PERCEIVED COMPETENCE OF PARAPROFESSIONALS

IN ELEMENTARY PHYSICAL EDUCATION

By
BEVERLY LYNN TAYLOR
Bachelor of Science in Physical Education
Pittsburg State University
Pittsburg, KS
2009

Master of Science in Health and
Human Performance
Pittsburg State University
Pittsburg, KS
2010

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Dissertation Approved:

Dr. Patricia Hughes

Dissertation Adviser

Dr. Doug Smith

Dr. Jason DeFreitas

Dr. Mwarumba Mwavita

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Name: BEVERLY LYNN TAYLOR

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Title of Study: PERCEIVED COMPETENCE OF PARAPROFESSIONALS IN ELEMENTARY PHYSICAL EDUCATION

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Abstract: The purpose of the study was to develop a preliminary instrument to ascertain the perceived competence, autonomy, and relatedness of special education paraprofessionals in elementary physical education. The Physical Education Competence Scale for Paraprofessionals (PECSP) was created from a list of paraprofessional competencies and with expert review. Participants were 138 special education paraprofessionals in the state of Oklahoma who attended physical education with one or more students during the 2019-2020 school year. The PECSP consisted of 25 questions measured on a 5-point Likert scale. Construct validity was examined through EFA, CFA, and known group differences. The researcher found five factors during the EFA analysis: Pre-Instructional Skills, Instructional Skills, Professionalism, Autonomy & Relatedness, and Feelings of Competence. After ten items with poor fit were dropped from the instrument, the CFA goodness of fit was found to be fair ($\chi^2 = 109.57$, d$f = 80$, $p = 0.016$; CFI = 0.89; SRMR = 0.104; and RMSEA = 0.074). Undergraduate students (N = 84) completed the instrument for the known group differences test and were compared to paraprofessional results to reveal a significant difference between groups ($p < 0.01$). Another version of the PECSP was created for physical education teachers to evaluate paraprofessional competence. Inadequate data collection led to the inability to properly examine concurrent validity with the validity correlation coefficient. However, through an independent t-test, the investigator determined a significant difference between the two groups' responses ($p < 0.01$). Due to the risk of participants overinflating self-reports, this was not unexpected. Cronbach alpha coefficients revealed adequate reliability of the instrument (.83) with factor reliabilities varying from low (.36) to acceptable (.70-.90). The investigator concluded that the preliminary instrument showed moderate validity and reliability and further instrument development is needed to refine and interpret the constructs of the PECSP.

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CHAPTER I

INTRODUCTION

Researchers have found that physical education has many benefits to students with and without disabilities in the health (Telford, Cunningham, Telford, et al., 2013), affective and social (Bodnar & Prystupa, 2015), cognitive (Carlson et al., 2008), and psychomotor (Ochoa-Martinez et al., 2019) domains. Special education laws require that students with disabilities be taught in the regular education setting when possible and appropriate (Individuals with Disabilities Education Act, 2004). Paraprofessionals are often employed to assist students with disabilities in the regular education setting, including physical education (Davis et al., 2007). Unfortunately, paraprofessionals have little training for physical education and their roles are not clearly defined (Bryan et al., 2013; Davis et al., 2007). Additionally, little research has been conducted to evaluate the competence of paraprofessionals which is perpetuated by the lack of an instrument to assess paraprofessional competence in physical education

Physical education has been shown to positively influence the health, affective, social, cognitive, and psychomotor development of children. Increased cardiorespiratory fitness, speed, and agility (Jarani et al., 2016), a healthier body composition (Daly et al., 2016; Sanchez et al., 2017; Telford et al., 2012), and a lowered risk of diabetes (Telford,

Cunningham, Waring, et al., 2013) were found to be some of the many health benefits of physical education.

Students with disabilities who are integrated into physical education with their peers, experienced a more positive attitude to physical training and less anxiety, irritability, and fewer mood changes than those in segregated physical education classes (Bodnar & Prystupa, 2015). Daily physical education increased social relationships and attitudes toward school (Pollatschek & O'Hagan, 1989), as well as decreased the likelihood that students will develop unfavorable attitudes toward school during the course of the school year (Pieron et al., 1994).

The cognitive benefits of physical education are more difficult to decipher. In some cases, increased physical education time has been related to better test scores (Carlson et al., 2008). However, many investigators have found no association between physical education class time and academic scores (Dollman et al., 2006; Pollatschek and O'Hagan, 1989; Stevens et al., 2008). Regardless, Shephard and Trudeau (2005) noted that academic scores were not negatively affected by lost academic time due to increased time in physical education.

Structured motor skill instruction, most commonly provided in physical education classes, increased motor skills more than open or free play sessions (Costa et al., 2015; Goodway & Branta, 2003; Palma, 2008; Robinson & Goodway, 2009). Students with lower fundamental motor skill ability have lower academic achievement (Ericsson and Karlsson, 2014; de Bruijn et al., 2019).

Federal law governs special education and the environment in which students with disabilities are taught. The Individuals with Disabilities Education Act (IDEA)

defines special education and emphasizes the right of all children to be educated in the least restrictive environment (Individuals with Disabilities Education Act, 2004). Least restrictive environment is defined as the education of children with disabilities in the same environment as their non-disabled peers unless the addition of supplementary aids and services do not satisfactorily allow for inclusion due to the nature or severity of the disability. When children with disabilities are taught in the regular education environment, it is called "inclusion".

The push for inclusion since the passage of IDEA in 1990 has increased the need for paraprofessionals in schools and changed their role from non-instructional duties such as supervising and preparing materials to curriculum implementation and instruction (Vogler et al., 1989). In 2015, a paraprofessional was defined by the Every Student Succeeds Act (ESSA) as an individual employed under the supervision of a certified teacher (U.S. Department of Education, n.d.). Federal law requires Title I paraprofessionals to have an associate's degree or higher and demonstrate their knowledge through a formal assessment (No Child Left Behind Act, 2001). Title I paraprofessionals are paid with federal funds and work in a Title I school-wide school or work with students who qualify for Title I funds in other schools. Some Special Education paraprofessionals fall under Title I requirements and some do not.

Unfortunately, paraprofessionals and regular education teachers are often unprepared to support students with disabilities in the regular curriculum (Webster et al., 2010). Data from the Deployment and Impact of Support Staff (DISS) Project, conducted between 2003 and 2008, revealed that student achievement was decreased as paraprofessional support was increased (Webster, et al., n.d.). Results from the DISS

project led researchers to recommend that teachers interact more with students with disabilities throughout the school day (Giangreco, 2010; Webster et al., 2010) and supervise and correct paraprofessionals' interactions with students (Webster et al., 2010).

Investigators who have sought to determine the competencies, roles, and training needs of paraprofessionals have found that they differ based on the age of students, model of teaching, and setting (Frank et al., 1998). There is a lack of research, education, training, and clarity about the role of paraprofessionals in the physical education environment, causing their usage to vary greatly. Oftentimes, paraprofessionals are left to adapt their classroom roles to the physical education environment and teach physical educators about their role (Bryan et al., 2013). Davis et al. (2007) found that over 80% of paraprofessionals followed students to and from classes and provided prompting cues, while 59% worked individually with students during activities. Unfortunately, only two articles were located relating to paraprofessional training for physical education. Heikinaro-Johansson et al. (1995) implemented two types of adapted physical education consultant models that benefited paraprofessionals and students; while, Davis et al. (2007) found that the majority of paraprofessionals were receptive to the possibility of training for physical education.

Despite the fact that paraprofessional training is lacking (Butt, 2018), it is clear from the research that paraprofessionals desire and are willing to participate in more training (Davis et al., 2007; Frank et al., 1998; Lewis & McKenzie, 2010) and do benefit from such training (Heikinaro-Johansson et al., 1995; Rispoli et al., 2011).

Due to the lack of training currently provided, researching the perceived competence of paraprofessionals may provide insight into what training paraprofessionals

need to feel more competent and able to adequately provide support in physical education classes. No previous instrument exists that can tap into the perceived competence of paraprofessionals in physical education.

Conceptual Framework of the Study

Deci and Ryan's Self-Determination Theory (1985) was used to guide the instrument development of this project. Ryan and Deci (2017) have identified three basic psychological needs: autonomy, competence, and relatedness. People whose needs are met, thrive, have increased intrinsic motivation, and are well and happy. While, people whose needs are not met experience a lack of motivation and become defensive, aggressive, and/or antisocial. Additionally, increased basic need satisfaction was associated with higher work performance (Baard et al., 2004) and work engagement (Shuck et al., 2015), and competence was related to increased self-esteem (Ilardi et al., 1993) and lower levels of anxiety and depression (Baard et al., 2004).

A lack of basic need satisfaction may be partially responsible for paraprofessionals who find themselves unmotivated and uninvolved in physical education classes. In this study, the primary focus will be to create an instrument that will evaluate whether a paraprofessional's basic needs, particularly the need for competence, are met in physical education. The instrument will be available for use in the future to determine necessary training and/or evaluate training programs for paraprofessionals.

Statement of the Problem

The paraprofessional career has grown substantially since the early 1980s (Giangreco, 2010; Vogler et al., 1989). In schools today, paraprofessionals are the

primary medium used to support the inclusion of students with disabilities in general education classes (Giangreco, 2010).

However, paraprofessionals are inadequately trained and supervised (Giangreco, 2010). When paraprofessionals attend a general education physical education class alongside a student with a disability, their roles are ambiguous (Bryan et al., 2013; Davis et al., 2007). Paraprofessionals often have to teach the physical education teacher about their role (Bryan et al., 2013). Research on paraprofessional competence in physical education is limited and no instrument exists to help physical education teachers understand how paraprofessionals feel about their competence, autonomy, and relatedness while working in physical education classes.

Purpose of the Study

The purpose of this study was to develop and preliminarily validate an instrument that can gauge the perceived competence, autonomy, and relatedness of paraprofessionals who work with students with disabilities in physical education. Two versions of the instrument were created—one for the paraprofessionals and one for the teachers.

Significance of the Study

Prior to this study, no instrument existed to measure paraprofessional perceived competence, autonomy, or relatedness in the physical education setting. This study resulted in a preliminary instrument to ascertain the perceived competence of paraprofessionals in physical education classes. The instrument is appropriate for researchers to use as a model and revise for the evaluation of the competence and training needs of paraprofessionals. Future adaptations of the instrument may be used to evaluate and develop training programs.

Definition of Terms

Autonomy and self-determination "pertain to acts that are experienced as freely done and endorsed by the self" **(**Ryan & Deci, 2017, p. 55). In order for autonomy to take place, there must be an absence of both internal (i.e. guilt or shame) and external influences (i.e. rewards or demands from others).

Concurrent validity "is a type of criterion validity that involves correlating an instrument with some criterion that is administered at about the same time" (Thomas et al., 2001, p. 194). Typically, concurrent validity is determined by comparing the results of the current instrument with the results of an existing, previously validated instrument, or to judges' ratings.

Construct validity "is the degree to which scores from a test measure a hypothetical construct" (Thomas et al., 2001, p. 197). Construct validity can be determined by the known-group difference method or statistical analysis such as factor analysis.

Content validity is "the extent to which an empirical measurement reflects a specific domain of content" (Carmines & Zeller, 1979, p. 20). Content validity is most commonly established by a panel of experts.

Competence is a person's ability to complete a task with mastery and **perceived competence** is "our basic need to feel effectance and mastery" (Ryan & Deci, 2017, p. 11).

Criterion validity is a way to validate instruments by comparing them to a criterion (Thomas et al., 2011). A type of criterion validity known as concurrent validity will be determined in this study.

Discriminant validity is "the absence of a correlation between measures of unrelated constructs" (DeVellis, 2017, p. 100). Discriminant validity is tested by the known group methods technique—comparing two populations or variables that should not be related to confirm the lack of correlation.

Inclusion, or mainstreaming, occurs when students with disabilities are taught in the regular education setting along with their peers without disabilities. For example, attending regular physical education with grade level peers rather than attending a specialized adapted physical education class with other students with disabilities.

Least restrictive environment describes the location where students with disabilities should be taught. "To the maximum extent appropriate, children with disabilities, including children in public or private institutions or other care facilities, are educated with children who are nondisabled; and special classes, separate schooling, or other removal of children with disabilities from the regular educational environment occurs only if the nature or severity of the disability is such that education in regular classes with the use of supplementary aids and services cannot be achieved satisfactorily" (Individuals with Disabilities Education Act, 2004).

Paraprofessional refers to "an individual who is employed in a preschool, elementary school, or secondary school under the supervision of a certified or licensed teacher, including individuals employed in language instruction educational programs, special education, and migrant education" (U.S. Department of Education, n.d.). In some schools, paraprofessionals work under the title of **paraeducator, teacher assistant,** or **teacher aide**. This study will be limited to paraprofessionals who work in special education at elementary schools.

Relatedness is “feeling socially connected” (Ryan & Deci, 2017, p. 11). People with relatedness experience a sense of belonging, significance, and the ability to contribute to a social group.

Reliability is the “consistency, or repeatability, of a measure” (Thomas et al., 2001, p. 197) and can be assessed through stability (intraclass correlation) and/or internal consistency (Cronbach alpha).

Self-Determination Theory (SDT) “is an empirically based, organismic theory of human behavior and personality development" (Ryan & Deci, 2017, p.3). SDT follows the idea that people’s inherent tendencies, especially the tendency to seek basic psychological needs fulfillment, lead them to behave certain ways and affects their motivation (Ryan & Deci, 2017; Deci & Ryan, 2000).

Hypotheses

The following hypotheses were evaluated:

For construct validity

1. During factor analysis, all factors load below .40.
2. There is no significant difference between paraprofessionals and undergraduate students on their perceived competence of working with students with disabilities in physical education.

For criterion validity

3. There is no significant difference between paraprofessionals’ perceived competence and their physical education teacher’s determination of their actual competence.

For reliability:

4. There is no significant difference between paraprofessional test and retest scores of the instrument seven days apart.
5. The instrument has a Cronbach alpha coefficient less than or equal to .70.

Assumptions

The following assumptions apply to this project:

1. Participants will answer questions on the instrument truthfully.
2. The Oklahoma Association of Health, Physical Education, Recreation, and Dance's email listserv contains an appropriate sample of elementary physical education teachers.
3. Competence and perceived competence can be evaluated through a written Likert-scale instrument.

Limitations

The following limitations apply to this project:

1. Physical education teachers' choice of paraprofessionals to participate. (Average, below average, or above average competence levels.)
2. Participants may not be an accurate sample of all paraprofessionals.
3. Measurement error on the instrument, such as confusing or unclear questions.

Delimitations

The following delimitations apply to this project:

1. Instrument development will be based on the expertise of administrators, special educators, adapted physical educators, and physical educators.
2. The amount of time the instrument is available (two weeks initially).

3. Participants are limited to elementary school employees in one southern state who work with students with disabilities in physical education classes.

Conclusion

This preliminary project developed and assessed the validity and reliability of an initial instrument to assess the perceived competence of paraprofessionals in physical education. The instrument development process contributes to the limited academic knowledge of paraprofessional competencies. Researchers will be able to use this project to revise and develop the competencies further. In the future, physical educators may be able to use the instrument to determine paraprofessional training needs and/or evaluate training programs.

CHAPTER II

REVIEW OF LITERATURE

The purpose of the study was to develop a preliminary instrument that determines the perceived competence, autonomy, and relatedness of paraprofessionals who work with students with disabilities in physical education. This chapter begins with a review of the theoretical framework of the study, followed by a discussion of instrument development, and then a topical review of literature on the benefits of physical education, special education laws, and paraprofessional roles.

Search Description

Sport Discus and Academic Search Premier databases were used in this search along with a review of the references of relevant articles. The theoretical framework was searched with the search terms of self-determination, self-determination theory, job, vocation, instrument, and validation. Search terms for paraprofessionals included: perceived competence, competence, competency, self-efficacy, self-concept, self-confidence, confidence, or training, and paraprofessional, teacher assistant, paraeducator, or aide. The benefits of physical education were researched using the terms affective, social, psychomotor, motor, physical education, PE, or physical activity, and elementary school, primary school, or grade school.

Theoretical Framework

Self-determination theory (SDT) uses logical reasoning to study human behavior, motivation, and personality based on an individual's inherent tendencies (Ryan & Deci, 2017; Deci & Ryan, 2000). SDT begins with the assumption that humans are active, curious, and social and will inherently seek out activities that allow for those behaviors to occur (Ryan & Deci, 2017). Autonomy, competence, and relatedness are recognized as three basic psychological needs in SDT. When individuals are provided a basic-need supporting environment they will thrive and experience wellness. However, when people are in a need-thwarting environment, such as a controlling, rejecting, critical, or negative environment, people will become self-focused, defensive, unmotivated, aggressive, and antisocial. Therefore, people will undertake goals, activities, and relationships that lead to the fulfillment of their needs (Ryan & Deci, 2000).

Basic Psychological Needs

Self-determination theory defines the basic needs as "innate psychological nutriments that are essential for ongoing psychological growth, integrity, and well-being" (Deci & Ryan, 2000). People will seek and be drawn to activities and relationships that enable their needs of autonomy, competence, and relatedness to be met (Ryan & Deci, 2017). The results of basic need satisfactions are increased intrinsic motivation, individual vitality, and social wellness; whereas, basic need frustration results in damage to development and well-being. Definitions of each of the three basic psychological needs follow:

Autonomy means to govern oneself and is defined by SDT as the need to regulate one's activities and behaviors. (Ryan & Deci, 2017). Someone who behaves

autonomously has no internal or external controlling pressures. The words autonomy, **self-determination,** and **will** are often used interchangeably in SDT.

Competence is the need to feel capable and proficient at a task (Ryan & Deci, 2017). People must feel ownership of their success in order to establish and maintain perceived competence.

Relatedness is feeling as though one has adequate social connections (Ryan & Deci, 2017). People who experience relatedness feel as though they belong, are significant, and can contribute to others as part of a social group.

Self-Determination Theory & Motivation

Self-determination theory (SDT) was developed out of the exploration of intrinsic and extrinsic motivation by multiple investigators in the 1970s and 1980s (Deci, 2013). Additionally, SDT states that one's need for competence and self-determination results in increased intrinsic motivation (Deci, 1975; Deci & Ryan, 1980).

Self-determination, or autonomy, is an important part of intrinsic motivation in SDT. Deci describes two ways that people are motivated: autonomous motivation and controlled motivation (Deci, 2013). Autonomous motivation occurs when a person does an activity by their own will and choice and controlled motivation occurs when a person does an activity from obligation. When people choose their own activities (autonomous motivation) they tend to use higher level thinking while learning and completing tasks. Therefore, autonomously motivated people are able to learn and perform activities that require creativity, flexibility, and abstract thinking. On the other hand, controlled motivation does not promote higher level thinking. People whose motivation is controlled employ rote memorization in learning and thrive at tasks in which they have step-by-step

procedures to follow. Furthermore, those who experience autonomous motivation tend to have a high level of mental health, while, those whose motivation is controlled more often experience poor mental health, such as anxiety or depression.

In addition to rewards and autonomy, intrinsic motivation is also affected by the need for competence (Deci & Ryan, 1980). In the presence of autonomy, increased perceived competence leads to increased intrinsic motivation, while perceived incompetence will reduce intrinsic motivation. Feedback, when intended to increase intrinsic motivation, must be positive and about one's competence. Controlling feedback that is highly evaluative, mentions extrinsic rewards or punishments, or feedback regarding incompetence decreases intrinsic motivation.

The concept of relatedness was discovered from three outcomes of research with infants, children, and students: (a) infants with a secure attachment were motivated to explore their environment more, (b) children who received interaction from a researcher in the room were more intrinsically motivated than those who were ignored, and (c) students who perceive their teachers as warm and caring had greater intrinsic motivation (Deci & Ryan, 2000). Deci and Ryan have noted that there are times where relatedness is not as important as autonomy and competence to intrinsic motivation; however, it is clear that intrinsic motivation is more likely to thrive in situations where people have secure social connections.

Finally, Deci and Ryan (2000) determined that not all extrinsic motivation poorly influences people. They found that extrinsic motivation can be internalized, causing it to be self-determined (autonomous) instead of controlled. The most commonly researched, most controlling, and well-known form of extrinsic motivation is external regulation.

Additionally, there are three ways in which extrinsic motivation can be autonomous: introjection, identification, and integration. The types of extrinsic motivation, in order from most controlled to most autonomous, are:

1. **External regulation** happens when people's actions are controlled by rewards or the avoidance of punishment. This is the main type of extrinsic motivation examined in research, is very controlling, and has been found to decrease intrinsic motivation.
2. **Introjection** occurs when an individual administers consequences to themselves such as self-worth, guilt, or shame. Introjection is a relatively controlled form of extrinsic motivation.
3. **Identification** is present when people recognize a behavior's value and take more ownership of it, such as exercising. For example, someone who identifies with healthy behaviors may perform them with some autonomy due to the extrinsic reward of being healthy, rather than for enjoyment.
4. **Integration** occurs when a behavior that was externally regulated has been fully integrated with a person's sense of self and has become self-regulated. Integration results in extrinsic motivation that is fully autonomous.

Six Mini-Theories

Self-determination theory is organized into six mini theories that each address an area of motivation and personality (Ryan & Deci, 2017). **Cognitive evaluation theory** predates self-determination theory and focuses on the influence of social environments on intrinsic motivation and people's resulting performance and well-being. The **organismic integration theory** addresses how extrinsically motivated behaviors become autonomous

through integration. Individual differences in how people behave and orient toward different environments, such as autonomy, controlled, or impersonal (unmotivated), are explored in the **causality orientations theory**. The basic needs and their impact on mental health are examined in the **basic psychological needs theory**. The **goal contents theory** focuses on how people's intrinsic and extrinsic goals relate to their basic need fulfillment and wellness. Finally, **the relationship motivation theory** addresses the relationships between people and how those relationships facilitate fulfillment of the basic needs.

Review of Theory and Instruments

To determine if any instruments exist that could be used for this project, a review of the literature on self-determination theory and the three basic needs was conducted. The search yielded articles both within and outside the workplace; however, only workplace-related research was included. The literature is divided into two sections: (a) Basic Need Satisfaction and Motivation in the Workplace and (b) Competency Determination and Instrument Development.

Basic Need Satisfaction and Motivation in the Workplace

Basic need satisfaction and increased motivation resulted in increased work performance (Baard, et al., 2004) and engagement (Gillet et al., 2013; Kasser et al. 1992; Shuck et al., 2015) in the workplace. Additionally, autonomy support increased basic need satisfaction (Baard et al., 2004; Deci et al., 2001). This section explores knowledge about the impact of basic need satisfaction, motivation, and autonomy support in the workplace and how investigators go about researching those topics. A detailed list of the instruments used in the following research is provided in Appendix A.

In 1992, eighty employees in a transitional employment program associated with a psychiatric hospital were involved in a study comparing their motivation, readiness for work, and program participation (Kasser et al., 1992). Participants' social adjustment, social security benefits, living arrangements, work earnings, and hours worked per month were established. The director of the program assigned each participant a rating of work readiness on a 6-point scale. Additionally, the Work Motivation Form-Employee and Work Motivation Form-Supervisor were created for this study to evaluate the work motivation of the employee. The participants and their supervisors completed the Work Motivation Forms. Investigators found that increased social adjustment related to increased hours worked. Also, participants' living arrangements were significantly related to each outcome variable, with those living independently exhibiting higher involvement and success. Participants had greater performance and involvement in work when they had higher self-ratings and employer ratings of motivation. Employees rated their motivation higher than their supervisors. The larger the gap between employee and supervisor ratings, which occurred more often in employees with low social adjustment, the smaller the employee's earnings and number of hours worked.

Investigators evaluated autonomy, relatedness, and competence from the perspective of both the employee and supervisor in a study of 117 shoe factory employees (Ilardi et al., 1993). A survey was created that included parts of the following instruments: Job Descriptive Index, General Health Questionnaire, Self-Esteem Inventory, Work Motivation Form-Employee, and the Work Motivation Form-Supervisor. Information on participants' job positions within an organizational hierarchy and their income level were also collected. Investigators found that participants with

higher-hierarchy jobs (management and administration) reported more job satisfaction. Motivation ratings from both employees and supervisors also saw a positive, significant relationship to job satisfaction. Competence ratings were significantly associated with self-esteem, while autonomy was significantly associated with general satisfaction, satisfaction with the work task, and general mental health. Relatedness was not significantly associated with any variable.

To test the self-determination model that basic need satisfaction forecasts task motivation and psychological adjustment at work, Deci et al. (2001) studied 431 employees from 10 companies in Bulgaria. A sample of 128 employees from the United States were also used as a comparison. The Work Climate Survey, Need Satisfaction Scale, Work Engagement Scale, General Health Survey, and the Multidimensional Self-Esteem Inventory were used in whole or part to create a survey. Reliability information was reported for the whole of each scale. Researchers found that Bulgarians reported they received more autonomy support from their supervisors, while Americans reported that autonomy support came from upper management. Bulgarian workers experienced greater need-satisfaction and anxiety than Americans; while Americans reported more work engagement and higher self-esteem. Need satisfaction variables were enhanced by autonomy support and were highly related to 22 out of 24 outcome variables. The outcome variable data indicated that increased autonomy support reduced anxiety and increased task engagement and self-esteem. Researchers confirmed that their results affirmed the self-determination model.

Richer et al. (2002) proposed that feelings of relatedness and competence at work positively affect self-determined work motivation, which increases work satisfaction and

prevents emotional exhaustion. Alumni from an administration school completed the study (N = 490). The questionnaire was created from all or part of the following scales: Feelings of Relatedness Scale, an unnamed scale on the feelings of competence, an intrinsic job rewards scale, the Blais Work Motivation Inventory, Work Satisfaction Scale, Maslach Burnout Inventory, and questions on turnover intentions. Actual turnover rates were evaluated one year later through the completion of a survey by 241 participants. The researchers found that relatedness and competence were important predictors of work motivation, along with intrinsic job rewards. Self-determined work motivation was correlated with increased work-satisfaction and decreased emotional exhaustion; while, emotional exhaustion was correlated with increased turnover intentions. Finally, researchers found a positive relationship between turnover intention and actual turnover.

Both a pilot and primary study were conducted by Baard et al. (2004) to determine whether employees' autonomous causality orientation and perceptions of autonomy support predicted the satisfaction of their basic needs. Investigators also explored whether the satisfaction of basic needs forecasted performance evaluations and psychological adjustment. For the pilot study, 59 banking employees completed four questionnaires. The questionnaires were created from the following instruments: General Causality Orientations Scale, Problems at Work, Intrinsic Need Satisfaction Scale, and the General Health Questionnaire. Thirty-five participants revealed their performance evaluation results for the work performance comparison during the questionnaire. The investigators found that work performance was correlated with intrinsic need satisfaction.

Also, as competence increased, anxiety and depression decreased. Employees' autonomy and perceived autonomy support were both related to intrinsic need satisfaction.

In the primary study, 528 associates from a major banking firm participated (Baard et al., 2004). Previously used parts of scales were adjusted so that all scales used a 7-point Likert scale, and two additional scales were added in whole or in part: the Work Climate Questionnaire and an unnamed questionnaire assessing mental and physical vitality. Also, an adjustment score was calculated from the anxiety, somatization, and vitality scores. The researchers discovered that work performance was significantly and positively correlated with intrinsic need satisfaction. Autonomy orientation and perceived autonomy support was also significantly correlated with intrinsic need satisfaction and satisfaction of the three basic needs.

Another set of researchers examined whether the principles of self-determination theory can predict an employee's intention to continue e-learning in a work setting (Roca & Gagné, 2008). The investigators surveyed employees across four different international agencies of the United Nations and complete responses were received from 166 participants. The following previously developed surveys were adapted or used in whole or part: Work Climate Survey, General Internet Self-efficacy, Torkzadeh and Van Dyke's Internet Self-Efficacy Instrument, and the Basic Need Satisfaction at Work Scale. Other items developed from previous works included: perceived usefulness, perceived playfulness, and continuance intention. Reliability and discriminant and convergent validity were examined and determined to be satisfactory. Investigators found that there was a positive relationship between perceived autonomy support and perceived usefulness and playfulness. Perceived competence was significantly and positively

related to perceived usefulness, playfulness, and ease of use. Perceived relatedness was significantly and positively related to perceived playfulness, but not perceived usefulness. Perceived usefulness, perceived ease of use, and perceived playfulness each individually and significantly predicted e-learning continuance intention. Finally, an indirect effect on continuance intention was significant for perceived autonomy support, perceived competence, and perceived relatedness.

In 2012, investigators explored whether perceived autonomy support can predict work satisfaction and psychological health in health professionals (Moreau & Mageau, 2012). A questionnaire was sent to health professionals in Quebec, Canada and was completed by 597 participants. The following already published surveys were used in whole or in part: The Perceived Autonomy Support Scale for Employees, Work Satisfaction Scale, The Satisfaction with Life Scale, Positive and Negative Affect Schedule, General Health Questionnaire, the Scale for Suicide Ideation, and two unnamed scales to determine general stress and intent to leave. The investigators determined that, after controlling for sociodemographic variables and general stress, perceived autonomy support from both colleagues and supervisors significantly predicted higher work satisfaction, increased well-being, and diminished suicidal ideation. However, reduced psychological distress and decreased intent to leave were best predicted by supervisors' perceived autonomy support alone. Additionally, lowered work satisfaction, diminished well-being, and increased psychological distress were associated with a higher number of hours worked per week.

Gillet et al. (2013) researched the impact of police officers' perceptions of organizational and supervisor support on work (Study 1) and situational motivation

(Study 2) and engagement. In the first study, 235 participants completed an online questionnaire. Questions were developed by using all or part of the following previously developed scales: Global Motivation Scale, Perceived Organizational Support Scale, Motivation at Work Scale-Revised, and the Utrecht Work Engagement Scale. The researchers found that the three work engagement dimensions: dedication, absorption, and vigor were positively predicted by contextual self-determined motivation, which was positively predicted by perceived organizational support and self-determined motivation. Perceived organizational support was positively related to work engagement.

In Study 2, the engagement of 147 police officers in a training program was evaluated (Gillet et al., 2013). The officers completed a questionnaire three times at the beginning, middle, and end of their training session that lasted 3-5 days. The questionnaire was adapted from the following previously developed instruments: Motivation at Work Scale, Perceived Organizational Support Scale, Situational Motivation Scale, and the Utrecht Work Engagement Scale. The researchers revealed that work engagement was predicted by situational self-determined motivation, which was predicted by perceptions of support from trainers and contextual self-determined motivation. Therefore, the suggested model of the prediction of work engagement by self-determined motivation was confirmed by the researchers in both studies and environments.

Shuck et al. (2015) examined the usefulness of self-determination theory in predicting work engagement and indirectly predicting work intentions. Participants included 1,586 clients of a national management and training consulting company. A survey was developed using all or part of the following previously developed surveys:

Basic Psychological Needs at Work Scale, Job Engagement Scale, Utrecht Work Engagement Scale-9, Harmonious and Obsessive Passion Scale, and an unnamed work intentions scale. The investigators used Bayesian estimation rather than traditional statistics to test their model and hypotheses. It was determined that basic needs satisfaction scores were positively associated with work engagement scores. When entered into predictive models separately, all four measures of work engagement were associated with work intention. However, when entered into the model simultaneously, the Utrecht Work Engagement Scale-9 and the Harmonious Passion Scale accounted for larger shares of variance than the Job Engagement Scale or Obsessive Passion Scale. Therefore, investigators determined that indirect effects exist between the self-determination theory's basic need fulfillment and work intentions only for two of the four engagement measures.

It is clear from the research that increased motivation leads to increased job satisfaction (Ilardi et al., 1993) and greater engagement at work (Gillet et al., 2013; Kasser et al., 1992), especially when autonomous motivation is present (Gillet et al., 2013). Investigators found that motivation was predicted by relatedness, competence, and intrinsic job rewards (Richer et al., 2002). Autonomy or perceived autonomy support was associated with increased basic need satisfaction (Baard et al., 2004; Deci et al., 2001) and increased job satisfaction and mental health (Ilardi et al., 1993; Moreau & Mageau, 2012). Increased basic need satisfaction was related to increased work performance (Baard et al., 2004) and work engagement (Shuck et al., 2015). Finally, competence was associated with increased self-esteem (Ilardi et al., 1993) and decreased anxiety and depression (Baard et al., 2004).

Competency Determination and Instrument Development

Several investigators have developed and confirmed the psychometric properties of instruments to examine competence in the workplace. The most commonly found area of competencies and competence instruments was in nursing; therefore, six of the following nine instruments relate to the nursing field. The development of each instrument or list of competencies is discussed in detail below, with an emphasis on the design process and statistics, and described in tabular form in Appendix B.

The Nurse Competence Scale (NCS, Meretoja et al., 2004) was developed in Finland to assess competence of nurses in the hospital setting. The investigators conducted a literature review to determine whether other competency instruments were available. A pre-existing scale, the 6D Scale, was found, but its purpose was to assess the competence of nursing students and recent graduates. It was determined that a new instrument was needed to assess currently practicing nurses and decided that the 6D scale would be used to test concurrent validity. The following six steps were followed to develop and confirm content validity of the NCS:

1. A semi-structured questionnaire was sent to a group of experts at a Finnish university hospital. Twenty five expert groups were organized, each from a different work environment and 122 nurses and managers created 1308 descriptions of competencies.
2. Twelve nursing science doctoral students reviewed the items that had greater than 50% of inter-rater agreement from the experts. Items that overlapped others were deleted, leaving 173 items.

3. Twenty-six nurses and nurse managers critically reviewed the items by rating their relevance on a scale of 0-3. Items with less than 50% inter-rater agreement were eliminated.
4. Pilot testing was conducted by asking 30 nurses and nurse managers to rate the 75 items for clarity, concreteness, measurement of competence, category correctness, relevance, category completeness, and appropriateness of category on a 1-10 Likert scale. The investigators determined that Cronbach alpha coefficients of 0.67 and greater indicated that there was no need to eliminate items.
5. Nurse managers and administrators reviewed the clarity of the items and either eliminated, divided into multiple questions, or added items as needed.
6. A second pilot test was conducted to determine whether the visual analog scale (VAS, 0-100) was appropriate. Three nurses participated and found it easy to use.

After the NCS was developed, 498 nurses working at a Finnish university hospital completed the instrument (Meretoja et al., 2004). Linear correlation analysis was used to compare the overall VAS mean scores on the NCS and 6D Scale and found they were strongly correlated ($r = 0.829$, $p = 0.00$), demonstrating the concurrent validity of the NCS. Lilliefors' test for normality was also performed and revealed that the NCS ($p > 0.20$) demonstrated a normal distribution while the 6D Scale ($p < 0.01$) demonstrated skewness. Construct validity of the NCS and 6D Scale were evaluated using principal component analysis with varimax and oblique rotations. The seven categories chosen were partially supported by principal component analysis with the items fit into the expected factors and accounted for 52.7% of variance. Reliability was determined by inter-item correlations (0.353-0.442), item-total correlations (0.322-0.731), and alpha-if

deleted values (no items needed elimination). The Cronbach alpha was determined to range between 0.79-0.91.

In 2009, a group of researchers in China sought to test the construct validity and reliability of the previously created Competency Inventory for Registered Nurses (CIRN) in Macao (Liu et al., 2009). The CIRN was a 7-dimension, 58-item, 5-point Likert scale instrument with a previously determined content validity index of 0.852 and Cronbach alpha of 0.893. An adjustment to the wording of questions was necessary due to the different Chinese dialect spoken in Macao. The questionnaire was completed by 533 registered nurses and the internal consistency (Cronbach alpha) was determined to be 0.908. Confirmatory factor analysis was used to determine content validity by testing whether the 7-dimensions loaded on latent factors. The factor loading values ranged from 0.239 to 0.725. The three items that loaded below 0.3 were deleted, which raised the Cronbach alpha values of the dimensions that contained those items and of the overall scale. The final model had the following goodness-of-fit indices: $\chi^2/df = 2.01$ ($\chi^2 = 154.3$, $df = 74$, $p < 0.01$), Goodness of Fit Index (GFI) = 0.933, Adjusted Goodness of Fit Index (AGFI) = 0.042 and Root Mean Square Error of Approximation (RMSEA) = 0.041.

The Work-Related Basic Need Satisfaction scale (W-BNS) was developed in Belgium in 2010 to measure the basic needs of autonomy, competence, and relatedness, as defined by self-determination theory, in the workplace (Van den Broeck et al., 2010). The lack of previously validated instruments led researchers to develop the W-BNS. The instrument developed was in Dutch. During the validation of the scale, it was administered to four samples, providing a total of 1,185 sets of data. Investigators completed five phases of development:

1. The generation of a twenty-six item pool through literature review, author creation, and a panel of four judges.
2. The scale was completed by 560 random employees recruited by undergraduate students (Sample 1). Item analysis, exploratory factor analysis, and item-total correlations were used to narrow to a final set of 18 items.
3. Confirmatory factor analysis was used on Samples 1 and 2 to confirm the fit of a three-factor structure (autonomy, relatedness, and competence) and confirm the uniqueness of each subscale.
4. Intercorrelations and reliability coefficients were calculated for each subscale. A confounded measurement model was used to determine whether subconscious management biases were present in participant responses.
5. A confirmatory factor analysis was conducted to examine the overlap between the environment, employee functioning, and work-related need satisfaction. Additionally, correlations between variables were calculated.

In another study, a group of researchers sought to determine the competence of operating room nurses by revising a previously developed scale to create the Perceived Perioperative Competency Scale - Revised (PPCS-R) (Gillespie et al., 2012). The previously developed Perceived Perioperative Competency Scale (PPCS) provided eight domains of competence. The revised version's content validity was determined through two phases. First, the definitions of each level of competence and scale items were given to eight nurses participating in a modified Delphi panel to assess relevancy and domain placement. Relevance was determined with the content validity index (CVI). Second,

four experts used the scale content validity index to assess the content validity and the items were narrowed from 120 to 98.

The PPCS-R was completed by 1238 operating room nurses during the pilot study (Gillespie et al., 2012). Content validity was determined through exploratory factor analysis and internal consistency (Cronbach alpha). The sample was split in half for analysis to allow the investigators to compare which factor each item loads on in each half. The Kaiser-Meyer-Olkin test (.97 & .96) and Bartlett's test of sphericity were used to test the appropriateness of factor analysis. Principal components analysis with varimax rotation was also used to condense the item pool. The following items were eliminated: (a) items that loaded on an eighth factor that was deemed irrelevant, (b) items that had low loadings, (c) items that loaded greater than .35 on multiple factors when the difference between the loadings was no more than .15, and (d) items that did not load on the same factor in each of the two halves of the sample. The final principal components analysis revealed 6 factors within the 40 items.

Construct validity of the PPCS-R was assessed using the known groups technique by comparing the relationship between competence and years of experience and education (Gillespie et al., 2012). Participants were divided into groups based on years of experience and it was found that all group differences were statistically significant at $p < 0.001$. Pearson's r between total scores and years of experience was .36 ($p < 0.001$). Additionally, nurses who received special operating room training were grouped against those who had not. The differences between training and competency were statistically significant for total scores, and all subscales except empathy. Reliability was evaluated using Cronbach alpha for each subscale (.81-.89) and total internal consistency was .96.

A group of investigators in 2012 examined the validity of the Pikes Peak Geropsychology Knowledge and Skill Assessment Tool (Karel et al., 2012). The tool was previously developed by a task force and contains 50 items from nine domains that are rated by participants on their level of training from novice to expert. Participants were 109 doctoral level psychologists and trainees. The subscales had Cronbach alpha coefficients from .91 to .97, indicating high internal consistency. A multivariate analysis of variance (MANOVA) was used to compare psychologists with trainees on the competency scales and confirmed the expected significant difference between the two groups ($F(5, 96) = 27.18$, $p < 0.01$). The subscale scores were intercorrelated for both psychologists (0.66-0.90) and trainees (0.47-0.89). Linear regressions were conducted for each group. The investigators determined that competence for psychologists was predicted by formal clinical training and the amount of experience working with older adults; while, competence for trainees was predicted by formal clinical training experiences.

Nicholson et al., (2013) created a performance based scoring rubric to measure nurse competencies in the operating room. The Australian College of Operating Room Nurses (ACORN) Standards of Practice and Competency Standards were used, along with previously published instrument development procedures, to develop 16 items and behavioral descriptors (coded 0-4) for each item. Five expert operating room nurses assisted with the development of the item descriptors and the level of difficulty of each indicator. A second rubric with four levels was developed to determine nurses' holistic level of performance and also included a simple competent versus not yet competent response.

For data collection, 32 nurse instructors observed three nurses of varying levels of experience (Nicholson et al., 2013). The internal consistency was determined to be high with a Cronbach alpha coefficient of .940 and a Person Separation Reliability Index coefficient of .959. The Rasch model for partial credit scoring was conducted. Three items did not fit the model, but only the item that underfit the model was discarded. The underfit and overfit of the three items were further explored and confirmed visually by the Item Characteristic Curve. The holistic performance rubric was evaluated with regard to which level was considered *competent* by participants. Though the results varied at lower levels, 96.3% of respondents agreed that Level 3 was competent (67% at level 2 and 20% at level 1). Investigators determined that Level 3 would make an appropriate cut-off point for competence.

In 2016, another group of researchers created a competency evaluation of operating room nurses with the goal to help select, train, and evaluate nurses in China (Wang et al., 2016). Three stages of instrument development were employed. First, interviews were conducted with 18 nurses to determine what competencies an operating room nurse should have. Next, the Delphi process was used via email with 30 experts in two rounds. In Round 2 of the Delphi process, experts used a 5-point Likert scale to evaluate the importance of each competency. Items with an average expert score below 3.5 were eliminated, modified, or replaced. Twenty-two items were in the final competency evaluation index system. Finally, a 9-point Likert, Analytic Hierarchy Process questionnaire was sent to experts and the results were used to calculate the relative weights of each dimension and element.

Investigators in the field of palliative and end-of-life care developed an instrument to evaluate staff preparedness for providing care in long-term facilities (Chan et al., 2018). The questionnaire was first developed from a literature review (16 items) and then reviewed by an expert panel. The content validity indices from the expert panel were greater than 0.8 and all items were considered very relevant. The instrument was completed by 247 staff members who worked at one of four chosen palliative and end-of-life care facilities. Pearson's product-moment correlation was used to compare clinical experiences with overall and subscale average scores.

Bartlett's test of sphericity and the Kaiser-Meyer-Olkin measure of sampling adequacy (.926) supported the use of principal component analysis (Chan et al., 2018). Three factors were found (68.5% of the total variance) and all factor loadings were greater than .58. The overall Cronbach's coefficient alpha was .927. A group of 20 participants took the test two weeks later and the intraclass correlation coefficient of each factor was between.87 and .86. An ANOVA was used to evaluate the difference between professional and non-professional staff for a known group comparison. The average scores for professionals were significantly higher than other facility job positions on each subscale, thus demonstrating discriminant validity.

In 2018, researchers created a set of clinical nurse specialist core competencies (Jokiniemi et al., 2018). Their study involved four phases:

1. Three Policy Delphi rounds with experts were conducted. The first round consisted of open-ended questions and the second and third rounds were Likert-scale questions. Sixty-seven competency items came out of the first Delphi round.

Experts continued to expand and analyze the items, adding eight additional items, for a total of 75.

2. Competencies were systematically mapped against the United States and Canada's clinical nurse specialist competency sets. Items were reworded, overlapping items were combined, and some were excluded, resulting in 61 items.
3. Experts completed web-based surveys in two rounds to evaluate each competency criteria and relevance on a 4-point Likert-scale. In the first round, seven experts excluded seven items and added three items to leave 57 items. The second round had 10 experts who rated each item (0-3) on relevance. The Item Content Validity Index (I-CVI) and Scale Content Validity Index Average (S-CVI/Ave) were calculated. Fifty-two items had I-CVI's over .78. Two items were left for further evaluation (I-CVI of .6 and .7) and two items (I-CVI = .4) were eliminated. Verbal feedback led to the elimination of 5 more similar items. The S-CVI/Ave was .94, which the researchers determined was valid (above .90).
4. Sixteen clinical nurse specialists rated the usage of the competency items in their work on a 6-point Likert-scale. No additional items were eliminated, added, or modified during this phase. The final scale had 50 competency criteria.

After reviewing the aforementioned articles, it is clear that the following practices are used for developing valid and reliable instruments. Content validity is determined and competence development is completed through the use of a review of literature and a panel of experts. The content validity index (CVI) is often used to evaluate expert responses to item relevance during instrument construction. Sometimes factor analysis (exploratory, confirmatory, or principal component) is used to evaluate items during the

development process. Construct validity is determined in different ways. Most commonly principal component analysis and/or the known groups technique, but the Rasch model was also used by one set of researchers (Nicholson et al., 2013). The Cronbach alpha coefficient is most always reported as a reliability measure (internal consistency) even if an intraclass correlation coefficient is also reported (test-retest method).

Review of Research by Topic

Paraprofessionals work with students who have special educational needs throughout the school day both within and outside of the special education classroom. When paraprofessionals are in the special education classroom, they have guidance and support from a teacher trained in special education. However, when paraprofessionals leave that location to accompany students into inclusive environments, they are often left to their own resources. Paraprofessionals must navigate the educational needs of students and classroom routines of general education teachers who typically have minimal special education training. With student success affected by the competence of paraprofessionals, administrators and teachers need to know the factors that influence paraprofessional competence and how to increase that competence in a variety of settings.

Physical education is required by law for all students, including special education students and no research has been done on paraprofessional competence or perceived competence in physical education. Learning about the competencies required and perceived competence of teacher assistants will help guide future paraprofessional and physical education teacher training.

How is the Physical Education Environment Different from the Classroom?

In the classroom, elementary students spend most of their time sitting on the carpet, in chairs, or at computers in a moderately sized, enclosed room. Classroom teachers have the ability and responsibility to keep their classroom routines organized, structured, and consistent for the majority of the school day. Both paraprofessionals and students with disabilities benefit from a well-maintained classroom environment.

A change in environment or type of activity often negatively affects behaviors of students with disabilities. Gymnasiums have brighter lights, louder sounds, and large open spaces that contribute to maladaptive behaviors and challenge behavior management. Physical education classes involve lots of activities that are not common in the classroom. Therefore, it is important for paraprofessionals to have specific competencies and training for the physical education environment.

Benefits of Physical Education

Health Benefits of Physical Education. Only one article was found describing the health benefits of students with disabilities in regular physical education versus a separate physical education class (Bodnar and Prystupa, 2005). In order to seek the benefits of physical education, inclusion criteria used for this section was research on elementary-aged students and benefits of physical education such as body composition, physical fitness, diabetes indicators, and bone density. Research projects involving school-wide initiatives such as parent education or additional health lessons were excluded from this section.

In 2015, Bodnar and Prystupa completed a study in Ukraine of the effects of integrated physical education classes on students with minor deviations in health and

students with poor fitness. The control group consisted of 720 fifth through ninth grade students who attended their normal physical education class separate from the main school population, while the experimental group had 694 students. Both groups had a mix of students who were healthy, convalescing, or had minor health problems. Investigators found that the experimental group was significantly more active outside of school than the control group. The experimental group's students were more active computer users while the control group's students were more active readers and visited museums and exhibitions outside of school hours. The experimental group students desired an average of 3.75 physical education classes per week while the control group desired an average of 3.28 classes per week, a significant difference. The investigators found that students with minor health disturbances experienced more positive physical fitness outcomes in the integrated classes (experimental group) and the healthy students experienced more positive fitness characteristics in the segregated classes (control group).

From 1970-1977, a longitudinal study was conducted in Trois-Rivières, Canada of 546 students who were divided into control and experimental groups and followed in grades 1 through 6 (Trudeau et. al., 1998). The experimental group received physical education for 1 hr each day provided by a physical education teacher and the control group received 40 min per week provided by their classroom teacher. Researchers assessed the two groups for academic achievement, bone development, school attendance, triceps skinfold, aerobic function, muscle strength, and physical performance (Shephard & Trudeau, 2005). Trudeau et al. discovered that the experimental group was significantly more active on the weekends, had increases in aerobic power, back extension force, abdominal endurance and higher scores on fitness field tests than the

control group (Trudeau et al., 1998). Investigators also found that increased physical education time did not have a negative impact on academic scores.

Between 1995 and 1997, a follow-up to the Trois-Rivières study was conducted in which 253 participants completed a survey regarding their health, physical activity levels, and beliefs about physical activity (Trudeau et. al, 1998). Investigators found that significantly more women in the experimental group engaged in strenuous activity or hard physical labor than in the control group. There was no significant difference in the physical activity levels of men between groups. The only significant difference in the groups' beliefs was that the control group felt less psychological dependence on exercise. Perceptions of healthiness were significantly more common in the experimental group women than the control group. Finally, lumbar problems were reported significantly less often in the experimental group women. In the long term, women appeared to have benefitted more from the daily physical education program than men. The investigators suggested that the results of this study may be explained by the general female population's lower level of physical activity.

For a second follow-up of the Trois-Rivieres study in 2008, investigators received completed questionnaires from 86 participants (Larouche et al., 2015). The survey addressed current physical activity levels and intensities as well as beliefs about physical activity. The investigators found no significant differences between any of the survey items for either group. The lack of significant differences between groups was likely due to the occurrence of life events (e.g. secondary school, entering the workforce, marriage, and parenthood) and the lack of further physical activity intervention in adulthood. Larouche et al. pointed out that despite the lack of gains in the second follow up, early

physical activity should be encouraged, as it did have an initial impact that appeared to continue for 20 years.

Pollatschek and O'Hagan (1989) conducted a study to evaluate the effects of daily physical education on academics, motor skills, and attitudes toward school, social relations, and personality (the Linwood Project). Children (n = 222) in Scotland in grade 6 (10-11 years old) from five schools participated in the daily physical education group. Control group children were selected from three schools and received two periods of physical education per week. Motor fitness, flexibility, academic, and affective assessments were administered in a pre and posttest format at the beginning and end of the academic year. The researchers found that the girls in daily physical education were significantly better on the shuttle run, standing long jump, and flexed arm hang. Boys who received daily physical education were superior to the other group on the shuttle run and 50 meter run at the posttest. The change scores indicated that the daily physical education group improved more than the normal physical education group on all fitness test items except sit ups. No significant flexibility differences were found in either group at pre or posttesting.

In the early 1990s, researchers sought to determine the impact of the SPARK physical education curriculum on 740 students from suburban southern California schools (Sallis et al., 1993). Students were divided into three groups: regular physical education (control), specialist-led physical education, and classroom teacher-led physical education. The classroom teachers received in-service training to implement the SPARK curriculum, while both specialists and classroom teachers received individual instruction and regular supervision throughout the program. The SPARK curriculum included three, 30-min

weekly physical education classes and one, 30-min weekly self-management class. The self-management class promoted physical activity outside of school by teaching self-monitoring, self-evaluation, and self-reinforcement. The study was completed over two years and data was collected at the beginning and end of each school year. Students were assessed using the FITNESSGRAM protocol, a survey of physical activity habits, and their weight, height, and calf and triceps skinfold measurements were determined. The investigators found that, while there was a trend for students in the two intervention groups to have lower skinfold measurements, there were no overall, significant differences between groups.

To determine whether a specialist-led physical education class had an impact on the health of elementary children, a four year longitudinal study was conducted in Australia (the Commonwealth Institute LOOK study) (Telford et al., 2009). Participants were 830 students and were divided into control and experimental groups by school site. All students received 150 min of physical education per week. The classroom teachers continued their normal physical education program with the control group. For the experimental group, physical education specialists taught two, 50-min classes of physical education each week and the classroom teachers taught the remaining 50 min of physical education each week. Questionnaires completed by the classroom teachers revealed that the physical education specialist led classes spent more time on strength, flexibility, endurance, and speed activities and engaged students in more moderate to vigorous physical activity (Telford, Cunningham, Telford, et al., 2013). Investigators collected data to seek out differences in cardiovascular structure and function, blood markers of degenerative diseases, psychological influences on lifestyle and health, motor control,

anthropometry and body composition, components of bone strength, fitness assessment, physical activity levels, family involvement and medical history, nutritional intake, academic achievement, pubertal assessment and skeletal age (Telford et al., 2009).

As part of the previously mentioned LOOK study, blood markers of pediatric diabetes were sought in the Fall of 2005, 2007, and 2009 (ages 8, 10, and 12) (Telford, Cunningham, Telford, et al., 2013). Fasting blood samples yielded glucose concentration, insulin concentration, and the marker HOMA-IR. The 20m shuttle run was used to estimate cardiorespiratory fitness and physical activity was measured with pedometers over the course of one week. Researchers found that there was a significant, lower development of insulin resistance in the specialist led physical education group, especially between the last two years of the experiment.

The LOOK study also undertook the measurements of total cholesterol and triglyceride concentrations and used a one-day dietary record to determine total energy and macronutrient intakes (Telford, Cunningham, Waring, et al., 2013). The intervention and control groups had no significant differences at baseline. At age 12, the experimental group had a smaller percentage of participants with elevated low-density lipoprotein cholesterol (LDL-C) and the boys experienced a significant reduction in mean LDL-C.

Researchers involved in the LOOK study also looked into the components of bone strength by collecting ulnar and tibial bone length, total body bone mineral content and body composition (Daly et al., 2016). Physical activity level, total energy intake, and dietary calcium intake were also determined through questionnaires and interviews. No significant differences were found between the experimental and control groups' baseline data. Investigators found that the only significant differences in the experimental and

control groups' follow up assessments were increased mid-shaft cortical area in girls and increased cortical thickness in boys. Additionally, the girls' total body lean mass was greater in the experimental group than the control group between the second and fourth year.

Finally, the investigators of the LOOK study investigated the effect of physical educator-led classes on the body composition of students (Telford et al., 2012). Dual energy X-ray absorptiometry was used to evaluate body composition and body fat percentage was determined in grades 3 and 5. Investigators found that students taught by a physical education specialist had smaller increases in age-related body fat percentage.

In 2016, investigators in Albania researched whether the games-based, exercise-based, or traditional (control) physical education curriculum was the most effective at improving students' health and fitness (Jarani et al., 2016). Participants included 767 first grade and fourth grade students whose classes were randomly assigned to one of three groups. The exercise-based curriculum emphasized exercises at stations to increase physical activity, while the games-based curriculum included large and small group games. Four different curriculum units were developed and implemented across the exercise- and games-based groups. All physical education lessons were 45 min and administered biweekly for five months. Pre and posttests assessed gross motor coordination, coordinative skills, physical fitness, and physical activity level. The only significant difference in pretest scores between groups was the lateral side jump where the control group had a higher mean score than the exercise-based group. Investigators determined that the exercise-based group was more effective for improving gross motor skill outcomes than the games-based group and had significantly higher gross motor

posttest results than the control group. The exercise-based group had significantly greater posttest health-related fitness scores than the control group for cardiorespiratory fitness, speed, agility, BMI, and % body fat. The games-based group had significantly greater posttest results than the control group for the components of cardiorespiratory fitness, speed, and agility. The researchers concluded that either curriculum would be more beneficial to students than the traditional physical education curriculum.

In 2017, researchers investigated whether a vigorous-intensity physical education program would improve body composition more than a moderate-intensity physical education program (Sanchez et al., 2017). An experimental (vigorous-intensity) and control (moderate-intensity) group were established and each group received physical education for 60-min, twice a week, for 12 weeks. One hundred and twenty children aged 10-11 years old underwent a bioelectrical impedance body composition assessment before and after the physical education programs. The body composition variables were body weight, fat-free mass, fat mass, body mass index (BMI), fat-free mass index, fat mass index, total body water, and height. After each lesson, participants rated their perceived exertion as *light*, *somewhat hard*, *hard,* or *very hard*. The majority of the control group boys (80%) described their exertion as *light* while the girls (75%) described their exertion as *somewhat hard*. For the experimental group, boys (85%) indicated their exertion was *hard* while girls (80%) indicated it was *very hard*. Investigators found that both groups of boys had significant, positive changes in body weight, fat free mass, and total body water. The experimental group's boys also had significant, positive changes in fat-free mass index, fat mass, and fat mass index. Both groups of girls saw positive and significant effects on body weight, fat free mass, and total body water, while the

experimental group also had significant improvement of fat mass. The researchers concluded that both groups improved body composition, but the vigorous-intensity group had greater improvements.

The previously discussed research indicates that students do receive health benefits from participation in physical education classes. Students with mild disabilities receive greater benefits from inclusive physical education than segregated physical education (Bodnar and Prystupa, 2015). More research is needed to determine the health effects of physical education for students with more significant disabilities. Students in the general population saw a decreased number of students with insulin resistance (Telford, Cunningham, Telford, et al., 2013) and elevated low density lipoprotein cholesterol (LDL-C) (Telford, Cunningham, Waring, et al., 2013), and smaller age-related increases in body fat percentage (Telford et al., 2012) when physical education classes were taught by a specialist. Additionally, both moderate and vigorous intensity physical education classes resulted in positive changes in body weight (Sanchez et al., 2017).

Affective/Social Benefits of Physical Education. Physical education is a useful setting for teaching appropriate social behavior to all students, including those with disabilities. Standard 4 of the National Physical Education Standards states "The physically literate individual exhibits responsible personal and social behavior that respects self and others." (SHAPE America, 2013). In the lower elementary grades, these skills include following directions and using personal space, while in the upper elementary grades, Standard 4 hones in on building relationships through teamwork and good sportsmanship. For students with disabilities to learn these skills, they often require

more support and direct instruction. Paraprofessionals are tasked with navigating when and how to provide support for social skills and/or prompt other students to teach social skills.

The following section summarizes known research on affective and social skills in physical education. Research involving students with disabilities is limited; therefore, only the first article is about students with disabilities in physical education. Articles that address elementary physical education students without disabilities are addressed. Next, two research projects about secondary students with disabilities in physical education are discussed. Finally, research on students with disabilities in extracurricular physical activity settings are described.

Bodnar and Prystupa (2015) researched whether integrated or segregated physical education classes had a bigger impact on the attitudes toward physical education of students with minor health deviations. Additional details of this study were previously mentioned in the health benefits section. The investigators used a previously developed questionnaire to gather data about students' favorite activities, physical education classes, harmful habits, and attitudes toward physical education. A significant, positive attitude to physical training was exhibited in the experimental group (integrated physical education) compared to the control group (segregated physical education). The control group complained of mood changes, anxiety, and irritability significantly more than the experimental group.

In a previously mentioned research project (see the health benefits section), Pollatschek and O'Hagan (1989) evaluated the effects of daily physical education attitudes toward school, social relations, and personality (the Linwood Project). Students

aged 10-11 from five schools in Scotland made up the daily physical education experimental group while the control groups came from three schools and received two periods of physical education per week. Students completed a questionnaire that addressed the affective domain at the beginning and end of the academic year. The questionnaire was divided into two categories for analysis: (a) attitudes about school and schoolwork and (b) relationships and personality. Investigators found that both groups improved their affective scores. However, the daily physical education group had higher posttest scores in both categories.

In 1994, investigators in Belgium studied the effects of a three year, daily physical education program on the attitudes of elementary students (Pieron et al., 1994). Seven hundred forty-five students were divided into experimental and control groups. The investigators started with Kindergarten through second grade students and then added grades 3 and 4 in year two and grades 5 and 6 in year three of the study. Student data was collected on physical fitness, motor skills, attitudes toward physical activity and school, sports and leisure time outside of school, and behaviors in physical education. Four attitude dimensions were examined: social relationships with peers and teachers, enjoyment of class activities and breaks, perceptions of academic skills, and interest in academic activities. All student assessments were performed at the beginning and end of the school year. Overall percentages of favorable attitudes for the experimental group were 53% at the beginning of the school year and 46% at the end of the school year. The control group experienced percentages of 44% and 39% respectively. In second grade, there was no significant difference of favorable attitudes toward school between groups. In fourth grade, the positive school attitudes were significantly stronger in the

experimental group, both at the beginning and end of the school year. Fourth grade boys had the largest drop in favorable attitudes, with the control group having a much higher percentage of students drop from favorable to unfavorable attitudes over the course of the school year. At the beginning of the school year, sixth grade students' attitudes in each group did not vary significantly. However, at the end of the school year, unfavorable attitudes toward school remained consistent in the experimental group and doubled in the control group. A gender comparison of combined data showed that the girls had significantly higher favorable attitudes toward school. Additionally, girl's favorable attitudes declined significantly less than boy's attitudes. Investigators concluded that the experimental group had significantly more positive attitudes about school than those in the control group.

Investigators in Spain explored the effect of two different teaching strategies on intrinsic motivation, anxiety, self-confidence, and competition stress (Cecchini et al., 2001). Divided into two groups, 115 children aged 11-12 were randomly chosen. Each group was provided twelve, 1-hr sessions of physical education over four weeks by the same physical educator. The first group learned within a mastery motivational climate, while the second group learned within an ego-centered (performance) motivational climate. One unit was taught to each group, and following the unit, a track and field competition was held. Researchers found that the mastery motivation climate was related to enjoyment, perceived ability, commitment, and competition vigor, while the performance climate was related to self-confidence, pre-competition vigor, and post-competition stress. Investigators concluded that students in the mastery motivational climate evaluated their participation in the competition by their effort, dedication, and

improvement, which allowed them to cope better with competition results than those in the performance climate.

In 2013, Schmidt et al. implemented a physical education intervention in Switzerland to determine whether it would result in an accurate self-concept of endurance and strength. Intervention and control groups were defined from a group of 464 children with an average age of 11.9. Three interventions were developed and each group went through two of the 10-week interventions in the first semester of the school year. There were six treatment program combinations. The control group had normal physical education lessons. Perceived physical competence, actual physical competence, and general self-concept were established via scales and fitness tests. Perceived physical competence was determined to be the difference between the self-concept values and actual competence. Based on their veridicality score, students were labeled *underestimators*, *overestimators*, or *realists*. Each 10-week intervention took place over twenty, 45-min lessons. Teachers received training and two phone calls during each intervention to support their implementation. Investigators found that the intervention groups had no significant effect on participants' actual strength or endurance when compared to the control group. However, a significant increase was found in the self-concept of endurance in the intervention group, but no effect was found in the self-concept of strength. Students' accuracy of self-concept also improved significantly for both strength and endurance in the intervention group.

Researchers in Australia explored the effect of specialist-led physical education in the Lifestyle of our Kids (LOOK) Study which was conducted between 2005 and 2009 (Olive et al., 2019). Details of this study were previously mentioned in the health benefits

of physical education section. For this part of the study, researchers explored the effect of the intervention on body dissatisfaction, symptoms of depression, and stress. Other variables included physical activity, cardiorespiratory fitness, percentage body fat, pubertal development and socioeconomic status. Body dissatisfaction, depression, and stress inventories were conducted at baseline (2nd grade), 12 months after baseline (3rd grade), and at the end of the intervention (6th grade). The researchers found significant differences in overall body image between grades 2 and 3: the intervention group had a decrease in overall body dissatisfaction, with girls experiencing the largest difference between groups, and the control group had an increase. No significant differences between the groups were found for overall depression between grades 2 and 3. However, significant differences were found in the ineffectiveness subscale of the depression assessment. No significant differences in stress were found between any groups or over time. Incorporating the 6th grade assessment results, investigators discovered that girls in the intervention group had a smaller general decrease in depression scores for effectiveness and interpersonal problems than the control group. No long-term intervention effects occurred for boys in the depression category or for boys or girls in the body image and stress categories.

Two studies that have been completed to explore the social skill learning of secondary students with disabilities in physical education. Cabrera et al. (2019) investigated whether inclusive physical education influenced the self-concept of students with motor disabilities in Spain. Three schools, six physical educators, and 168 students, including nine with a motor disability, participated in the study. Students were aged 12-18 years. Participants completed a self-concept questionnaire before and after an

intervention in which teachers learned to develop and teach inclusive lessons. Investigators found that, while the students without motor disabilities did not have changes in self-concept from their pre to posttest, students with motor disabilities had a significant improvement in all dimensions of self-concept, with the greatest increase in physical self-concept.

Another group of investigators examined the emotional responses of students with intellectual disabilities to physical education and compared them to non-disabled peers (Wieczorek et al., 2018). Fifty students with mild or moderate intellectual disabilities from special schools and 50 students without disabilities from mainstreamed schools participated in the study. No data collection dates or specific ages were provided. The survey questions were read aloud to participants and they answered verbally by responding *yes* or *no*. The most common positive emotions during physical education for students with intellectual disabilities were relaxation, self-confidence, and a positive attitude to physical education. Boys with intellectual disabilities had more positive emotions than girls, with significant differences in self-confidence, successful task completion, and positive emotions toward physical education lessons. The most frequent negative emotions for those with intellectual disabilities were fatigue, fear and tension, and unhappiness and anger. Negative emotions in girls with disabilities were statistically significant compared to students without disabilities. Finally, the investigators found that non-disabled students had more frequent positive emotions than those with intellectual disabilities.

Finally, four research projects involving physical activity programs and their affective or social effects on students with disabilities will be described. In a study by

Schlein et al., an integrated physical activity program that included children with autism was provided as a three-week intervention program to improve social behaviors (Schlein et al., 1987). Following the intervention, students demonstrated increased appropriate social behaviors and decreased inappropriate social behaviors.

Bluechardt and Shephard (1995) evaluated a physical activity program's effects on students with learning disabilities. Forty-five participants between 8 and 11 years old were randomly assigned to the experimental or control group. Data was collected with the Bruininks-Oseretsky Test of Motor Proficiency, a self-perceptions profile, social behavior observations by classroom teachers, and progress notes by program supervisors. The experimental group received a physical activity program while the control group received an academic assistance program. Observations occurred as a pretest, posttest after the 10-week program, and a three month follow-up test. During the program, students attended two, 90-min sessions per week. All students in both groups received individual attention and the physical activity instructors (26 in number) were well-trained. The motor skills tests resulted in only one significant group effect: visual motor control was better in the experimental group after the 10-week program. There were no significant differences in self-perception scores between groups. The investigators pointed out that significant differences were observed in both groups over time in motor skills, self-perceptions, and social skills. The one-on-one attention provided to students in both the control and experimental groups may have contributed to the results.

Another group of researchers examined whether physical activity is an appropriate environment for the socialization of children with physical disabilities (Taub & Greer, 2000). Through interviews with 21 children aged 10-17, Taub & Greer found

that physical activity increased students' social identity and strengthened social ties. Students felt that physical activity increased strength, built muscles, and taught them that they could perform more skills like their peers than they knew. Investigators received student reports of pride and sometimes surprise by their physical activity accomplishments. The students were also able to show off their abilities and receive affirmation from others. Some students reported the emotional benefits of increased self-esteem, excitement, and enjoyment of being part of a team. Additionally, physical activity provided students increased social access to classmates and a way to become acquainted with peers without disabilities. Some students also reported increased communication skills, cooperation skills and friendships. Finally, researchers found that the physical activity environment created a unique opportunity for students with and without disabilities to bond through the mutual enjoyment of activities.

In 2004, three investigators conducted a case study to determine whether the Personal and Social Responsibility Model (PSRM) would be successful in an adapted physical activity program (Wright et al., 2004). Five students with cerebral palsy were recruited from a developmental martial arts program (DMAP) that met once a week. Participant were 4, 5, 7, 11 and 11 years old. The PSRM program lasted 13 weeks and was integrated into the DMAP program that took place once a week for 45 min. Data was collected from instructor observation, parent interviews, and physician and physical therapist interviews. Five themes emerged from the data: anticipated benefits, increased sense of ability, positive feelings about the program, positive social interactions (improvements noted in four participants), and therapeutic relevance (physical improvements noted in four participants). The investigators concluded that the students

with disabilities benefited from PSRM and it had the potential to help all students increase a sense of ability, have positive social interactions, and have a positive learning experience.

Daily physical education may result in more positive attitudes about school (Pieron et al., 1994; Pollatschek and O'Hagan, 1989). Different teaching models in physical education can increase students' enjoyment, perceived ability, and commitment (Cecchini et al., 2001), and decreased symptoms of depression in girls (Olive et al., 2019). Secondary students with motor disabilities may increase their self-concept by participating in physical education (Cabrera et al., 2019) while students with intellectual disabilities, especially girls, have more negative emotions during physical education than their non-disabled peers (Wieczorek et al., 2018). In extracurricular physical activity programs, students with disabilities can improve social behaviors, interactions, and bonding, and increase their sense of ability (Schlein et al., 1987; Taub & Greer, 2000; Wright et al., 2004). As Taub and Greer (2000) pointed out, in order for students to receive the affective and social benefits of physical activity, students with disabilities must be allowed to play and not be excluded because of a disability.

While many positive results have been found, most physical education research projects in the area of affective and social development lack generalizability to different environments or groups of students. Research that builds off of these already completed projects is needed to provide a better snapshot of the affective and social benefits of physical education for students with disabilities.

Cognitive Benefits of Physical Education. The connection between physical activity and academic performance has been well documented. Increased physical

activity consistently correlates with increased scores in reading and mathematics (Bailey et al., 2009; Donnelly et al., 2016; Stevens et al., 2008; Telford, 2017). However, when investigators compared academic performance with the amount of physical education class time, they found physical education class time had limited positive contributions directly to academic achievement. More importantly, investigators did not find any negative associations between physical education class time and academic performance (Carlson et al., 2008; Coe et al., 2006; Dollman et al., 2006; Stevens et al., 2008). In this section research about the impact of physical education and motor skill development on academic ability is discussed.

From 1970-1977, the Trois-Rivières project was completed in Canada to determine the effects of daily physical education on elementary school children (Shephard & Trudeau, 2005). The study and several follow-up studies of participants were described in detail earlier in the health benefits of physical education section. Investigators found that the lost academic time due to increased time in physical education did not negatively affect academic scores.

A daily physical education research project in Scotland with 10-11 year olds (the Linwood Project), also addressed the academic benefits of physical education (Pollatschek and O'Hagan, 1989). Details about this study were also presented in the health benefits section. Math and reading were evaluated before and after an academic school year to determine academic ability. Researchers found no significant difference in any academic score among groups, pretests, posttests, or gender. However, the investigators noted that the daily physical education group had higher change scores.

Investigators in Southern Australia researched whether increased physical education time led to increased reading and math skills (Dollman et al., 2006). One-hundred seventeen school administrators completed a survey that provided demographic information, physical education time, and math and reading scores at school years three, five, and seven. No association between physical education time and academic scores was found by the investigators. Higher reading and math skills were found in schools with a higher average SES and fewer staff under 30 years of age.

In 2008, two sets of researchers examined data from the Early Childhood Longitudinal Study, Kindergarten Class of 1998-1999 (ECLS-K) to determine the impact of increased physical education time on academic achievement (Carlson et al., 2008; Stevenson et al., 2008). Data was collected at six time points: Fall and Spring of kindergarten and first grade, and the spring of third grade and fifth grade.

Carlson et al. (2008) used data through 3rd grade and split the participants into three groups based on the amount of physical education they received (high, medium, low). The researchers determined that girls with the lowest amount of physical education had significantly lower reading scores in all grades and math scores in kindergarten and first grade. There were no significant differences among the boys' scores from either category.

Stevens et al. (2008) used the same data mentioned above from the ECLS-K but focused on 5th grade academic scores. First grade scores were used as variables of prior math and reading achievement and data of both physical activity and physical education time were used. Investigators found that increased physical activity had a greater impact on math and reading scores than the amount of time in physical education. No significant

relationship was found between physical education time and math or reading achievement. Stevens et al. pointed out that data about the activity intensity and engagement levels of students in physical education and physical activity outside of school was not available.

The researchers' goal of the Lifestyle of Our Kids (LOOK) study performed in Australia was to determine the impact of specialist-led physical education on student health and academic achievement (Telford et al., 2012). The LOOK study participants and methodology was described in detail in the health benefits of physical education section. Investigators determined that physical education led by a specialist significantly improved math scores and participants experienced non-significant, but higher, writing and reading scores.

Motor skill development and aerobic fitness are important parts of the physical education curriculum. The following two research studies demonstrate a relationship between motor skill performance and academic ability.

Ericsson and Karlsson (2014) investigated the impact of motor skill performance on academic performance through a 9-year longitudinal study in Sweden. The control group had two, 45-min physical education lessons per week and the intervention group had daily, 45-min physical education lessons. The school day was lengthened to allow time for the daily physical education classes. Students with motor deficits received an extra 60 min of adapted motor training using the Motor Skills Development as Ground for Learning (MUGI) method. Initially, the control group had significantly better reading ability than the intervention group. Investigators found that the intervention group had significant improvements in motor skills over the course of the study, but the control

group did not. At school year 9, the intervention group had 7% of students with motor deficits and the control group had 47% of students with motor deficits. There was no difference in the intervention and control groups' girls' academic subjects, however, the boys in the intervention group had higher grades in school year 9, and more of them qualified for secondary school. Regardless of group, students with motor deficits had lower academic grades and were less likely to qualify for secondary school.

In 2019, researchers explored the relationships between aerobic fitness, fundamental motor skills, and reading, mathematics, and spelling achievement (de Bruijn et al., 2019). The study involved 891 students at 22 elementary schools, and investigators assessed relationships among hand-eye coordination, locomotor skills, balance, motor coordination, cardiovascular fitness, and academic achievement. Investigators found that fundamental motor skills were a greater predictor of academic achievement than aerobic fitness. However, since those with higher aerobic fitness also tended to have greater motor skills, it was difficult to differentiate between the two. Further analysis indicated that cardiovascular fitness predicted spelling and mathematics achievement, while motor skill ability predicted reading and mathematics achievement.

As mentioned in the previous articles, investigators found that increased physical education and increased motor skills either had a positive or neutral impact on academic skills (Carlson et al., 2008; de Bruijn et al., 2019; Dollman et al., 2006; Ericsson & Karlsson, 2014; Shephard & Trudeau, 2005; Stevens et al., 2008; Stevenson et al., 2008; Telford et al., 2012). Since no negative associations in increasing physical education or motor skills were found, students should be provided opportunities for increased physical education time, especially for students with motor delays.

Psychomotor Benefits of Physical Education. Physical education is an important place for psychomotor skill instruction. In elementary school, the primary focus of the physical education curriculum is typically fundamental motor skill development. However, there is no single curriculum, philosophy, or teaching method that is universally used by physical educators, making the generalization of any research in physical education difficult, unless the investigators evaluated a specific curriculum. Therefore, most psychomotor research falls into one of three categories: early intervention with preschoolers (Goodway and Branta, 2003), interventions of specific teaching strategies (Robinson & Goodway, 2009), or the effect of adding physical education or motor skill interventions (Costa et al., 2015). From research in each of those categories, the determination can be made that most interventions either resulted in positive significant improvement in psychomotor skill development or no significant difference in skill development (Ochoa-Martinez et al., 2019; Sopa & Pomohaci, 2016; Robinson & Goodway, 2009; Palma, 2008; McKenzie, et al., 1998; Goodway & Branta, 2003). Even though more research is certainly needed, no study showed an overall negative impact on psychomotor skills. (Morgan et al., 2013; Kyriakides et al., 2018).

In 1998 McKenzie et al. investigated whether 700 fourth and fifth grade students would make greater manipulative skill gains using the SPARK PE curriculum when taught by a physical education teacher or a trained classroom teacher. The physical education teachers were employed by SPARK and received additional training on curriculum, and the classroom teachers were also trained how to implement the curriculum. Both groups received written lesson plans for each unit and had regular meetings or visits to receive feedback from investigators. The control group was taught

by classroom teachers who received no extra training. The SPARK groups received physical education for 30 min, three times per week. Students were pre and posttested for skills in catching, kicking, and throwing. Initially, the classroom teacher-taught groups were significantly more skilled than the physical education teacher-taught groups. However, after the study, the teacher trained group was significantly better at the three manipulative skills than the control group. No significant differences were found between the two intervention groups. It is unknown why the students in the physical educator-taught groups had lower pretest scores and what other factors may have affected the results. The investigators in this study found that, when provided a written curriculum and support, both physical education teachers and classroom teachers can provide quality programs to improve student motor skills.

Goodway and Branta (2003) completed a study of at-risk preschoolers (mean age 4.74) to determine whether a 12-week motor skill intervention program would improve their fundamental motor skills. A total of 59 students participated, with two classes in the control group and two classes in the intervention group. The interventions occurred twice weekly for 12 weeks and lasted 45 min. In each session, students rotated in small groups to three skill stations, each with a separate instructor. The control group did not receive any organized motor skill instruction, but did have seven, 45-min play sessions in the gym. The pretest scores of the two groups revealed no significant differences. While both groups had significant, positive changes between pre and posttest locomotor and object control scores, Goodway and Branta found that the intervention group had significantly higher posttest locomotor and object control scores than the control group.

In 2008, Palma studied which play environments were more conducive to the development of motor skills. Seventy-one kindergarten students participated, with two experimental groups (free play & play with orientation) and one control group. The children's engagement in the experimental programs was also examined. The investigator found that the play with orientation group had motor development skill increases, while the other two groups did not. The children with low skills benefited the most from the orientation to play program while those with high skills did not experience gains. Additionally, the children in the play with orientation group were more engaged than those in the free play group. As expected, the students who made the most progress were those whose motor skill practice was of the highest quality.

In 2009, Robinson and Goodway researched whether the low autonomy (LA) or mastery motivational climate (MMA) instructional methods would significantly increase at-risk preschoolers' motor skill performance. The study included 124 at-risk preschool age children from two Head Start facilities and were divided into three groups. The Test of Gross Motor Development-Second Edition (TGMD-2) was used to determine the raw scores of students during a pretest, a posttest, and a nine-week retention test. The interventions took place two days a week for nine weeks. The control group maintained the regular Head Start curriculum of two days per week of unstructured recess. The MMA and LA interventions were structured similar to a physical education class, with 2-3 min at the beginning and end for warm-up and closure, and 24 min of motor skill instruction. During each lesson, the LA group participated in two, 12-min skills stations where their progression through skills was based on their level of performance. The MMA group also participated in the skill stations, but were allowed to choose the skill,

difficulty level, and the amount of time they spent working on a skill. The researchers found that both the LA and MMA groups had significantly higher posttest and retention scores than their pretest scores. The LA and MMA groups also had significantly higher posttest and retention scores than the control group. The differences between the LA and MMA groups' post test and retention scores were not statistically significant. This research highlighted the importance of structured and intentional motor skill instruction in early childhood and demonstrated that multiple teaching strategies may be effective to enhance psychomotor skills.

In 2015, three hundred twenty-four children aged 3-5 were divided into control and experimental groups to determine the impact of structured physical education on psychomotor skills (Costa et al., 2015). The experimental group received structured physical education classes while the control group received the standard preschool program (no physical education teacher). Students' psychomotor skills were pre and post tested after 24 weeks to assess coordination and balance, laterality, body schema, spatial organization, and temporal organization. Significant, positive differences were found between the pretest and posttest scores of all ages in the experimental group. However, researchers found significant, positive differences in the control group's three-year old's pre and posttest scores for temporal organization, laterality, and coordination of balance. The investigators of this six-month study concluded that structured physical education increased the psychomotor development of preschool children.

In 2019, investigators evaluated the effect of a physical education program on children with hearing impairments (Ochoa-Martinez et al., 2019). A control group (n = 15) and experimental group (n = 23) were established and the Battelle Developmental

Inventory was used as a pre and posttest to determine a motor age equivalent by assessing muscle control, body coordination, locomotion, fine motor skills, and perceptual motor ability. The experimental group participated in a physical education program for five, 50-min sessions per week for four months. Communication with students was provided through Mexican sign language. Researchers found that the experimental group experienced a significant increase in motor age equivalents in the posttest results, and this difference was significantly larger than the increase experienced by the control group. The investigators concluded that structured physical education classes produced psychomotor gains for students with hearing disabilities. The investigators also highlighted the importance of inclusion in physical education classes.

It is clear from research that structured motor skill development programs, such as physical education classes, have a positive influence on student psychomotor development and have a greater impact on that development than unstructured gross motor play (Goodway and Branta, 2003; McKenzie et al., 1998; Ochoa-Martinez et al., 2019; Palma, 2008; Robinson & Goodway, 2009; Sopa & Pomohaci, 2016). Students with the lowest motor skills received the most gains from structured physical education (Ochoa-Martinez et al., 2019). For this reason, students with disabilities and delayed motor skills benefit from instruction in skill development. Finally, it was discovered that both classroom teachers and physical education teachers could be trained to lead programs that enhanced psychomotor development (McKenzie et al., 1998).

Special Education Laws

In 1965, the Elementary and Secondary Education Act (ESEA) became a law and offered grants to districts that served low-income students, as well as grants for

textbooks, library books, special education centers, and college scholarships for low income students (U.S. Department of Education, n.d.). This was the first education law that protected the educational rights of children and young adults and would be built upon in later years.

The year 1975 saw Public Law 94-142 passed in Congress, which was a significant expansion of previous laws and required states to provide a free, appropriate public education (FAPE) to all children with disabilities (Martin, 1976). The implementation of the law was staggered, with ages 3 through 18 receiving services in 1978 and ages 18-21 receiving services no later than 1980 (Education for All Handicapped Children Act of 1975, 1975). In this time period, special education was becoming a more defined profession and students were beginning to be viewed as individuals instead of grouped in categories and segregated by group (Martin, 1976).

In the 1980s, more interest developed in meeting the needs of individuals with disabilities, which resulted in the passage of the Individuals with Disabilities Education Act (IDEA) by Congress in 1990 (Office of Special Education & Rehabilitative Services, 2010). IDEA continued to require public schools to educate students with disabilities from age 3 to 21, unless state law required otherwise (Individuals with Disabilities Education Act, 2004). Additionally, IDEA included the requirement of states to provide services to children with disabilities from birth to age 3. IDEA defined special education as instruction, including physical education, in a classroom, home, hospital, or institution and emphasized the child's right to be taught in the least restrictive environment. Due to the requirement to provide physical education in the least restrictive environment as a

part of free appropriate public education (FAPE), the practice of paraprofessionals assisting students in mainstreamed physical education classes began.

The No Child Left Behind Act of 2001 (NCLBA) defined the role of a paraprofessional and introduced minimum requirements for paraprofessionals. To meet the minimum requirements, paraprofessionals must have: completed at least two years of study at an institution of higher education, obtained an associate's (or higher) degree; or met a rigorous standard of quality and can demonstrate, through a formal state or local academic assessment: knowledge of, and the ability to assist in instructing, reading, writing, and mathematics, or knowledge of, and the ability to assist in instructing, reading readiness, writing readiness, and mathematics readiness, as appropriate (No Child Left Behind Act, 2001). The duties of paraprofessionals were defined as: providing one-on-one tutoring for eligible students, when a student would not otherwise be receiving instruction from a teacher; assisting with classroom management; organizing instructional and other materials; providing assistance in a computer laboratory; conducting parental involvement activities; providing support in a library or media center; acting as a translator; or providing instructional services to students under the direct supervision of a teacher. Although physical education is specifically included in special education and required by federal law, NCLBA did not mention roles or training of paraprofessionals in physical education. This coincides with the most common complaint about the law: it overemphasized math, reading, and writing skills, and did not include science, social students, fine arts, or physical education.

The latest major update to education law was called the Every Student Succeeds Act (ESSA) and was signed into law in 2015 (U.S. Department of Education, n.d.). ESSA

modified the Elementary and Secondary Education Act of 1965 and replaced parts of the NCBLA. Additionally, the ESSA required states to: educate all students, including disadvantaged and special education students; required all students be prepared for college and careers; required assessments to measure student progress; expected accountability of low performing schools, and more. ESSA defined a paraprofessional as "an individual who is employed in a preschool, elementary school, or secondary school under the supervision of a certified or licensed teacher, including individuals employed in language instruction educational programs, special education, and migrant education" (Elementary and Secondary Education Act of 1965, 2018, p. 206). Paraprofessionals are mentioned 38 times in the modified ESEA law with the majority of those instances encouraging the including of paraprofessionals, along with teachers, administrators, and other staff, in professional development and training opportunities (Elementary and Secondary Education Act of 1965, 2018).

Paraprofessionals

Paraprofessional Requirements. Paraprofessionals have minimal training and meet minimal postsecondary qualifications, not just in the United States, but also around the world (Butt, 2018). The No Child Left Behind Act presented minimum qualifications that Title I paraprofessionals must maintain prior to working in the schools (No Child Left Behind Act, 2001). Apart from these minimum requirements, it is up to each individual state to establish training guidelines for paraprofessionals.

Title I paraprofessionals are paid with federal funds and are those who provide instructional support to students who qualify for Title I services in Title I targeted schools or those who work in Title I school-wide schools. Students with low incomes who qualify

for free and reduced school lunches also qualify for Title I services. Paraprofessionals who work with students with disabilities sometimes are considered Title I paraprofessionals, and sometimes are not. Some states provide separate requirements for Title I paraprofessionals and other paraprofessionals (e.g. South Dakota Department of Education, 2017a, 2017b).

Ten states were randomly chosen for a review of paraprofessional requirements (Appendix C). Most states in this sample opted for the minimum Title I requirements (e.g. Iowa Department of Education, n.d.) and many provided lesser requirements for paraprofessionals that are not Title I (e.g. Kirner et al., 2007). One exception was the State of Oklahoma, which had higher requirements for Special Education paraprofessionals. The Oklahoma State Department of Education requires either a 25-hr course titled "Oklahoma Special Education Paraprofessional Training" or an online series of courses, CPR & First Aid training, yearly bloodborne pathogens training, and six professional development hours each year for special education paraprofessionals (Oklahoma State Department of Education, 2019).

Other states require an expirable certification, license, or permit to be a paraprofessional. The renewal requirements vary between paying fees (ISBE Educator Effectiveness Department, n.d.) to completing professional development (e.g. State of New Hampshire Department of Education, 2018). For example, in Delaware, a paraeducator permit is valid for five years with 15 hr of professional development required for renewal (Delaware Department of Education, 2019).

Role of Paraprofessionals in Schools. Though schools were not yet required by law to educate all students with disabilities, as early as 1967 teacher aides were used in

special education (Blessing, 1967). Kenneth Blessing conducted a review of current research in the area of using teacher aides in special education. At the time, researchers found that much of a teacher's instructional day was spent on nonprofessional duties. Therefore, teacher aides were employed to help with some of the extra duties such as keeping the classroom organized, putting up bulletin boards, preparing academic materials, providing additional instructions during seatwork, and supervising children in the hallways, bathrooms, specials classes, and on the playground. Blessing also revealed an approach by the Wisconsin State Department of Public Instruction, the UW-Extension Division, and the Research and Development Center for Learning and Re-Education to define four roles of a teacher aide such as: (a) the assistant teacher who teaches reading; (b) the instructional aide who preps materials, assists with seatwork, math and writing, and can teach electives; (c) the supervision aide; (d) and the clerical aide. At the time of Blessing's article, little research was published of field testing on the use of teacher aides in special education and he pointed out the need to study it further before teacher aides were extensively employed in special education. However, Blessing reported that many such research projects were in progress and hopefully, "will result in further clarification of the efficacy of utilizing teacher aides in this era of manpower shortage in the behavioral sciences" (Blessing, 1967, p. 113).

By 1989, the paraprofessional career had quickly expanded due to advocates' requests for more services, the availability of a large labor force, a need for personnel qualified in low incidence disabilities, and the challenge to find teachers in rural areas (Vogler et al., 1989). It was estimated that the number of paraprofessionals in the United States had multiplied by 40 since 1965. Also, by the late 1980s, the paraprofessional role

had shifted from clerical and transportation duties to tasks related to "teaching, assistance, and instruction" (Volger et al., 1989, p. 69).

As special education has evolved and with the passage of new laws in the United States, special education programs have changed. Instead of serving students with disabilities inside segregated, self-contained classrooms, students are mainstreamed—included in general education classes. Due to the many and varying needs of special education students, paraprofessionals also leave the special education classrooms and help students navigate the mainstreamed environment. However, often both regular education teachers and paraprofessionals have limited knowledge of special education and are unprepared to support students with disabilities (Webster et al., 2010).

Between 2003 and 2009, The Deployment and Impact of Support Staff (DISS) Project was conducted to study the impact of paraprofessionals on teachers and students. The study found that increased paraprofessional support resulted in decreased student achievement (Webster et al., n.d.). Prior to this project, there was much ambiguity surrounding the use of paraprofessionals (Webster et al., 2010). Webster et al. synthesized the data and suggested three ways to change paraprofessional support to increase student outcomes. First, the researchers suggested changing the deployment of paraprofessionals by limiting routine student support to allow students to receive more direct time with the teacher and ensuring that teachers provided paraprofessionals with an intervention curriculum to use when away from the classroom. The second proposed area of improvement was paraprofessional practice. The researchers recommended that teachers closely monitor paraprofessional and student interactions and provide correction and practice for paraprofessionals when needed. Finally, Webster et al. proposed that it

was important for teachers to prepare paraprofessionals for lessons rather than expect them to respond reactively. Overall, the researchers challenged schools and teachers to rethink the roles of the paraprofessional, as that of a secondary educator, not a primary educator, and provide better training and mentoring.

Giangreco (2010) compared the DISS project to paraprofessional research in the United States. He found that the United States and United Kingdom have many similarities in paraprofessional usage, such as:

"(a) marked increases in utilization,

(b) their use as a key mechanism to support inclusion of students with disabilities,

(c) inadequacy of their preparation, training and supervision,

(d) concerns about the quality of their instruction, and

(e) perpetual concerns and ambiguity about the appropriateness of their increasingly instructional roles" (Giangreco, 2010, p. 342).

Giangreco pointed out that our society has been responding reactively to increased diversity in the schools and we need to take a step back to develop research-based approaches. Like Webster et al., (2010), Giangreco (2010) also recommended teachers engage more with students with disabilities rather than leaving the paraprofessional as the main source of education.

An idea in the late 1960's to provide overworked teachers with an assistant to take care of mundane, non-instructional tasks has evolved into paraprofessionals who are expected to complete those mundane tasks as well as fully educate the student they are assigned. As the role of the paraprofessional has expanded, the role of the teacher in educating students with disabilities has decreased (Webster et al., 2010). Since the

completion of the DISS project in 2009, the role of the paraprofessional remains unchanged in the United States.

Paraprofessional Roles and Responsibilities in Physical Education.

Paraprofessional roles in physical education vary from state to state, school to school, and teacher to teacher. Despite the fact that several authors have suggested paraprofessional roles (Block & Vogler, 1994; Murata & Hodge, 1997; Reams, 1997), there remains great variance in the use of paraprofessionals by physical educators. The lack of research, education, and training for teachers and paraprofessionals, especially in the physical education environment, contributes highly to that variance. In physical education classes, paraprofessionals must adapt their classroom roles and often teach the general physical educators what their role is (Bryan et al., 2013). Additionally, little research is available to indicate the most common roles of a paraprofessional in physical education and no researchers have evaluated the most effective roles.

In 1989, Volger et al. wrote an article to inform adapted physical educators about paraprofessional roles, selection, and training in the hopes that teachers could use them effectively. They cited an unpublished pilot survey they used to rank the roles of paraprofessionals in adapted physical education (Vogler et al., 1989). The top seven roles included teaching assistance, assisting students with traveling, gathering teaching materials, child health care, performing therapy, behavior management and paperwork.

Murata and Hodge (1997) further clarified the paraprofessional role as “to provide instructional assistance and student support for the general physical educator”. They pointed out that a paraprofessional allows for more supervision and increased learning time for all students.

In 2007, the responsibilities of paraprofessionals were addressed again (Davis et al., 2007). Researchers conducted a survey of 76 paraprofessionals and revealed that over 80% of those who work in physical education (29 total) had the responsibility to accompany students to and from classes and provide prompting cues. Davis et al. discovered that 59% of respondents worked individually with a student during an activity; however, the interpretation of this responsibility was not clear. Twelve other responsibilities were indicated by less than 40% of respondents: (a) curriculum implementation, (b) assisting all students, (c) sharing IEP suggestions, (d) assisting only when asked, (e) implementing behavior management programs, (f) assessing students with disabilities, (g) charting the performance of students with disabilities, (h) assisting with hygiene, (i) assisting with planning, (j) contributing ideas, (k) watching from the sidelines with student, and (l) assisting with integration. The great variety of responses demonstrates the lack of clarity over the role of the paraprofessional.

Finally, in 2013, Bryan et al. attempted to broaden the knowledge base about the roles of paraeducators by investigating how 15 teachers and paraprofessionals from three middle schools described the role of a paraprofessional. They found that "paraeducators and teachers described the paraeducator role as being in a constant stretching and contracting position between student protection and teacher backup". Additionally, they detailed their struggle with mixed expectations and the "ambiguity" of the paraprofessional role. Paraprofessionals stated that their role was clear and learned from teachers, while special education teachers and physical education teachers did not have information about the paraprofessional role. Investigators also found that only half of the adapted physical education teachers understood the role of the paraeducator. Further

exploration into the districts' policies revealed that neither district provided information to teachers on how to use paraprofessionals, but each district did provide a list of primary duties and responsibilities.

The lack of literature and consensus on the most effective roles of a paraprofessional in physical education makes it difficult to clarify the competencies of the paraprofessional. Future research is needed to establish the most effective paraprofessional roles and competencies to increase student achievement in physical education.

Paraprofessional Training. Investigators have found that providing training for paraprofessionals does improve their skills and/or translate to better outcomes for students (Rispoli et al., 2011). Many professionals have provided non-research-based suggestions and insight into training paraprofessionals in the physical education environment. Unfortunately, only two sets of researchers were found to have explored paraprofessional training in physical education; therefore, following those articles, research on paraprofessional training and requirements in other environments is briefly discussed.

In 1995, four researchers developed and tested a model for adapted physical educators to help include children with disabilities in regular physical education (Heikinaro-Johansson et al., 1995). The model consisted of a needs assessment, the development and implementation of the consultation program, and an evaluation. The case studies were completed within a Finnish community in which the classroom teachers taught physical education twice per week. Investigators tested two model options:

intensive consultation and limited consultation. A case study was performed with each model.

The intensive consultation model was developed in response to working with a student with spina bifida in physical education (Heikinaro-Johansson et al., 1995). The needs assessment revealed that the paraprofessional wanted to help plan physical education lessons. An interdisciplinary team met to set goals and objectives and the adapted physical education consultant developed lesson plans and met with the paraprofessional and teacher bi-weeekly. Lessons were delivered once a week, allowing modifications to be made over time, as needed. Investigators found that the teacher and paraprofessional became comfortable, more motivated, and assertive over time. The paraprofessional believed her role in physical education improved and she was now able to help her assigned student, other students, and the teacher.

For the limited consultation model, the needs assessment revealed that paraprofessionals and teachers were not effectively working together (Heikinaro-Johansson et al., 1995). Paraprofessionals felt unsupported while teachers blamed the paraprofessionals for not making it work. For this model, the adapted physical education consultant wrote the physical education IEP goals and designed a five-week lesson plan package. Only two in-person visits by the adapted physical educator were conducted in this model, but teachers, students and paraprofessionals completed journals, videotaped lessons, and completed interviews. From the limited consultation model, the investigators found that paraprofessionals and students believed they benefited from the support and supervision, but the teacher believed the journals and evaluations were unpaid work.

In summary, Heikinaro-Johansson et al. (1995) found that the consultant models did benefit students; however, the benefit to teachers and paraprofessionals was dependent on attitudes and the amount of support provided by the consultant. Therefore, the model with limited consultation did not provide as many benefits as the model with intensive consultation. Additionally, the researchers described how paraprofessionals should be provided special training and co-ownership of interventions and how paraprofessionals could work as an assistant teacher and should be available for every student who needed assistance.

In a second study of paraprofessionals in physical education, paraprofessionals were asked about their perceived training through a survey (Davis et al., 2007). Davis et al. discovered that although 61% of respondents perceived they were adequately trained, only 16% had received training in physical education. It is noteworthy that 82% of respondents expressed an interest in participating in physical education training. Respondents indicated that the three most desired topics for professional development included activity adaptations, characteristics of learning for students with disabilities, and motor development.

In 2010, Lewis and McKenzie investigated the training needs of paraeducators working with students with visual impairments. More than 60% of the paraeducators they surveyed in local schools expressed a desire for more training in all 16 areas they were asked about. The top desired training areas of 80% or more participants included: communication, developmental skills, independent living, and social skills as well as low vision devices, sighted guide, and teamwork. Paraprofessionals desire more training; administrators just need to provide it. Some of the top skills that paraprofessionals

desired training for included: sighted guide, teamwork and communication, development, and social skills. The top desired training areas are all prominent skills to be taught in a physical education environment.

Rispoli et al. reviewed 12 studies involving the training of paraprofessionals to work with students with autism (Rispoli et al., 2011). The instructional strategies included videos, written instructions, verbal instructions, practice, modeling, role playing, and supervisor feedback. Investigators revealed that pretest scores indicated a 0-60% accuracy for paraprofessionals to implement interventions and most posttest scores indicated 80%-100% accuracy. No negative outcomes were reported for any study. Seven sets of researchers found positive effects on paraprofessionals' skill acquisition and six studies yielded positive results for targeted student behaviors. If training is provided, regardless of the type, paraprofessionals may improve their skills, thereby positively addressing student behaviors and learning.

Present and past researchers have indicated that paraprofessionals are willing to participate in training and desire to have more training on working with students with disabilities. Though research is limited on the results of training interventions with paraprofessionals in the physical education setting, learning about paraprofessional competence and perceived competence can assist researchers in developing professional development programs for future testing.

Research on Paraprofessional Competence. There has been scant research to evaluate paraprofessional competence and no known research in the physical education environment. Research found regarding paraprofessional competence has mostly been conducted for the purpose of evaluating a training program for children with autism

(Rispoli et al., 2011). Two groups of researchers were found to have surveyed teachers and paraprofessionals during the exploration of paraprofessional competencies and their findings are presented in this section (Frank et al., 2008; Lewis & McKenzie, 2010).

In 1998, Frank et al. attempted to quantify the training needs of special education paraprofessionals based on special education teachers' ratings of important tasks for paraprofessionals. The teachers were grouped based on the population they served and whether the environments were self-contained or inclusive. The investigators found that only two of the 18 tasks they asked teachers to rate were rated important by every group of teachers. Therefore, task importance and paraprofessional competencies vary based on the instructional model, age, and setting. The two tasks rated important by every group of teachers were managing behavior and preparing materials. Frank et al. found that the most common additional statements from teachers and paraprofessionals were that more training was needed and/or formal college training was needed for paraprofessionals.

Lewis and McKenzie (2010) explored the competencies and roles of paraprofessionals working with students with visual impairments. Two 44-item questionnaires were developed and administered to teachers (N = 293) and paraprofessionals (N = 106) across the United States. Responses to the survey indicated that paraprofessionals' primary role was to provide instructional support to the curriculum rather than direct support. Over 50% of paraprofessionals and 60% of teachers who worked in local schools indicated that paraprofessionals assisted with curriculum in language arts, mathematics, science, and social studies. Additionally, over 50% of paraprofessionals and teachers in local schools responded that paraprofessionals supported instruction in the following areas: assistive technology, braille, listening, and

social skills. Finally, 80% or more of paraprofessionals reported the following responsibilities: audio tape creation, feeding, health care, toileting, after-school supervision, transportation, interpreter, and intervener.

The lack of information about paraprofessional competency provides little basis for developing and implementing training programs for paraprofessionals. The academic literature is even more sparse in the physical education environment. There is a significant need to study paraprofessionals' competence and perceived competence in the physical education setting as a springboard to further research and development of training programs.

Conclusion

Inclusion in physical education is required by special education laws (Individuals with Disabilities Education Act, 2004). Teaching or working with students with disabilities in physical education requires a different skill set than inclusion in other environments due to the content, large open spaces, and high activity levels. Social skill development is prevalent in physical education and participation in physical activity increases academic achievement (Bailey et al., 2009; Donnelly et al., 2016; Stevens et al., 2008; Telford, 2017) . Paraprofessionals are commonly used to assist students with disabilities in the physical education environment. Unfortunately, they receive very little training (Butt, 2018) and little research has been done to explore their competence or perceived competence. However, paraprofessionals consistently indicate that they desire more training (Davis et al., 2007; Lewis and McKenzie, 2010) and researchers have shown that paraprofessionals benefit from training (Rispoli et al., 2011). Unfortunately, there are no previously known valid and reliable instruments to measure paraprofessional

competence in any environment. Therefore, there is a need for an instrument that can be used to increase knowledge in the area of paraprofessional competence and perceived competence in physical education classes.

CHAPTER III

METHODOLOGY

The purpose of this study was to create and preliminarily validate an initial instrument that will ascertain the perceived competence of paraprofessionals. The method that was used for instrument development, instrument administration, and examination of criterion validity, construct validity, and reliability follows.

Research Design

The purpose was to develop and determine the validity and reliability of a preliminary instrument to determine the perceived competence of paraprofessionals in elementary physical education classes. The project was divided into five steps as listed below. Each step will be described in detail later in this section.

Step 1: Development of the Instrument & Determination of Content Validity

Phase 1: Determination of Competencies

Phase 2: Panel of Experts Round 1

Phase 3: Panel of Experts Round 2

Step 2: Administration of the Instrument

Step 3: Examination of Criterion Validity

Step 4: Examination of Construct Validity

Step 5: Examination of Reliability

Development of the Instrument and Examination of Content Validity

Prior to the instrument development process, a literature review was conducted to ascertain the most commonly used methods for determining competencies, how competence is measured, and the procedures for determining the validity and reliability of a survey (Appendix A & B). In each research article that was reviewed in which surveys were developed, competencies or items were developed first from the literature review, then from use of experts either using the Delphi method (Jokiniemi et al., 2018; Wang et al., 2016), or a panel of experts (Chan et al., 2018; Kalkbrenner & Sink, 2018; Nicholson et al., 2013; Mertoja et al., 2004; Van den Broeck et al., 2010). Initial competency lists are narrowed down by further expert analysis, for example in the development of the Nurse Competence Scale (Meretoja et al., 2004) or factor analysis (Gillespie et al., 2012; Van den Broeck et al., 2010).

The literature revealed that 5- and 7-point Likert scales are most commonly used to measure competency (Appendix A & B). A 5-point Likert scale was chosen for this instrument because, based on a review of literature, it is the most commonly used scale to evaluate competencies. Additionally, the hope is for a future version of this instrument to be accessible to practitioners in the schools, so it needed to be as simple and efficient as possible.

Phase One: Determination of Competences

A review of training requirements (Appendix C) and competencies for paraprofessionals (Appendix D) in nine randomly chosen states, plus the state of

Oklahoma was conducted, as well as a literature review of paraprofessional competencies. Only five of those states provided competency lists that were easily accessible online (Connecticut, Iowa, Kentucky, New Hampshire, and South Dakota). A list of 80 generic paraprofessional competencies were derived from the 170 competencies found during the review of states. Unfortunately, no competencies were found that specifically addressed working with students in physical education. From the literature review, the researcher determined that the roles and responsibilities of paraprofessionals in physical education are not clearly defined nor understood by many education professionals (Bryan et al., 2013; Davis et a., 2007). It is clear from this role ambiguity that a panel of experts should be involved in the creation and evaluation of competencies for physical education.

In the first phase of item development, the investigator and the investigator's advisor, narrowed the list of 80 items to the 62 items listed in Appendix D by combining similar items. Further item elimination was performed for items that were not relevant to the typical physical education environment. Thirty-two items remained to be presented to the panel of experts.

Phase Two: Panel of Experts Round 1

A panel of eight or more experts was selected and invited to participate in the next two phases of item development. Experts had at least three years of teaching experience in elementary physical education or special education in Oklahoma, held a physical education teaching certification or special education certification, and were current elementary physical education or special education teachers.

The second phase of item development was an item reduction stage. The panel of experts were sent the list of 32 competences and was asked to choose 16 competencies that they believed were most important for paraprofessionals in physical education class. Experts had the option to add additional competencies and/or provide notes on potential item modifications. The investigator tallied the frequency that each item was chosen and paid special attention to items that were chosen solely by physical education teachers or special education teachers. A list of the most frequently selected items and those items that were chosen by one group and not the other were compiled for phase three.

Phase Three: Panel of Experts Round 2

The third and final phase of item development was a check of content validity by the panel of experts. For each instrument item, the panel answered yes or no to the following questions:

1. Is this item essential for an instrument that measures the competence of paraprofessionals in physical education?
2. Will this item discriminate paraprofessionals who are competent in physical education from paraprofessionals who are not competent? (Will competent paraprofessionals score differently than non-competent paraprofessionals?)
3. Is this item worded clearly? (If "no", please suggest an alternative)
4. Does this item apply equally to paraprofessionals working with students with all types of disabilities?
5. Does this item represent a typical job responsibility?

The content validity ratio (CVR) and content validity index (CVI, Lawshe, 1975) were used to determine item inclusion or exclusion. The CVR was calculated for each

item based on the experts' response to Question 1 above. A CVR of greater than 0.78 is recommended by Polit, Beck, and Owen (2007) for item retention. After evaluating items for possible elimination, the CVI of the instrument, or mean of all the CVR's, was determined. A CVI greater than 0.70 has been recommended by some, while others recommend a CVI greater than 0.80 (Gilbert & Prion, 2017).

Autonomy and Relatedness

According to self-determination theory, autonomy and relatedness have an impact on perceived competence at work (Ryan & Deci, 2017). It is important for physical education teachers to understand this connection and learn how to foster autonomy and relatedness in the workplace. Questions were developed to assess perceived autonomy and relatedness. To help generate ideas for question development, relevant literature was reviewed (Brien et al., 2012; Gagné et al., 2015; Van den Broeck et al., 2010).

Two Audiences

The final version of the instrument was modified into an instrument for two different audiences. The primary instrument to be validated was the initial Physical Education Competence Scale for Paraprofessionals. An alternate version, designed for physical educators to evaluate the competence of paraprofessionals, was also created to assess the accuracy of the paraprofessionals' self-assessments.

Description of the Physical Education Competence Scale for Paraprofessionals

The Physical Education Competence Scale for Paraprofessionals (PECSP) was a 25-item instrument that used a 5-point Likert scale instrument to determine the perceived competence, autonomy, and relatedness of paraprofessionals.

Administration of the Instrument

The instrument was emailed to potential participants and administered through Qualtrics. Instrument administration is described under the following headings: (a) Participants, (b) Sampling Method, (c) Data Collection, and (d) Permission to Conduct Research.

Participants

Participants were paraprofessionals and physical education teachers who worked in public elementary schools in Oklahoma. Physical educators were recruited by email through the Oklahoma Association of Health, Physical Education, Recreation, and Dance (OAHPERD) email listserv. The physical education teachers were asked to select a paraprofessional who attends physical education with students with disabilities to participate. Additional participants were recruited by individual emails. The goal was to recruit 400 paraprofessionals for this project to allow for 200 responses for exploratory factor analysis and 200 responses for confirmatory factor analysis as recommended by Comrey for instruments with fewer than 40 items (1998).

Sampling Method

The sampling method was purposive sampling. Participants were chosen from a list of previous and present Oklahoma State University student teacher mentors, nearby school districts, personal contacts, and the OAHPERD listserv. Emails were also sourced from the Oklahoma State Department of Education's public records of current certified teachers and support staff. The demographic information added to the instrument allowed for the elimination of participants who are not currently working in an elementary school.

Data Collection

Initially, physical education teachers received an email invitation to complete the instrument through the Qualtrics program. They were asked to choose a paraprofessional who attended physical education with one or more of their students and complete the survey based on the competency of that paraprofessional. Physical educators then invited their chosen paraprofessional to complete the instrument. Unfortunately, an extremely low response was received from physical educators. Therefore, the researchers modified data collection and analysis procedures to contact paraprofessionals and physical education teachers separately.

Demographic information gathered from participants included gender, education level, teacher and paraprofessional certifications, and years of experience. Data collection took approximately 5 to 12 min for most participants.

For the majority of participants, no identifying information was collected and data was collected anonymously, without a connection to an email address. Initially, physical educators were asked to create a unique identification code when they completed the survey. The physical educators gave the unique ID code to the corresponding paraprofessional and forwarded the paraprofessional a link to the instrument. The paraprofessional then had the option of completing the instrument. The physical education teacher and the paraprofessional did not have access to each other's responses.

Physical education teachers and paraprofessionals who completed the instrument had the option to volunteer to retake the test after approximately one week. Volunteer re-takers were required to provide an email address. Any email addresses provided were split from the data by the researcher.

Due to a dismal initial response rate and no responses from those volunteering to re-take the instrument, a second attempt to collect data was completely anonymized and physical education teachers and paraprofessionals were contacted separately. No second attempt was made to collect email addresses for a re-test.

All data was collected and stored electronically in the principal investigator's Qualtrics account. Upon completion of data collection, it was downloaded and stored electronically on a password-protected computer, in the locked home of the principal investigator. Data will be stored for a period of three years, after which the electronic files will be destroyed.

Permission to Conduct Research

Permission was granted from the Human Subjects Review Committee at Oklahoma State University to conduct the study. An informed consent form was signed electronically by participants prior to participation. The form included the purpose and length of the study, the benefits and risks of participation, and the rights of the participant to refuse to participate or stop participation at any time. Additionally, the form provided information about how confidentiality was maintained and included contact information in case participants have questions.

Examination of Construct Validity

Construct validity is the extent that the scores from a test measure the theoretical construct being tested (Thomas et al., 2001). Thomas et al. (2001) described how construct validity is established by relating the test results to an observed behavior. Construct validity was examined by completing an exploratory and confirmatory factor analysis and analyzing known group differences.

Exploratory Factor Analysis

Factor analysis can be used to determine and define latent variables represented by data, identify items that do not fit, and explain the variation of items in terms of the new latent variables (DeVellis, 2017). After the data was screened for factorability, five methods of factor retention were evaluated. Varimax and Promax rotation were both considered to find the simple factor structure of the data and items that did not adequately fit the model were eliminated. The exploratory factor analysis was performed with SAS (Version 9.4).

Data Screening Prior to Factor Analysis. Two diagnostics can be used to determine whether the assumption that variables are correlated is met, meaning that factor analysis is an appropriate choice to analyze the data. The Kaiser-Maier-Olkin (KMO) measure of sampling adequacy (Kaiser, 1974) shows the amount of common variance between each variable and all the other variables. The KMO measure results in a value between 0.0 and 1.0. A value of .50 or better describes an amount of common variance high enough to justify the use of factor analysis (Kaiser, 1974). A second test, Bartlett's test of sphericity (Bartlett, 1954), examines whether the correlation matrix produces correlations of zero (an identity matrix), that is, the variables are uncorrelated (Tabachnick & Fidell, 2001, p. 589). A Bartlett's test result with a p-value less than 0.05 rejects the null hypotheses and indicates that factor analysis may be appropriate.

Factor Reduction. Many methods exist to determine the number of factors to retain and five of those methods were explored in this project: eigenvalue rule, scree test, percentage of variance, parallel analysis, and interpretability. An eigenvalue describes how much information is contained by a factor (DeVellis, 2017). The eigenvalue rule

dictates that factors must have an eigenvalue greater than or equal to one to be included. DeVellis (2017) states that the eigenvalue rule may be too liberal, allowing for the retention of too many factors. However, some believe that the eigenvalue cut-off should be 0.70 to keep from eliminating too many variables (Joliffe, 1986). In this research, the investigator considered retaining items with an eigenvalue greater than 1.0.

The Scree test is based on the relative, not absolute, values of the eigenvalues (DeVellis, 2017). The values are plotted on a graph. Ideally, there will be a point where the graph changes from vertical to horizontal, that is, the amount of information predicted by each factor has markedly decreased. The factor at the corner of that exchange is considered the elbow of the scree plot. As Catell (1966) suggested, the investigator considered retaining all the factors above, but not including, the elbow of the curve.

Another option to discern how many factors to retain is to compute the percentage of variance that is extracted by each factor (Gorsuch, 1983). A goal percentage is calculated, such as to account for 80% of the variance. Then, factors are eliminated until the goal percentage of variance is accounted for. Alternatively, the percentage of variance can be used to exclude factors that account for a percentage less than a percentage, such as 5% or 10%. In this study, factor retention of items that accounted for at least 80% of the variance were considered.

Parallel analysis is a statistical test in which a large number of random data sets are created, eigenvalues are calculated for each data set, and the median of the eigenvalues is identified. Researchers agree that the largest eigenvalue retained should be greater than an eigenvalue obtained from random data (DeVellis, 2017). Therefore, factors with a larger eigenvalue in the parallel analysis than in the real data are retained

by this method. For this project, a parallel test was conducted with O'Connor's SAS program (2000).

Finally, interpretability was also used as a criterion to determine the number of factors to retain. For this preliminary project, it was important that the solution was understandable and could be used to further instrument development and research in the field of paraprofessional perceived competence and competence in physical education.

In summary, there are many correct ways to choose and verify the number of factors to retain. Gorsuch (1983) states that, when in doubt, one should slightly retain more factors with the knowledge that there may be a low chance of reproducing the extra factors in subsequent research.

Rotation. Factor rotation is used to make factors more interpretable by identifying groups of variables that are determined by only one factor (DeVellis, 2017). Different types of rotation will create different vectors to define each factor. Once a vector for each factor is defined, the correlation between an item and that factor, the loading, can be determined. There are two kinds of rotations in factor analysis: orthogonal rotation which establishes uncorrelated factors and oblique rotation that allows factors to be correlated. Orthogonal rotations can create results that are easier to grasp (Goldberg, 1997); however, oblique rotations must be used if the proposed latent variables are correlated (O'Rourke and Hatcher, 2013). DeVellis (2017) suggested that when inter-factor correlations are less than 0.15, then orthogonal rotations are preferred.

Varimax rotation is an orthogonal rotation that transforms the data to maximize the variance of each item's squared loading. The variance is greatest when some squared loadings are large and some are small; therefore, a maximally uneven set of loadings is

sought. Promax rotation is an oblique rotation based on Varimax rotation and produces a pattern matrix that is used to evaluate items and factors. A Varimax rotation is performed first, and then the loadings are raised to powers and transformed to the Promax rotation (Finch, 2006). The Promax rotation is a good option for providing the simple factor solution in factors that are correlated (Gorsuch, 1983; Finch, 2006). In this preliminary instrument analysis, both rotational methods were investigated to find the best fit.

Item Reduction. The investigator performed a factor analysis with the goal of identifying a simple structure. Items that had a factor loading of 0.40 or greater with no large cross-loadings were included in the final instrument (Gorsuch, 1983). A large cross-loading was defined as an item that loaded on two or more factors with a difference between the two highest loadings less than 0.20.

Confirmatory Factor Analysis

While the correlation matrix is used to investigate multivariate data in exploratory factor analysis (EFA), confirmatory factor analysis (CFA) uses the covariance matrix. The latent variable model found during the EFA was evaluated and interpreted with the SAS (Version 9.4) statistical package's "proc calis" feature. Goodness of fit indices and factor loadings were investigated to determine the retention of items.

Many goodness of fit indices are reported by statistical programs upon analysis of a CFA model. For this project, the Chi-Square, Bentler Comparative Fit Index, Root Mean Square Error of Approximation (RMSEA), Standardized Root Mean Square Residual (SRMR) are reported. A large chi-square statistic will result in a p-value less than 0.05 and will reject the null hypothesis that the model is a good fit for the population. However, according to O'Rourke and Hatcher (2013), the null hypothesis is

rarely rejected and the chi-square statistic, though it should be reported, is not considered a good fit statistic. For the Bentler Comparative Fit Index (CFI), values greater than 0.94 indicate a good fit (Hu and Bentler, 1999). The Root Mean Square Error of Approximation (RMSEA) takes into account the population error and should have a value less than 0.09 for a fair error of approximation (O'Rourke and Hatcher, 2013). It was noted by O'Rourke and Hatcher (2013) that both CFI and RMSEA measures take degrees of freedom into account and will be negatively affected by complex models. Finally, the Standardized Root Mean Square Residual (SRMR) statistic fit values are similar to the RMSEA values; however, the SRMR is the standardized difference between the correlations that are observed and predicted. A SRMR of less than 0.08 is recommended by Hu and Bentler (1999).

The standardized factor loadings of the model were analyzed for those less than 0.40 and the t-tests for convergent validity were examined. Items with poor convergent validity and low factor loadings were eliminated if eliminating the item did not affect the interpretability of the factors by leaving a factor with less than three items.

Discriminant Validity

Discriminant validity is a test to confirm that unrelated constructs are uncorrelated (DeVellis, 2017) and is most commonly tested with the known group difference method (Thomas et al., 2001). In this method, two different groups that are known to have differences in the examined content area are administered the instrument and the results are examined to determine whether they confirm that the instrument differentiates between the groups. For this study, the instrument was administered to: (a) paraprofessionals mentioned beforehand and (b) undergraduate students. The

undergraduate students were recruited through the Oklahoma State University College of Education and Human Sciences Sona system (n.d.). Students may have received extra credit in one or more classes upon instrument completion. An independent t-test was performed to determine the differences between the two groups.

Examination of Reliability

A valid test must always be reliable (Thomas et al., 2001). Reliability is whether an instrument is consistent or repeatable over time. In this study, the goal was to test the reliability by examining the stability and internal consistency of the instrument.

Stability

Stability was going to be determined through the test-retest method. The instrument was to be administered to a group of participants on two different days, one week apart. The two trials would have been evaluated through a dependent t-test to determine whether differences exist. The intraclass correlation coefficient (ICC) would also have been calculated using ANOVA procedures and interpreted to examine the stability. Unfortunately, due to insufficient data collection, test-retest stability was not evaluated.

Internal Consistency

The internal consistency of the instrument was determined by calculating the Cronbach alpha coefficient (Cronbach, 1951) for the final instrument and final factors. The composite reliability of each factor was also determined.

Examination of Criterion Validity

Criterion validity is a type of validity in which a criterion is used to evaluate the results of the research study (Thomas et al., 2001). Criterion validity has two types: predictive and concurrent. In this study, concurrent validity was tested. established.

Concurrent Validity

In this study, the goal was to compare paraprofessional responses on the Physical Education Competence Scale for Paraprofessionals (PECSP) to physical educator responses to a modified version of the scale. In other words, physical educators would judge a paraprofessional's actual competence for comparison to the paraprofessional's perceived competence. In that case, the validity (correlation) coefficient would have been calculated and used to establish concurrent validity.

Unfortunately, due to insufficient data collection, paraprofessional and physical education instrument responses were collected separately and likely did not use the same paraprofessional subjects. There was no way to pair them for a correlation analysis. Therefore, an independent sample t-test was used to compare the means of the groups. This is not a proper test of concurrent validity; however, so concurrent validity could not be evaluated.

Conclusion

This study was designed for the preliminary development and validation of an instrument to ascertain the perceived competence of paraprofessionals in physical education. The construction of the Physical Education Competency Scale for Paraprofessionals (PECSP) followed commonly used procedures to confirm validity and

reliability. Content, criterion, and construct validity were analyzed, as well as internal consistency.

CHAPTER IV

RESULTS

The purpose of this study was to develop a valid and reliable instrument to determine the perceived competence, autonomy, and relatedness of paraprofessionals who work with students with disabilities in physical education. A second purpose was to create an instrument that physical educators could use to evaluate paraprofessional competence. The study included the development of the instrument, data collection, and statistical tests to analyze validity and reliability.

Development of the Instrument

Three phases were deployed during the instrument development process. In the first phase, paraprofessional competencies were sought from state department of education websites. The discovered competences were then combined and narrowed to a list of 32 items. A panel of experts was solicited in the second phase and experts were asked to choose the top sixteen competencies that they felt were important in physical education. During the third phase, the panel of experts were asked to answer five questions about each remaining survey item. Next, the instrument was written for both the physical education teacher's evaluation and the paraprofessional self-evaluation. Finally, six, separate autonomy, competence, and relatedness items were written for

paraprofessionals. Twenty-five questions were administered to paraprofessionals and 19 questions were administered to physical educators.

Phase One: Determination of the Competencies

Competencies were derived from a review of paraprofessional training requirements and evaluations from nine randomly chosen states plus the state of Oklahoma. Five of the states had the information publicly available on their websites. A list of 170 competencies was compiled, leaving out the competencies that were specifically tied to a subject area such as math, reading, or writing. No competencies specific to physical education were found. Next, the investigator and the investigator's advisor completed three rounds of item elimination. First, similar items were combined, retaining the main idea of the competency and narrowing the list to 80 items. Next, items were further combined and irrelevant items such as family and parent interactions were eliminated to retain the 62 items listed in Appendix D. For an example of how items were combined, see Table 1**.**

Lastly, items that were not commonly relevant to the majority of paraprofessionals in the physical education environment such as "Checks student papers against an answer key" and "Acts as a foreign language translator for students and families" were dropped. Other items that addressed the knowledge of paraprofessionals were also eliminated due to the focus of assessing perceptions of competence rather than perceptions of knowledge in this instrument. One such item was "has knowledge of developmental stages from birth to age 21". After the three rounds of item elimination, 32 items remained for phase two.

Table 1

Sample Item Merges

Item	Example 1	Example 2
Item A	Understands and implements effective practices to manage student behavior	Reinforces skills and concepts taught by a teacher
Item B	Implements teacher designed proactive and positive behavior management strategies	Provides instructional support
Item C	Implements teacher designed behavior programs and plans	Implements learning strategies developed by teachers
Combined Item(s)	• Understands and implements proactive and positive behavior management strategies • Implements teacher designed behavior programs and plans	• Provides instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers

Selection of Panel of Experts

Five physical education teachers and four special education teachers agreed to participate on the panel of experts (Table 2). The invitation email can be found in Appendix E. Each of the experts had at least 10 years of teaching experience and were currently working with PK-5 students in Physical Education or Special Education. All of the experts were female. Since it is rare to have more than one or two males in any position at an elementary school, an all-female expert panel was considered acceptable. Two of the special education teachers worked with students with mild/moderate disabilities while two of the special education teachers worked with students with severe/profound/multiple disabilities. Both severe/profound/multiple disability teachers, one mild/moderate disability teacher, and one of the physical education teachers held

master's degrees. Two of the physical education teachers had completed part of a graduate degree program. All experts received their initial bachelor's degree in education except for one physical education teacher, who received her initial degree with a major in therapeutic recreation. All of the experts completed round one of the expert panel analysis (N = 9). One of the severe/profound/multiple disabilities teachers was unable to complete the second round of the expert panel analysis (N = 8).

Table 2

Panel of Expert Demographic Information

Category	N	%
Current Teaching Assignment		
Physical Education/Health/Safety	5	56%
Mild/Moderate Disabilities	2	22%
Severe/Profound/Multiple Disabilities	2	22%
Years of Experience		
10-14	2	22%
15-19	3	33%
20-24	1	11%
25+	3	33%
Level of Educational Obtainment		
Bachelor's degree	3	33%
Bachelor's degree with some master's	2	22%
Master's degree	4	44%

Phase Two: Panel of Experts Round 1

In phase two, the panel of experts completed an online survey to answer questions about their demographic information and choose 16 out of the 32 provided paraprofessional skills that they felt were most important in physical education. The letter and instructions that were sent to the panel can be found in Appendix E. The average completion time for the survey was 12 min and 4 sec. To determine whether to include or

exclude items, the total number of times each item was chosen as well as the total number of physical education teacher picks and special education teacher picks was calculated. Next, the percentage of physical education teachers and special education teachers who chose an item was calculated separately. Finally, the difference between the percentage of physical education teachers and percentage of special education teachers was determined. Items that were chosen by more than 50% of the total panel of experts (5/9) were retained. Additionally, items that were chosen by fewer than 50% of the total panel of experts, but had a difference between percentage of physical education teachers and percentage of special education teachers greater than 50% were also retained.

For example, the item “Reports information about student performance and behavior to the physical education teacher” was selected by four physical education teachers and zero special education teachers. The item was chosen by less than 50% of the panel, but the percentage difference (percent physical education teachers minus percent special education teachers) was 80%. The physical education teachers felt that this item was important, while the special education teachers did not. Therefore, the item was retained. The opposite was true of the item “Implements teacher-designed behavior programs and plans”. Special education teachers (3/4) felt that this item was important while only one physical education teacher did. A difference percentage of -55% led to the retention of this item. Table 3 shows the number of times each item was chosen as important, the percentages of physical education teachers and special education teachers and the percentage differences.

Table 3

Panel of Expert Item Selection

Item	Total Times Selected	% PE Teachers (N = 5)	% SPED Teachers (N = 4)
Behavior Management			
1. Implements teacher-designed behavior programs and plans [a]	4	20.0%	75.0%
2. Implements proactive and positive behavior management strategies	5	60.0%	50.0%
3. Supports and models the school's school-wide behavior expectations	6	60.0%	75.0%
4. Modifies the learning environment as needed to manage student behavior	7	60.0%	100.0%
5. Aids the teacher in classroom management	5	60.0%	50.0%
Communication & Collaboration			
6. Collaborates with teachers for program planning, IEP development, or problem-solving[b]	4	40.0%	50.0%
7. Reports information about student performance and behavior to the physical education teacher [a]	4	80.0%	0.0%
8. Maintains student, staff, and family confidentiality	8	80.0%	100.0%
Diversity			
9. Demonstrates respect for all students and staff	9	100.0%	100.0%
10. Adapts to different learning styles, intelligences, and personality types	6	60.0%	75.0%
11. Assists teachers in modifying learning strategies, materials, and activities for individual students[b]	2	20.0%	25.0%
Instruction			
12. Helps with recording and charting data of student data social skills, learning activities, or behavior[b]	2	20.0%	25.0%
13. Provides instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	9	100.0%	100.0%
14. Provides one-on-one tutoring or individual assistance on teacher-developed projects or learning activities[b]	3	20.0%	50.0%
15. Promotes student independence	5	40.0%	75.0%

Item	Total Times Selected	% PE Teachers (N = 5)	% SPED Teachers (N = 4)
16. Follows lesson plans provided by teachers[b]	2	20.0%	25.0%
17. Sustains appropriate interactions with students	8	100.0%	75.0%
18. Provides opportunities for students to practice social skills [a]	5	80.0%	25.0%
19. Uses and adapts a variety of approaches, materials, and assistive technology to teach skills [a]	3	0.0%	75.0%
20. Applies basic skill interventions (prompting, task analysis, corrective feedback)[b]	4	60.0%	25.0%
21. Maintains safe and healthy learning environments	5	40.0%	75.0%
22. Prepares and creates educational materials assigned by teacher	1	0.0%	25.0%
Professionalism			
23. Participates in professional development when available [a]	3	60.0%	0.0%
24. Works with supervisors to identify strengths and training needs[b]	3	40.0%	25.0%
25. Interacts constructively and uses conflict management techniques with colleagues in various professional settings[b]	1	20.0%	0.0%
26. Follows district policies and procedures and standards of professional and ethical conduct[b]	2	20.0%	25.0%
27. Follows district health and safety guidelines (health plan, bloodborne pathogens, CPR training, etc.)[b]	4	60.0%	25.0%
28. Appropriately receives and applies constructive feedback[b]	4	40.0%	50.0%
29. Asks for help when needed	6	60.0%	75.0%
30. Supports teachers' instructional choices for students[b]	4	40.0%	50.0%
Special Education			
31. Prepares and uses adaptive equipment and devices for students as prescribed	5	60.0%	50.0%
32. Has the ability to discern developmentally and age-appropriate reinforcement and learning activities [a]	5	80.0%	25.0%

[a] Items with a percentage difference greater than 50% were retained. [b] Items not chosen by at least 50% of experts with a percentage difference of less than 50% were eliminated.

The panel of experts was also given an opportunity to provide open-ended feedback to add items or ask for clarification. One expert wrote: “It is important to be a ‘Team Player’…everyone must be willing to be flexible, communicate with other para's in a positive way and to also communicate with [the] supervising teacher”. Upon that suggestion and with professional knowledge, the investigator chose to create two new items to represent those competencies:

1. Communicates positively with supervising teacher and other paraprofessionals
2. Demonstrates flexibility and adaptability to changes

Following the elimination and retention of items from the panel of experts’ responses, the researcher evaluated the remaining items. Item number 1 was dropped because behavior plans are typically written by special education teachers and it is not typical for physical education teachers to know the full extent of the behavior plan. Thus, a physical education teacher would not necessarily be able to assess whether the paraprofessional is successfully implementing a behavior plan. The investigators also modified one item for clarity, adding the examples of high fives, praise, rewards, and anticipating potential behavior issues for “implementing proactive and positive behavior management strategies”.

After the analysis of the panel of experts round one data, 14 items had been eliminated, 2 items were added, and one item was modified for clarity.

Phase Three: Panel of Experts Round 2

For phase three, the panel of experts was sent a second, online survey link and asked to answer five questions about each of the 20 items to assess content validity. The letter and instructions sent to them can be found in Appendix E. Each expert (N = 8)

spent an average of 15 min, 22 sec completing the round 2 online survey. For each item, the panel of experts answered yes or no to the following questions (Table F2):

1. Is this item essential for an instrument that measures the competence of paraprofessionals in physical education?
2. Will this item discriminate paraprofessionals who are competent in physical education from paraprofessionals who are not competent? (Will competent paraprofessionals score differently than non-competent paraprofessionals?)
3. Is this item worded clearly? (If "no", please suggest an alternative)
4. Does this item apply equally to paraprofessionals working with students with all types of disabilities?
5. Does this item represent a typical job responsibility?

To determine item inclusion or exclusion, the content validity ratio and index and the mean score for each item was evaluated. The content validity ratio (CVR) for each item and the content validity index (CVI) for the scale were calculated based on the expert's responses to question one above (Table 4). Although some have suggested that CVR values should be greater than 0.78 for item retention (Polit, Beck, and Owen, 2007), no item in the instrument had a score of less than 0.75. It was determined, based on the CVI, that all items would be retained. The overall CVI score for the scale of 0.925 confirms that this scale exceeds the recommended guidelines of 0.80 (Gilbert & Prion, 2017).

Table 4

Item Content Validity Ratios

Item	CVR
Behavior Management	
1. Implements proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	0.75
2. Supports and models the school's school-wide behavior expectations	1.0
3. Modifies the learning environment as needed to manage student behavior	0.75
4. Aids the teacher in classroom management	1.0
Communication & Collaboration	
5. Reports information about student performance and behavior to the physical education teacher	1.0
6. Maintains student, staff, and family confidentiality	1.0
7. Communicates positively with supervising teacher and other paraprofessionals	1.0
Diversity	
8. Demonstrates respect for all students and staff	1.0
9. Adapts to different learning styles, intelligences, and personality types	1.0
Instruction	
10. Provides instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	1.0
11. Promotes student independence	1.0
12. Sustains appropriate interactions with students	1.0
13. Provides opportunities for students to practice social skills	0.75
14. Uses and adapts a variety of approaches, materials, and assistive technology to teach skills	0.75
15. Maintains safe and healthy learning environments	1.0
Professionalism	
16. Participates in professional development when available	0.75
17. Asks for help when needed	1.0
18. Demonstrates flexibility and adaptability to changes	1.0
Special Education	
19. Prepares and uses adaptive equipment and devices for students as prescribed	1.0
20. Has the ability to discern developmentally and age-appropriate reinforcement and learning activities	0.75

To further analyze whether items should be retained, each expert response to the five questions above was coded as “0” for no and “1” for yes. All the response scores for

all five questions and eight experts for each item were summed to provide a total score for each item. The item scores had a mean of 35.3 and a standard deviation of 1.95. One item scored a 29, which was significantly lower than the other scores and was -3.63 standard deviations from the mean. Upon further evaluation, it was determined that the item should be eliminated because physical educators may not have knowledge of whether paraprofessionals participate in professional development. Therefore, the item: "Participates in professional development when available" was dropped. All other items were retained for the final instrument. The summed item scores can be found in Appendix F, Table F1.

In an analysis of expert answers to item questions 2-5, most experts felt that the items were clearly worded, applied equally to all paraprofessionals, and were representative of a typical job responsibility. However, 50% or more of the experts did not believe that four of the remaining items would discriminate a competent paraprofessional from an incompetent paraprofessional. The items in question were:

- Implements proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)
- Supports and models the school's school-wide behavior expectations
- Demonstrates respect for all students and staff
- Maintains safe and healthy learning environments

Despite this, the investigators believed that these items were general questions about a paraprofessional's behavior in the school environment that could be an important part of overall competence. The items were retained.

Finally, the items were re-evaluated for clarity and meaningfulness. The item “has the ability to discern developmentally and age-appropriate reinforcement and learning activities” was changed to “uses developmentally and age-appropriate reinforcement and learning activities” to make the wording more consistent with the other questions.

Autonomy and Relatedness

The development of questions for autonomy, relatedness, and general competence was completed by the investigator and the investigator’s advisor after a literature review (Brien et al., 2012; Gagné et al., 2015; Van den Broeck et al., 2010). Two questions were developed for each category.

Autonomy:

- I feel free to make decisions that are best for students in PE
- I feel free to communicate my ideas to the PE teacher

Competence:

- I feel competent doing the tasks the PE teacher asks me to do
- I feel competent working with students in PE

Relatedness:

- If I didn't go to PE with my student(s), I would be missed
- I feel valued and respected by the PE teacher

Two Audiences

The final version of the instrument was modified into two different versions. In one version, the paraprofessional completes the instrument as a self-evaluation and in the other version, a physical education teacher completes the instrument as an evaluation of the paraprofessional. There are two differences between the versions. First, the plural of

the item verbs are used in the physical educator version whereas the singular form of the item verbs are used in the paraprofessional version. Such as “adapts” versus “adapt”. Second, since the physical education teacher cannot evaluate paraprofessional perceptions, the physical educator version does not include the self-determination theory questions on autonomy, competence, and relatedness. Therefore, the paraprofessional version had 25 questions, and the physical educator version had 19 questions.

Description of the Instrument

The Physical Education Competence Scale for Paraprofessionals (PECSP) was a Likert-type instrument that contained 25 questions. Nineteen of the questions were paraprofessional competencies and six of the questions related to paraprofessional perceived competence, relatedness, and autonomy. The questions were placed in a random order in the administered version of the instrument. Participants rated their perceived competence by answering the questions on a 5-point scale. The ratings of “never, rarely, half the time, most of the time, always” were converted to a score from one to five. A copy of the PECSP as presented to paraprofessionals in Qualtrics can be found in Appendix H.

Data Collection

Three populations were sought to collect data for this project: paraprofessionals, physical education teachers, and undergraduate students. The initial goal was to collect data from 400 paraprofessionals, 400 physical education teachers (or fewer if each teacher evaluates more than one), and 100 undergraduate students.

Prior to data collection, the COVID-19 pandemic caused all Oklahoma PK-12 schools to close for a period of two weeks followed by a transition to distance learning.

With school buildings closed, physical education teachers and paraprofessionals had not been teaching or working in physical education classes for one to two months prior to participating in this study.

Initially, the investigator contacted 736 physical education teachers via emails found on individual school websites and also sent out an invitation to participate in the research project via the OAHPERD Listserv. Physical education teachers were asked to complete the survey about one or two paraprofessionals who attended their physical education classes, create a password for each paraprofessional, and forward the password and paraprofessional link to the paraprofessional they chose. Unfortunately, only seven physical education teachers completed the instrument and responses were received from only two paraprofessionals. Both paraprofessionals and physical education teachers were asked whether they would retake the instrument in a week's time. Four physical education teachers and two paraprofessionals provided email addresses to retake the instrument; however, upon solicitation, no one completed the re-test.

In a second attempt to collect data, paraprofessionals and physical education teachers were contacted separately, the survey was completely anonymized, and twelve days were allowed for data collection. Email addresses were sourced from the Oklahoma State Department of Education's (OSDE) public information website (Oklahoma State Department of Education, 2020a). Paraprofessionals of all job descriptions (special education, title I, etc.) were included in the invitation email due to many roles on the OSDE spreadsheet being undefined. Qualtrics was utilized to send out 5,128 invitation emails successfully to paraprofessionals. Three-hundred and fifty paraprofessionals completed all or part of the instrument. Using the demographic information to narrow the

field to special education paraprofessionals who attend elementary physical education classes and eliminating responses that reported only one score throughout (such as "always" on every item) or responses missing more than two item answers yielded data from 140 individuals.

For the second attempt to gather physical educators' evaluations of paraprofessionals, 896 different physical educators were contacted via email. New potential participant emails were sourced from the Oklahoma State Department of Education's public records. (Oklahoma State Department of Education, 2020b). Additionally, the investigator and the investigator's advisor personally contacted several elementary physical education teachers over email and Facebook to solicit involvement. A few teachers were asked and agreed to invite others to participate. A reminder email was sent out to physical education teachers contacted via email. During that time, 59 responses were received via the email link, and 9 responses were received from the direct contacts. After narrowing the responses to physical education teachers who qualified to participate (elementary level who work with paraprofessionals) and eliminating responses where the teacher marked the same answer for each item, 45 participants were left. Sixteen of those physical education teachers provided an evaluation of more than one paraprofessional.

Due to the dismal participation initially and time constraints, a second attempt was not made to collect test-retest data.

Data collection from undergraduate students was carried out via the Oklahoma State University College of Education, Health, and Aviation's Sona system (n.d.). Ninety-nine students completed the instrument. Students received class credit for

completing the survey. After removing students who answered the same on every item, data from 84 participants remained.

Examination of Outliers

IBM SPSS Statistics (Version 24) was used to examine the data for outliers. Mahalanobis distances were calculated and compared to the chi-square distribution for each set of data (paraprofessionals, physical education teachers, undergraduates) with the formula: 1 - cdf.chisq (Mahalanobis_distance, *df*). Cases with a p-value of less than 0.001 were evaluated as possible outliers. Eight paraprofessional responses, two physical education teacher responses, and eight undergraduate student responses met that criteria. For each possible outlier, the researcher looked at the Qualtrics response for any clear nonsensical data patterns. Two paraprofessional responses were identified as problematic and removed. In one response, the researcher observed a clear, zig-zag pattern and in the other response the researcher observed 23 items answered as “most of the time” and two items illogically answered as “never”.

Participants & Participant Performance

Participants were from three different groups: paraprofessionals, physical education teachers, and undergraduate students. Demographic and descriptive statistics were calculated using IBM SPSS Statistics (Version 24) and/or SAS (Version 9.4) software.

Paraprofessionals

One hundred and thirty-eight participants were included in the final analysis for this project. They had an average completion time of 7 min and 39 sec. Three participants failed to answer one question while one participant failed to answer two questions. No

item was missing more than one data point. In order to retain the maximum about of data for the analysis, SPSS was used to replace missing responses with item means (Tabachnick and Fidell, 2001, p.62).

Seventy-seven percent of special education paraprofessional responses indicated that they were certified in the state of Oklahoma and 9% indicated they were working toward certification. Since the state of Oklahoma has higher paraprofessional certification requirements than many other states and the researchers were seeking an instrument that could be applicable in other places, it was decided that both certified and non-certified responses would be retained for analysis. Additionally, t-tests and an ANOVA were performed comparing the groups and no significant difference was found in the overall scores with only significant differences appearing for the responses on two items "Demonstrate respect for all students and staff" and "Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)". For details of this analysis, see Appendix G.

Frequency tables for the demographic information of paraprofessionals were calculated and are presented in Table 5. Ninety-two percent of the paraprofessionals were female, 54% were in their first five years working as a paraprofessional and 76% were certified special education paraprofessionals. Over half of the paraprofessionals (55%) had not earned a college degree while 12% had earned a two-year degree and 21% had completed their bachelor's degree.

Table 5

Paraprofessional Demographic Data

Category	N	%
Gender		
Female	127	92.03
Male	9	6.52
Other/Unspecified	2	1.45
School Location		
Rural	46	33.33
Suburban/Rural	2	1.45
Suburban	41	29.71
Urban	21	15.22
Unspecified	28	20.29
School's Title I Status		
Title I	47	34.06
Not Title I/Not Specified	91	65.94
Years of Experience		
0-5	75	54.35
6-10	31	22.46
11-15	14	10.14
16-20	13	9.42
21-25	2	1.45
26+	3	2.17
Education Level		
No college	20	14.49
Some college	56	40.58
2 yr. degree	17	12.32
Bachelor’s degree	29	21.01
Bachelor’s + some master’s	7	5.07
Master’s degree	7	5.07
Master's plus some doctoral	1	0.72
Unknown	1	0.72
Certified Paraprofessional?		
No	18	13.04
No, but working toward	13	9.42
Yes	106	76.81
Unknown	1	0.72

Category	N	%
Certified Teacher?		
No	110	79.71
No, but working toward	18	13.04
Yes	9	6.52
Unknown	1	0.72

The means and standard deviations of the items are provided in Table 6. Means ranged from 3.66 to 4.96 and standard deviations ranged from 0.35 to 1.19. The mean of participant scores was 4.47 of 5 possible with a standard deviation of 0.36.

Table 6

Paraprofessional Descriptive Statistics

Item	M	SD
Aid the teacher in classroom management	3.66	1.10
Maintain student, staff, and family confidentiality	4.87	0.40
Ask for help when needed	4.37	0.87
Demonstrate flexibility and adaptability to changes	4.58	0.59
I feel free to make decisions that are best for students in PE	4.17	0.90
Demonstrate respect for all students and staff	4.96	0.19
Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	4.75	0.48
Promote student independence	4.51	0.57
If I didn't go to PE with my student(s), I would be missed	3.96	0.94
I feel competent doing the tasks the PE teacher asks me to do	4.46	0.78
Provide opportunities for students to practice social skills	4.59	0.62
Report information about student performance and behavior to the PE teacher	4.29	1.03
Prepare and use adaptive equipment and devices for students as prescribed	4.16	1.19

Item	M	SD
Provide instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	4.45	0.80
Use and adapt a variety of approaches, materials, or assistive technology to teach skills	4.30	0.78
I feel valued and respected by the PE teacher	4.40	0.93
Adapt to different learning styles, intelligences, and personality types	4.61	0.58
Communicate positively with supervising teacher and paraprofessionals	4.67	0.60
I feel free to communicate my ideas to the PE teacher	4.20	1.08
Modify the learning environment as needed to manage student behavior	4.32	0.79
Maintain safe and healthy learning environments	4.73	0.49
Use developmentally and age-appropriate reinforcement and learning activities	4.64	0.55
Support and model the school's school-wide behavior expectations	4.75	0.48
I feel competent working with students in PE	4.50	0.74
Sustain appropriate interactions with students	4.86	0.35
Overall average score	4.46	0.36

Physical Education Teachers

Physical educators (N = 45) who participated in the study were invited to provide evaluations of one or two paraprofessionals. The physical education teachers who completed the instrument for one paraprofessional took an average of 8 min and 27 sec to respond, while the teachers who completed the instrument for two paraprofessionals took an average of 11 min and 13 sec to respond. Demographic information is provided in Table 7 and shows that 57% of teacher respondents were female and 70% received their initial bachelor's degree in physical education.

Sixteen physical education teachers provided information for two paraprofessionals, resulting in data on the competence of 61 paraprofessionals. As shown

in Table 8, the item means ranged from 3.30 to 4.77 and standard deviations ranged from 0.65 to 1.26. The average item scores for each response produced a mean of 4.08 and standard deviation of 0.65.

Table 7

Physical Educator Demographic Data

Category	N	%
Gender		
Female	26	57.78
Male	19	42.22
School Location		
Rural	22	48.89
Suburban/Rural	2	4.44
Suburban	10	22.22
Urban	5	11.11
Unspecified	6	13.33
School's Title I Status		
Title I	17	35.56
Not Title I/Not Specified	30	64.44
Years of Experience		
0-5	12	26.67
6-10	5	11.11
11-15	6	13.33
16-20	6	13.33
21-25	6	13.33
26+	10	22.22
Education Level		
Bachelor’s Degree	32	71.11
Bachelor’s + Some Master’s	4	8.89
Master’s Degree	9	20.00
Undergraduate Major		
Physical Education	29	64.44
Elementary Education	5	11.11
Physical Education & Elementary Education	2	4.44
Other	9	20.00

Table 8

Physical Educator Evaluation Descriptive Statistics

Item	M	SD
Aid the teacher in classroom management	3.30	1.22
Maintain student, staff, and family confidentiality	4.77	0.50
Ask for help when needed	3.70	1.19
Demonstrate flexibility and adaptability to changes	4.31	0.76
Demonstrate respect for all students and staff	4.56	0.70
Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	4.23	0.97
Promote student independence	4.28	0.69
Provide opportunities for students to practice social skills	4.16	0.71
Report information about student performance and behavior to the PE teacher	3.74	1.24
Prepare and use adaptive equipment and devices for students as prescribed	3.49	1.26
Provide instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	3.79	1.18
Use and adapt a variety of approaches, materials, or assistive technology to teach skills	3.64	1.20
Adapt to different learning styles, intelligences, and personality types	3.87	1.04
Communicate positively with supervising teacher and other paraprofessionals	4.28	0.82
Modify the learning environment as needed to manage student behavior	3.80	1.13
Maintain safe and healthy learning environments	4.48	0.65
Use developmentally and age-appropriate reinforcement and learning activities	4.28	0.82
Support and model the school's school-wide behavior expectations	4.43	0.67
Sustain appropriate interactions with students	4.48	0.65
Overall average score	4.08	0.65

Undergraduate Students

Eighty-four undergraduate students completed the instrument with an average completion time of 3 min and 45 sec. Demographic data is displayed in Table 9 and reveals that respondents were primarily female (60%). The participants were asked whether they had a friend or family member who had a disability, was a teacher or a special education teacher, as well as whether they had volunteered in special education or Special Olympics. The majority of participants did have a friend or family member who was a teacher (73%), but only 27% knew a Special Education teacher. Forty-six percent of respondents had volunteered in special education at school and 34% of respondents had volunteered at a special Olympics event. About half of respondents knew someone with a disability (48.8%).

The mean scores of the instrument items varied from 3.67 to 4.70 and the standard deviation of items varied from 0.62 to 1.06 (Table 10). The overall average scores had a mean of 4.28 and a standard deviation of 0.51.

Table 9

Undergraduate Student Demographic Data

Category	N	%
Gender		
Female	51	60.71
Male	33	39.29
Family/Friend Teacher		
No	22	26.2
Yes	62	73.8
Family/Friend SPED Teacher		
No	61	72.7
Yes	23	27.38

Category	N	%
Family/Friend Disability		
No	43	51.2
Yes	41	48.8
Volunteered in SPED at school		
No	39	46.4
Yes	45	53.6
Volunteered in Special Olympics		
No	55	65.5
Yes	29	34.5

Table 10

Undergraduate Student Descriptive Statistics

Item	M	SD
Aid the teacher in classroom management	3.67	1.06
Maintain student, staff, and family confidentiality	4.32	1.00
Ask for help when needed	4.26	0.88
Demonstrate flexibility and adaptability to changes	4.26	0.78
I feel free to make decisions that are best for students in PE	3.96	0.86
Demonstrate respect for all students and staff	4.68	0.70
Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	4.44	0.87
Promote student independence	4.35	0.81
If I didn't go to PE with my student(s), I would be missed	3.69	0.99
I feel competent doing the tasks the PE teacher asks me to do	4.18	0.91
Provide opportunities for students to practice social skills	4.24	0.83
Report information about student performance and behavior to the PE teacher	4.40	0.79
Prepare and use adaptive equipment and devices for students as prescribed	4.08	1.00
Provide instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	4.19	0.90
Use and adapt a variety of approaches, materials, or assistive technology to teach skills	4.10	0.89
I feel valued and respected by the PE teacher	4.32	0.66

Item	M	SD
Adapt to different learning styles, intelligences, and personality types	4.24	0.86
Communicate positively with supervising teacher and other paraprofessionals	4.49	0.69
I feel free to communicate my ideas to the PE teacher	4.27	0.86
Modify the learning environment as needed to manage student behavior	4.35	0.80
Maintain safe and healthy learning environments	4.60	0.64
Use developmentally and age-appropriate reinforcement and learning activities	4.37	0.77
Support and model the school's school-wide behavior expectations	4.61	0.62
I feel competent working with students in PE	4.26	0.81
Sustain appropriate interactions with students	4.70	0.55
Overall Average Score	4.28	0.51

Examination of Construct Validity

Three methods were used to evaluate the construct validity of the PECSP. First, an exploratory factor analysis (EFA) was conducted with half of the paraprofessional data. Next, two confirmatory factor analyses (CFA) were conducted—one for the second half of the paraprofessional data and one for the physical educator data. Finally, undergraduate student scores were compared to paraprofessional scores for a known group differences analysis.

Exploratory Factor Analysis

An exploratory factory analysis (EFA) was conducted using the Proc Factor program of the SAS (Version 9.4) statistical package. The maximum likelihood factor was chosen as the primary factor due to its use in confirmatory factor analysis. As a Heywood case was present through the factor analysis, the “ml heywood” procedure was used. Promax rotation was used because the investigator found some moderate factor

correlations and a more clear, simple factor solution than with varimax rotation. During the EFA, Principal Axis (SPSS) and Principal Factor (SAS) analyses were also investigated, as well as Varimax Rotations.

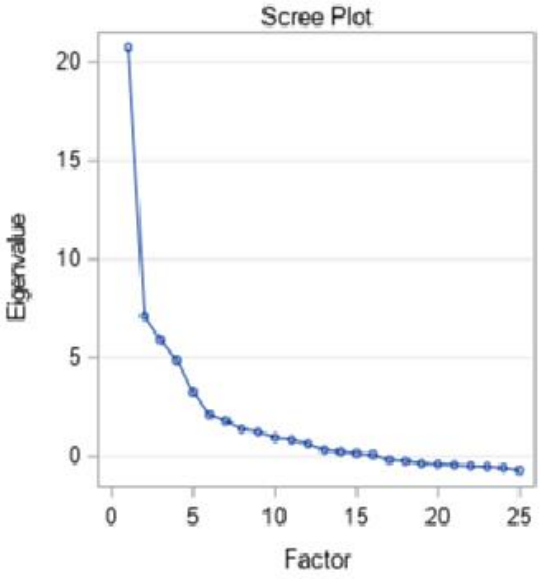
Results of Screening Prior to Factor Analysis. In order to conduct an Exploratory Factor Analysis (EFA) and Confirmatory Factor Analysis (CFA) on the data, IBM SPSS Statistics (Version 24) was used to randomly sort the data into two groups (N = 69 for each group). Next, the data was screened to determine if it was appropriate for a factor analysis. The EFA data had a measure of sampling adequacy (KMO) of 0.71, which was in Kaiser's "middling" category (Kaiser, 1974). Bartlett's test of sphericity was significant ($p < 0.0001$), rejecting the null hypothesis that there are no common factors. It was determined from these measures that the data was appropriate for factor analysis.

Factor Reduction. Five methods were used to determine the number of factors to retain. The initial eigenvalues and scree plot can be found in Figure 1. The eigenvalues greater than one method supported the retention of nine factors while the scree plot revealed five factors before the elbow (Figure 1). Additionally, the percentage of variance method indicated that four factors explained 80% of the variance.

Figure 1

Preliminary EFA Eigenvalues and Scree Plot

Preliminary Eigenvalues: Total = 47.7041472 Average = 1.90816589				
	Eigenvalue	Difference	Proportion	Cumulative
1	20.7396282	13.6109283	0.4348	0.4348
2	7.1286999	1.2219139	0.1494	0.5842
3	5.9067860	1.0287058	0.1238	0.7080
4	4.8780802	1.6321073	0.1023	0.8103
5	3.2459729	1.1477531	0.0680	0.8783
6	2.0982198	0.2935854	0.0440	0.9223
7	1.8046344	0.4022065	0.0378	0.9601
8	1.4024278	0.1522967	0.0294	0.9895
9	1.2501311	0.2935554	0.0262	1.0157
10	0.9565757	0.1119075	0.0201	1.0358
11	0.8446682	0.2106512	0.0177	1.0535
12	0.6340170	0.2969646	0.0133	1.0668
13	0.3370524	0.0938853	0.0071	1.0738



A parallel analysis and a Velicer's minimum average partial (MAP) test (O'Connor, 2000) were run with SAS (Version 9.4) to confirm the number of factors selected. The parallel analysis was conducted with a principal axis/common factors analysis, 1000 datasets, and was based on permutations of the raw data. It found that four factors had an eigenvalue greater than one and the fifth and sixth factors had eigenvalues of 0.99 and 0.76. Since the parallel analysis was based on principal components analysis, it was difficult to ascertain the appropriateness of the test. Therefore, the MAP test was also employed. The MAP test also identified an ideal solution of four factors. However, the investigators noted that the MAP test also indicated the presence of eight factors with eigenvalues greater than one.

The final method to determine the number of factors to retain was interpretability. Due to the preliminary nature of this project, the investigator wanted to retain as many factors as possible. Gorsuch (1983) suggested that it is better to retain a few extra factors than not retain enough factors if the researcher remains aware of the low probability of reproducibility. Since this is a preliminary project, the investigator sought factor combination possibilities while retaining between three and six factors. In particular, the four-factor and five-factor models were analyzed extensively for interpretability. The researcher concluded that the five-factor model made the most sense theoretically and would allow future opportunities to refine the instrument.

The five factors shown in Table 11 were named as follows:

1. Pre-Instructional Skills
2. Autonomy & Relatedness
3. Professionalism
4. Feelings of Competence
5. Instructional Skills

Rotation and Item Reduction. Both Varimax and Promax rotations were used during the EFA. However, the researcher found that the Promax rotation produced a cleaner factor solution. This is possibly due to the moderate factor correlations also found during the Promax rotation and presented in the data (Table 11; Finch, 2006). The largest correlation (.50) was found between Factor 5 (Instructional Skills) and Factor 4 (Feelings of Competence).

Table 11

EFA Inter-Factor Correlations Prior to Item Elimination

Factor	1	2	3	4	5
1	—	.10	.13	.35	.20
2	.10	—	.12	.32	.22
3	.13	.12	—	.32	.30
4	.35	.32	.32	—	.50
5	.20	.22	.30	.50	—

While exploring the factor analysis, several items needed to be removed due to low factor loadings (below 0.40) and large cross loadings. A large cross loading was defined as less than 0.20 difference between loadings on two factors (Gaskin, 2018). One item was left in the factor with a loading of 0.39. The researcher felt that the item could be removed during the CFA, if necessary. The following items were eliminated during the EFA:

- Maintains student, staff, and family confidentiality
- Demonstrates respect for all students and staff
- Maintains safe and healthy learning environments
- Uses developmentally and age-appropriate reinforcement and learning activities
- Reports information about student performance and behavior to the PE teacher
- Provides opportunities for students to practice social skills
- Aids the teacher in classroom management
- Modifies the learning environment as needed to manage student behavior
- Prepare and use adaptive equipment and devices for students as prescribed

Once the inappropriate items were deleted, a simple factor pattern was found in the data (Table 12). Factor 4, Feelings of Competence, only had two items, but since they

had a high correlation with each other (.82), the factor was retained. The final instrument's scree plot and eigenvalue chart with the variance explained for each factor can be found in Appendix I.

Table 12

EFA Factor Reliability and Loadings

	Factor				
	1	2	3	4	5
Factor Reliability (α)	*0.74*	*0.78*	*0.73*	*0.90*	*0.77*
PECSP Item	Factor Loading				
Ask for help when needed	**0.75**	0.11	0.02	-0.09	-0.02
Promote student independence	**0.70**	-0.06	0.04	0.05	0.07
Demonstrate flexibility and adaptability to changes	**0.70**	0.09	0.07	0.00	-0.07
Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	**0.44**	-0.22	0.11	0.24	0.11
If I didn't go to PE with my student(s), I would be missed	**0.39**	0.18	-0.08	-0.13	0.1
I feel free to communicate my ideas to the PE teacher	-0.02	**0.94**	0.08	0.04	0.00
I feel free to make decisions that are best for students in PE	0.34	**0.64**	-0.16	0.07	-0.11
I feel valued and respected by the PE teacher	-0.07	**0.61**	0.12	0.03	0.21
Support and model the school's school-wide behavior expectations	0.02	-0.03	**1.01**	0.01	-0.1
Communicate positively with supervising teacher and other paraprofessionals	0.00	0.09	**0.71**	-0.08	0.07
Sustain appropriate interactions with students	0.11	-0.01	**0.45**	0.00	0.04
I feel competent working with students in PE	-0.1	0.11	0.00	**1.02**	-0.08
I feel competent doing the tasks the PE teacher asks me to do	0.07	0.04	-0.07	**0.76**	0.13
Use and adapt a variety of approaches, materials, or assistive technology to teach skills	0.15	-0.03	-0.08	-0.08	**0.74**
Provide instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	0.2	-0.05	0.06	0.18	**0.67**
Adapt to different learning styles, intelligences, and personality types	-0.18	0.24	0.06	0.03	**0.66**

Confirmatory Factor Analysis

A confirmatory factor analysis (CFA) was completed with the second, randomly split half of the paraprofessional data (N = 69). The Proc Calis program with the covariance modification was used in SAS (Version 9.4) to complete the analysis. Due to a low factor loading (0.144) in the CFA, one item (mentioned previously with an EFA loading of 0.39) was eliminated from the Pre-Instructional Skills factor. The final model (Figure 2) had the following goodness of fit indices: chi-square: $\chi^2 = 109.57$, d*f* = 80, p = 0.016; Bentler Comparative Fit Index (CFI) = 0.894; SRMR = 0.104; and RMSEA = 0.074. The final factor loadings are provided in Appendix J.

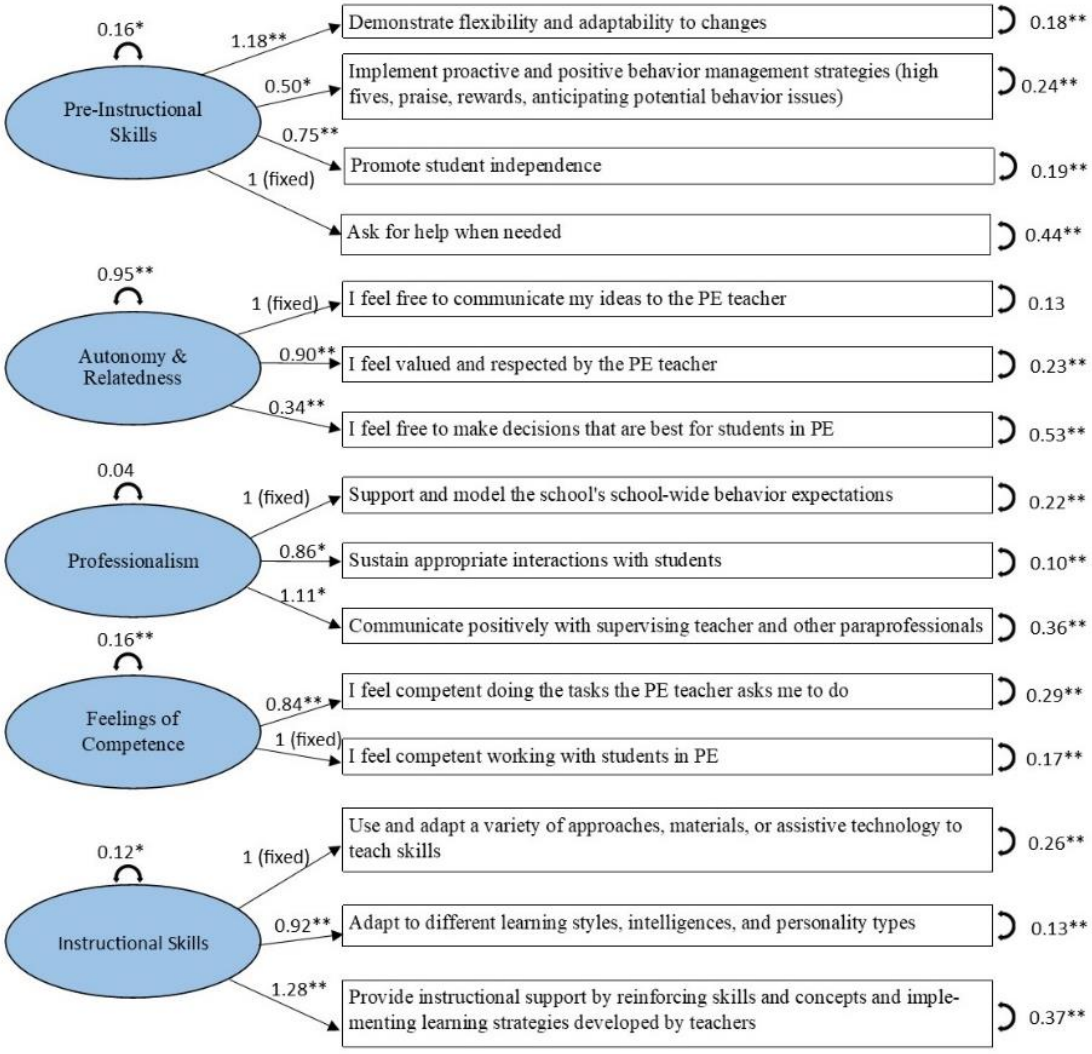
Factor loadings for three items fell below 0.40. Despite this, in a test of convergent validity, all items on the Pre-Instructional Skills, Autonomy & Relatedness, Feelings of Competence, and Instructional Skills factors had p-values less than to 0.01. The Professionalism factor had one item with a p-value equal to 0.01. Since the Professionalism factor had only three items, the investigator chose to leave the item in place, despite its low convergent validity.

Once the model was established, a CFA was also conducted on the physical education teacher's paraprofessional evaluations (N = 61). The Autonomy & Relatedness and Feelings of Competence items were related to paraprofessional perceptions and not included in the physical education teacher instrument. Therefore, the CFA was run with the Pre-Instructional Skills, Professionalism, and Instructional Skills factors using the same items identified in the paraprofessional data. The physical educator version had the following goodness of fit indices: Chi-Square: $\chi^2 = 47.04$, d*f* = 32, p = 0.0421; Bentler Comparative Fit Index (CFI) = 0.961; SRMR = 0.058; and RMSEA = 0.089. The model

and final factor loadings are provided in Appendix K. Factor loadings varied between 0.55 and 0.90 and all were sufficient to retain items. Convergent validity tests were successful with $p < 0.01$ on all items.

Figure 2

CFA Model for Paraprofessionals



* $p < .05$, ** $p < .01$

Known Group Differences

In order establish whether the instrument would distinguish the perceived competence of someone who was a paraprofessional from someone who did not have knowledge of paraprofessional competencies, undergraduate university students (N = 84) completed the instrument. An independent t-test was performed in IBM SPSS Statistics (Version 24) comparing the overall average score of paraprofessionals (N = 138) and undergraduate students. There was a significant difference between the two groups (t_{220} = 3.185, p = 0.002).

Examination of Criterion (Concurrent) Validity

Some physical education teachers completed the instrument by rating one or two paraprofessionals with whom they worked. This resulted in scores for 61 paraprofessionals. Unfortunately, paired results for determining the validity (correlation) coefficient were not able to be obtained due to data collection challenges. Instead, to investigate differences between physical educators' evaluations (N = 61) and paraprofessional responses (N = 138), an independent samples t-test was performed in SPSS. The t-test revealed a significant difference between the physical educator evaluations and the paraprofessional scores (t_{197} = 5.056, p < 0.001). Although the data was not able to accurately test for concurrent validity, the investigators believe that the instrument would not have met concurrent validity requirements.

Examination of Reliability

Stability

The goal was to test stability by having paraprofessionals and physical education teachers complete the instrument twice, one week apart. A dependent t-test and intraclass

correlation coefficient would have been calculated and interpreted. However, due to data collection challenges, test-retest stability was not completed for this analysis.

Internal Consistency

The Cronbach alpha coefficient was used to test the internal consistency of the instrument. At the end of the EFA, the five factors each had Cronbach alpha coefficients varying from 0.73 to 0.90 (Table 11). Factor Cronbach alpha coefficients based on the paraprofessional CFA data were lower as shown in Table 12. However, coefficients based on the physical education teacher evaluation instrument were between 0.80 and 0.90. Additionally, the composite reliability of each factor was calculated (Table 13).

The Cronbach alpha values for the instrument with 15 remaining items was 0.83 for both the separated groups and the whole set of paraprofessional data. The instrument for physical educators to evaluate paraprofessionals had a reliability of 0.92. Further elimination of any items from any of the alpha analyses (α if deleted) would not have increased the reliability of the instrument; therefore, all items were retained.

Table 13

CFA Factor Reliability

Factor	Composite Reliability	Cronbach Alpha	Composite Reliability	Cronbach Alpha
	Paraprofessional Self-Evaluations		Physical Educator Evaluations	
1	0.64	0.64	0.8	0.8
2	0.81	0.76		
3	0.36	0.34	0.87	0.86
4	0.56	0.54		
5	0.64	0.65	0.91	0.9
Overall Instrument α		0.83		0.92

Conclusion

To determine the content validity of the PECSP, an item pool of paraprofessional competencies was created from state department of education websites. Next, a panel of experts participated in two rounds of item analysis. First, narrowing a list of 32 items to 20, then analyzing those items for potential weaknesses. After adding questions for autonomy, competence, and relatedness, the PECSP consisted of 25 items. Construct validity was established through exploratory and confirmatory factor analysis and known group differences. After the elimination of 10 items, all statistical tests indicate that the PECSP has construct validity. Finally, internal consistency was examined and found that reliability of the PECSP was adequate.

CHAPTER V

CONCLUSION

The purpose of this study was to develop and preliminarily validate an initial instrument to investigate the perceived competence of paraprofessionals in physical education. A version of the instrument for physical educators to evaluate paraprofessionals was also created. A brief summary of results and an examination of hypotheses are followed by a discussion of the research and suggestions for further studies.

Summary of Findings

Two versions of the Physical Education Perceived Competence Scale for Paraprofessionals (PEPCS) were developed to investigate the perceived competence and competence of paraprofessionals. The instrument was based on a 5-point Likert scale and was administered with 25 items for paraprofessionals and 19 items for physical education teachers to evaluate paraprofessionals. One hundred and thirty-eight elementary special education paraprofessionals and 45 elementary physical education teachers participated in the study. The paraprofessionals were primarily female (92%) as well as the physical education teachers (58%). Seventy-six percent of paraprofessionals were certified. The

average item score for paraprofessionals was 4.46 (SD=0.36) and the average item score of physical educator evaluations was 4.08 (SD=0.65).

Data collection took place in the spring of 2020 while PK-12 schools were implementing distance learning due to the Covid-19 pandemic. Participants were asked to answer questions based on their experiences during the 2019-2020 school year.

Construct validity was examined and established using exploratory and confirmatory factor analysis (EFA & CFA) as well as examining known group differences. Ten items were eliminated from the first version and five factors were found during the EFA and CFA. The known group differences test revealed a significant difference between undergraduate students and paraprofessionals.

Concurrent validity was investigated by comparing the physical education teachers' responses with the paraprofessional responses. Unfortunately, but also somewhat expected, a significant difference was found between the groups. The PECSP did not meet concurrent validity requirements.

Reliability was established by assessing Cronbach alpha for the overall scale (α=0.83) as well as the factors (α between 0.36 and 0.81). Factor reliability for factor three was low with for the CFA data, but not for the EFA data or physical education teacher version. Reliability for the was determined to be acceptable for a preliminary instrument

Examination of Specific Hypotheses

Hypothesis 1

The hypothesis that, during factor analysis, all factors load below 0.40 was rejected. Fifteen items loaded above 0.40 during the Exploratory Factor Analysis and twelve items loaded above 0.40 during the Confirmatory Factor Analysis.

Hypothesis 2

The hypothesis that there was no significant difference between paraprofessionals' and undergraduate students' perceived competence of working with students with disabilities in physical education was rejected. A significant difference was found ($p = 0.002$) between the two groups.

Hypothesis 3

The hypothesis that there is no significant difference between paraprofessionals' perceived competence and their physical education teacher's evaluation of their actual competence was unable to be properly tested. The validity coefficient was not able to be calculated as planned due to insufficient data. However, an independent t-test was used to compare the differences between groups. A difference between the self-evaluation scores and the physical educator evaluation scores was found ($p < 0.001$). The researcher believes that this hypothesis would have been rejected.

Hypothesis 4

The hypothesis of a significant difference between paraprofessional test and retest scores was not evaluated due to insufficient data.

Hypothesis 5

The hypothesis that the instrument has a Cronbach's alpha of less than or equal to 0.70 was rejected. The PECSP's Cronbach alpha was 0.83.

Discussion

The purpose of this preliminary study was to develop a valid and reliable instrument to assess paraprofessional perceived competence while working with students with disabilities in physical education. A version of the instrument was also created to allow physical education teachers to evaluate paraprofessional skills.

With a lack of data on paraprofessional roles specific to physical education, the researcher began instrument development with a generalized list of paraprofessional roles and competencies for the school setting from several state department of education websites. A panel of experts was then deployed to analyze and narrow the list of competencies to those most relevant to paraprofessionals in physical education. The panel of experts were asked to contribute additional competencies they felt were missing, but only one expert participated in that request. The investigator believes that the experts' demanding roles as teachers may have impacted their contributions. Perhaps a method such as an interview or open-ended questioning might be more efficient at gathering information from teachers. Researchers wishing to make future modifications to the PECSP should consider employing a second panel of experts for item analysis.

The panel of experts expressed concern that the instrument items may not discriminate a competent paraprofessional from an incompetent paraprofessional. One issue found was that the items "Maintains student and staff confidentiality" and "Demonstrates respect for all students and staff" demonstrated low to poor correlation

with other items and rarely loaded on any factor. Respondents consistently rated themselves so high on those items ($\bar{x}$= 4.97 and 4.87) that the items failed to provide evidence of differences between competent and non-competent individuals. Those items were eliminated during the EFA.

The investigator also concluded that autonomy and relatedness constructs can be similar and future item development will be necessary to discriminate between them. The autonomy and relatedness questions "I feel free to communicate my ideas to the PE teacher" and "I feel valued and respected by the PE teacher" were closely correlated (0.71) and thus, loaded together on the same factor. Many advanced paraprofessional skills that did not make it on the final instrument cross-loaded with the Autonomy & Relatedness items. Perhaps the ability of the paraprofessional to carry out advanced skills is related to their perceived autonomy and relatedness. For example: "modifies the environment as needed to manage student behavior" and "aids the teacher in classroom management" were as much autonomy items as skill items and were dropped from the instrument due to severe cross-loadings.

The researcher also found that the item "Maintains safe and healthy learning environments" loaded on almost all factors, was likely too general of a question, and had to be removed from the instrument.

According to O'Rourke and Hatcher (2013), interpretability is the most important criterion for choosing the number of factors to retain. A factor should have at least three items that seem to measure the same concept, a concept that is a different from the other factors, and have a simple structure (O'Rourke and Hatcher, 2013). Unfortunately, the PECSP did not have enough items that represented the identified factors. That left one

factor with two items and caused structural under-identification (Hoffman, 2014) which impacted the interpretability of the model. Raubenheimer (2004) believes that a model with only two items on each factor can be used only in an exceptional case. Others believe that if two items are highly correlated (greater than 0.70) with each other and not very correlated with other items, they can appear as the sole items of a factor (Yong & Pearce, 2013). For this pilot study, the researchers did not attempt to define constructs during instrument development. Instead, the goal was to explore and ascertain latent factors during the analysis. Therefore, the "feelings of competence" factor which had two items with a correlation of .82 (EFA data) was allowed.

The final model revealed five latent variables that were described by the PECSP: pre-instructional skills, instructional skills, professionalism, autonomy & relatedness, and feelings of competence. Unfortunately, the professionalism construct demonstrated poor reliability in the CFA sample. Due to the preliminary nature of this study, since the reliability was acceptable in the EFA sample and good in the physical educator evaluation data, the construct was left in place. More research is needed to investigate this construct.

The differences between the randomly split EFA and CFA data could have occurred due to the small sample size and a less than ideal population sample. A sample size of 400 paraprofessionals would have increased statistical power (O'Rourke and Hatcher, 2013) and lowered the risk of empirical under-identification (Hoffman, 2014). Additionally, data collection was conducted in May 2020 during the Covid-19 pandemic. Schools were closed mid-March and it is not known which paraprofessionals and physical education teachers continued to check their school e-mail through the end of the

school year. Therefore, paraprofessionals and physical education teachers who participated in this study may not have been representative of their respective populations.

The potential lack of concurrent validity of the PECSP could be associated with social desirability bias and/or a lack of knowledge. Social desirability is one's tendency to respond in a way that is different from their real feelings, beliefs, or actions (Larson, 2019). According to Larson (2019), there are several types of social desirability bias such as impression management, self-deception, and identity definition. The anonymity of the data collection in this project was intended to reduce impression management bias. However, some paraprofessionals may have indicated a higher perceived competence due to desire to feel good about themselves. Another reason for inflated responses could be that people with limited knowledge tend to make more mistakes without recognizing it (Kruger and Dunning, 1999). Paraprofessionals who are less competent may perceive a higher competence than what they have because they do not know otherwise. A high turnover rate in paraprofessional positions presents a challenge for this and future studies of special education paraprofessionals.

In summary, this project was a preliminary validation of an instrument designed to assess special education paraprofessionals' perceived competence, relatedness, and autonomy in physical education. Additional instrument development is necessary to refine and further validate the PECSP for interpretation and population generalizability. Based on previous research in other environments (Baard et al., 2004; Shuck et al., 2015), and the facets of Self-Determination Theory by Deci and Ryan (1985), the investigator believes that basic need satisfaction has the potential to increase work performance and

engagement in the physical education environment. However, more research is needed to improve the instrument and confirm those beliefs.

Recommendations for Further Studies

1. The model discovered through this assessment should be used to modify the PECSP by adding more items for each construct. An additional pilot should then be conducted to verify validity and reliability of the modified instrument.
2. Researchers should seek out items and constructs that apply more specifically to the physical education environment.
3. Investigate what factors lead to a paraprofessional's perceived competence and competence in physical education class.
4. Compare and investigate paraprofessional responses to physical educator evaluations through pair-wise tests.
5. Evaluate training programs for paraprofessionals in physical education.

Conclusion

The preliminary Physical Education Competence Scale for Paraprofessionals can be used as a model when developing future assessments of special education paraprofessional competence in physical education. The addition of items to the instrument and further exploration of how to discriminate competent and incompetent paraprofessionals is advised. Additionally, a more detailed comparison between a paraprofessional's perceived competence and actual competence is needed.

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APPENDICES

APPENDIX A

Instruments for Self-Determination Theory in the Workplace

Authors	Domain	Purpose	Instruments used	Instrument descriptions
Baard et al. (2004)	Banking employees	To determine the relationship of perceptions of managers' autonomy support and subordinates' autonomous causality orientations to intrinsic need satisfaction	The General Causality Orientations Scale (GCOS)	7-point Likert Scale, 36 items
			Problems at Work (PAW)	7-point Likert scale, 8 items
			Intrinsic need satisfaction (INS scale)	5-point/7-point Likert scale, 23 items
			General Health Questionnaire (GHQ)	5-point/7-point scale, 28 items
			Work Climate Questionnaire (WCQ)	7-point Likert scale, 15 items
			Vitality	7 items
			Work Performance	self-reported evaluation results, 3 or 4 point scale
Deci et al. (2001)	Company employees	To examine whether autonomy supportive work climates fulfil the basic psychological needs and predict task motivation and psychological adjustment on the job	Work Climate Survey (WCS)	Likert scale, 28 items
			Need Satisfaction Scale	5-point, Likert scale, 21 items
			Work Engagement Scale	7-point Likert scale, 9 items
			General Health Survey	4-point Likert scale, 7 items
			Multidimensional Self-Esteem Inventory	10 items

Authors	Domain	Purpose	Instruments used	Instrument descriptions
Gillet et al. (2013)	Police officers	To compare perceived organizational and supervisor support with situational motivation, engagement, and area of work	Perceived Organizational Support Scale	7-point Likert scale, 8 items
			Motivation at Work Scale-Revised	7-point Likert scale, 19 items
			Utrecht Work Engagement Scale (UWES-9)	7-point Likert scale, 9 items
			Motivation at Work Scale	7-point Likert scale, 12 items
			Situational Motivation Scale	6 subscales after adaptations
Ilardi et al. (1993)	Workplace	To explore employees' autonomy, competence, and relatedness from the perspective of employees and supervisors	Job Descriptive Index	Scores of no, ?, and yes
			General Health Questionnaire	4-point Likert, 28 items
			Self-Esteem Inventory	Gutman scale
			Work Motivation Form-Employee	5-point Likert scale, 15 items
			Work Motivation Form -Supervisor	5-point Likert scale, 15 items
Kasser et al. (1992)	Psychiatric hospital vocational program participants	To determine how program participation and estimates of readiness for work compared to motivation as rated by supervisors and employees	Social Competence Index (SCI)	Demographic questions
			Extrinsic Factors	Social Security status & living arrangements
			Work Motivation Form-Employee (WMF-E)	5-point Likert scale, 15 items
			Work Motivation Form-Supervisor (WMF-S)	5-point Likert scale, 15 items
			Work-readiness rating	6-point scale
			Current level of work adjustment	Work earnings & hours worked per month

Authors	Domain	Purpose	Instruments used	Instrument descriptions
Moreau & Mageau (2012)	Health professionals	To study perceived autonomy support, psychological health, and work-related outcomes	The Perceived Autonomy Support Scale for employees	7-point Likert scale,
			Work Satisfaction Scale	7-point Likert scale, 5 items
			Intent to leave	7-point Likert scale, 4 items
			The Satisfaction with Life Scale	7-point Likert, 5 items
			Positive and Negative Affect Schedule	5-point Likert, 20 items
			General Health Questionnaire	4-point Likert
			Scale for Suicide Ideation	Value of 0, 1, or 2
			Stress scale	Yes/no, 13 items
Richer et al. (2002)	Administra-tion school alumni	To determine whether relatedness and competence affect self-determined work motivation and whether those factors will increase work satisfaction and reduce emotional exhaustion	The Feelings of Relatedness Scale	7-point Likert, 10 items
			Feelings of competence in the work domain	7-point Likert, 3 items
			Intrinsic job rewards	3 items
			Blais Work Motivation Inventory (abridged)	7-point Likert, 16 items
			Work Satisfaction Scale	7-point Likert, 3 items
			Maslach Burnout Inventory	7-point Likert, 4 items selected
Roca & Gagne (2008)	E-learning in the workplace	To evaluate how perceived autonomy support, competence, and relatedness affect the perceived usefulness, playfulness, and ease of use of e-learning	Work Climate Survey	7-point Likert, 10 items used
			Basic Need Satisfaction at Work Scale	21 items
			Competence using computer or internet	4 items
			Computer self-efficacy	9 items
			General Internet Self-efficacy	8 items
			Perceived usefulness & ease of use	6 items
			Perceived playfulness	6 items
			Continuance intention	3 items

Authors	Domain	Purpose	Instruments used	Instrument descriptions
Shuck et al. (2015)	Clients of a national manage-ment training consulting company	To examine the relationship between self-determination theory and the link between engagement and performance at work	Basic Psychological Needs at Work Scale (BPNS) Job Engagement Scale [JES] Utrecht Work Engagement Scale-9 [UWES-9] Harmonious and Obsessive Passion (HOPS) Work intention scales	6-point Likert scale, 12 items Not reported Not reported Not reported Not reported

APPENDIX B

Development and Validation of Surveys

Authors	Purpose of instrument	Instrument name	Instrument description	Face & content validity	Construct validity	Criterion validity	Reliability
Chan et al. (2018)	To assess staff perceived knowledge, skill, and psychological readiness for end of life care	Unnamed	16 items 5-point Likert scale	Review of literature; expert opinions; reviewed by expert panel	Principal component analysis; ANOVA - known groups technique	N/A	Cronbach alpha; Test-retest-intraclass correlation coefficient
Gillespie et al. (2012)	To assess perceived competence in the operating room	Perceived Perioperative Competence Scale-Revised (PPCS-R)	40 items 5-point Likert scale	Literature review; modified Delphi panel; content validity index; pilot survey; factor analysis	Known groups technique	N/A	Cronbach alpha
Jokiniemi et al. (2018)	To determine the core competencies of clinical nurse specialists	CNS Core Competencies	50 competencies	Expert round table; Delphi process; professional standards	N/A	N/A	

Authors	Purpose of instrument	Instrument name	Instrument description	Face & content validity	Construct validity	Criterion validity	Reliability
Karel et al. (2012)	To evaluate competencies of geropsychologists	Pikes Peak Geropsychol-ogy Knowledge and Skill Assessment Tool	50 items, 9 domains, 5-point Likert scale	Previously designed	MANOVA - known group differences	N/A	Cronbach alpha
Liu et al. (2009)	To evaluate competencies of registered nurses	Competency Inventory for Registered Nurses	5-point Likert Scale	Previously designed	Confirmatory factor analysis	N/A	Cronbach alpha
Meretoja et al. (2004)	To be used by nurses and managers to assess nurse competence	Nurse Competence Scale	73 items Visual analogue scale (VAS 0-100)	Review of literature; expert panels	Factor analysis	Compar-ison with 6D scale	Cronbach alpha; inter-item & item–total correlations ; alpha-if-deleted values
Nicholson et al. (2013)	To measure clinical nurse performance in the operating room	Performance Based Scoring Rubric for Operating Room Nurses	16 items Behavioral rubric coded 0-4	Review of literature; standards of practice; expert panel	Rasch model	N/A	Cronbach alpha; and person separation reliability index

Authors	Purpose of instrument	Instrument name	Instrument description	Face & content validity	Construct validity	Criterion validity	Reliability
Van den Broeck et al. (2010)	To measure work-related need satisfaction	Work-related Basic Need Satisfaction Scale	18 items 5-point Likert scale	Review of literature; expert panel; principal component analysis	Confirmatory factor analysis; logical regression analysis	N/A	Cronbach alpha
Wang et al. (2016)	To create a competency evaluation for operating room nurses	ORN Core Competency Evaluation Index System	22 competencies	Interviews with nurses; Delphi survey; analytic hierarchy process	N/A	N/A	N/A

APPENDIX C

State Requirements for Paraprofessionals

State	Paraprofessional Levels	Training requirements	Certificate Expiration	Renewal Requirements	Citation
Connecticut	Level 1 - has a high level of direct supervision	HS diploma	N/A	N/A	(Kirner et al., 2007)
	Level 2 - one-to-one aide/speech aide & has on-site supervision	HS diploma and multiple years of experience or specific training			
	Level 3 - speech assistant, job coach, tutor, ABA instructor, or sign language interpreter & may not have on-site supervision	2 years of college and/or an assoc. deg. and/or highly specialized training			
Delaware	Title I paraeducator	2 years of college and/or an assoc. deg. and/or pass ParaPro test	Permit at different levels, valid 5 years	15 hours of professional development	(Delaware Department of Education, 2019)
	Instructional paraeducator	Same at Title I			
	Service paraeducator	HS diploma			

State	Paraprofessional Levels	Training requirements	Certificate Expiration	Renewal Requirements	Citation
Illinois	N/A	At least 19 years old & Assoc. deg. or 60 hours of college, or HS diploma & pass ETS Parapro or ACT WorkKeys	Paraprofes-sional License, valid for 5 years	Payment of registration fees	(ISBE Educator Effectiveness Department, n.d.)
Iowa	Title I paraprofessional Voluntary paraeducator certification: Level 1 - Generalist PK-12 Level 2 - Concentration specific area Level 3 - Advanced PK-12	2 years of college, or assoc. deg, or complete an assessment or obtain voluntary certification HS diploma, certification course Certification course to concentrate in early childhood, special needs, ESL, career and transition programs, school library media, speech language pathology, or vision impairments Unknown	Voluntary paraeducator certificate at different levels, valid for 5 years	3 renewal credits & mandatory reporter training	(Iowa Department of Education, n.d.)
Kentucky	Title I paraprofessional	2 years of college, or assoc. deg, or complete an assessment or obtain voluntary certification	N/A	N/A	(Kentucky Department of Education, 2019)

State	Paraprofessional Levels	Training requirements	Certificate Expiration	Renewal Requirements	Citation
Minnesota	Title 1 paraprofessional	2 years of college, assoc. deg., or pass ParaPro assessment.	N/A	N/A	(Minnesota Department of Education, n.d.)
	Other paraprofessional	School districts establish requirements and they receive training on disabilities All - within 60 days must have training on emergencies, confidentiality, vulnerability, reporting obligations, discipline, roles, responsibilities, and building orientation, annual training			(Education Code: Prekindergarten-Grade 12, 2016, 2019)
Missouri	N/A	60 college hours or pass the ParaPro Assessment (MEGA)	N/A	N/A	(Missouri Department of Elementary & Secondary Education, n.d., 2018)

State	Paraprofessional Levels	Training requirements	Certificate Expiration	Renewal Requirements	Citation
New Hampshire	Paraeducator I Paraeducator II (Title I)	HS diploma 48 college hours or assoc. deg., or HS diploma & ETS ParaPro Assessment, or HS diploma & assessment of candidate's strengths and professional development needs	Voluntary Paraeducator Certification, valid 3 years	Document 50 CEU's or clock hours in 3 years	(State of New Hampshire Department of Education, 2018)
Oklahoma	Tier 1 (Title I) Tier 2 (Special Education)	48 hr of college or assoc. deg. or have taken and passed the WorkKeys test, Parapro test or Oklahoma General Education Test Tier 1 requirements & an in-person Oklahoma special education paraprofessional training or online training or other state approved training & maintain CPR and first aid training & universal precautions/bloodborne pathogens training	N/A	Tier 2 - Special Education: Complete 6 hours of professional development and Bloodborne Pathogens each year	(Oklahoma State Department of Education, 2019)

State	Paraprofessional Levels	Training requirements	Certificate Expiration	Renewal Requirements	Citation
South Dakota	Standard Paraprofessional Advanced Paraprofessional (Title I)	HS diploma or pass state test Assoc. deg. or 48 hours college or HS diploma & state paraprofessional assessment	Education Permit, valid 5 years	3 CECs (45 hours) & 1 hour of Suicide Awareness and Prevention Training	(South Dakota Department of Education, 2017a, 2017b)

Note. assoc. deg. = Associate's degree or higher, HS diploma = HS diploma or equivalent

APPENDIX D

Paraprofessional Competencies

The table below presents competencies for paraprofessionals. Competencies are grouped into categories and were adapted from competencies from the states of Connecticut (Kirner et al., 2007), Iowa (Iowa Department of Education, 2013), Kentucky (Kentucky Department of Education, 2009), New Hampshire (State of New Hampshire Department of Education, 2017), and South Dakota (South Dakota Department of Education, n.d.).

Competencies for Paraprofessionals

Competency	State				
	Connecticut	Iowa	Kentucky	New Hampshire	South Dakota
Assessment					
Helps with recording and charting data of student social skills, learning activities, or behavior for the maintenance of student records and logs	x	x		x	
Provides testing accommodations (reading tests aloud, etc.)	x	x	x		
Assists teachers with completing a functional behavioral analysis	x				
Helps administer standardized tests	x				
Checks student papers against an answer key		x			

Competency	State					
	Connecticut	Iowa	Kentucky	New Hampshire	South Dakota	
Behavior Management						
Implements teacher designed behavior programs and plans	x	x				
Understands and implements proactive and positive behavior management strategies	x		x	x		
Supports the school's school-wide behavior expectations		x				
Modifies the learning environment as needed to manage student behavior				x		
Aides the teacher in classroom management			x			
Communication & Collaboration						
Collaborates with teachers for program-planning, IEP development, or problem-solving.	x	x		x		
Has knowledge of communication styles and their effectiveness within teams	x		x			
Reports information about student performance and behavior	x					
Has knowledge of strategies for problem-solving and decision-making and contributes to the process	x					
Confidentiality						
Maintains student, staff, and family confidentiality and understands the legal rights of staff and students	x		x	x		
Diversity						
Has knowledge of strategies to work with students from different backgrounds	x					
Uses culturally responsive teaching methods			x			
Demonstrates respect for students and staff from all cultures, lifestyles, and value systems				x		

Competency	State				
	Connecticut	Iowa	Kentucky	New Hampshire	South Dakota
English Language Learners					
Acts as a foreign language translator for students and families	x		x		x
Human Development					
Has knowledge of development stages from birth to age 21	x			x	
Understands different learning styles, intelligences, and personality types	x			x	
Has awareness of developmental disorders, delays, and disabilities				x	
Has the ability to discern developmentally and age-appropriate reinforcement and learning activities	x				
Interventions					
Has knowledge of multi-tiered system of supports, such as RTI, and how to assist students in each level			x	x	
Understands how to apply basic skill interventions (prompting, task analysis, corrective feedback)			x		
Instruction					
Assists teachers in modifying learning strategies, materials, and activities for individual students	x	x			
Provides instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	x	x	x		
Provides one-on-one tutoring or individual assistance on teacher developed projects or learning activities	x		x		
Promotes student independence	x			x	
Follows lesson plans provided by teachers	x			x	

Competency	State					
	Connecticut	Iowa	Kentucky	New Hampshire	South Dakota	
Has knowledge of technology's use in education	x					
Understands the different curriculum areas	x					
Knows how organized environments can help with transitions and promote learning	x					
Has the ability to sustain appropriate interactions with students	x					
Is competent in basic skills such as reading, math, writing and speaking English	x					
Implements strategies to increase student social skills				x		
Uses and adapts a variety of approaches, materials, and assistive technology to teach academic skills				x		
Lesson Preparation						
Prepares and creates educational materials assigned by a teacher	x	x		x	x	
Organizes and maintains learning environments (such as setting up for a lesson and keeping materials organized)		x				
Modifies instructional material format		x				
Professionalism						
Participates in professional development	x			x		
Works with supervisors to identify strengths and training needs	x			x		
Interacts constructively and uses conflict management techniques with colleagues in various professional settings	x			x		
Keeps the learning environment safe, healthy, and organized		x		x		

Competency	State					
	Connecticut	Iowa	Kentucky	New Hampshire	South Dakota	
Knows the roles of a teacher, paraprofessional, and other licensed professionals	x					
Has knowledge of laws, policies, and procedural safeguards applicable to education environments (such as for identifying and reporting child abuse)	x			x		
Follows district policies and procedures and standards of professional and ethical conduct	x					
Follows district health and safety guidelines	x					
Contributes to professional development programs for paraprofessionals	x					
Respects differences in others	x					
Performs self-evaluations and applies constructive feedback				x		
Participates in self-reflection				x		
Asks for help when needed				x		
Supports teachers' instructional choices for students				x		
Special Education						
Supports the inclusive environment by implementing inclusive strategies and techniques	x			x		
Assists students to complete activities designed by physical therapists, occupational therapists, or speech-language pathologists	x					
Understands the importance of, prepares, and uses adaptive equipment and devices for students as prescribed	x					
Knows what the least restrictive environment is and its importance	x					
Assists with the maintenance of adaptive equipment	x					

Competency	State				
	Connecticut	Iowa	Kentucky	New Hampshire	South Dakota
Works with the school's designated health care aide to care for students with special health care needs	x				
Helps professionals with the delivery of related services (physical therapists, occupational therapists, speech-language pathologists, nurses)	x				
Supervisory Duties					
Supervises and assists students in other locations (hallway, gymnasium, library, cafeteria, playground, bus, community work settings, etc.)	x	x			x

APPENDIX E

Letters to Panel of Experts

Invitation Letter

Dear Ms. _____,

My name is Beverly Taylor and I am working on my dissertation in Health and Human Performance at OSU. In order to complete my research project, I am developing a questionnaire to determine the perceived competence of paraprofessionals/teacher assistants in physical education. In the future, the questionnaire may be used to help guide the training and mentoring of paraprofessionals. It is critical that I get input from a number of experts. Would you consider being on my panel of experts?

I know you are extremely busy and you were not looking to add anything else to your plate today. Please know that I greatly value your time!

If you do decide to participate, there are two phases that I will need your help completing in the next 2-3 weeks. First, you will be asked to narrow down a list of competencies for paraprofessionals and add any additional competencies that you feel need to be added. The following week, I will send you a list of revised competencies to review for inclusion in the questionnaire. Each phase should take you no more than 30 minutes.

Thank you for contributing to our profession and helping me graduate!

Beverly Taylor
Adapted Physical Education Teacher - Stillwater Public Schools
PhD Candidate - Oklahoma State University

ROUND 1 Letter

Thank you for volunteering to be part of my expert panel!

For the first stage, you will provide some background information and then choose 16 paraprofessional skills that you feel are most important in physical education. You will also have the opportunity to add any skills that you feel were not in the list. Please don't hesitate to do so. It will probably take less than 30 minutes to complete.

Click this link to start:
https://okstateches.az1.qualtrics.com/jfe/form/SV_3elJZkFjkorP1SR

Please complete this at your earliest convenience, but no later than 5pm Monday, February 3rd if possible.

Thank you!

Beverly Taylor
Adapted Physical Education Teacher - Stillwater Public Schools
PhD Candidate - Oklahoma State University

ROUND 2 Letter

Thank you so much for all your help!

For the second stage, you will answer yes or no to five quick questions about 20 competencies. It will probably take you less than 20 minutes.

Click this link to start:
https://okstateches.az1.qualtrics.com/jfe/form/SV_6yPmualfmyUX1uR

Please complete this at your earliest convenience, but no later than 5pm Tuesday, February 11th if possible.

Thank you!

Beverly Taylor
Adapted Physical Education - Stillwater Public Schools
PhD Candidate - Oklahoma State University

APPENDIX F

Results from Panel of Experts Round Two

Table F1

Item Total Scores and Standard Deviations

Item	X	SD
Behavior Management		
1. Implements proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	34	-0.67
2. Supports and models the school's school-wide behavior expectations	36	0.36
3. Modifies the learning environment as needed to manage student behavior	34	-0.67
4. Aids the teacher in classroom management	34	-0.67
Communication & Collaboration		
5. Reports information about student performance and behavior to the physical education teacher	36	0.36
6. Maintains student, staff, and family confidentiality	37	0.87
7. Communicates positively with supervising teacher and other paraprofessionals	37	0.87

Item	X	SD
Behavior Management		
8. Demonstrates respect for all students and staff	36	0.36
9. Adapts to different learning styles, intelligences, and personality types	37	0.87
Instruction		
10. Provides instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	36	0.36
11. Promotes student independence	37	0.87
12. Sustains appropriate interactions with students	37	0.87
13. Provides opportunities for students to practice social skills	34	-0.67
14. Uses and adapts a variety of approaches, materials, and assistive technology to teach skills	35	-0.15
15. Maintains safe and healthy learning environments	36	0.36
Professionalism		
16. Participates in professional development when available	29	-3.23
17. Asks for help when needed	37	0.87
18. Demonstrates flexibility and adaptability to changes	37	0.87
Special Education		
19. Prepares and uses adaptive equipment and devices for students as prescribed	34	-0.67
20. Has the ability to discern developmentally and age-appropriate reinforcement and learning activities	33	-1.18

Table F2

Expert Responses to Item Questions

Item	1		2		3		4		5	
	Is it essential?		Will it discriminate competence from incompetence?		Is it clearly worded?		Does it apply equally?		Is it a typical job respon-sibility?	
	yes	no	yes	no	yes	no	yes	no	yes	no
Behavior Management										
1. Implements proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	7	1	4	4	8	0	8	0	7	1
2. Supports and models the school's school-wide behavior expectations	8	0	4	4	8	0	8	0	8	0
3. Modifies the learning environment as needed to manage student behavior	7	1	6	2	8	0	7	1	6	2
4. Aids the teacher in classroom management	8	0	6	2	7	1	6	2	7	1
Communication & Collaboration										
5. Reports information about student performance and behavior to the physical education teacher	8	0	5	3	8	0	7	1	8	0
6. Maintains student, staff, and family confidentiality	8	0	5	3	8	0	8	0	8	0
7. Communicates positively with supervising teacher and other paraprofessionals	8	0	5	3	8	0	8	0	8	0
Diversity										
8. Demonstrates respect for all students and staff	8	0	4	4	8	0	8	0	8	0
9. Adapts to different learning styles, intelligences, and personality types	8	0	5	3	8	0	8	0	8	0

Item	1		2		3		4		5	
	Is it essential?		Will it discriminate competence from incompetence?		Is it clearly worded?		Does it apply equally?		Is it a typical job respon-sibility?	
	yes	no	yes	no	yes	no	yes	no	yes	no
Instruction										
10. Provides instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	8	0	6	2	8	0	7	1	7	1
11. Promotes student independence	8	0	5	3	8	0	8	0	8	0
12. Sustains appropriate interactions with students	8	0	5	3	8	0	8	0	8	0
13. Provides opportunities for students to practice social skills	7	1	5	3	8	0	7	1	7	1
14. Uses and adapts a variety of approaches, materials, and assistive technology to teach skills	7	1	6	2	8	0	7	1	7	1
15. Maintains safe and healthy learning environments	8	0	4	4	8	0	8	0	8	0
Professionalism										
16. Participates in professional development when available	7	1	4	4	8	0	6	2	4	4
17. Asks for help when needed	8	0	5	3	8	0	8	0	8	0
18. Demonstrates flexibility and adaptabilty to changes	8	0	5	3	8	0	8	0	8	0
Special Education										
19. Prepares and uses adaptive equipment and devices for students as prescribed	8	0	6	2	8	0	6	2	6	2
20. Has the ability to discern developmentally and age-appropriate reinforcement and learning activities	7	1	5	3	8	0	7	1	6	2

APPENDIX G

Comparison of Certified and Non-certified Paraprofessionals

Paraprofessionals in this study indicated that they were uncertified (13%), working toward certification (9%), or certified (77%). Two of the uncertified paraprofessionals reported that they were certified teachers. One was certified in science and physical education, and one was certified in special education. The following analyses were conducted with IBM SPSS Statistics (Version 24).

For the first analysis, the certified teachers who were uncertified paraprofessionals remained with the uncertified group. A one-way ANOVA revealed no significant difference between the average score ($F = 0.376$, $p = 0.687$) or the individual items of the three groups ($0.199 < p < 0.966$).

Next, those working toward certification were put in the non-certified group and a t-test was performed. The t-test indicated there was no significant difference between the certified and non-certified groups' average score ($t_{135} = 0.870$, $p = 0.386$). When the items were individually evaluated for differences, the only significant difference at the $p < 0.05$ level was found for the item "Demonstrate respect for all students and staff" ($t_{105} = 2.28$, $p = 0.025$). Next, the investigator conducted a cross-tabulation with certification and the respect item, it was found that 100% of the uncertified respondents selected "Always" as their response and 95% of certified paraprofessionals selected "Always".

If the certified teachers who did not have their certification were included with the certified paraprofessionals group, the only difference in statistical results was that the

item “Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)” showed significant difference between groups $t_{73.80} = 2.422$, $p = 0.018$). Looking at cross-tabulation data, a higher percentage of non-certified paraprofessionals (90%) felt they “Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)” than non-certified paraprofessionals (74%).

APPENDIX H

Physical Education Competence Scale for Paraprofessionals

While working with students with disabilities in physical education, please indicate how often you feel able to do the following:

	Never	Rarely	Half the time	Most of the time	Always
Aid the teacher in classroom management	○	○	○	○	○
Maintain student, staff, and family confidentiality	○	○	○	○	○
Ask for help when needed	○	○	○	○	○
Demonstrate flexibility and adaptability to changes	○	○	○	○	○
I feel free to make decisions that are best for students in PE	○	○	○	○	○
Demonstrate respect for all students and staff	○	○	○	○	○
Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	○	○	○	○	○
Promote student independence	○	○	○	○	○
If I didn't go to PE with my student(s), I would be missed	○	○	○	○	○
I feel competent doing the tasks the PE teacher asks me to do	○	○	○	○	○
	Never	Rarely	Half the time	Most of the time	Always
Provide opportunities for students to practice social skills	○	○	○	○	○
Report information about student performance and behavior to the PE teacher	○	○	○	○	○
Prepare and use adaptive equipment and devices for students as prescribed	○	○	○	○	○
Provide instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	○	○	○	○	○
Use and adapt a variety of approaches, materials, or assistive technology to teach skills	○	○	○	○	○

I feel valued and respected by the PE teacher	○	○	○	○	○
Adapt to different learning styles, intelligences, and personality types	○	○	○	○	○
Communicate positively with supervising teacher and other paraprofessionals	○	○	○	○	○
I feel free to communicate my ideas to the PE teacher	○	○	○	○	○
Modify the learning environment as needed to manage student behavior	○	○	○	○	○
	Never	Rarely	Half the time	Most of the time	Always
Maintain safe and healthy learning environments	○	○	○	○	○
Use developmentally and age-appropriate reinforcement and learning activities	○	○	○	○	○
Support and model the school's school-wide behavior expectations	○	○	○	○	○
I feel competent working with students in PE	○	○	○	○	○
Sustain appropriate interactions with students	○	○	○	○	○

APPENDIX I

Final EFA Eigenvalues and Scree Plot

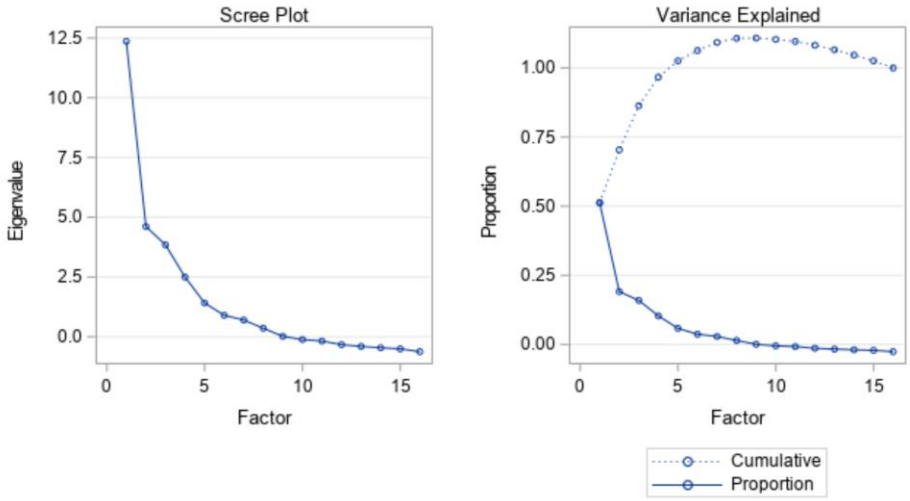
Table I1

Eigenvalues and Variance Explained for Final EFA Model

Factor	Eigenvalue	Proportion of variance	Cumulative variance
1	12.362822	0.5126	0.5126
2	4.6158525	0.1914	0.7039
3	3.8481881	0.1595	0.8635
4	2.5001661	0.1037	0.9671
5	1.4159808	0.0587	1.0259
6	0.9011828	0.0374	1.0632
7	0.7034367	0.0292	1.0924
8	0.357929	0.0148	1.1072
9	0.0203054	0.0008	1.1081
10	-0.1152579	-0.0048	1.1033
11	-0.1778044	-0.0074	1.0959
12	-0.3275591	-0.0136	1.0823
13	-0.4013028	-0.0166	1.0657
14	-0.4584616	-0.019	1.0467
15	-0.5040708	-0.0209	1.0258
16	-0.6218887	-0.0258	1

Figure I1

Scree Plot and Variance Explained Plot for Final EFA Model



APPENDIX J

CFA Paraprofessional Model Factor Loadings

Item	Factor loading	Standard error	t value	Pr > |t|
Factor 1				
Ask for help when needed	0.51	0.103	4.97	<.0001
Promote student independence	0.56	0.097	5.78	<.0001
Demonstrate flexibility and adaptability to changes	0.74	0.078	9.58	<.0001
Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	0.38	0.117	3.24	0.0012
Factor 2				
I feel free to communicate my ideas to the PE teacher	0.94	0.048	19.53	<.0001
I feel free to make decisions that are best for students in PE	0.41	0.106	3.88	0.0001
I feel valued and respected by the PE teacher	0.88	0.051	17.15	<.0001
Factor 3				
Support and model the school's school-wide behavior expectations	0.38	0.132	2.90	0.0037
Communicate positively with supervising teacher and other paraprofessionals	0.34	0.131	2.58	0.01
Sustain appropriate interactions with students	0.48	0.134	3.53	0.0004
Factor 4				
I feel competent working with students in PE	0.70	0.103	6.75	<.0001
I feel competent doing the tasks the PE teacher asks me to do	0.54	0.107	5.01	<.0001
Factor 5				
Use and adapt a variety of approaches, materials, or assistive technology to teach skills	0.57	0.900	6.32	<.0001
Provide instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	0.59	0.087	6.78	<.0001
Adapt to different learning styles, intelligences, and personality types	0.67	0.079	8.45	<.0001

APPENDIX K

CFA for Physical Education Teacher Data

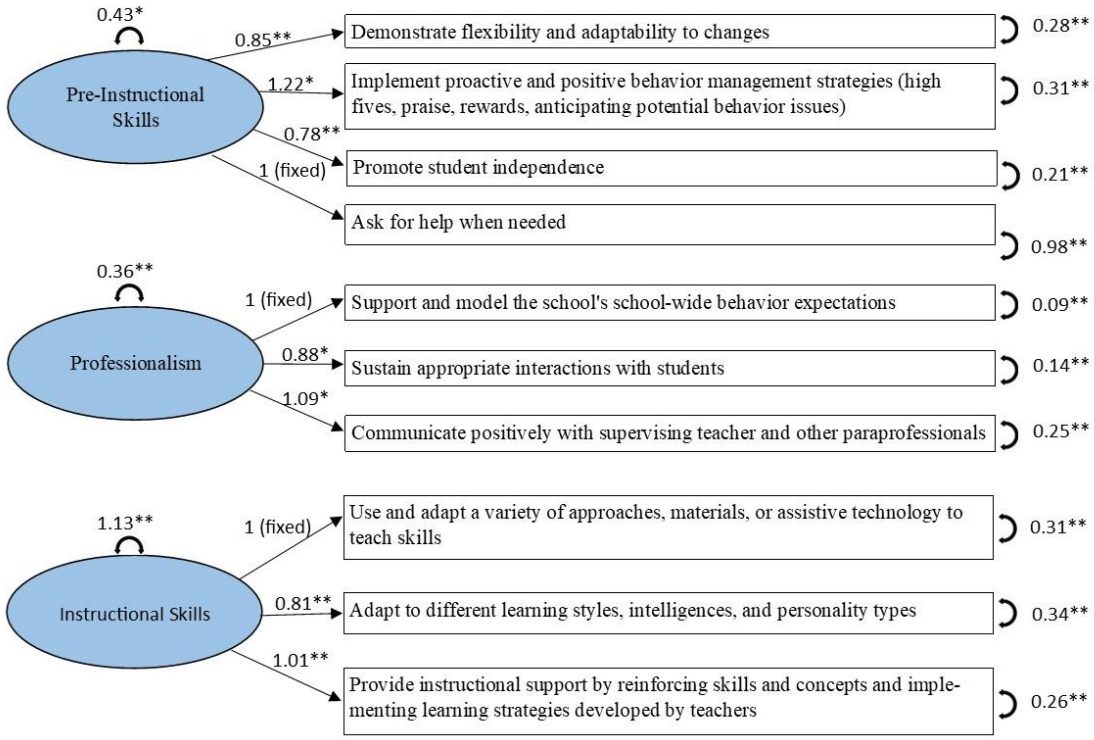
Table K1

CFA Factor Loadings for Physical Education Teacher Evaluations

Item	Factor loading	Standard error	t value	Pr > |t|
Factor 1				
Ask for help when needed	0.55	0.098	5.64	<.0001
Promote student independence	0.75	0.066	11.29	<.0001
Demonstrate flexibility and adaptability to changes	0.73	0.070	10.46	<.0001
Implement proactive and positive behavior management strategies (high fives, praise, rewards, anticipating potential behavior issues)	0.82	0.053	15.53	<.0001
Factor 3				
Support and model the school's school-wide behavior expectations	0.89	0.042	21.14	<.0001
Communicate positively with supervising teacher and other paraprofessionals	0.80	0.057	13.90	<.0001
Sustain appropriate interactions with students	0.81	0.055	14.68	<.0001
Factor 5				
Use and adapt a variety of approaches, materials, or assistive technology to teach skills	0.89	0.037	24.04	<.0001
Provide instructional support by reinforcing skills and concepts and implementing learning strategies developed by teachers	0.90	0.034	26.48	<.0001
Adapt to different learning styles, intelligences, and personality types	0.83	0.047	17.61	<.0001

Figure K1

CFA Model for Physical Education Teacher Evaluations



* p < .05, ** p < .01

VITA

Beverly Lynn Taylor

Candidate for the Degree of

Doctor of Philosophy

Dissertation: PERCEIVED COMPETENCE OF PARAPROFESSIONALS IN ELEMENTARY PHYSICAL EDUCATION

Major Field: Health, Leisure, and Human Performance

Biographical:

Education:

Completed the requirements for the Doctor of Philosophy in Health, Leisure, and Human Performance at Oklahoma State University, Stillwater, Oklahoma in July, 2020.

Completed the requirements for the Master of Science in Health and Human Performance at Pittsburg State University, Pittsburg, Kansas in 2010.

Completed the requirements for the Bachelor of Science in Physical Education at Pittsburg State University, Pittsburg, Kansas in 2009.

Experience:

Elementary Adapted Physical Education Teacher:
Stillwater Public Schools (Stillwater, OK) October 2012-present
Elementary Physical Education Teacher:
Skyline Elementary (Stillwater, OK) Aug-Oct 2012
Cooper Elementary (Tulsa, OK) 2011-2012
Mills Elementary (Owasso, OK) 2010-2011
Graduate Teaching Assistant: Pittsburg State University - 2009-2010

Professional Memberships:

National Strength and Conditioning Association – Since 2009
SHAPE America --- Since 2008