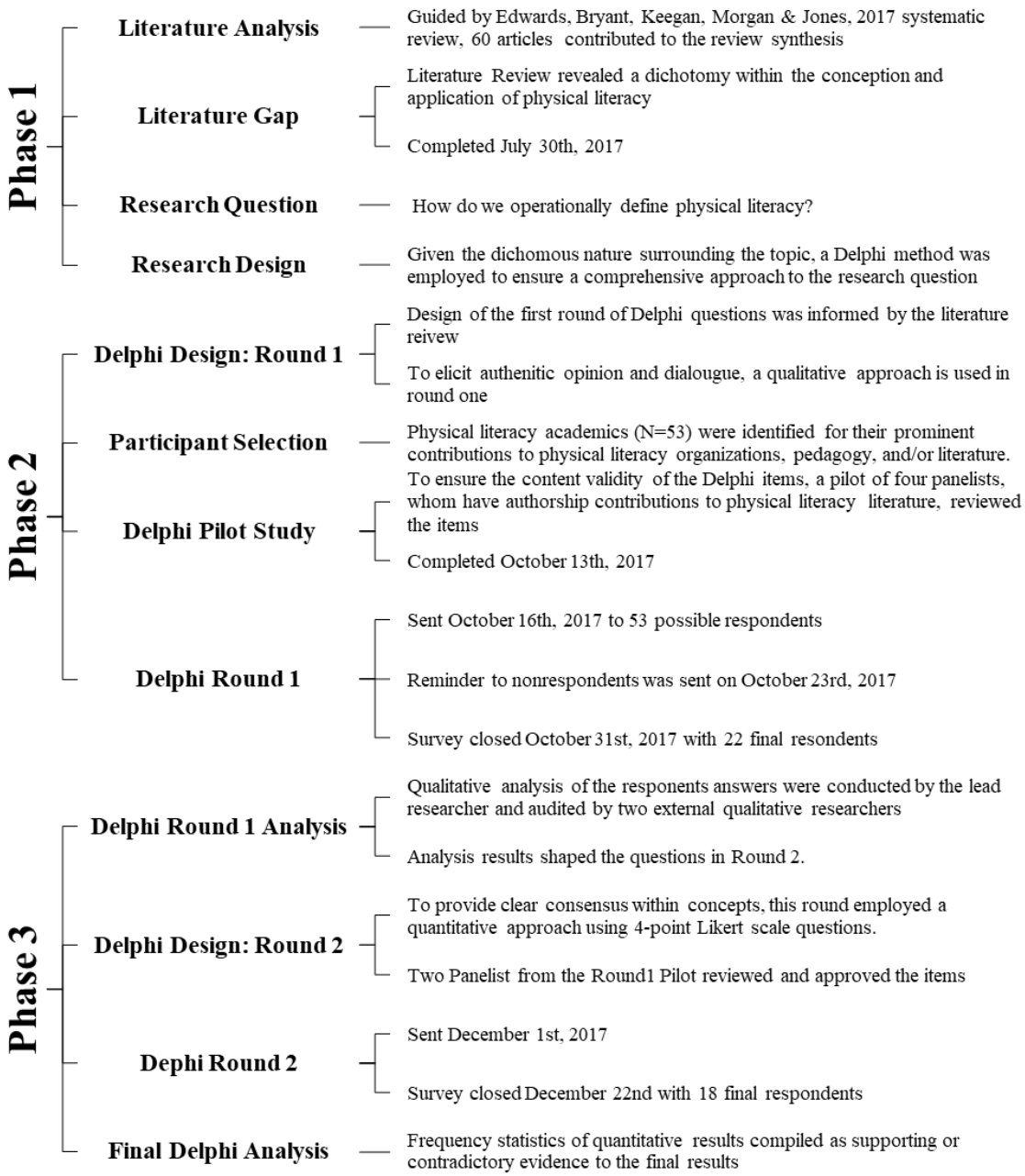


Figure 3.1. Flowchart of Delphi Study Phases

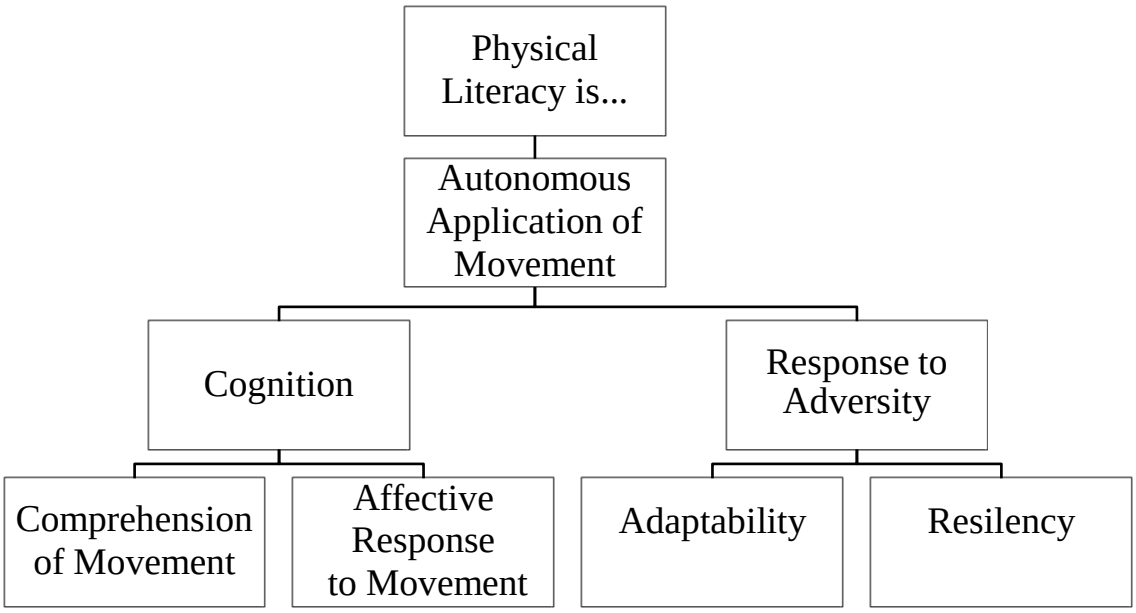
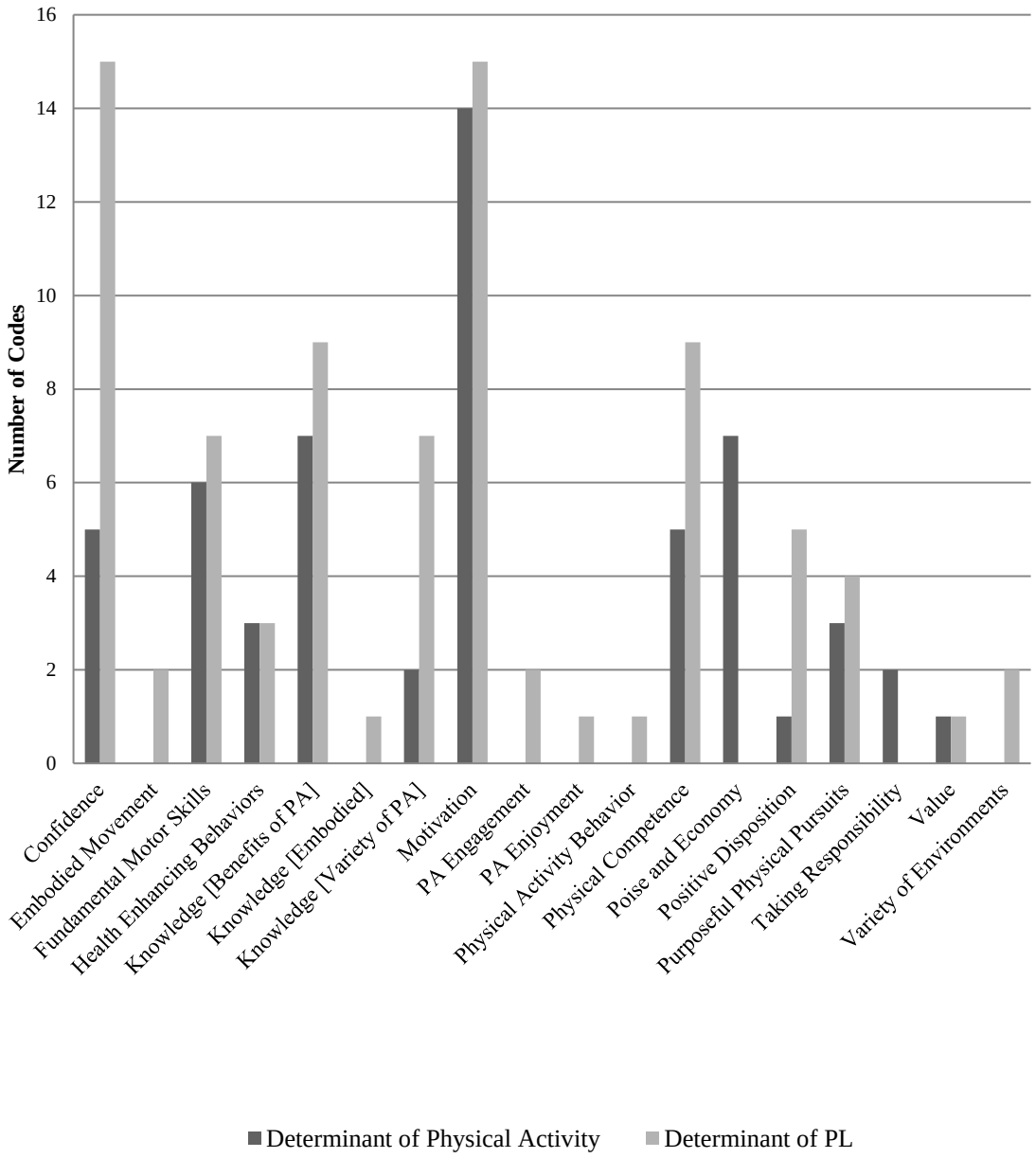
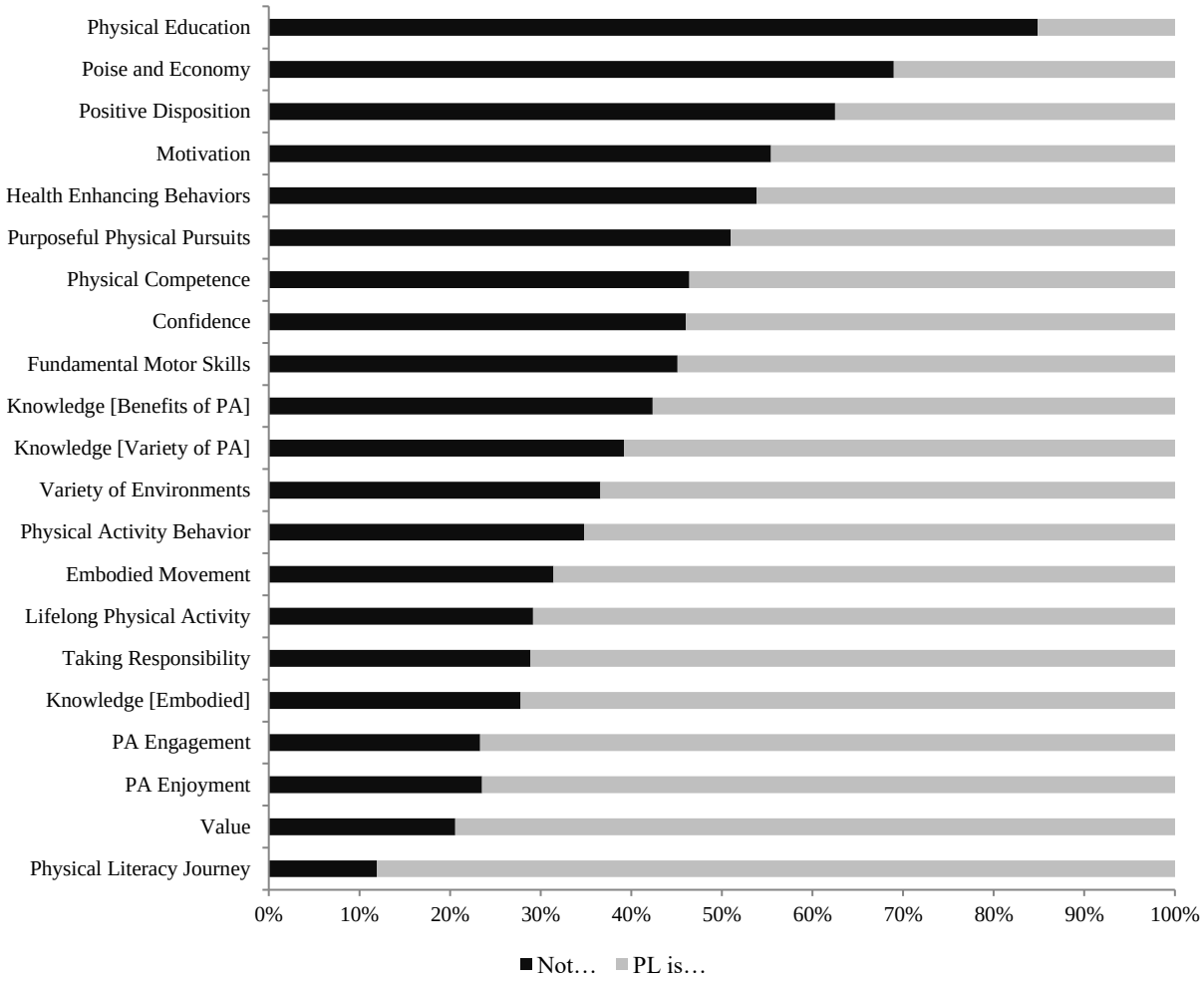


Figure 3.2. Relationship between "Physical Literacy is" subthemes



Note. PL = physical literacy; PA = physical activity

Figure 3.3. Theme "Physical Literacy is not" displayed across physical literacy concepts



Note. PL = physical literacy; PA = physical activity

Figure 3.4. Physical Literacy is and Physical Literacy is not displayed across physical literacy concepts

CHAPTER 4:

EVIDENCE-BASED CONCEPTS TOWARD ASSESSING THE PHYSICAL LITERACY OF UNITED STATES ADOLESCENTS: AN EXPLORATORY STUDY USING REPERTORY GRID ANALYSIS[2]

[2] Shortt, C.A., Webster, C.A., Keegan, R.K., Brian, A., & Stodden, D., (In Progress). Evidence based concepts toward assessing the physical literacy of United States adolescents: An exploratory study using repertory grid analysis.

4.1 ABSTRACT

Purpose: The purpose of this exploratory study was to gather data to inform core constructs and characterizing dimensions of PL for U.S. adolescents using a mixed-method repertory grid analysis (RGA) approach.

Methods: RGA is a mixed-method approach with systematic questioning for element (i.e., activities) and construct elicitation (i.e., perceptions of activities). A convenience sample of U.S. adolescents (*N*=17) participated in the multi-step RGA interview (M=59 minutes). Participants identified 9 to 25 activities (M=15) in four domains of physical activity (PA): physical education, exercise/fitness, recreation/leisure, sport, and overall. Activities identified as their most/least favorite were categorized as *PA preference*. Activities participants said they chose to do most/least often were categorized as *PA choice*. Activities participants said they would try / would never try were categorized as PA *ideals*. Triadic elicitation (i.e., comparing and contrasting three activities) of the elements revealed constructs (i.e., perceptions) surrounding PA. Participants identified the opposite meaning of each construct to develop a personalized scale for why they choose to engage in or refrain from PA. Participants then rated the elements (i.e., activities) against the constructs (i.e., original perceptions – opposite meaning) on a scale from 1-6. Data analysis involved frequency counts, descriptive statistics, and qualitative analysis.

Results: Overall, 88 elements and 123 constructs were identified. Constructs were organized into 23 construct categories. The most elicited construct category was *active* (i.e., participants' perceived energy exertion). Participants preferred (i.e., rating average ≥ 5) engaging in activities favored in the construct categories of *familiarity* (i.e., perceived

comfort), *identification* (i.e., perceived suitableness), *enjoyment* (i.e., perceived fun) and *activity competence* (i.e., perceived good/bad at activity). In the element category *PA choice*, participants highly favored *familiarity*, *activity competence*, *enjoyment* and *outcomes* (i.e., perceived benefit). In the element category *PA ideal*, participants favored the construct category *freedom* (i.e., perceived level of control).

Discussion: Building on the results of Shortt et al. (2019), this study reinforces the importance of the personalized position and complexity of PL. This study provides PL researchers with initial groundwork, based on RGA methodology for developing more person-centered conceptions of PL that can be used to design appropriate assessments for application with U.S. adolescents.

4.2 Introduction

In the U.S. daily PA behavior decreases as adolescents (ages 14-18) progress through high school (CDC, 2017; Dumith, Gigante, Domingues, & Kohl, 2011; Kann et al., 2018; National Physical Activity Plan Alliance., 2018; Pearson, Atkin, Biddle, Gorely, & Edwardson, 2009; Skinner, Ravanbakht, Skelton, Perrin, & Armstrong, 2018). The habits adolescents establish in high school have been shown to influence PA behavior in adulthood (Gordon-Larsen, Nelson, & Popkin, 2004). Today, only 24% of high school-aged adolescents meet the PA guidelines (i.e., 60 minutes of daily PA; 2018 Physical Activity Guidelines Advisory Committee, 2018; Kann et al., 2018).

The adolescent years provide a unique transitional position between childhood and adulthood. During this time, adolescents tend to seek out social acceptance and emotion generating behaviors (Steinberg, 2005). Adolescents' sense this transient reality and evolve into social roles and personal identities (Dahl, 2004). These identities play an important part in an adolescent's PA behavior as PA is socially constructed (Hay & Macdonald, 2010; Kendzierski et al., 1998; Macdonald et al., 1999). Research shows that, globally, adolescent PA is socially and culturally constructed into the domains of physical education, recreational or leisure PA, fitness or exercise, and sport (Hulteen et al., 2017; Martins et al., 2015).

In response to the decline in PA behavior throughout childhood, the U.S. has orchestrated national PA plans to increase PA in youth (under 18) and adults (e.g., National Physical Activity Plan [NPAP] Alliance, 2016). A strategic element of the NPAP is to increase and develop PL. "Strategy 4: Sports organizations should adopt policies and practices that promote physical activity, health, participant growth, and

development of physical literacy" (NPAP Alliance, 2016, p. 43). However, the NPAP currently does not include a formal assessment for PL (i.e., NPAP Alliance., 2018).

PL is complex and comprised of a multitude of concepts (Edwards, Bryant, Keegan, Morgan, & Jones, 2017; Hyndman & Pill, 2018). Many countries have pursued the operational conceptualization of PL as a research construct (Barnett et al., 2019; Cairney, Dudley, Kwan, Bulten, & Kriellaars, 2019; Chen, 2015; Edwards et al., 2019; Keegan et al., 2019; Shortt, Webster, Keegan, Egan, & Brian, 2019). Operational research in the U.S. conceptualizes PL as non-contextual (i.e., not dependent on ability, age, or location) and individually-driven (i.e., each individual exercises autonomy in his/her decisions to be active) (Shortt et al., 2019).

Operational conceptualizations of PL guide its assessment (Barnett et al., 2019; Edwards et al., 2018, 2017). The 2nd edition of the Canadian Assessment of Physical Literacy (CAPL-2; Gunnell, Longmuir, Barnes, Belanger, & Tremblay, 2018) assesses PL based upon four overarching concepts: physical competence (i.e., muscular endurance, cardiovascular endurance, and Canadian agility and movement skills); motivation/confidence (i.e., benefits/barriers to PA, adequacy, predilection); knowledge/understanding (i.e., defining cardiorespiratory endurance, muscular endurance, PA guidelines, PA comprehension, and improve sport skills), and daily behavior (i.e., step counts, self-reported PA, screen time). Australia recommends assessing PL with a SOLO taxonomy approach (e.g., Dudley, 2015), based upon four defining statements: core (i.e., lifelong holistic learning applied in movement), composition (i.e., integrated/entwined physical, psychological, cognitive, and social changes), importance (i.e., helps lead active/healthy lifestyles), and aspiration (i.e.,

promotion and fulfillment of PA - Barnett et al., 2019; Keegan et al., 2019). The U.S. operational conceptualization guides researchers to assess PL with two leading questions: "What do you choose to do [concerning participation in PA]?" and "Why do you choose to do it?" (Shortt et al., 2019). Research aimed at addressing these two questions can advance and strengthen the conceptual basis of PL for U.S. adolescents and aid in the development of an appropriate PL assessment tool for this population (Cook & Beckman, 2006).

To capture data-driven constructs, researchers recommend studies using qualitative data that directly target the population of interest (Brod, Tesler, & Christensen, 2009). Qualitative methods (e.g., grounded theory - Glaser & Strauss, 2017; ethnography - Hammersley, 2007; case study - Yin, 2018; construct elicitation - Kelly, 1955;) vary in theoretical foundations and research purpose. Selection of the appropriate qualitative methodology is instrumental to the results in which it yields. The present study was grounded in a construct elicitation approach (Kelly, 1955), which seeks to identify personal constructs through interview techniques (Fransella, Bell, & Bannister, 2004; Kelly, 1955; Tan & Hunter, 2002). Construct elicitation allows for mixed-methods (i.e., qualitative and quantitative) analysis (Fransella et al., 2004; Kelly, 1955; Tan & Hunter, 2002). The most common interview technique for construct elicitation is repertory grid analysis (RGA; Fransella et al., 2004; Kelly, 1955; Tan & Hunter, 2002), which is a mixed-method approach with systematic questioning for construct elicitation (Tan & Hunter, 2002). Construct elicitation and RGA are rooted in personal construct theory (Kelly, 1955) and examine hierarchical relationships between elicited constructs through personal interview and grid analysis (Fransella et al., 2004). Personal construct

theory focuses on the individual's understanding of the world through his/her own experiences, thereby revealing constructs through an interpretation of personal experience (Kelly, 1955; Tan & Hunter, 2002).

RGA has been commonly used in behavior research to understand the perceptions and semantic relationships surrounding the topic of interest (e.g., business practices– Lemke, Clark & Wilson, 2011; destination travel – Pike, 2012; information systems – Ryan & O'Connor, 2009). RGA has historical depth and validity in questionnaire development (Bradshaw, Ford, Adams-Webber, & Boose, 1993; Hutchinson, 1998; Pike, 2007; Senior & Swailes, 2004; Spinelli et al., 2019). RGA has four components: (a) a topic (i.e., PA), (b) elements (i.e., activities within PA domains), (c) construct elicitation (e.g., personal conception of activities or the reasons why participants engage in / refrain from activities), and (d) ranking with dichotomous identification of personal constructs (i.e., emergent construct – contrast construct) on a 6-point scale.

The purpose of this exploratory study was to gather data to inform core constructs and characterizing dimensions of PL for U.S. adolescents using a mixed-method RGA research approach (Fransella et al., 2004; Hutchinson, 1998; H. J. Smith, 2000). This study is intended to extend the findings of Short et al. (2019) and enrich the framework for future assessment of PL with U.S. adolescents.

4.3 METHODS

Participants

Participants for this study consisted of a convenience sample of U.S. adolescents (*N*=17; *see Table 4.1*) recruited through social media posts and networking with parents, coaches, physical educators, and church/community organizations. Requirements to

participate were being of high school age (14-18 years old) and currently living in the U.S. In line with recommendations for RGA (Dunn, 1986; Ginsberg, 1989; Tan & Hunter, 2002; *see Instrumentation section below*), the sample size for this study was targeted to be between 15 and 25 participants (Downs, 1976; Pike, 2007; Stevens, Guo, & LI, 2014).

Repertory Grid Technique

RGA is a methodology of systematic questioning to elicit personal conceptions (Tan & Hunter, 2002) and was used in this study to explore participants' conceptions of PA. The elicitation techniques used in RGA reduce researcher bias (Ding & Ng, 2008; Tan & Hunter, 2002) due to the cross-validation nature of the methodology (e.g., triangulation of elements, the ranking of constructs - Ding & Ng, 2008). RGA is a reliable mixed-method approach for generating items for psychometric assessments (e.g., semantic scale - Ding & Ng, 2008; organizational commitment – Balfour & Wechsler, 1996; higher education satisfaction – White, 2013; Fashion Personality – Willems, Swinnen, Janssens, & Brengman, 2011).

RGA provides a unique methodology to articulate underlying thoughts and expressions where spontaneous thought might not occur (e.g., children; Pike, 2012). To accurately accrue the adolescents' conceptions of movement, each participant was asked to engage in a formal, structured, individual interview (Gall, Borg, & Gall, 1996). RGA interviews impose a moderate level of cognitive demand, involving comparing/contrasting, ranking, and rating (Fransella et al., 2004; Tyler & Feldman, 2004). The interview questions focused on participants' perceptions and definitions of PL, PA, physically active lifestyles, domains of movement (i.e., sport, exercise/fitness,

recreation/leisure, and physical education), as well as the elicitation of the RGA elements (i.e., activities) and constructs (i.e., conceptions of the element) (Fransella et al., 2004). The interviewee was prompted by structured questions (*see Appendix D*) but was also free to share his/her thoughts/stories surrounding PA in whatever capacity entered the conversation (Castillo-Montoya, 2016). The interviewer (first author) asked clarifying questions (e.g., clarifying an element if the participant stated a general activity, such as "dancing" or more than one activity) to ensure accurate depiction of the interviewees' words and meanings (Rubin & Rubin, 2011). The following interaction depicts structured and clarifying questions asked during the RGA interview (Fransella et al., 2004), as well as the interviewee's free flow of thought (Castillo-Montoya, 2016):

> Interviewer: What would you say is your most favorite physical activity, overall?
>
> Glenda (Northeast): Dance would have to be my favorite.
>
> Interviewer: Any particular type of dance or just dance in general?
>
> Glenda (Northeast): Maybe contemporary since I have to use, like, strength and, like, have to use, like, mental and physical, like, abilities.

The RGA interview followed a five-step procedure (Fransella et al., 2004; Neimeyer, Bowman, & Saferstein, 2005; Tan & Hunter, 2002). First, the interviewer discussed with the participant the RGA topic and PA domains, asking him/her "What comes to mind when you think of [PL, PA, exercise/fitness, recreation/leisure activities, sport, and physical education]?" (*see Appendix D*). After eliciting the participant's self-generated definitions of these terms, the participant was asked to describe what he/she perceived to be (and not to be) a physically active lifestyle. Participants were then prompted to identify a person or group of people in their life to illustrate their perceptions

of active lifestyles. The following interview transcript reflects the questions asked and how participants responded in step one:

Interviewer: What comes to mind when you think of physical activity?

Michael: My definition of physical activity is probably, like, going out moving around anything that involves physical movement. So, like, running, jogging, playing a sport something like, that

Interviewer: What comes to mind when you think of exercise or fitness?

Michael: Exercise or fitness is when you try or, I don't know how to say this. Exercise and fitness are when you go out and do, like, a physical activity to try and, I guess, like, lose weight or workout or try and, like, you know, change your body for the good, I guess.

Interviewer: What comes to mind when you think of activities for recreation or leisure?

Michael: Like, playing sports outside with your friends or something. Like, you could go to, like, a recreational site that might have basketball, sports, like that.

Interviewer: What comes to mind when you think of sport?

Michael: Like, a game, that you keep score, you're trying to win. Like sports to me is, like, you're on a team or by yourself and you're competing.

Interviewer: What comes to mind when you think of physical education?

Michael: Well really, I think that, I think of, like, PE or, like, school and how I guess PE is, like, what you do at school. So, yeah.

Interviewer: Describe what you believe would be a physically active lifestyle.

Michael: A physically active lifestyle, you know, like, you got your job, but you go and work out and go to the gym. As long as you're doing stuff every day, like, you're going to the gym or going for a jog, or go to walk your dogs, something like that.

Interviewer: Who in your life lives out that kind of a lifestyle?

Michael: Not really anybody, my mom doesn't go to the gym. My dad doesn't go to the gym, like, that. Really me and my brother 'cuz we always go to the gym

Interviewer: What would you describe is the opposite of a physically active lifestyle?

Michael: Probably, like, just, like, sitting around and not going out. Being cooped up inside. Just sitting around really.

Interviewer: Is there anyone in your life that lives out that kind of lifestyle?

Michael: Probably my Dad

Second, the participant elicited elements (i.e., physical activities) through series of questions asking about his/her choice to participate in or refrain from various physical activities (Tan & Hunter, 2002). The activities participants identified became the RGA elements. RGA element elicitation recommends polarization for enriched construct elicitation (Tan & Hunter, 2002). In line with these recommendations, the researcher presented questions in a polarized fashion, identifying activities within domains of PA that he/she (a) most and least favored, (b) chooses to do most and least often, and (c) have not tried but would/would never try (*see Appendix D*). The domains of PA included physical education, exercise/fitness, recreation/leisure, sport, and overall (Hulteen et al., 2017). Three element categories (i.e., preference, choice, ideals) were predefined to

organize elements and create polarization semantically (i.e., positive-negative) and experientially (i.e., activities known – unknown) (Adams-Webber, 1970; Fransella et al., 2004; Tan & Hunter, 2002). Specifically, *PA preference* categorized activities participants identified as their most/least favorite, *PA choice* categorized activities participants said they chose to do most/least often, and *PA Ideals* categorized activities participants said they would try / would never try (Tan & Hunter, 2002). Examples of questions posed to the participant include, "What is your least favorite activity for exercise or fitness?", "What is a sport you haven't tried but would like to try?" and "What is an activity you choose to do most often for recreation, leisure, or fun?" Participants had the opportunity to identify up to 30 activities. Participants were allowed to repeat activities across categories and domains of PA. The following transcript is an example of the questions asked in step two:

> Interviewer: What would be your most favorite activity for exercise or fitness?
>
> David: Running or, like, cardio.
>
> Interviewer: What about your least favorite activity for exercise or fitness?
>
> David: Squatting, like, really heavy weight. It hurts.
>
> Interviewer: What is an activity that you choose to do most often for exercise or fitness?
>
> David: Running
>
> Interviewer: What's an activity you do least often, so still something you choose to do just don't do it as often, for exercise or fitness?
>
> David: Like, going to the gym and using the cardio machines.
>
> Interviewer: Is there a particular cardio machine you choose or prefer to use?

David: Like, the rowing machine or stationary bike.

Interviewer: What is something that you haven't tried but would like to try for exercise or fitness?

David: Tennis.

Interviewer: What is something that you haven't tried and would never try for exercise or fitness?

David: Cricket.

Third, triadic elicitation of the elements revealed constructs surrounding PA (Fransella et al., 2004). Triadic elicitation compared and contrasted three activities randomly chosen by the interviewer (e.g., most favorite, least favorite, and sport would try). Participants identified two activities that are alike and why the chosen activities are different from the third. The generated conceptions (i.e., why) through the triadic elicitation are called emergent constructs. Triadic elicitation continued with a random selection of three activities until no new constructs were presented (Stevens et al., 2014). After the triadic elicitation, participants labeled the semantics of the emergent constructs with a positive, negative, or neutral (e.g., Robert (Midwest) "lots of running" – negative; Charles (Southwest), "play with my friends" – positive). The following interview transcript is an example of triadic elicitation:

Interviewer: So, between archery [favorite], lifting weights [exercise favorite], and soccer [sport favorite], which two are alike, which one is different, and why?

Thomas: I think archery and soccer are alike because they take accuracy of sorts. [Weightlifting is different] because you don't really need accuracy because you're not really throwing anything unless you throw something.

Interviewer: Okay, between football [least favorite], soccer [sport favorite], and hockey [would try], which two are alike, which one is different, and why?

Thomas: Well, right off the bat, hockey is on ice and football and soccer are running on a field. Then again, hockey and soccer are also alike in the fact that they have the nets that you trying to score into. They're all pretty much alike just on different things. You know what? No, I'd have to say that football and hockey are the same 'cuz you don't need so much brute force in soccer as you do in football and hockey. Because I've seen fights break out in hockey before. Yeah, and football is just, like, pushing people so.... So, I'm thinking hockey and football.

Fourth, participants generated opposing ideas to the emergent constructs, called contrast constructs (Neimeyer et al., 2005). An example of an emergent construct was "fun," whereas a contrast construct was "boring" or "miserable" (Fransella et al., 2004). Contrast elements further enabled the source of meaning to the emergent construct (Neimeyer et al., 2005). Participants verified both emergent and contrast constructs (*see Appendix D*). The following example illustrates this step in the interview:

Interviewer: [What's the opposite of] social or with friends?

Kayla: Just, like, anti-social or alone.

Interviewer: [What's the opposite of] opportunity to play?

Kayla: Not getting the opportunity. Kind of segregated, like, boys and girls camp with the different sports. so maybe, like, segregation.

Fifth, participants were asked to further evaluate the elements (i.e., physical activities in Step 1) from a bipolar standpoint. The bipolar scale is participant-generated using the

emergent and contrast constructs (i.e., Step 3). Participants then ranked the activities on a 6-point scale, with six being the emergent pole and one being the contrast pole (*see Appendix D*). The central numbers of the scale (i.e., 2, 3, 4, 5) were not specified to the participant (Fransella et al., 2004). The technology was used as a visual to assist in the rating process. Participants were able see their RGA grid on a spreadsheet using an iPad screen or using Zoom's screen-sharing technology. The following transcript is an example of step five in the interview:

> Interviewer: Alright, so, what's going to happen now is you're going to rate these [activities] on your own scale you created here. So, everything on your left-hand side [emergent construct] will be 6 and everything on your right-hand side [contrast construct] will be 1. Can you see that on your screen, or do you only see a few activities on your screen right now?
>
> Thomas: I see all the activities.
>
> Interviewer: From accuracy to inaccuracy, with accuracy being 6, how would you rate archery?
>
> Thomas: Archery, I think it'd be the accuracy, accuracy of 6.
>
> Interviewer: Playing catch?
>
> Thomas: 4.
>
> Interviewer: Soccer?
>
> Thomas: 6.

Procedures

Following Institutional Review Board (IRB) approval, parental consent and participant assent, participants scheduled and completed the RGA interview face-to-face

(*n=5*) or via a video conferencing platform (*n=12*) (i.e., Zoom; Sedgwick & Spiers, 2009). Before the interview, participants provided demographic information (e.g., age, sex, self-identified gender, race) on a brief questionnaire. Interviews lasted between 30 and 110 minutes (*M* = 59) and were audio-recorded (Glesne, 2016). A follow-up email was sent to provide participants with the transcription of the interview, the RGA, and the research results (Simpson & Quigley, 2016). Participants were asked to check the transcripts and grid for accuracy, provide any additional comments or reflections, and explain any parts of the transcripts that were unclear (Simpson & Quigley, 2016). Eleven participants responded to the follow-up email (*see section on Trustworthiness*).

Data Analysis

RGA studies have employed five methods of analyzing data (Stewart, Stewart, & Fonda, 1981): frequency counts, content analysis, visual focusing, cluster analysis, and principal-components analysis. Preserving the language and meaning of the participants was essential to the results of the RGA (Adams-Webber, 1970; Bradshaw et al., 1993; Glesne, 2016; Tan & Hunter, 2002). Participant meanings needed not to be oversimplified. This study employed frequency counts and content analysis as a mixed-method approach (Pike, 2012; Stewart et al., 1981). This methodology verifies the preservation of participants' self-generated constructs (Hair, Rose, & Clark, 2009). The presentation of results uses language consistent with RGA research (i.e., constructs, elements).

Transcription of the interview informed the text data for analysis (Glesne, 2016). The content analysis drew upon established procedures (e.g., definitions, terms, and procedures) recommended by Glesne (2016) and Saldaña (2016). Responses to each

interview question were coded *in vivo* (e.g., in the participants' original language), directly from participant quotes (Saldaña, 2016). Coding involved attaching a paraphrased word (or descriptive code) to a segment of text (Saldaña, 2016). An iterative and recursive process ensued, in which additional rounds of coding were employed to progressively refine, strengthen, and connect the codes based on multiple perspectives (e.g., alignment with participants' responses; Glesne, 2016). Coding continued until no further analysis revealed no additional insights into the meanings and connections within and across participants' responses.

Several different methods were employed to maintain the trustworthiness of the data. First, to maintain the credibility of the data, detailed analytic memos (e.g., researcher explanation to codes, reflections after coding rounds) followed alongside the coding process (Glesne, 2016). Second, the data analyst (first author) maintained a codebook documenting definitions (*see Table 4.3*), category inclusion/exclusion criteria (e.g., achievement = activity outcome (e.g., failure, success); achievement ≠ process of activity (e.g., personal improvement, competing with self), and changes to codes (Bazeley, 2013). Third, an experienced qualitative researcher from the first author's university conducted an external audit (Creswell & Poth, 2018). The audit involved an external researcher, who was not initially involved in the conception, collection, or analysis of data to review the codes and categories derived in the qualitative analysis (Saldaña, 2016). Post audit, the external researcher and the first author engaged in peer debriefing until both met agreement on all categories and codes. Fourth, member checking (Glesne, 2016) helped to ensure the authenticity of the participants' conceptions and the trustworthiness of the content analysis. All participants were contacted via email

and given one week to respond to the email stating their agreement, disagreement (i.e., change the results), or additions to the results. Participants were given one reminder email six days after receiving the first email. Ten participants responded to the email, all in agreement with the results. These participants received the interview transcript, their repertory grid, and the analysis of the grid organized by element categories construct categories, and descriptive codes. The email provided a personal, highlighted version of the results (i.e., top-rated construct, least rated construct). Highlighted results specifically stated, "Based on your results, you prefer activities that you [top-rated constructs]**.** You refrain from activities that are [low rated constructs]" (Simpson & Quigley, 2016). Triangulation occurred through the mixed-methodological data, comparing the quantitative data from the grid analysis and qualitative data from the transcribed interviews (Creswell & Poth, 2018).

In addition to the qualitative analysis, descriptive statistics included frequency counts (Stewart et al., 1981) and measures of central tendency (i.e., mean) and range (i.e., standard deviation [SD] - Fransella et al., 2004). Examples of frequency counts include the number of times an element, construct or construct category was mentioned and the number of participants that mentioned the element or construct (Hair et al., 2009; Rogers & Ryals, 2007). Descriptive statistics (i.e., mean ± SD) were analyzed using Microsoft® Excel (Redmond, WA) and IBM SPSS statistical software (Armonk, NY) employing RGA statistical methods (Edwards, McDonald, & Young, 2009; Fransella et al., 2004; Stewart et al., 1981). Constructs, which participants labeled negative (i.e., Step 3), were reverse coded for data analysis. The RGA 6-point scale ratings reflect positively perceived constructs closer to 6, and negatively perceived constructs closer to 1.

Researcher positionality. The first author conducted qualitative analysis for this study as part of her dissertation requirement for degree completion. The author is a certified physical education teacher, having taught middle school and high school grade levels at a public school in a Midwest state from 2011-2016. In line with the theoretical underpinning of mixed methodological research, the author positions herself in a post-positivistic manner (Crossan, 2003) with a critical multiplism lens (Cook, 1985). Critical multiplism promotes multiple methodological approaches such as using qualitative and quantitative methods (Patry, 2013). The ontology and epistemology of multiplism claim that knowledge is constructed, therefore subjective, and no one point of view is more valid than another (Felton & Kuhn, 2007). Critical multiplism seeks to reduce inherent bias through triangulation (e.g., methodological triangulation) and confirmability during data collection, analysis, and interpretation (Bisman, 2010)

4.4 RESULTS

Elements

Elements (i.e., activities) ranged between 9 and 25 with a median of 15. Collectively, participants identified 88 different elements. Qualitative analysis organized elements into classification categories (*see Table 4.2*). Elements most noted in each category were weightlifting, running, basketball, golf, tennis, swimming, and wrestling. Across all domains of PA, weightlifting was the most preferred activity (i.e., most favorite), mentioned 11 times by 9 participants. Running was the least preferred activity (i.e., least favorite) mentioned 25 times by 10 participants. Basketball was participants' top activity of choice (i.e., chosen most and least often), mentioned 24 times (n=12), followed by weightlifting and running mentioned 18 times (n=12). Golf mentioned 9

times (*n*=4), swimming mentioned 8 times (*n*=5), and tennis mentioned 7 times (*n=4*) were the top activities participants would like to try. Wrestling was mentioned 12 times (*n*=4) as the activity participants would never try.

Element elicitation began to reflect a pattern of activity profiles. For example, David (Midwest), Eric (Midwest), Nathan (Southeast) identified *running* as an activity they prefer (i.e., favorite) and do not prefer (i.e., least favorite) weightlifting. Charlie (Southeast), George (Southeast), Amanda (Midwest), and Robert (Midwest) do not prefer soccer and running but do prefer weightlifting. Two activity profiles stood out from the rest, Rosa (Southeast), whose interest in martial arts largely reflected a combat sports profile identifying the classification seven times. Glenda (Northeast), whose interest largely reflected a dance profile, identifying the classification four times (*see Table 4.2*).

Constructs

Constructs represent participants' perception of elements and whether their perception would lead to engaging in or refraining from different elements. Participants generated between 9 and 24 constructs, with a median of 18 constructs. Qualitative analysis organized constructs into construct categories (*see Table 4.3*). Supporting evidence from the qualitative and quantitative analysis is presented in the element categories of preference, choice, and idea. Constructs that participants have favored high/low on the 6-point scale will be highlighted in each RGA element category (*see Table 4.3*). For participant privacy, quotes follow with a gender identifiable pseudonym and the U.S. region in which the participant resides.

RGA Element Categories

PA preference. PA preference represents elements that participants identified as their most favorite and least favorite activity overall, for exercise/fitness, for recreation/leisure, sport, and physical education. Construct categories highly favored (*mean* ≥ *5*) among elements participants identified as most favorite were *familiarity* (*5.43*±*.66*), *activity competence* (*5.37*±*.47*), *enjoyment* (*5.26*±*.36*), and *identification with activity* (*5.2*±*.84*) (*see Table 4.4*). Conversely, constructs of low favor among elements participants identified as their least favorite were *enjoyment* (*2.31*±*.16*), and *activity competence* (*2.38*±*.43*).

Familiarity. The construct category of *familiarity* was identified seven times in 7 out of 17 participants' interviews (*see Table 4.3*). Constructs within this category were *comfort* (*n=3*), *experience* (*n=3*), and *unknown* (*n=2*). For example, Eric (Midwest), indicated running as his most favorite activity because of his experience with it:

> I would say running because I have a lot of, like, experience with it because in the past, like, I said I used to run a lot and it was just my chosen, like, thing to do 'cuz it was fairly simple, and it was, like, you know, gave me a good workout, and it was really simple, and I was able to do it pretty often.

Robert (Midwest) identified wrestling as his least favorite activity because he felt it was uncomfortable: "I'd say one [reason] is comfort. Yeah, just out of comfort zone. It's all the word I got. I mean, I'm just not very comfortable with wrestling."

Activity competence. The construct category of *activity competence* was identified eight times in 7 out of 17 participants' interviews (*see Table 4.3*). Constructs within this

category were *bad* (*n=3*), *good* (*n=3*), *natural ability* (*n=1*), and *terrible* (*n=1*). For example, Nathan (Midwest) said,

> Basketball - I'd say it's just, it's my favorite sport because you can really do anything in basketball. Yeah, like in basketball, you can really be good at anything in basketball and help the team out. You don't have to, like, [be] overall generally good I guess just [be good] a little thing, and it helps everyone out. Yeah, I'm pretty good at [basketball], I guess.

George (Southeast) said running, soccer, and climbing rope were his least favorite activities, "cuz I am not good at them."

Enjoyment. The construct category of *enjoyment* was identified 17 times in 13 out of 17 participants (*see Table 4.3*). Constructs within this category were *fun* (*n=11*), *enjoyment* (*n=3*), *appealing* (*n=1*), and *entertaining* (*n=1*). For example, Kayla (Midwest) said her favorite activities were volleyball and weightlifting, "Because they're fun. They keep me in shape." John (Southwest) said his least favorite activities were volleyball, track, and basketball because "These are sports that I don't enjoy very often and never really have and still don't today."

Identification with activity. The construct category of *identification with activity* was represented ten times from 6 out of 17 participants' interviews. Constructs within this category were *athlete* (*n=1*), *genetics* (*n=1*), *fits me* (*n=2*), *identify* (*n=1*), and *physicality* (*n=3*) (*see Table 4.3*). For example, Glenda (Northeast) said contemporary dance, lacrosse, and workout videos fit who she sought to be,

> I feel like they're in my favorite list because with them, like, since I'm, like, all about strength and stuff. I feel, like, all of them kind of involves, like strength and

just, like, building up your body and making you stronger and just, like, a healthy and happier person.

Richard (Midwest) said his body type was one of the reasons swimming was his least favorite activity, “Competitive swimming stuff, like, that I've just never liked, and I don't have the physique to do swimming.”

PA choice. PA choice represents elements that participants identified as engaging in most often and least often overall, for exercise/fitness, for recreation/leisure, sport, and in physical education. Different than other element categories, the elements in this category represent activities that participants choose to do. The construct categories highly favored (mean ≥ 5) among elements participants chose to engage in most often were *familiarity* (5.37±.72), *enjoyment* (5.27±.27), and *activity competence* (5.26±.33) (*see Table 4.4*). The highest rated construct category among elements participants chose to engage in the least often was *outcomes* (*4.87*±.47).

Familiarity. The following quotes provide a context within the construct category of *familiarity* as it pertains to the element category ‘PA choice.’ Britney (northeast) said heavy is lifting is an activity she doesn’t do very often because of her comfort level, “heavier lifting I don't really enjoy. So, unless I’m with someone else that wants to do heavier lifting, I tend to not do it. I am not very comfortable with it.”

Enjoyment. The following quotes provide a context within the construct category of *enjoyment* as it pertains to the element category ‘PA choice,’ George (southeast) said football, weightlifting, and throwing shot put and discus are activities he does most often, “because they're enjoyable and I normally have good teammates.”

Activity competence. The following quotes provide a context within the construct category of *activity competence* as it pertains to the element category 'PA choice.' Britney (northeast) said she is best at high intensity interval training [HIIT] and resistance training and chooses these activities most often, "I like the HIIT workouts and resistance training because I think it's something different every time, I still feel accomplished, and I get a good workout out of it. I still feel that I am best at and most comfortable doing."

Outcomes. The construct category of *outcomes* was identified 22 times in 12 out of 17 participants (*see Table 4.3*). Constructs within this category were *beneficial* (*n=4*), *doesn't help* (*n=3*), *improves sports* (*n=2*), *improve fitness* (*n=5*), *improves strength* (*n=5*), *improves health* (*n=1*), and *reach goals* (*n=2*). For example, Ethan (southeast) said, "Not sure I really have a least favorite. Maybe, like, lifting weights and do, like, push-ups and that kind of thing because I have a hard time getting myself to do it. Even though I know it's good for me physically."

PA ideal. PA ideal represents elements which participants identified as being willing to try or not willing to try overall, for exercise/fitness, for recreation/leisure, sport, and in physical education. The highest rated construct category among elements participants have not tried but would like to try was *freedom* (*4.58±.47*) (*see Table 4.4*). Conversely, the lowest rated construct category among elements participants have not tried and would never try was *activity competence* (*1.63±.31*).

Freedom. The construct category of *freedom* was identified nine times in 7 out of 17 participants (*see Table 3*). Constructs within this category were *control* (*n=2*), *forced* (*n=1*), *freedom* (*n=2*), *learn* (*n=1*), *restrictions* (*n=1*), and *rules* (*n=1*) (*see Table 2*). For example, Susan (northeast) said rugby was an activity she would like to try because the

rules seem more lenient than activities she is currently involved in, like, lacrosse and soccer,

> Rugby was always intriguing to me because, like, playing girls sports growing up, like, there were so many different rules that we had that guys didn't have. So, like, in rugby, I feel like it's more Hands-On and you can be very aggressive. Cause in, like, soccer and lacrosse for girls, you can't really touch the other girl without getting a yellow card or anything. There're so many different rules in place. So, I like rugby because it's a more aggressive sport you're allowed to be very competitive in it.

Active. Active was the construct category with the most frequently mentioned constructs. Active was identified 44 times in all 17 participants. The active construct reflects participant preferences on levels of energy exerted played a part in the activities that they chose to engage in or refrain from (*see Table 4.3*). Constructs within this category were *action-packed* (*n=1*), *challenging* (*n=3*), *easy* (*n=3*), *endurance* (*n=3*), *energy exertion* (*n=10*), *fast-paced* (*n=5*), *flexibility* (*n=1*), *force* (*n=2*), *good workout* (*n=2*), *intense* (*n=1*), *power* (*n=1*), *whole-body* (*n=4*), *distance* (*n=1*), *aerobic* (*n=1*), *physically demanding* (*n=1*), and *sedentary* (*n=1*). For example, Glenda (Northeast) said weightlifting, softball, and ballet were her least favorite activities because of the lack of perceived energy exertion,

> I feel like they're in my least favorites list because, like, in all of these activities. I feel like you're not moving around as much your kind of just, like, standing around waiting for the piece of it is much slower, and I feel like I need to be up in about, like, doing something.

Similarly, Michael (Southeast) said he would never try baseball due to his perception of the game being slow, “I think baseball's kind of boring. It's just a slow pace game.” High amounts of perceived energy exertion are why some participants chose or would choose to engage in activities. For example, Glenda (northeast) said her favorite activity, contemporary dance, and an activity she would try, trampoline, are very active, “Contemporary dance and trampoline are alike because both of them you are, like, being very active and, like, working your body on while using, like, your, all of your muscles and strength.”

4.5 Discussion

This study sought to identify constructs important to why adolescents choose or choose not to be active. Overall, 88 elements, organized into RGA element categories of preference, choice, and ideal, were identified from the qualitative analysis (*see Table 4.2*). Participants identified 123 constructs organized into 23 construct categories (*see Table 4.3*). The construct category *active* was the most elicited construct. *Active* reflected participants’ perceived energy exertion when engaging in an activity. Energy exertion was equally a stimulus and a deterrent for whether participants chose to partake in the activity (*see Table 4.4*). The literature on PA behavior in adolescents supports the notion that engagement in PA is related to perceived energy exertion (e.g., Robbins, Pender, Ronis, Kazanis, & Pis, 2004). For example, research has found that a person’s perceived energy exertion is related to his/her cardiovascular fitness (Racil et al., 2016). Furthermore, research suggests a moderate association between cardiovascular fitness, sedentary behavior and PA (Júdice et al., 2017; Kristensen et al., 2010), particularly vigorous levels of PA (Gralla, McDonald, Breneman, Beets, & Moore, 2019).

Adolescents tend to refrain from PA where the energy exertion is perceived to be uncomfortable (Robbins et al., 2004), exemplifying the role of cardiovascular fitness for reducing perceived energy exertion and promoting engagement in PA.

The element category *PA preference* represented activities that participants identified as their favorite or least favorite (*see Table 4.2*). Four highly favored construct categories emerged from *PA preference*: *familiarity, identification, enjoyment* and *activity competence* (*see Table 4.3*). Participants preferred engaging in activities that they have experience in, which fit with their sense of self, enjoy participating in, and perceive themselves to be good at. Evidence from other research also supports this finding, as youth who are more active have experience and exposure to PA (e.g., early intervention - Stodden et al., 2008), perceive themselves to be good at PA (e.g., perceived competence - Babic et al., 2014), and positively perceive their physical self (e.g., physical self-concept - Babic et al., 2014).

Similarly, this study found that participants choose to participate in PA in which they have experience (i.e., *familiar*) and perceived themselves to be good at (i.e., *activity competence*). In addition to the construct categories of *familiarity* and *activity competence*, in the element category *PA choice*, participants highly favored *enjoyment* and *outcomes*. Perceived enjoyment and benefit were found to have an inconclusive association with PA behavior in previous studies (Biddle, Atkin, Cavill, & Foster, 2011; Sterdt, Liersch, & Walter, 2014). However, recent research has highlighted the association between retrospective memories regarding PA and future PA behavior (e.g., Ladwig, Vazou, & Ekkekakis, 2018; Miller & Siegel, 2017). Since the participants in this study were reflecting retrospectively on how they perceived different activities, future

research should consider broader individuals' semantic memories of PA for construct elicitation.

Lastly, within the element category *PA ideal*, participants favored the construct category *freedom.* Participants perceived that having control over the experience of an activity (e.g., willingness to learn/try, set own pace, establish lenient rules) increased their willingness to try activities that they have not engaged in before. Research has shown that providing youth with PA choice increases PA behavior (e.g., Sanders et al., 2016), supporting the construct category of *freedom* highlighted in the current study.

The results of this study began to emerge PL profiles, or relationships between elements (i.e., activities) and constructs in groups of people. For example, the PL profile of Eric (Midwest), David (Midwest), and Richard (Midwest) could be labeled the male runner. All three favored running, otherwise preferred activity that was cardiovascular endurance based (e.g., cycling), and refrained from activity that were stereotypically masculine in nature (e.g., contact sports football, rugby, wrestling). Other profiles like this example began to emerge. Future research should expand upon the emerging evidence of PL profiles and looking into differences by race, gender, and regional location. Continuation of this investigation will help solidify various profiles in adolescents across the U.S. and build a PL assessment that is personalized to the individual.

The participants in this study had many reasons for engaging or refraining from PA. Additionally, the participants had vast differences in their activity preferences, choices, and ideals. Physical educators should be aware of this and include a curriculum that provides choices and a variety of unrelated activities. If the scope of a physical

education program is comprised of only team sports (e.g., soccer, basketball, handball), reevaluation is recommended. It is also recommended to include a variety of fitness-enhancing activities where students have the choice between HIIT, cardiovascular endurance, and muscular strength exercises. Participants in this study, by in large, chose to engage in activities where they controlled the intensity and duration. Based upon the results of this study, students strongly dislike when a physical education program only offers one activity to enhance fitness (e.g., running) and the distaste for this activity lingers into his/her PA preferences outside of physical education.

As with any study, the research reported herein has both strengths and limitations. A limitation of this study is the lack of participant cohesion. In retrospect, recruiting participants from a singular region of the U.S. or singular gender might have exemplified PL profiles more than the variety of participants in this study. However, due to the explorative nature of the study, the regional variety gave light to the potential multiplicity of PL profiles. A strength of this study is the application of the RGA methodology for PL research. RGA led to a plethora of data that other qualitative or quantitative research only could not provide. This mixed-method study had several trustworthiness applications including triangulation of the data, researcher-participate triangulation, and member checking (Glesne, 2016; Saldaña, 2016).

4.6 Conclusion

Building on the results of Shortt et al. (2019), this study reinforces the importance of the personalized position and complexity of PL. Current PL assessments may erroneously be targeting a limited range of individuals without considering the idiosyncratic and unique attributes that comprise distinct PL profiles. This study provides

PL researchers with initial groundwork, based on RGA methodology (Lambert, Kirksey, Hill-Carlson & McCarthy, 1997), for developing more person-centered conceptions of PL that can be used to design appropriate assessments for application with U.S. adolescents.

Table 4.1. *Participants' Demographic Information*

Pseudonym	U.S. Region	State	Age	Sex	Race	Sport Participant
Amanda	Midwest	IA	16	F	White/Caucasian	Yes
Britney	Northeast	NJ	15	F	White/Caucasian	Yes
Charlie	Southeast	SC	16	M	White/Caucasian	No
David	Midwest	IA	17	M	Black/African American	Yes
Eric	Midwest	IA	16	M	White/Caucasian	No
Ethan	Southeast	SC	17	M	White/Caucasian	No
George	Southeast	SC	16	M	White/Caucasian	Yes
Glenda	Northeast	NJ	14	F	White/Caucasian	Yes
John	Southwest	CA	17	M	White/Caucasian	Yes
Kayla	Midwest	IA	16	F	White/Caucasian	Yes
Michael	Southeast	SC	17	M	White/Caucasian	Yes
Nathan	Midwest	IA	17	M	White/Caucasian	Yes
Richard	Midwest	IA	17	M	White/Caucasian	Yes
Robert	Midwest	IA	14	M	White/Caucasian	Yes
Rosa	Southeast	SC	15	F	White/Caucasian	No
Susan	Northeast	NJ	17	F	White/Caucasian	Yes
Thomas	Southeast	SC	15	M	White/Caucasian	No

Note. IA = Iowa; CA = California, SC = South Carolina; F = female, M = male; schooling experience and sport participation are for the present school year.

Table 4.2. *Element Frequency Counts by Classification and Category*

Element Classification	Frequency	Physical Activity Preference		Physical Activity Choice		Physical Activity Ideal	
Elements	*Total*	*Most Favorite*	*Least Favorite*	*Most Often*	*Least Often*	*Would Try*	*Never Try*
Art	**4(*n=3*)**	**1(*n=1*)**		**2(*n=2*)**	**1(*n=1*)**		
Building Things	1(*n=1*)				1(*n=1*)		
Marching Band	3(*n=2*)	1(*n=1*)		2(*n=2*)			
Bat/Club and Ball	**27(*n=12*)**	**1(*n=1*)**	**10(*n=8*)**	**2(*n=1*)**	**3(*n=3*)**	**14(*n=7*)**	**11(*n=6*)**
Baseball	14(*n=8*)	1(*n=1*)	2(*n=2*)		2(*n=2*)	4(*n=2*)	4(*n=4*)
Cricket	6(*n=3*)					1(*n=1*)	4(*n=2*)
Golf	14(*n=7*)		2(*n=2*)	2(*n=1*)	1(*n=1*)	9(*n=4*)	
Softball	7(*n=4*)		5(*n=4*)				3(*n=2*)
Cardiorespiratory Endurance	**71(*n=17*)**	**9(*n=5*)**	**28(*n=11*)**	**9(*n=5*)**	**15(*n=10*)**	**4(*n=2*)**	**6(*n=4*)**
Bicycling	8(*n=5*)	1(*n=1*)	1(*n=1*)	2(*n=1*)	1(*n=1*)	2(*n=1*)	1(*n=1*)
Cardio	5(*n=4*)	1(*n=1*)	2(*n=2*)		2(*n=2*)		
Rowing	1(*n=1*)				1(*n=1*)		
Running	57(*n=17*)	7(*n=4*)	25(*n=10*)	7(*n=4*)	11(*n=8*)	2(*n=1*)	5(*n=3*)
Combat Sport	**10(*n=3*)**	**3(*n=1*)**		**1(*n=1*)**	**1(*n=1*)**	**4(*n=3*)**	**1(*n=1*)**
Boxing	2(*n=2*)					2(*n=2*)	
Jujitsu	1(*n=1*)					1(*n=1*)	
Karate	6(*n=2*)	3(*n=1*)		1(*n=1*)	1(*n=1*)		1(*n=1*)
Sparing	1(*n=1*)					1(*n=1*)	
Dance	**7(*n=3*)**	**2(*n=2*)**	**1(*n=1*)**	**2(*n=1*)**			**1(*n=1*)**
Ballet	1(*n=1*)		1(*n=1*)				
Contemporary Dance	1(*n=1*)	1(*n=1*)					
Dance	5(*n=3*)	1(*n=1*)		2(*n=1*)			2(*n=1*)
Extreme Sport	**6(*n=4*)**					**3(*n=3*)**	**3(*n=2*)**
Base Jumping	1(*n=1*)						1(*n=1*)
Cliff Diving	1(*n=1*)						1(*n=1*)
Mountain Biking	1(*n=1*)						1(*n=1*)
Skateboarding	1(*n=1*)					1(*n=1*)	
Skydiving	2(*n=2*)					2(*n=2*)	
Frisbee Sport	**6(*n=4*)**	**1(*n=1*)**		**1(*n=1*)**	**3(*n=2*)**	**1(*n=1*)**	
Frisbee Golf	1(*n=1*)				1(*n=1*)		
Ultimate Frisbee	5(*n=3*)	1(*n=1*)		1(*n=1*)	2(*n=1*)	1(*n=1*)	
Group Fitness	**13(*n=7*)**	**1(*n=1*)**		**1(*n=1*)**	**3(*n=3*)**	**6(*n=4*)**	**2(*n=2*)**
Group Fitness	1(*n=1*)				1(*n=1*)		
Kickboxing	2(*n=2*)					1(*n=1*)	1(*n=1*)
Partner Workout	2(*n=1*)	1(*n=1*)		1(*n=1*)			
Yoga	8(*n=5*)				2(*n=2*)	5(*n=3*)	1(*n=1*)
High Intensity Interval Training	**11(*n=6*)**	**1(*n=1*)**	**4(*n=3*)**	**1(*n=1*)**	**3(*n=2*)**	**2(*n=2*)**	
Burpees	1(*n=1*)		1(*n=1*)				
Climbing Rope	1(*n=1*)		1(*n=1*)				
Conditioning	6(*n=3*)		2(*n=1*)		3(*n=2*)	1(*n=1*)	
CrossFit	1(*n=1*)					1(*n=1*)	
HIIT Workouts	1(*n=1*)			1(*n=1*)			
Workout Video	1(*n=1*)	1(*n=1*)					
Individual Sport	**30(*n=10*)**	**5(*n=2*)**	**4(*n=3*)**	**4(*n=2*)**	**1(*n=1*)**	**1(*n=1*)**	**15(*n=6*)**
Bodybuilding	2(*n=1*)						2(*n=1*)
Discus	2(*n=2*)	1(*n=1*)		1(*n=1*)			
Gymnastics	2(*n=2*)					1(*n=1*)	1(*n=1*)
Shot Put	2(*n=2*)	1(*n=1*)			1(*n=1*)		
Wrestling	22(*n=7*)	3(*n=1*)	4(*n=3*)	3(*n=1*)			12(*n=4*)
Modified Game	**11(*n=8*)**	**3(*n=3*)**	**3(*n=3*)**	**2(*n=2*)**	**2(*n=2*)**	**1(*n=1*)**	
3v3 Basketball	1(*n=1*)				1(*n=1*)		
Competitive Games	1(*n=1*)		1(*n=1*)				
Crab Soccer	1(*n=1*)	1(*n=1*)					
Flag Football	4(*n=3*)	1(*n=1*)	1(*n=1*)	1(*n=1*)		1(*n=1*)	
Floor Hockey	2(*n=1*)	1(*n=1*)		1(*n=1*)			
Tag Games	1(*n=1*)		1(*n=1*)				
Whiffle Ball	1(*n=1*)				1(*n=1*)		
Muscular Strength & Endurance	**45(*n=16*)**	**11(*n=9*)**	**9(*n=5*)**	**11(*n=8*)**	**9(*n=6*)**	**2(*n=1*)**	**3(*n=3*)**
Core Exercises	1(*n=1*)			1(*n=1*)			

Pull Ups	2(*n=2*)						
Push-Ups	2(*n=2*)		1(*n=1*)		1(*n=1*)		
Weightlifting	40(*n=16*)	11(*n=9*)	8(*n=4*)	10(*n=7*)	8(*n=5*)	2(*n=1*)	
Racing Sport	**46(*n=14*)**	**2(*n=2*)**	**6(*n=4*)**	**2(*n=2*)**	**9(*n=7*)**	**8(*n=5*)**	**19(*n=9*)**
Cross Country	6(*n=3*)	2(*n=2*)		2(*n=2*)			2(*n=1*)
Horse Racing	1(*n=1*)						1(*n=1*)
Swimming	22(*n=12*)		1(*n=1*)		6(*n=4*)	8(*n=5*)	6(*n=5*)
Track	16(*n=7*)		4(*n=3*)		3(*n=3*)		9(*n=4*)
Triathlon	1(*n=1*)						1(*n=1*)
Racquet Sport	**16(*n=8*)**	**2(*n=1*)**		**1(*n=1*)**	**2(*n=1*)**	**10(*n=7*)**	**1(*n=1*)**
Badminton	2(*n=2*)					1(*n=1*)	1(*n=1*)
Racquetball	2(*n=2*)					2(*n=2*)	
Tennis	12(*n=6*)	2(*n=1*)		1(*n=1*)	2(*n=1*)	7(*n=4*)	
Recreational Activity	**9(*n=6*)**	**1(*n=1*)**		**3(*n=3*)**		**2(*n=2*)**	**3(*n=2*)**
Playing Catch	1(*n=1*)			1(*n=1*)			
Rock Climbing	3(*n=2*)					1(*n=1*)	2(*n=1*)
Roller Skating	1(*n=1*)			1(*n=1*)			
Trampoline	1(*n=1*)					1(*n=1*)	
Walking	3(*n=2*)	1(*n=1*)		1(*n=1*)			1(*n=1*)
Target Sport	**8(*n=4*)**	**2(*n=1*)**		**2(*n=1*)**		**1(*n=1*)**	**3(*n=3*)**
Airsoft	1(*n=1*)						1(*n=1*)
Archery	5(*n=2*)	2(*n=1*)		2(*n=1*)			1(*n=1*)
Bowling	1(*n=1*)						1(*n=1*)
Paintball	1(*n=1*)					1(*n=1*)	
Team Sport	**132(*n=17*)**	**30(*n=12*)**	**17(*n=8*)**	**31(*n=10*)**	**26(*n=14*)**	**16(*n=9*)**	**12(*n=6*)**
Basketball	33(*n=14*)	6(*n=4*)	2(*n=2*)	14(*n=6*)	10(*n=6*)		1(*n=1*)
Field Hockey	2(*n=2*)				1(*n=1*)	1(*n=1*)	
Football	31(*n=11*)	7(*n=3*)	5(*n=3*)	4(*n=2*)	5(*n=5*)	5(*n=3*)	5(*n=3*)
Handball	1(*n=1*)					1(*n=1*)	
Lacrosse	13(*n=5*)	6(*n=3*)		5(*n=2*)		2(*n=2*)	
Rugby	8(*n=5*)					5(*n=3*)	3(*n=2*)
Soccer	30(*n=9*)	6(*n=3*)	8(*n=4*)	4(*n=1*)	8(*n=5*)	1(*n=1*)	3(*n=2*)
Volleyball	14(*n=5*)	5(*n=2*)	2(*n=1*)	4(*n=1*)	2(*n=2*)	1(*n=1*)	
Traditional Game	**27(*n=14*)**	**9(*n=9*)**	**3(*n=3*)**	**9(*n=9*)**	**4(*n=4*)**	**1(*n=1*)**	**1(*n=1*)**
Capture the Flag	2(*n=2*)	1(*n=1*)			1(*n=1*)		
Dodgeball	15(*n=11*)	5(*n=5*)	2(*n=2*)	7(*n=7*)	1(*n=1*)		
Kickball	9(*n=8*)	3(*n=3*)	1(*n=1*)	2(*n=2*)	2(*n=2*)		1(*n=1*)
Tetherball	1(*n=1*)					1(*n=1*)	
Water Sport	**5(*n=5*)**				**1(*n=1*)**	**3(*n=3*)**	**1(*n=1*)**
Canoeing	1(*n=1*)					1(*n=1*)	
Fishing	1(*n=1*)				1(*n=1*)		
Surfing	1(*n=1*)					1(*n=1*)	
Water Polo	2(*n=2*)					1(*n=1*)	1(*n=1*)
Winter Sport	**7(*n=4*)**				**1(*n=1*)**	**6(*n=4*)**	
Curling	1(*n=1*)					1(*n=1*)	
Ice Hockey	2(*n=2*)					2(*n=2*)	
Ice Skating	1(*n=1*)				1(*n=1*)		
Snowboarding	3(*n=1*)					3(*n=1*)	

Note. Data presented in *x*(*n=*); *x=* the amount of times the element was mentioned; *n=* number of participants who mentioned the element, $n \leq N$, $N=17$. HIIT = High intensity interval training.

Table 4.3. *Construct Categories, Definitions, Frequency Counts, Codes and Context*

Construct Category	Frequency Counts	Definition	Constructs Codes	Frequency Counts	Context Quote
Achievement	17 (*n=11*)	Participants perceiving positive or negative feelings regarding the outcome of engaging in activity	Accomplished Confidence Confident Empowering Encouragement Failure Memories Results Rewarding Success	2 (*n=2*) 1 (*n=1*) 2 (*n=2*) 1 (*n=1*) 1 (*n=1*) 3 (*n=3*) 1 (*n=1*) 1 (*n=1*) 2 (*n=2*) 3 (*n=3*)	"I just like weightlifting [favorite] cuz it's really, like, showing how much power you have, proving to yourself that you can do more," (Charlie, Southeast).
Active	44 (*n=16*)	Participants perceived effort when engaging in activity	Action Challenging Easy Endurance Energy Exertion Fast-Paced Flexibility Force Good Workout Intense Power Whole Body Distance Aerobic Physically Demanding Sedentary	1 (*n=1*) 3 (*n=3*) 3 (*n=3*) 3 (*n=3*) 13 (*n=10*) 5 (*n=5*) 1 (*n=1*) 2 (*n=2*) 2 (*n=2*) 1 (*n=1*) 1 (*n=1*) 4 (*n=4*) 1 (*n=1*) 1 (*n=1*) 1 (*n=1*) 1 (*n=1*)	"I really enjoyed karate [favorite] because of how physically demanding it. It really did require me to be as fit as possible. And I loved the competitive nature of it. I'm a competitive person. I loved sparring with someone. It is so fun. It's, like, your brain just kind of shuts off, and it's just your body, and you're just moving and it, I don't know, it's hard to explain, but it's so fun," (Rosa, Southeast)
Typicality	6 (*n=5*)	Participants perception of activity in the culture/region they reside	Atypical Different Mainstream Uncommon	1 (*n=1*) 3 (*n=3*) 1 (*n=1*) 1 (*n=1*)	"I would say for me lacrosse [would try] is different because I haven't tried it and I feel, like, it's not as common, like, around where we are, like, it's not, like, a school sport or that you can do through school. at least at my school" (Kayla, Midwest)

Outcomes	22 (*n=12*)	Participants perception of the activity in relation to achieving personal outcomes	Beneficial Doesn't Help Improve Sports Improves Fitness Improves Health Improves Strength Reach Goals	4 (*n=4*) 3 (*n=3*) 2 (*n=2*) 5 (*n=5*) 1 (*n=1*) 5 (*n=5*) 2 (*n=2*)	"I take the weightlifting [most often] class that is offered at school, and I feel, like, that just, like, benefits me, and it keeps me in shape all the time," (Amanda, Midwest).
Competition	12 (*n=11*)	Participants' perception of engaging in the activity toward the purpose of winning or for fun	Competition Leisure Passive Winning	6 (*n=6*) 2 (*n=2*) 1 (*n=1*) 3 (*n=3*)	"Running, I mean, like, I would try it. I want to try it, but at the same time, I don't want to do it, like, competitively. I just want to do it for fun. I used to do track, and so that was fun, but at the same time I just wasn't really enjoying it" (Amanda, Midwest).
Complexity	9 (*n=7*)	Participants' perception of skill and technique required to engage in activity	Accuracy Agility Multiple Parts Simple Skill Technique	1 (*n=1*) 1 (*n=1*) 1 (*n=1*) 1 (*n=1*) 4 (*n=4*) 1 (*n=1*)	"Paintball [would try] and racquetball [would try] are more similar because you gotta run fast and you gotta to be a lot more agile, and competitive swimming [never try] is not like that. It's not you don't have to, like, dodge things or run back and forth" (Richard, Midwest)
Emotion	5 (*n=3*)	Participants' perception of emotions evoked by engaging in activity	Angry Gracefulness Happy Patience Stress	1 (*n=1*) 1 (*n=1*) 1 (*n=1*) 1 (*n=1*) 1 (*n=1*)	"Karate [least favorite], I did for about six months. I did not like it just because the trainer was just getting on my nerves and all the standing. You literally stand still for about 30 minutes just to watch some other kid. Try to get one move down and so. I wasn't very fond of that" (Charlie, Southeast).
Enjoyment	16 (*n=13*)	Participants' perception of positive feelings while engaging in activity	Appealing Enjoy Entertaining Fun	1 (*n=1*) 3 (*n=3*) 1 (*n=1*) 11 (*n=9*)	"Ultimate Frisbee, because well… you know, being able to, like, show off your skills and stuff with it, really, like, appealed to me" (Eric, Midwest)
Externally Motivated	16 (*n=10*)	Participants perceptions of influences, not self-derived that led to engaging or refraining from activity	Fans Indoor/Outdoor Motivated by Others Chasing/Fleeing Scenic Weather Positive Environment Score/Goal	1 (*n=1*) 2 (*n=2*) 1 (*n=1*) 2 (*n=2*) 1 (*n=1*) 2 (*n=2*) 1 (*n=1*) 5 (*n=4*)	"Partner workouts [most often] is for, like, the same reason. I like having someone to encourage me and be competitive against. Because when I am by myself, and I start to die down I don't have anyone to compare myself to, so I don't really push myself as hard" (Susan, Northeast)

Familiarity	7 (*n=7*)	Participants perceived comfort zone regarding engagement in activity	Comfort Experience Unknown	3 (*n=3*) 2 (*n=2*) 2 (*n=2*)	"I think of doing many different activities that are, like, in your comfort zone or out of your comfort zone, like, make you a better person." (Glenda, Northeast)
Freedom	9 (*n=7*)	Participants' perception of personal control over their engagement in activity	Control Forced Freedom Learn Restrictions Rules	2 (*n=2*) 1 (*n=1*) 2 (*n=2*) 1 (*n=1*) 1 (*n=1*) 2 (*n=1*)	"8-minute run is more of a personal goal, like, getting how many meters [can you run] in 8 minutes… [prefer the personal goal over a distance] because you can, you have more freedom to what you're body, to the extent of what your body can handle" (Robert, Midwest).
Activity Competence	8 (*n=7*)	Participants' perception of ability regarding engagement in activity	Bad Good Natural Ability Terrible	3 (*n=3*) 3 (*n=3*) 1 (*n=1*) 1 (*n=1*)	"[favorite - soccer, running, basketball] are things that I'm generally good at, and that I find a lot of fun in, and enjoy putting in extra effort and energy and seeing that pay off," (Ethan, Southeast).
Identification with Activity	10 (*n=6*)	Participants' perception of the activity reflected in themselves	Athlete Fits Me Genetics Identify Not for me Physicality	1 (*n=1*) 3 (*n=1*) 1 (*n=1*) 1 (*n=1*) 1 (*n=1*) 3 (*n=3*)	"[never try competitive swimming, triathlons, and running races] They're not the kinds of things that would be necessarily meant for me. Like, physically, not my standards" (Robert, Midwest).
Intellectual Stimulation	9 (*n=5*)	Participants' perception regarding the amount of higher-order thinking involved in an activity	Innovation Knowledge Mentally Challenging Mind-Body Problem Solving Strategy	1 (*n=1*) 1 (*n=1*) 2 (*n=2*) 1 (*n=1*) 1 (*n=1*) 3 (*n=3*)	"Soccer [favorite] I guess I really enjoy the strategy and being able to work with the other spend a lot of time with the same other players and be able to develop your strategy as a group and dodgeball. I find a lot of fun. With the people that you play with" (Ethan, Southeast)
Interest	10 (*n=6*)	Participants' perception of their investment regarding activity	Buy in Care Elimination Interested Intriguing Invested	1 (*n=1*) 1 (*n=1*) 1 (*n=1*) 3 (*n=3*) 1 (*n=1*) 3 (*n=3*)	"Karate has been, probably, my favorite and I really don't want to lose the, cause you know, if you don't practice it you're going to lose the knowledge and the muscle memory and all that. So, I try to practice at as much as possible on my own" (Rosa, Southeast)
Internal Motivation	10 (*n=8*)	Participants' perception of self-derived influences which led to	Self-Improvement Self-Motivation	7 (*n=5*) 3 (*n=3*)	"… I'd rather be competitive with myself rather than with other people. I want to see how far I can improve

		engaging in or refraining from activity			rather than how I'm improving compared to other people" (Susan, Northeast).
Opportunity	18 (*n=13*)	Participants' perception of activity availability in the area they reside	Accessible Convenience Equipment Feasible Opportunities Routine	3 (*n=3*) 5 (*n=5*) 2 (*n=2*) 1 (*n=1*) 5 (*n=4*) 2 (*n=2*)	"Basketball cuz it's just what I do most often with my friends. It's just easier cuz it's accessible for me because, you know, when you have a local gym and things like that, usually basketball's in there. So, you just go pick up a basketball you start dribbling around you start shooting it" (Charlie, Southeast) .
Priorities	15 (*n=11*)	Participants' perception of tenacity regarding engaging in or refraining from activity	Make Time Not a priority Priority Waste of Time	7 (*n=7*) 1 (*n=1*) 5 (*n=5*) 2 (*n=2*)	"… I don't know I guess I just prioritize over those things [least often - running, frisbee golf] with sports that I would rather be doing and are more accessible at the time," (Nathan, Midwest).
Safety	13 (*n=7*)	Participant perception of personal risk regarding engaging in or refraining from activity	Dangerous Hurts Safe	1 (*n=1*) 2 (*n=2*) 10 (*n=7*)	"So, weightlifting [least favorite] because I am not a strong person on my upper body at all. So, weightlifting I just find super dangerous for person like me because I'm always concerned that I'm doing something wrong and that I'm going to drop the bar on myself. I'm just going to injure myself really badly and that it's just definitely not for me" (Eric, Midwest)
Social	17 (*n=11*)	Participants' perception regarding positive or negative feelings about people associated with an activity	Cooperation Friends Good Teammates Nice People Care Social	3 (*n=3*) 8 (*n=7*) 2 (*n=2*) 1 (*n=1*) 1 (*n=1*) 2 (*n=2*)	"I just don't like the men in football [least favorite] and so the people that are in that, they just... they don't exactly have, like, the nicest mindset. They're not really the nicest people. And they get really competitive, to the point where they kind of, like, you know, insult other people" (Richard, Midwest).
Sport Type	17 (*n=11*)	Participants' perceptions of activity regarding the competition structure	Contact Sport Individual Sport Team Sport	3 (*n=2*) 7 (*n=7*) 7 (*n=6*)	"[never try] definitely, like, a big contact sport so something. Like I mean there's, like, girls wrestling [never try] now, like girls are starting to wrestle so that I probably wouldn't want to try" (Amanda, Midwest)
Value	4 (*n=3*)	Participants' perception of an activity's significance	Respect Value	3 (*n=2*) 1 (*n=1*)	"Boxing [would try] because I don't know, I've always considered myself a decent fighter. I have never lost, but I haven't been in that many fights, and I don't feel like fighting. I don't condone it, but for a

sport, it's very intriguing to me. One man uses all of his power and strength to strike down another man. It's not out of hate; it's out of competition and respect" (Charlie, Southeast).

Table 4.4. *Constructs Category Means and Standard Deviation by Element Category*

Constructs	**Preference**				**Choice**				**Ideal**			
	Most Favorite		*Least Favorite*		*Most Often*		*Least Often*		*Would Try*		*Never Try*	
	Mean ± SD		Mean ± SD		Mean ± SD		Mean ± SD		Mean ± SD		Mean ± SD	
Achievement	4.78	0.25	3.43	0.28	4.97	0.16	4.3	0.24	4.27	0.23	2.99	0.23
Active	4.33	0.33	3.99	0.16	4.4	0.16	4.18	0.3	3.96	0.2	3.83	0.3
Activity Competence	5.23	0.41	2.38	0.43	5.05	0.33	3.83	0.46	3.15	0.14	1.63	0.31
Competition	4.52	1.11	3.85	0.72	4.37	0.52	4.07	0.69	3.68	0.41	4.33	0.61
Complexity	3.93	0.78	3.87	0.77	3.93	0.56	3.49	0.4	3.73	0.1	3.38	0.13
Emotion	4.12	0.91	2.88	1.09	4.68	0.72	3.64	0.89	3.36	1.05	3.32	0.93
Enjoyment	5.18	0.3	2.31	0.16	5.14	0.23	3.8	0.54	4.18	0.17	2.31	0.33
External Motivation	3.49	0.76	3.71	0.26	3.33	0.38	3.35	0.43	3.84	0.75	3.31	0.42
Familiarity	5.43	0.66	3.2	0.5	5.37	0.64	4.43	0.27	3.74	0.36	2.43	0.48
Freedom	3.93	0.68	3.37	0.52	4.22	0.21	3.49	0.43	4.58	0.47	3.78	0.28
Identification with Activity	5.08	0.36	3.16	0.44	4.98	0.36	3.86	0.49	3.94	0.19	3.4	0.12
Intellectual Stimulation	3.98	0.54	2.89	0.61	4.31	0.39	3.67	0.18	3.89	0.71	3.16	0.41
Interest	4.72	0.71	2.52	0.29	4.66	0.48	3.94	0.32	3.52	0.25	2.24	0.4
Internal Motivation	4	0.57	3.53	0.83	4.2	0.69	3.87	0.27	3.89	0.34	2.67	0.24
Opportunities	4.37	0.4	3.67	0.38	4.48	0.28	3.84	0.33	2.94	0.27	2.72	0.52
Outcomes	4.86	0.65	4.79	0.56	4.98	0.54	4.87	0.47	4.44	0.4	4.02	0.29
Priorities	4.11	0.75	3.08	0.3	4.33	0.64	3.69	0.35	2.91	0.26	2.75	0.22
Safety	3.95	0.19	3.29	0.47	3.95	0.22	3.8	0.26	3.43	0.28	2.78	0.51
Social	4.42	0.47	2.94	0.21	4.61	0.22	3.84	0.45	3.69	0.39	2.82	0.3
Sport Type	3.66	0.53	3.34	0.29	3.18	0.37	3.41	0.47	3.24	0.43	3.4	0.29
Typicality	2.87	0.27	2.4	0.32	2.9	0.44	2.4	0.53	4.07	0.37	3.33	0.79
Value	4.05	0.74	4.35	0.58	4.4	0.2	4.85	0.58	3.45	0.11	2.95	1.05

CHAPTER 5:

DISCUSSION

The purpose of this dissertation was to advance PL in the U.S. through operationally conceptualizing the definition and building toward a valid and reliable assessment tool for high-school aged students. The results of this dissertation have laid the groundwork for a new and innovative approach to assessing PL. These results can advance PL research and assessment practice in the U.S.

Operational and theoretical definitions of PL are complex with inconsistent definitions encompassing over 20 defining constructs (Edwards et al., 2017). Due to the variation in definitions, assessing PL is challenging (Edwards et al., 2018). The complexity of PL has led to a lack of understanding and halted its dissemination among practitioners (Gunnell et al., 2018). Many PL assessments today look no different than physical fitness tests, motor skills tests, or a health quiz (Edwards et al., 2018). In the U.S., PL is not widely known or understood and many practitioners simply have replaced the term “physically educated” with “physically literate” (Lounsbery & McKenzie, 2015).

To increase its clarity and potential uptake among practitioners, this dissertation focused on preliminary steps needed to operationally conceptualize PL for future assessment of the construct with high school students. Study 1 employed a sequential, mixed-method, modified Delphi research design. National and International academics, representing some of the top professionals in the field, participated in the study. The

breakdown of defining constructs and analysis of the Delphi responses, led to a clear operational conceptualization. Despite theoretical loyalties (e.g., Whiteheadian, LTAD), all participants agreed that anyone can be physically literate regardless of ability, skill, or location and PL was individually driven and behavior reliant. Essentially, it did not matter how you were moving, if you were moving. However, different from a physically active lifestyle, PL consists of the underlying psychosocial and cognitive precursors (i.e., comprehension of movement, affective response to movement, and response to adversity) to an individual choosing to engage in or refrain from PA. Understanding these precursors can help shift the culture of physical inactivity and lead to healthier individuals and communities.

The operational conceptualization of PL emerged as a framework (*see Figure 3.2*) with two guiding questions: "What do you do?" and "Why do you do it?" (Shortt et al., 2019). In most instrument development research, the next step post-operationalizing is to build items to fit into the constructs (Cook & Beckman, 2006). However, specific to PL assessment, creating or using established survey items for the Shortt et al. (2019) operational conceptualization did not seem adequate for capturing the uniqueness of the individual, which is a key aspect of PL. Study 2 therefore sought to explore the conceptions of U.S. adolescents by asking the guiding questions derived in Study 1.

Study 2 employed a mixed-methods research design using RGA interview techniques. The RGA interview elicited activity preferences (i.e., most/least favorite), choices (i.e., most/least often), and ideals (i.e., would/would not try) through predetermined polarized questions. Constructs were elicited through comparing/contrasting the activities they identified. The results of Study 2 revealed 88

activities and 123 constructs from 17 participants. Important to the future of PL assessments, patterns of constructs and activities began to emerge, meaning that PL could be assessed specific to an individual's PL profile (e.g., the runner, the dancer, and the martial arts guru).

The implications of this dissertation extend into the curricular considerations of secondary physical education in the United States. During adolescence, individuals are maluable and impressionable, embarking an opportunistic period where values and identity are generated (Dahl, 2004; Steinberg, 2005). Being that PA is socially constructed (Hay & Macdonald, 2010; Macdonald et al., 1999), adolescent PA behavior is manifested through experiential learning (Holler et al., 2019; Miller & Siegel, 2017), embedding the foundations of their PL journey (Green et al., 2018).

Throughout adolescence, participation in organized sports or PA decreases (Sabo & Veliz, 2014). However, physical education remains steadfast in United States with 95% of public high schools requiring the course for graduation (CDC, 2017). Quality physical education programs with relevant and meaningful curriculum have shown to improve fitness and PA behavior in students (Chen, Mason, Hypnar, & Hammond-Bennett, 2016; McLennan & Thompson, 2015; Vass et al., 2017). Secondary physical education programs have potential to be a prominent outlet for adolescents' PL.

Physical educators, coaches, school administrators, and policy makers are stakeholders in adolescent PL as they provide the funding, space, and movement experiences (Bocarro et al., 2012; Chriqui, Eyler, Carnoske, & Slater, 2013; McLennan & Thompson, 2015). The data driven from this dissertation study indicate that support for diverse, inclusive, and relevant movement experiences is important. Holistic approaches

to movement opportunities (e.g., sports programming/policy, physical education curriculum) has positive implications on PL in adolescent populations. Future research should gather the interpretations of PL and the perceived role stakeholders (e.g., physical educators, coaches, policymakers) have in the development/growth of PL in adolescents.

In continuation of this dissertation, steps to progress the data for application are necessary. Future research should build upon this dissertation, collecting data using RGA in other populations (e.g., young adults, prepubescent children), other ethnicities (e.g., Native American, Hispanic), and other regions in the United States. Gathering additional data will further verify and validate PL profiles. RGA captures the uniqueness of the individual and can change how PL is assessed.

Assessments have been missing the individual component to a largely sociocultural construct (i.e., PL). There continues to be an emphasis on skill, ability, and exposure, capturing the determinants of PA (i.e., *PL is not*) instead of what PL is. PL is not about what you can do, it is about what you do and why you do it. This dissertation provides emerging evidence to break away from the same mold, and approach PL in the cultural and social contexts in which it is shaped.

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Chelsee Shortt, Lead Author

01/10/2019 — Date

APPENDIX B

DELPHI STUDY I

Dear [*Participant's Name*],

We would like to invite you to take part in a modified Delphi study, which I, Chelsee Shortt, am conducting for my doctoral dissertation in the Department of Physical Education at the University of South Carolina under the direction of Dr. Collin Webster. We request your participation because of your published research and/or noted experience and knowledge related to physical literacy. Please consider our invitation as we explain the research being done below.

The United States national physical education organization, SHAPE America, has adopted physical literacy into the national physical education standards (SHAPE America, 2014). These standards outline the knowledge and skills students should acquire from school physical education. It is believed that achieving the standards can set students on a positive pathway for physical literacy. However, current assessments in physical education are limited in their ability to either measure physical literacy or be practically and feasibly used, especially by school professionals (e.g., teachers, principals).

The purpose of this Delphi study is to obtain expert feedback to operationally define physical literacy. This is a critical first step in developing a new assessment tool that encompasses the multiple aspects of physical literacy. Our aim is to use the

assessment to determine the status of high school students' (14-18 years old) physical literacy in United States schools.

Your participation in the Delphi study would involve completing a brief online questionnaire to identify possible factors related to physical literacy. Completing the questionnaire should take approximately 20 minutes. We will review participants' responses, refine our definition of physical literacy, and then ask that you respond to the questionnaire a second time. In order to allow timely conclusion of the study, we would respectfully request a response time of two weeks for completion of each round.

All responses received in the study will be confidential, and your identity will not be divulged. Direct quotes to free-text answers may be used as part of the study report or later Delphi iterations, but these will not be traceable back to you.

Survey responses will be collected online using Google Forms. Results will be downloaded to an encrypted University of South Carolina computer to allow analysis by the research team. Data will be stored for the duration of the research project only and then deleted.

The proposed Delphi study abides by the ethical requirements of the University of South Carolina. A copy of the University of South Carolina Institutional Review Board (IRB) application and decision letter is available upon request.

Thank you for your time and for considering taking part in this research. If you wish to participate, we would be very grateful. Please click "NEXT" below to complete the attached survey.

If you have any questions or concerns, please do not hesitate to contact us.

Sincerely,

Chelsee Shortt
cshortt@email.sc.edu

Collin A. Webster, Ph.D.
websterc@mailbox.sc.edu

Instructions: Below are key terms used to define physical literacy. All terms below were derived from published articles included in Edwards, Bryant, Keegan, Morgan, and Jones's (2017) systematic review on the definitions, associations, and foundations of physical literacy.

The physical literacy concepts are presented in a yes/no format. Below each question of the posed term, are examples from the physical literacy literature. Please check "yes" to the aspects that you feel apply to physical literacy and check "no" to the aspects you feel do not apply. If you feel the term does not fully apply, add your thoughts to the "other" portion of the question. Your answers should reflect the term as it relates to operationally defining physical literacy.

Expert Rating: I identify as a physical literacy expert

Strongly Disagree				*Strongly Agree*
O	O	O	O	O

Should the enjoyment of physical activities be included in the definition of physical literacy?

i.e. Enjoy the bodily experience of movement (Kentel & Dobson, 2007; McCaffery & Singleton, 2013; Whitehead, 2010)

O Yes
O No
O Other…

Does the definition of physical literacy include physical activity participation?

i.e. Lifelong Habit (Almond (b), 2013; Chen, 2015; Fairclough et al., 2002; Sprake & Walker, 2015; Weiler, 2014; Whitehead, 2010). Physical activity as a systematic element to optimize the integral health of the human being (Almond, 2013; Lopez, 2013)

O Yes
O No
O Other…

Should the engagement of physical activity form part of the definition of physical literacy?

i.e. Engagement in movement (Lundvall, 2015; Jurbala, 2015; Kentel & Dobson, 2007; Sun, 2013 Whitehead, 2010). Engage in activities from "adventure, esthetic and expressive, athletic, competitive, fitness and health, and interactional/relational"., providing a breadth of experiences in movement. (Roetert & MacDonald, 2015). Engaging in personal, social, and physical ways become intimately connected with their physical literacy journey (Dudley, 2015)

- O Yes
- O No
- O Other…

Does the definition of physical literacy include physical activity throughout a lifespan?

i.e. Lifetime of physical activity promotion is a behavior rather than a state of being (Corbin, 2016). Lifelong participation in sport and physical activity for health (Almond, 2013; Corbin, 2016; Dudley, 2015; Hastie & Wallhead, 2015; Haughey, Breslin, Toole, & McKee, 2013; Lundvall, 2015; Kirk, 2013; Whitehead, 2010).

- O Yes
- O No
- O Other…

Does the definition of physical literacy include health enhancing behaviors?

i.e. Appropriate fitness levels enabling effective participation (Almond, 2013;Chen, 2015). Health is a constant work in progress (Castelli, Centeio & Beighle, 2014).

- O Yes
- O No
- O Other…

Should physical education be an integral part of the definition of physical literacy?

i.e. A physically educated individual: 1. performs a variety of physical activities; 2. is physically fit; 3. participates regularly in physical activity; 4. knows the implications and benefits from involvement in physical activities and 5. Values physical activity and its contributions to a healthful lifestyle. (Lounsbery & McKenzie, 2015). The purpose of physical education must be to support each individual to develop an understanding of his/her embodiment and movement abilities inherent in embodiment: the "ability to identify and articulate the essential qualities that influence the effectiveness of his/her own movement performance" (Jurbala, 2015; Keegan, Keegan, Daley, Ordway & Edwards, 2013; Whitehead, 2007, p. 288). Physical education is to develop physically literate individuals with the needed knowledge, skills, and confidence to enjoy a lifetime of healthful physical activity (Flemons, 2013; Green 2002; Marsden, 2007; Roetert & MacDonald, 2015; Sun, 2015)

- O Yes
- O No
- O Other…

Instructions: The physical literacy concepts are presented in an open-ended format. Below each question of the posed term, are examples from the physical literacy literature. The questions are framed

intentionally to create dialogue. Feel free to write as much as you would like. Your answers should reflect the term as it relates to operationally defining physical literacy.

What role does motivation play in the definition of physical literacy?

i.e. Motivation to move, every day, and at every opportunity (Keegan, Keegan, Daley, Ordway & Edwards, 2013). Motivated for meaningfully identifying self to the behavior (Chen, 2015; Whitehead, 2010). Intrinsic motivation (Biddle, 2001; Chen, 2015; Corbin, 2016; Dudley, 2015; Kilpatrick, Herbert, & Jacobsen, 2002; MacDonald, 2015; Standage, Duda, & Ntoumanis, 2003; Weiss, 2000)

Long answer text

What role does confidence play in the definition of physical literacy?

i.e. Confidence in a wide variety of physically challenging situations (Almond, 2013; Hastie & Wallhead, 2015). Confidence to try new activities (Keegan, Keegan, Daley, Ordway & Edwards, 2013; Sheehan & Katz, 2013). Confidence to capitalize on innate movement/physical potential (Hastie & Wallhead, 2015).

Long answer text

How does physical competence fit into the definition of physical literacy?

i.e. Competence in application of physical skills (Mandigo et al., 2009; McCaffery & Singleton, 2013). Physical competence to perform safely (Ennis, 2015). Competence in meaningful movement activities (Dudley, 2015; Hastie & Wallhead, 2015; McCaffery & Singleton, 2013; Roetert & MacDonald, 2015; Whitehead, 2010)

Long answer text

How does knowledge of various physical activities important in defining physical literacy?

i.e. "The foundation for knowing what to do and how and when to perform" (Ennis, 2015 p. 119) cited by (Corbin, 2016). Knowledge necessary for engaging in the physical activities valued and beneficial (Chen, 2015). Knowledge to solve problems in novel situations (Ennis, 2015).

Long answer text

How does embodied knowledge fit into the definition of physical literacy?

i.e. 'Knowledge' is described as 'a great intelligence' that resides within our 'body' (Nietzsche, 1969; Whitehead, 2010). Knowledge is acquired through the experience (Gill, 2000; Lussier, 2010; Whitehead, 2010). Knowledge is in a sense 'held' in our embodiment and called upon without conscious attention (Gill, 2000; Whitehead, 2010).

Long answer text

Describe how understanding the benefits of physical activity aligns with the definition of physical literacy?

i.e. Has an understanding of the principles of embodied health, with respect to basic aspects such as exercise, sleep and nutrition (Jurbala, 2015; QCA, 2007; Whitehead, 2007; Whitehead, 2010). 'Understanding' that is associated with maintaining purposeful physical pursuits/activities throughout one's life course (Almond, 2013; Whitehead, 2013).

Long answer text

Describe how 'purposeful physical pursuits' fit into the definition of physical literacy?

i.e. Purposeful physical pursuits engage their interest and convince them of the need to be more active (Almond, 2013). Purposeful physical pursuits represent a range of activities that can have great significance and value that affect people in a very pervasive manner (Almond (b), 2013).

Long answer text

What role can the development of motor competence play in the definition of physical literacy?

i.e. Fundamental movement skills as the foundation to competent and confident participation in a range of physical activities (Almond, 2013; Dudley, 2015; Fisher et al., 2005; Giblin, Collins, & Button 2014; Lundvall, 2015; Marsden, 2007; MacDonald & Enright, 2013; Okely, Booth, & Patterson, 2001; Roetert & MacDonald, 2015; Saakslahti et al., 1999; Sheehan & Katz, 2013; Whitehead, 2010; Williams et al., 2008).

Long answer text

How might 'valuing physical activity' be included in the definition of physical literacy?

i.e. Value of being active in purposeful physical pursuits on a regular basis (Almond(b), 2013; Whitehead, 2010).

Long answer text

How can taking responsibility for one's own physical activity be included in the definition of physical literacy?

i.e. To take responsibility for their own activity level (Almond, 2013; Whitehead, 2013). Responsibility to establish, maintain and further physical literacy is in the hands of the individual (Almond(b), 2013; Whitehead, 2010; Whitehead & Almond, 2013; Whitehead, 2013).

Long answer text

How can having a positive disposition toward physical activity be part of defining physical literacy?

i.e. Disposition to capitalize on innate movement potential (Chen, 2015). Positive disposition to participate in physical activity (Whitehead, 2010). Lifestyle to incorporate the behavior as part of his/her identity, environment, and lifestyle (Castelli, Centeio & Beighle, 2014; Chen, 2015; Corbin, 2016; Lynch, 2015).

Long answer text

What is the role of 'embodied movement' in the definition of physical literacy?

i.e. A well-established sense of self as embodied in the world (Hastie & Wallhead, 2015; Whitehead, 2007; Whitehead, 2010; Whitehead, 2013). Embodied experience: a holistic understanding of human existence and captures the full essence of human experience (Lussier, 2010; McCaffery & Singleton, 2013; Sprake & Walker, 2013; Whitehead, 2001; Whitehead, 2007; Whitehead, 2010; Whitehead, 2013).

Long answer text

What does 'poise and economy' look like; how would you operationalize this?

i.e. Moves with poise, economy and confidence in a wide variety of physically challenging situations (Hastie & Wallhead, 2015; Jurbala, 2015; Whitehead, 2001; Whitehead, 2013 Whitehead(b), 2013).

Long answer text

How might the ability to interpret a wide variety of environments fit into the definition of physical literacy?

i.e. 'Reading' all aspects of the physical environment, anticipating movement needs or possibilities and responding appropriately to these, with intelligence and imagination (Hastie & Wallhead, 2015; Jurbala, 2015; Whitehead, 2001; Whitehead, 2010; Whitehead, 2013). The dynamic communication between the embodied self and the physical environment, which continuously integrates perceptive reading of, and appropriate response to, physical challenges (Corbin, 2016; Jurbala, 2015; Lopez de D'Amico, 2013; Whitehead, 2001; Whitehead, 2007; Whitehead, 2010).

Long answer text

APPENDIX C

DELPHI STUDY II

Dear [*Participant's name*],

Thank you for taking the time to fill out the first round of the Delphi. We would greatly appreciate your participation in this second and final round.

All questions from the first round were qualitatively analyzed by two investigators on our research team. The questions below are derived from the qualitative results in round one. All questions pertain to the operational definition of physical literacy. The questions use a four-point Likert scale: 1 = Not Important, 4 = Very important.

As a reminder, the purpose of this Delphi study is to obtain expert feedback to operationally define physical literacy. This is a critical first step in developing a new assessment tool that encompasses the multiple aspects of physical literacy. Our aim is to use the assessment to determine the status of high school students' (14-18 years old) physical literacy in United States schools.

Survey responses will be collected online using this platform (Google Forms). All responses received in the study will be confidential, and your identity will not be divulged. Direct quotes to free-text answers may be used as part of the study report or later Delphi iterations, but these will not be traceable back to you. The proposed Delphi study abides by the ethical requirements of the University of South Carolina. A copy of

the University of South Carolina Institutional Review Board (IRB) application and decision letter is available upon request.

If you have any questions or concerns, please do not hesitate to contact us.

Sincerely,

Chelsee Shortt

cshortt@email.sc.edu

Collin A. Webster, Ph.D.

websterc@mailbox.sc.edu

Instructions: Please identify the following items that are most important to the operational definition of physical literacy: 1 = Not Important, 2 = Somewhat Important, 3 = Important, 4 = Very Important.

Knowledge of a variety of specific sport skills and tactics

Not Important			*Very Important*
O	O	O	O

Application of knowledge to various physical activities

Not Important			*Very Important*
O	O	O	O

Sport specialization

Not Important			*Very Important*
O	O	O	O

Identifying with movement as a part of one's self

Not Important			*Very Important*
O	O	O	O

Perceived motor competence

Not Important			*Very Important*
O	O	O	O

Actual motor competence

Not Important			*Very Important*
O	O	O	O

Transfer of motor skills to variety of contexts

Not Important			*Very Important*
O	O	O	O

Value of movement through daily physical activity

Not Important			*Very Important*
O	O	O	O

Supporting others in physical activity settings

Not Important			*Very Important*
O	O	O	O

Choosing peers because of personal identity in physical activity

Not Important			*Very Important*
O	O	O	O

Family/Peer support of physical activity

Not Important			*Very Important*
O	O	O	O

Structure of accountability for physical activity

Not Important			*Very Important*
O	O	O	O

Community/Facility support of physical activity

Not Important			*Very Important*
O	O	O	O

Participating in physical activity autonomously

Not Important			*Very Important*
O	O	O	O

Personal recognition of affective response to physical activity

Not Important			*Very Important*
O	O	O	O

Efficient movement

Not Important			*Very Important*
O	O	O	O

Physical demonstration of transferability of skill to various environments

Not Important *Very Important*

O O O O

The physical literacy journey

Not Important *Very Important*

O O O O

How would you operationalize the physical literacy journey?

Long answer text

Internal motivation for physical activity

Not Important *Very Important*

O O O O

Personal reason to participate in physical activity

Not Important *Very Important*

O O O O

Personal goals, geared toward physical activity

Not Important *Very Important*

O O O O

Personal enjoyment in physical activity

Not Important *Very Important*

O O O O

Positive physical education experience

Not Important *Very Important*

O O O O

Physical educator as support in physical literacy journey

Not Important *Very Important*

O O O O

Coach as support in physical literacy journey

Not Important *Very Important*

O O O O

Positive sport experience

Not Important *Very Important*

O O O O

Ability to participate in physical activity by oneself

Not Important *Very Important*

O O O O

Participate in activities that challenges oneself

Not Important *Very Important*

O O O O

Participate in new activities

Not Important *Very Important*

O O O O

Meeting/achieving personal physical activity goals

Not Important *Very Important*

O O O O

Health enhancing movement to improve or maintain fitness levels

Not Important *Very Important*

O O O O

Additional thoughts, comments, or elements important to operationalizing physical literacy

Long answer text

APPENDIX D

THE PHYSICALLY LITERATE STUDENT INTERVIEW

Read the privacy policy below and check "I agree" to continue.

The usage of any data collected will be for the sole purpose of research. Your information will not be divulged. Personal identification will be removed for the analysis and reporting of data. This study is approved by the Institutional Review Board (IRB) in accordance with Federal regulations. The IRB, a university committee established by Federal law, is responsible for protecting the rights and welfare of research participants. *

[ ] I consent to having my information collected and stored

Participant Signature:

REPERTORY GRID

1. What comes to mind when you think of…
    a. Physical Literacy?
    b. Physical Activity?
    c. Physically Active Lifestyle
    d. Exercise?
    e. Recreation?
    f. Sport?
    g. Physical Education?
2. Describe what a physically active lifestyle means?
3. Who in your life lives out the physically active lifestyle you describe?
4. Describe what you believe is the opposite of a physically active lifestyle?
5. Who in your life lives out what you have just described?

6. Identify one activity in each box…

	Overall	**For Exercise or Fitness**	**For Leisure or Recreation**	**For Sport**	**In Physical Education**
Most favorite activity...	A1	B1	C1	D1	E1
Least favorite activity...	A2	B2	C2	D2	E2
Activity I choose to do most often	A3	B3	C3	D3	E3
Activity I choose to do least often	A4	B4	C4	D4	E4
An activity I have not tried, but would like to try...	A5	B5	C5	D5	E5
An activity I have not tried and would never try...	A6	B6	C6	D6	E6

7. Which two are alike and which is different and why?

   [choose three elements at random, continue asking this question until they have repeated answers multiple times]

8. Why are these activities (A1, B1, C1, D1, E1) your *most favorite*?

9. Why are these activities (A2, B2, C2, D2, E2) your *least favorite*?

10. Why do you choose to do these activities (A3, B3, C3, D3, E3) *most often*?

11. Why do you choose to do these activities (A5, B5, C5, D5, E5) *least often*?

12. Why did you choose these activities (A5, B5, C5, D5, E5) in *have not tried but would like to try*?
13. Why did you choose these activities (A6, B6, C6, D6, E6) in *have not tried and would never try*?

14. Rank the following activities from 1 (related to the emergent pole) to 6 (strongly related to the contrast pole)

Construct: *Contrast Pole*														
PE Resistant (E6)														
Sport Resistant (D6)														
Recreation Resistant (C6)														
Exercise Resistant (B6)														
Overall Resistant (A6)														
PE New Ideal (E5)														
Sport New Ideal (D5)														
Recreation New Ideal (C5)														
Exercise New Ideal (B5)														
PE Least (E1)														
Sport Least (D4)														
Recreation Least (C4)														
Exercise Least (B4)														
Overall Least (A4)														
PE Most (E3)														
Sport Most (D3)														
Recreation Most (C3)														
Exercise Most (B3)														
Overall Most (A3)														
Overall New Ideal (A5)														
PE Least Favorite (E2)														
Sport Least Favorite (D2)														
Recreation Least Favorite (C2)														
Exercise Least Favorite (B2)														
Overall Least Favorite (A2)														
Physical Education Favorite (E1)														
Sport Favorite (D1)														
Recreation Favorite (C1)														
Exercise Favorite (B1)														
Overall Favorite (A1)														
Construct: *Emergent Pole*														