A Factor Analysis of the Student School Uniform Survey

A dissertation submitted in partial fulfillment of the requirements for the degree of Doctor of Philosophy in Educational Leadership

by

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Abstract

The primary purpose of this study was to investigate the factor structure of the Student School Uniform Survey, developed by Sanchez, Yoxsimer, and Hill (2012) for the purpose of collecting data on student perceptions of the benefits of wearing a school uniform. A secondary purpose of this study was to investigate relationships among responses based on student membership in the demographic groupings of gender, ethnicity, and grade level. This quantitative study utilized existing, de-identified data that related to sixth, seventh, and eighth grade students at three middle schools in northern Nevada. The data were collected in each school at the conclusion of the first year of a mandatory school uniform policy. A factor analysis was conducted on 32 of the survey items which revealed 13 of the items contributed to three meaningful factors: Factor 1- Safety and Behavior of Others, Factor 2- Acceptance and My Behavior, and Factor 3- Ease of Going to School. Internal reliability of the survey items was assessed using Cronbach’s alpha coefficient (α), which indicated the 13 variables that related to each of the identified factors had a high degree of reliability (α > .70). To check the factors for reliability, a Pearson’s product moment correlation was conducted. In all cases the identified factors had a high degree of reliability. Finally, three multivariate analyses of variance (MANOVA) were conducted to determine if demographic groups identified by gender, ethnicity, and grade level had discrepant response patterns on the three identified factors. Where significance was found, an analysis of variance (ANOVA) was calculated and the factor means were examined to identify which groups responded higher on each factor. The results revealed that seventh grade students responded higher on Factors 1 and
3, Hispanic/Latino respondents responded higher on Factors 2 and 3, and there were no differences in response patterns by gender.
Dedication

This dissertation and the work that it represents is dedicated to my family for all of the support they have given me over many years. My mother and father were both inspirational to me and supportive of me as I struggled in my early years of school and flourished in the later years. My wife Denise, and my two children Jake and Andrea, have been amazing in their love and encouragement. I could not have accomplished this without the love and support they have given me. Thank you.
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Any significant achievement in life requires the help and guidance of others. My committee members have been exceptionally helpful on my journey. My committee chair, Dr. Hill, has been steady in his support and guidance. Dr. Sanchez has been an invaluable resource for me. She is very knowledgeable of the dissertation process and research methodology, but most importantly she has been extremely generous with her time and knowledge. Dr. Thornton’s and Dr. Maddux’s knowledge of statistics kept me on track as I stumbled through some of the statistical analysis techniques employed in this study. Dr. Janet Usinger’s questions and attention to detail were much appreciated as I prepared to defend this dissertation. Last, but most certainly not least, I would like to thank Howard Rosenberg for his unwavering support and encouragement over many years. In addition, I would like to acknowledge all of my teachers, from elementary school through my doctoral program, who have dedicated their lives to educating me and the thousands of other students whose lives they have touched. Without teachers, there are no doctors.
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CHAPTER I

Introduction

School administrators and teachers are under increasing pressure to close the achievement gap, improve the quality of education all students receive, and make schools safe from internal and external threats. These are daunting challenges under the best of circumstances, but even more so in the face of tighter budgets and more diverse student populations. Since the mid-1980s school officials have increasingly turned to school uniforms to address the issues plaguing America’s public schools (Brunsma, 2004; Anderson, 2002).

Although many school leaders are implementing school uniform policies, mandatory school uniforms continue to be controversial primarily because there is conflicting research on the effectiveness of school uniforms to achieve the intended results (Bodine 2003; Brunsma, 2004). Part of the problem is rooted in the instruments researchers use to gather data; few have been analyzed for construct validity to determine the underlying factor structure and ascertain if the instruments actually assess what researchers think they asses (Burkemper, 2008; Draa, 2005; Reynolds, 2004).

Modern School Uniform Movement in American Public Schools

With the release of A Nation at Risk: The Imperative for Education Reform (United States, National Commission on Excellence in Education, 1983), the foundations of the U.S. educational system came under intense scrutiny. School leaders across the nation sought to address the challenges they faced. Although the report did not specifically address school uniforms, it did focus on student achievement and a standards-based curriculum to promote greater student success. As administrators at
schools and school districts attempted to heed the call for higher student achievement, some turned to school uniforms as a way to achieve academic and behavioral improvements. School leaders at Cherry Hill Elementary School in Baltimore, Maryland were among the first to actively publicize a uniform policy (Anderson, 2002). An elementary school serving low- to middle-income, predominantly African-American families, Cherry Hill administrators implemented a uniform policy in 1987 to reduce clothing costs as well as reduce social pressure on students (Brunsma, 2004). Soon after, leaders at several other Baltimore-area schools adopted a uniform policy. The initiative was dubbed “The Uniform Project” (Brunsma, 2004, p. 16). The year after The Uniform Project was initiated in Baltimore, Mayor Ed Koch of New York and New York school Chancellor Richard Green proposed a pilot school uniform project, which was implemented in 1989 (Brunsma, 2004). In turn, leaders in school districts across the country, including districts in Chicago, Detroit, and Los Angeles, implemented uniform policies. Some were district-wide initiatives, while others were initiatives in individual schools. The common factors in all of the early uniform policies were that uniforms were voluntary and policies were primarily implemented in schools serving poor and minority students in urban areas (Brunsma, 2004).

In 1994, Long Beach Unified School District (LBUSD) was one of the first and largest school districts in the United States to require all students in the district to wear uniforms. As a consequence, Long Beach received a great deal of attention from researchers and politicians; several studies were conducted on the Long Beach uniform implementation process (Firmin, Perry, & Smith, 2006; Stamison, 2006; Stanley, 1996). The impetus for the Long Beach uniform policy was stated as: “To combat ‘gang wear’, 
or gang-related clothing, soothe the frenzy over designer clothing that highlights economic disparities and help pupils focus on learning” (Melvin, 1994, p. 7). After one year of mandatory common dress, LBUSD reported impressive gains in safety and improvement in student behavior (Stanley, 1996). Long Beach officials reported a dramatic reduction in fights by more than 50%, assaults and batteries by 34%, sex offenses by 74%, robberies by 66%, suspensions by 32 %, and vandalism by 18% (Cohn & Siegel, 1996; Kennedy, 1995; Wade & Stafford 2003). In addition to the tremendous gains in safety, district officials noted that in some of the schools there was a significant improvement in grades and student achievement (Stamison, 2006). However, much of the LBUSD data were gathered using perception surveys, not quantitative empirical data (Stamison, 2006). The questions regarding the validity of LBUSD data supporting claims of dramatic improvements in academic achievement and behavior undermined the credibility of the results in Long Beach (Stamison, 2006).

Despite challenges to the data, the results reported by LBUSD prompted President Bill Clinton to advocate for school uniform policies in his State of the Union address in 1996 (Firmin et al., 2006). President Clinton’s endorsement of school uniforms encouraged many more stakeholders in school districts around the country to implement mandatory uniform policies. As student uniforms become more prevalent in public schools across the United States, the debate over the effectiveness of uniforms to achieve the goals proclaimed by school leaders who implemented common dress policies elicited strong reactions from both sides of the issue (Brunsma & Rockquemore, 1998; Brunsma & Rockquemore, 2003; Brunsma, 2004; Firmin et al., 2006).
Problem Statement

Despite of the rise in the number of schools that have uniform dress codes, there is a dearth of research on the effectiveness of uniforms as a means of improving academic achievement and reducing undesirable behavior in public schools. Attention has been given to common dress by researchers; however, there is no clear consensus on the ability of uniforms to achieve the types of improvements sought by proponents (Brunsma, 2006a). One criticism confounding the issue is that many researchers are conducting surveys with instruments that have not been validated (Draa, 2005; McGloin, 2009; Padgett, 1998)

Research on school uniforms has either relied on quantitative data, such as school discipline entries, attendance records, and grades, or researchers have used perception data in an attempt to capture the perceived impact of mandatory school uniforms on school climate, safety, and student self-esteem. Perception studies utilize a variety of instruments to collect data, including the Self Perception Profile for Children (Wade & Stafford, 2003), the Comprehensive Assessment of School Environments (Murray, 1996; Wade & Stafford, 2003), and Metropolitan Life’s American Teacher Survey: Violence in American Public Schools: The Family Perspective (Metropolitan Life Insurance Company, 1994). Moreover, many studies rely on researcher-generated surveys without established validity and reliability. School officials and other stakeholders considering a mandatory uniform policy need an instrument that can accurately quantify student attitudes about mandatory school uniform policies.
**Purpose of Study**

This study assessed the validity and reliability of the Student School Uniform Survey, a survey instrument created by Sanchez, Yoxsimer, and Hill (2012), which was initially used to examine the perceived benefits of a mandatory school uniform policy at an urban middle school. Subsequently, The Student School Uniform Survey was administered at two additional middle schools the following year at the conclusion of the three middle schools in northern Nevada at the end of the first year of a mandatory uniform policy. The data from one of the schools were analyzed and used as the basis of an article published in *The Journal of School Violence* (Sanchez, Yoxsimer, & Hill, 2012). The data were analyzed using chi square tests of independence and Pearson’s product moment correlation. For the purpose of this study, the Student School Uniform Survey was analyzed to determine empirical factors and reliabilities.

**Student School Uniform Survey**

The Student School Uniform Survey was developed by Sanchez et al. (2012) to assess student perceptions of the benefits of a mandatory school uniform policy, including increased safety, ease of going to school, bullying, decreases in discipline, gang involvement, confidence, and self-esteem. The Student School Uniform Survey was administered at the conclusion of the first year of a mandatory uniform policy at three urban middle schools in northern Nevada.

**Research Questions**

A variety of researcher-developed surveys designed to gather student perception data have been utilized in much of the research regarding impacts of mandatory school uniforms on the climate and culture of schools (Alleyne, LaPoint, Lee, Mitchell, 2003;
Few of the researcher-developed surveys have empirical data to support the reliability of these instruments. The primary purpose of this study was to employ exploratory factor analysis to assess the construct validity of the survey instrument developed by Sanchez et al. (2012). The research questions guiding this study were:

- **Research Question 1.** Given the survey dataset, what are the empirical factors of the survey instrument?
- **Research Question 2.** Given the empirical factors established in Research Question 1, what are the internal reliabilities of each factor?
- **Research Question 3.** Do relationships exist among the identified factors from Research Question 1?
- **Research Question 4.** Are the perceptions of various groups, as identified by the demographic variables, different on the newly identified factors of the survey instrument? Of specific interest, are groups established by grade level, ethnicity, and gender.

**Significance of the Study**

The study is significant in several ways. First, this study provides empirical psychometric information on the reliability and validity of the survey instrument developed by Sanchez et al. (2012). Researchers and school leaders could use this information to develop survey instruments that more accurately measure intended targets. The focus of the Student School Uniform Survey is student perceptions of behavior problems, self-esteem, confidence, feeling equal to others, feeling accepted by others, ease of going to school, and school safety. Items in the survey that are found not to be
reliable will be removed. The resulting survey will be thoroughly vetted and could be used for further research.

**Limitations and Delimitations**

This study was conducted acknowledging the following limitations:

1. The students surveyed in this study were public middle school students who were mandated to wear a uniform.
2. The subjects were a sample of convenience because there are eight middle schools in the district with mandatory uniform policies.
3. In all three schools, the first survey was given to students who had not previously been made to wear a uniform to school, which may have influenced how they responded to the survey.
4. Despite being told otherwise, students may have believed their responses could influence the administrative policy regarding uniforms and, therefore, may have altered their response.
5. Students were encouraged to be as honest as possible, yet some student responses may not have been truthful.
6. The results of this study are not widely generalizable.

The study has the following delimitations:

1. All student data collected was included for analysis.
2. All students in core academic classes present on the day the survey was administered were provided the opportunity to participate in the study.
Definition of Terms

The following terms can have various meanings in different contexts, but for the purpose of this study the definitions below will apply.

**Administration.** The school site administrative staff, including the principal, assistant principal, and dean of students.

**District Administration.** The school district educational leaders, including the superintendent and area superintendents in charge of schools.

**Cronbach’s alpha coefficient (α).** An index of reliability often used to assess the internal consistency or average correlation of items in a survey instrument (Santos, 1999).

**Eigenvalue.** The amount of total variance explained by each factor (Mertler & Vannatta, 2004).

**Factor.** Variations in independent variables that relate to and are components of a larger group of variables (Sprinthall, 2007).

**Factor Analysis.** A method of data reduction that analyzes relationships within a set of variables resulting in the construction of a lesser number of hypothetical factors that contain the essential information in the larger set of variables (Stapleton, 1997).

**Factor Extraction.** The process of identifying factors from a larger set of variables (Mertler & Vannatta, 1974).

**Factor Loading.** Factor loading is defined as the correlation of a variable with a factor. Factor loadings range from -1 to 1 (Mertler & Vannatta, 2004).

**Longitudinal Perception Studies.** Studies which collect data multiple times in the same school over a period of years and ask the same questions about student perceptions and opinions.
**Mandatory Uniform Policy.** The common dress policy implemented within each school after going through a process that elicited input from parents, teachers, students, administration, and other interested community stakeholders. Mandatory uniform policies must include an opt-out option in Nevada, where this study was conducted.

**Multivariate Analysis of Variance (MANOVA).** A statistical procedure designed to test the significance of group differences when two or more dependent variables are providing different measure of the same thing (Mertler & Vannatta, 2004).

**Participants.** For the purpose of this study, participants refers to the students who voluntarily completed surveys for the dataset.

**Pearson’s correlation coefficient (r).** A measure of the relationship that exists between two quantifiable variables when both variables represent interval measures. The degree of relationship is represented by a correlation coefficient ranging from -1.00 to 1.00 (Mertler & Vannatta, 2004).


**Researcher-Generated Survey.** Survey created by the researcher or researchers, designed to gather quantitative or qualitative data.

**Rotation.** Rotation is a mathematical process of making the factor solution more interpretable without changing the underlying mathematical structure (Mertler & Vannatta, 2004).

**School Uniform.** Refers to the common dress that is agreed upon by the administration, parents, and other interested parties. The uniform at all three middle
schools consisted of a polo shirt with the logo of the school on the upper left chest and khaki pants. Some school policies allowed black pants.

**Scree Plot.** A scree plot is a graphical representation of the magnitude of each eigenvalue plotted against their ordinal numbers (Mertler & Vannatta, 2004)

**Validity.** A measure of the “degree to which all of the accumulated evidence supports the intended interpretation of test scores for the intended purpose” (AERA et al., 1999, p. 11).

**Variable.** Measurable attributes of data that can vary. Variables are used in research to determine differences among outcomes (Sprinthall, 2007).

**Summary**

This chapter gave a brief history of the school uniform movement in the United States. In addition, this chapter defined the problem and the purpose of this study. The research questions that drive this study were outlined, as well as the significance of the study. Limitations and delimitations of the study were identified and the terms used in this paper were defined as they relate to this study. Chapter II will present a literature review of factor analysis and a discussion of reliability and validity. Next, Chapter II will examine school uniforms and the current survey instruments being used in school uniform research, followed by a comprehensive literature review of the theoretical basis of the study, school uniforms and child development, the legal aspects of school uniforms, the current research on school uniforms, and finally the statistical methods that will be used in this study. Chapter III will provide a detailed explanation of the methodology to be used in this study to address the research questions stated above.
Chapter IV will report the findings of the research, and Chapter V will be a discussion about the implications of the study and areas for future research.
CHAPTER II

The purpose of this study was to investigate the factor structure of the Student School Uniform Survey created by Sanchez, Yoxsimer, and Hill (2012) and used to gather data on students’ perceptions on the benefits of wearing a school uniform. Although the implementation of mandatory school uniform policies continues to proliferate in the United States, there is no clear consensus on the effect uniforms have on student achievement, nor the many other challenges administrators and school communities are hoping uniforms will address. One problem clouding the issue is the dearth of empirical research on school uniforms (Brunsma, 2006a). Confounding the issue further is that researchers disagree on the treatment and interpretation of existing data (Bodine, 2003a; Brunsma & Rockquemore, 2003). In addition, many survey instruments researchers are currently using have not been studied for empirical factors (Alleyne et al., 2003; Bodine, 2003a).

This review of literature is divided into two major sections. The first section will address the literature surrounding factor analysis. Specifically, the first section will address exploratory factor analysis (EFA) which was employed in this research. EFA is a process of variable reduction that attempts to identify the underlying factor structure of a survey instrument. The second section of this review of literature will address the research investigating school uniforms.

Factor Analysis

Factor analysis is a method of variable reduction by determining which variables cluster together. The variables can be instrument questions or respondents (Henson & Roberts, 2006; Mertler & Vennatta, 2004). Factor analysis can help determine which
theoretical constructs are present in a given data set. Factor analysis can also be a useful technique for establishing evidence of validity based on internal structure (Henson & Roberts, 2006).

Factor analysis has become increasingly popular with the advent of computers and statistical software packages like SPSS (Thompson, 2004). The process of factor analysis requires the researcher to make a series of decisions which can affect the inferences made from an instrument’s scores; therefore, it is imperative that the steps taken, decisions made, and justifications for decisions are thoroughly documented to assist in evaluation of the research and make the process clear for other researchers who may want to replicate the research (Henson & Roberts, 2006).

A review of the literature reveals five components that need to be considered when planning and reporting factor analysis procedures: (1) Factor model and estimation method; (2) Sample size suggestions for factor analysis; (3) Factor extraction techniques most commonly used to identify the assessed factors; (4) Rotation criteria, which is the mathematical process of identifying those variables that are most closely aligned without changing the underlying structure of the instrument; and (5) Factor retention, which is a process of analyzing the data to determine which theoretical constructs are present in the instrument and should be reported (Comrey, Reise, & Waller, 2000). All five of these components will be discussed in more detail below.

**Factor Analysis Models**

There are two types of factor analysis: exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). Exploratory factor analysis is an inductive approach
in that researchers develop conclusions from observations. Basically, researchers are attempting to identify the underlying factors present in a set of measured variables. The focus of EFA is the factor, and the questions or tasks (measured variables) are the conduit that allows some aspects of the factor to be seen (Meyers, Gamst, & Guarino, 2013). Confirmatory factor analysis, on the other hand, seeks to confirm an existing theory, and represents a deductive approach because researchers are predicting an outcome from a theoretical framework. Instead of comparing every question to each factor, researchers assign measured variables to each factor. Not all of the factors are necessarily correlated, and some of the variations are hypothesized to be correlated (Meyers et al., 2013). A larger data set is necessary for CFA, and it can be more difficult to perform. Both EFA and CFA are based on common factor analysis, which proposes that every response is influenced in part by common factors and in part by unique factors (DeCoster, 1998).

Principal components analysis (PCA) is a statistical technique for factor extraction similar to exploratory factor analysis (EFA). The primary difference between PCA and EFA is that PCA is a single procedure conducted in an attempt to explain the total variance of the variables, whereas EFA is a multiple step procedure where the focus is on the common variance the variables share. As a result, PCA is less complex mathematically (Meyers et al., 2013). The components identified by PCA are weighted linear combinations of variables in the analysis, where each variable’s distance from a component is calculated; the stronger the relationship to the component, the higher the correlation. An underlying assumption of PCA is that the components are orthogonal in nature, meaning they are not related to one another. Therefore, the explained variance is additive: the first identified component will account for the most variance, the second
component will account for the second most amount of variance, and so on until all of the components are identified and all of the variance has been accounted (Meyers et al., 2013; Nie, 1975). Because the first component accounts for the most variance, and the last identified component accounts for the least amount of variance, the researcher must determine how many components should be retained for further rotation and analysis.

**Sample Size Criteria**

There is no general consensus regarding rules governing sample size criteria for factor analysis. MacCallum, Widaman, Zhang, and Hong (1999) commented that “the common rules of thumb regarding sample size in factor analysis are not valid or useful” (p. 96). However, it is commonly accepted that larger sample sizes produce better results and are more stable across sampling (DeVellis, 2003). The only true consensus regarding sample size is that it should be left up to each researcher to determine the most appropriate sample size for a particular study.

Several researchers have suggested guidelines for participant-to-variable ratios and overall sample size for factor analysis studies (Guadagnoli & Velier, 1988; Mertler & Vannatta, 2004; Tabachnick & Fidell, 2007). To get an accurate estimated reliability, Tabachnick and Fidell (2007) suggested a sample size of at least 300. Tabachnick and Fidell noted that a sample of 150 participants was sufficient if there were several high loading marker variables (> .80), which would indicate a variable is highly correlated to a particular factor. Bryant and Yarnold (1995) indicated that a sample should be five times greater than the number of variables. For example, a survey with 50 items should have a sample of 250 participants.
Factor Extraction and Retention

As with sample size, there is no one rule governing how many factors should be extracted for further rotation. It is important to extract an appropriate number of factors; too few and the subsequent rotation can be skewed, while retaining too many can lead to poorly defined rotated factors resulting in fewer factors with prominent loadings (Reise, Comrey, & Wallner, 2000). It is desirable, however, to over-extract than under-extract as studies have shown that under-extraction leads to factors with significantly more error (Wood, Tataryn, & Gorsuch, 1996).

There are several methods of extraction that provide guidance as to how many factors should be extracted. Kaiser (1960) proposed one of the most widely used factor extraction methods. Kaiser (1960) suggested retaining all factors with an eigenvalue (the total amount of variance explained by a factor) greater than 1.00, which is the current default in IBM SPSS. However, this method has been widely criticized for including too many factors in the final solution and is more commonly used today as an upper boundary of factors to retain (Meyers, Gamst, & Guarino, 2013). Scree plots, one of the most popular guides for identifying how many factors to retain, are used to visually assess where the eigenvalues drop off. A scree plot is a graphical representation of the magnitude of each eigenvalue plotted against the number of factors (Mertler & Vannatta, 2004). The rule of thumb is to retain the number of factors where the sharp descent of the scree plot flattens out. Although helpful, there is a good deal of researcher subjectivity involved in identifying the point at which a scree plot flattens out and if factors should be excluded or included for further rotation. (Meyers et al., 2013). An extension of a scree plot is parallel analysis, where a random data set is used to create a second scree plot. The
point where the two plots intersect is the maximum number of factors that should be extracted (Reise et al., 2000). Henson and Roberts (2006) suggested that parallel analysis is the most accurate method. Because a particular factor extraction method directly affects the EFA results, Henson and Roberts (2013) encouraged researchers to use “multiple criteria and reasoned reflection” (p. 399) in addition to explicitly explaining the strategies employed in making factor retention decisions.

**Factor Rotation**

After factors have been extracted from the data, most researchers rotate the factors to discover relationships between the different observed variables without altering the underlying structure (Mertler & Vannatta, 2004). The goal of rotation is simple structure, which implies each variable is highly loaded on one or more factors while the other items have very little or no loading to those factors (Meyers et al., 2013; Thurstone, 1947). Researchers must look for the best fit from solutions gained from the rotations, which means that the solution that best satisfies the theoretical and practical needs of the research should be selected (Mertler & Vannatta, 2004).

There are two types of rotational strategies that are most commonly used: orthogonal and oblique. In orthogonal rotation, the factors are not allowed to correlate with one another, whereas in oblique rotations the different factors are allowed to correlate (Henson & Roberts, 2006). Orthogonal rotation produces a loading matrix that shows the extent of the relationships between the observed variables and extracted factors. There are three types of orthogonal rotation, which will be discussed in more detail below. Oblique rotation generates three matrices: correlation matrix, pattern matrix, and a structure matrix. A correlation matrix show relationships among items, a
pattern matrix shows unique relationships among items with no overlap, and a structure
recommended using orthogonal rotation because the goal of factor analysis is to obtain
unrelated factors, but Meyers et al. (2013) suggested starting with an oblique rotation first
so researchers can decide which rotational strategy is the most appropriate. The choice of
which rotation method should be driven by the theory or model that instigated the study
(Meyers et al., 2013).

The three types of orthogonal rotation most commonly used are varimax,
quartimax, and equamax, with varimax being the most common orthogonal rotation
employed. Each of the three types of rotation aims to minimize factor complexity.
Varimax rotation maximizes the variance of each factor, quartimax rotation maximizes
variance loading on each instrument item, and equamax uses a combination of varimax
and quartimax rotation procedures. Terminal factors can be identified upon interpretation
of the results (Mertler & Vannatta, 2004).

Factor Analysis Studies

Many studies have employed factor analysis as evidence of validity for a survey
instrument, but this review will focus on two recent studies that utilized similar
methodologies and purpose as the current study. Turk-Fiecoat (2011) used factor analysis
to examine the construct validity of a widely used survey instrument. Coleman (2006)
tested the construct validity of an instrument by comparing the Rasch measurement to
confirmatory factor analysis (CFA) and exploratory factor analysis (EFA).

Turk-Fiecoat’s (2011) study utilized factor analysis to assess the construct validity
of an instrument commonly used to measure student perception of value with student
union facilities. Principal components analysis, along with various extraction methods, identified five constructs from the 56 scaled survey items. As a step in her process, a cluster analysis was then conducted to identify relationships between student satisfaction and perception of value. The results of the analysis indicated that the overall instrument was valid, although several of the items and at least one construct were not supported by the data. Additionally, Turk-Fiecoat suggested that several survey items should be further reviewed to strengthen the data collection around the measured constructs.

Coleman (2006) examined and compared the use of Rasch measurement, exploratory factor analysis (EFA), and confirmatory factor analysis (CFA) in establishing construct validity evidence based on internal structure of an existing survey instrument using multi-item scales which purports to measure student motivation. The results of the study showed that when items were analyzed individually, all three methods corroborated unidimensionality. However, the multi-factor model identified through EFA was not supported by the CFA or Rasch analysis when all items were analyzed together.

Factor analysis is widely used to investigate the underlying factor structure of a survey instrument (Bailey-Jones, 2008; Smith, 2003). This study employed exploratory factor analysis to determine the latent factors present in the Student School Uniform Survey. The following section of this chapter will discuss the literature surrounding reliability and validity.

**Reliability and Validity**

Measurement is central to understanding and adapting applied practice (Meehl, 1978; O’Donohue, 1989), but the ability to determine if the data obtained from the instrument are of any value is critical (Cone & Foster, 1991). Reliability and validity are
inextricably linked in that an instrument needs to measure the intended target, validity, and in a consistent fashion, reliability. Faulty measures can be reliable, but not valid, or valid but not reliable, neither of which is good (Trochim, 2006). Educational researchers have struggled with poor measurement and the inability to quantify latent traits (Bond & Fox, 2001). As educational stakeholders increasingly demand scientifically based research that can be replicated and demonstrates evolution of knowledge over time, research methods cannot rely on observation of raw scores, but must depend on quality instrument construction and show evidence of validity (Coleman, 2006).

The following section of this literature review will address accepted best practice for establishing reliability and validity of a survey instrument, as well as established methods of factor analysis. The discussion that follows informs methodology for the current study.

Reliability

Reliability refers to the measure of consistency of an instrument, which directly impacts the validity of the data gathered by the instrument (Carmines & Zeller, 1979; Sprinthall, 2007). Reliability measures indicate the relationship between the instrument items, identified participant populations, and the application context of the tool (AERA et al., 1999). There are four general methods used to assess the reliability of a survey instrument: inter-rater, test-retest, parallel forms, and internal consistency (Sprinthall, 2007). Each method will be discussed in more detail below, including advantages and disadvantages of each and the value associated with each method.

Inter-rater reliability is the extent to which different observers rate an event consistently using the same measure (Trochim, 2006). There are two primary ways to
estimate inter-rater reliability: categorical and continuous. For categorical inter-rater reliability, percent agreement between observers is calculated for each observed category. For continuous inter-rater reliability, the correlation between the ratings of the observers is calculated (Trochim, 2006). A commonly used measure of inter-rater reliability is Cohen’s Kappa. Scores for Cohen’s Kappa range from 0.0 to 1.0, where a lower score suggests that differences between raters were chance, and a higher score indicates lower reliability (Wood, 2007).

Representing inter-rater reliability as a single concept is imprecise. A more accurate representation can be obtained by classifying inter-rater reliability into three categories for which different statistical methods can be used to calculate estimates (Stemler, 2004). The three categories are consensus estimates, consistency estimates, and measurement estimates. Consensus estimates assume that different raters can agree on rubric levels to be applied to observable phenomenon. Percentage agreement is the most popular method used to calculate consensus agreement, but other methods such as Cohen’s Kappa are used as well. Consistency estimates assume that observers will consistently apply a rating scale to observable behaviors even if they do not agree on the meaning of the rating scale. Pearson’s product moment correlation coefficient is commonly used to measure consistency estimates, although Spearman’s rank coefficient may be used when the data are not normally distributed. Cronbach’s alpha coefficient (α) may be used when there are multiple judges. Measurement estimates create a summary score for each respondent based on all of the information provided by the observers or judges. “Measurement estimates are best used when different levels of the rating scale are
intended to represent different levels of an underlying unidimensional construct” (e.g., mathematical competence) (Stemler, 2004, p. 1).

Test-retest is another method for establishing the reliability of an instrument, whereby consistency of the instrument is measured over multiple administrations (Key, 1997; Sprinthall, 2007; Trochim, 2006). Several factors have to be taken into consideration when calculating estimates of reliability, such as time between administrations, the practice effect, and respondent fatigue and boredom in cases of a short rest time between testing (Sprinthall, 2007). The closer in time the two observations occur, the greater the correlation between error factors, which is the test-retest estimate of reliability. Hence, considerably different estimates of reliability can be obtained depending on the time interval between measurements (Trochim, 2006). Various correlation coefficients can be used to determine test-retest reliability; therefore, one that is appropriate for the type of data being collected should be used (Rummel, 1976).

Parallel-forms reliability is exactly as its name suggests: two tests constructed at the same time, with the same structure, content, difficulty of items, and administered to the same sample group (Sprinthall, 2007). A large number of questions must be generated and randomly divided into two sets, which are then used to create two tests. Parallel-forms reliability assumes that the two sets of questions are similar in content, difficulty, and structure, and that the time between administration of the tests is sufficient enough to prevent fatigue (Sprinthall, 2007; Trochim, 2006). An estimate of reliability is calculated by correlating the test results. As with test-retest reliability, a statistically appropriate correlation coefficient should be used when calculating reliability of parallel-forms (Rummel, 1976).
Internal-consistency is a fourth method of reliability testing that assesses the consistency of an instrument across items. Test items measuring the same construct are measured for consistency by calculating an average inter-item correlation, an item-total correlation, a split-half reliability test, or Cronbach’s alpha coefficient ($\alpha$) (Trochim, 2006). Average inter-item correlation simply computes the mean of each item pair, and then calculates the mean for all of the correlations. Item-total correlations use the inter-item correlations and then calculate the mean for each item which becomes a new variable. Split-half reliability randomly divides all items that measure the same construct into two sets. The entire instrument, comprised of both sets of questions, is then administered to respondents. The total score for each set of questions is calculated and the correlation between these two sets of scores is the split-half reliability estimate. However, because the test items were divided, the resulting reliability estimate is underestimated. The Spearman-Brown prophecy formula can be applied to compensate for the underestimation (Sprinthall, 2007).

Cronbach’s alpha coefficient ($\alpha$), which is probably the most commonly used reliability estimate, is another method of assessing a test’s reliability (Trochim, 2006). One of the main advantages of Cronbach’s alpha coefficient ($\alpha$) is that it can identify which items are or are not contributing to the overall reliability because each item is assessed for variability (Sprinthall, 2007). To calculate coefficient alpha the split-half estimate is calculated for every possible combination of test items, yielding a mean for the total possible number of split-half estimates. A scale of 0.0 to 1.0 is used where scores closer to 1.0 indicate the null hypothesis of no correlation can be rejected (Rummel, 1976; Sprinthall, 2007)
Each of the aforementioned methods for calculating reliability will give a different value for reliability, and each method is best for certain situations. Inter-rater reliability is best used when measuring observations. It can be used with one rater over multiple observations, or it can be used with multiple raters (Trochim, 2006). Parallel-forms is most commonly used when alternate measures of the same variables are desired. One of the primary drawbacks of parallel-forms and all internal consistency estimators is that multiple items for the same construct must be designed (Trochim, 2006). Test-retest is most useful for experimental and quasi-experimental designs when there is no control group; one group is tested two times generating pretest-posttest data (Trochim, 2006). Cronbach’s alpha coefficient ($\alpha$) is used when respondents are asked to agree or disagree with statements, such as Likert-type questionnaire items (Key, 2007). The appropriate method for calculating a reliability estimate should be chosen to ensure the estimate is the most accurate measure of reliability.

Validity

Validity is “the most fundamental consideration in developing and evaluating tests” (AERA et al., 1999, p. 9). In the most basic terms, validity refers to the ability of a test to accurately measure what it is intended to measure (Sprinthall, 2007). A more technical definition is offered by the Standards for Educational and Psychological Testing (1999), “It is the degree to which all of the accumulated evidence supports the intended interpretation of test scores for the proposed purpose” (p. 11). In other words, every intended use of test scores must be validated for that use (AERA et al., 1999).

The traditional concept of validity focuses on three sources, which Mason and Bramble (1989) identified as content, construct, and criterion validity. AERA et al.
(1999) deviates from the traditional nomenclature of validity and instead identifies five types of validity evidence. Validity evidence based on (a) test content, (b) response processes, (c) internal structure, (d) relations to other variables, and (e) consequences of testing. This review of literature will focus on the sources of validity evidence identified by the Standards of Educational and Psychological Testing (1999).

Content validity evidence is based on test content, bias and sensitivity review, item try-out and statistical reviews, alignment studies, and other processes (Cizek, n.d.). Analyzing the relationship between the test content and the construct the instrument is intended to test can often provide important information (AERA et al., 1999). Test content refers not only to the content domain included on the test, but also the wording, format, tasks and questions, and guidelines for administration and scoring (AERA et al., 1999). Construct defines an attribute or behavior an individual may possess, such as honesty, but may be difficult to observe. Content validity evidence ultimately supports, or not, how well the test and the identified construct are aligned (AERA et al., 1999).

Evidence based on the response processes in which an individual engages while taking a test can provide information regarding the fit between the targeted construct and the nature of the performance examinees are actually engaged while testing (AERA et al., 1999). Depending on the nature of the test, evidence of the fit between the components of the test can be gathered in a variety of ways: through items that ask respondents to show their work, through interviews while respondents are working through items, tracking eye movements, and response times to items (AERA et al., 1999). The internal structure of a test can also provide evidence of validity. Sub-score reporting is one way to scrutinize the internal structure of a test for evidence of validity (Cizek, n.d.). Analyzing disaggregated
test scores into sub-score groups or strands can provide evidence that a set of test items supports inferences about a construct (Cizek, 2009). Statistical methods, such as factor analysis, can also be used to determine homogeneity and dimensionality of a collection of test items (AERA et al., 1999).

Item homogeneity refers to the relationships between items and underlying factors and the extent to which the different sets of survey questions support the intended construct (Coleman, 2006). Although item homogeneity as a source of validity evidence is supported by the literature, an overdependence on inter-item relationships and item homogeneity can be misleading (Gorsuch, 1997). Therefore, dimensionality as identified through factor analysis is commonly used as evidence of validity.

Dimensionality refers to an instrument’s intended purpose and ideology based on the hypothesized theoretical structure. In other words, if students’ feelings of safety are theorized to exist in two dimensions, then confirmation or rejection of that structure will influence the inferences one can draw from scores on the instrument. The theoretical foundation of an instrument is important because it provides a framework to understand the instrument and inferences (Coleman, 2006). Additionally, the theoretical underpinnings of an instrument help identify whether the purpose of the future statistical analysis is to investigate a theory or determine the construct (Coleman, 2006). Typically, research to provide evidence of a theory is preferred. However, that may not be the case when there is limited understanding of the construct or the instrument, and researchers must use statistical methods such as factor analysis to build theory (Smith & McCarthy, 1995).
A fourth source of validity evidence rests in the relationship the observed behavior has to other variables. Correlations are used to discover relationships that may or may not have been predicted (Cizek, n.d.) Evidence based on the consequences of testing is the fifth and final source of evidence that the *The Standards for Educational and Psychological Testing* recommends and is also the most controversial (Cizek, Brown, & Church, 2010). If unintended consequences result from participants taking a test, those consequences should have no bearing on the validity of the test (Cizek, n.d.; Cizek, et al., 2010).

The survey for the current study was created prior to the study being conducted, so there was no opportunity to gather validity evidence through survey construction processes, such as item construction procedures, pilot administration responses, and other procedures. Therefore, it is necessary to examine the internal structure as evidence of validity for this instrument to ensure the inferences about the identified constructs are supported (Cizek, 2009; AERA et al., 1999). Most researchers measuring constructs use Cronbach’s alpha coefficient (α) as evidence of an instrument’s reliability, thereby validating the internal structure, so there is limited discussion of validity evidence in the literature (Hogan & Agnello, 2004). Hogan and Agnello explained this by acknowledging that internal consistency reliability is easier to obtain than validity evidence.

Several pieces of evidence are examined when considering internal structure as evidence of validity. One aspect is the extent of the relationship between items, between underlying factors, or how consistent the inter-item relationships are with the construct. Dimensionality of the instrument is also taken into consideration. Additionally, the item functioning is considered, which includes individual item functioning, inter-item
functioning, differential item functioning (DIF), and how well the test items explain the
theorized continuum of the construct (AERA et al., 1999; Coleman, 2006).

“Internal consistency estimates relate to item homogeneity, or the degree to which
the items on a test jointly measure the same construct (Henson, 2001, p. 177). To
establish that items on a test are functioning as anticipated, item-to-total and inter-item
correlations are calculated. Collinear items would be expected to have some degree of
correlation between items and item scores. Conversely, no correlation would be expected
between non-collinear items (Gorsuch, 1997).

Differential item functioning (DIF) occurs when the same test item consistently
receives different responses from different groups with similar characteristics (AERA et
al., 1999). Such differences suggest that an item may be biased and needs to be modified
or eliminated. However, different responses may also be a result of the relationship of the
test content or task to the conceptual framework of the instrument. In such a case, the DIF
would not be detrimental to the argument for an instrument’s validity (AERA et al.,
1999).

To select the most appropriate piece of evidence to evaluate an instrument’s
internal structure, it is essential to consider the intended purpose of the instrument and the
inferences that might be drawn from the scores (Cizek, 2009). Score reliability estimates
are often derived from inter-item relationships and used as a substitute for validity
evidence. However, inter-item correlations provide a lower-bound estimate of validity
(AERA et al., 1999; Coleman, 2006).
School Uniforms

This review of literature surrounding school uniforms is divided into three major sections. The first section addresses the arguments for and against school uniforms. The second section examines the survey instruments currently being used to study student perceptions of school uniforms. The following section addresses the current research on school uniforms and the debate surrounding the impact mandatory uniform policies have on desired results. Lastly, the theoretical framework for studying school uniforms will be presented, along with the theoretical framework for reliability, validity, and factor analysis.

Arguments in Favor of School Uniforms

The primary reason school administrators cite for implementing mandatory school uniform policies is to improve school safety by eliminating the clothing associated with gang membership (Ramirez, Ferrer, Cheng, & Cavanaugh, 2011). Uniform proponents cite safety benefits, such as lowering student victimization (Scherer, 1991), reducing gang activity and fights (Kennedy, 1995; Loesch, 1995), more easily identifying strangers on campus (Starr, 2000), reducing substance use, and lowering suspension rates (Gursky, 1996) as reasons to implement a uniform policy. Because gang members identify themselves by wearing certain colors, accessories, or wearing clothing in a particular way, enacting a uniform dress code may minimize the overt symbols of gang activity (Holloman, 1995; Kommer, 1999; Starr, 2000). Uniforms may also serve to reduce fights and assaults because they are often a result of clothing-related problems; uniforms are thought to reduce student-on-student violence (Murray, 2002).
Violence related to clothing was strongly recognized after the Columbine shootings in 1999. Specifically, the two students who attacked and killed 12 students and a teacher were members of the “trench coat mafia”, symbolized by wearing baggy clothing and trench coats (Ogle & Eckman, 2002). Many proponents of mandatory uniform policies used the Columbine tragedy as justification for uniform implementation (Ogle & Eckman, 2002). Bodine (2003b) pointed out that when asked why uniforms were implemented in Milpitas, California, “Columbine type violence” (p. 51) was frequently mentioned.

Bodine (2003b) also noted in her study of the uniform initiative in Milpitas, California that many who were interviewed stated that uniforms helped prevent girls from becoming sexualized at increasingly younger ages. Additionally, it was argued that uniforms protect boys from tough, often violent, images popular in youth fashion, such as chains worn as accessories (Bodine, 2003b).

Furthermore, advocates have pointed to evidence that school uniforms are more cost effective for parents (Caruso, 1996), and that they create an equalizing effect for students of different socio-economic status (Holloman, LaPoint, Alleyne. Palmer, Sanders-Phillips, 1998). Prohibiting name brand, status-label clothing and fashions may also remove clothing as a source of ridicule. “A few economically struggling families reported clothing related taunts and ridicule from pre-uniform days” (Bodine, 2003b, p.53).

In addition to reducing clothing related taunts and teasing, eliminating student choice in clothing makes it easier to come to school because the competitive aspect of fashionable clothing is removed (Bodine, 2003b; Kommer, 1999). In Milpitas, parents
overwhelmingly agreed (88%) with the statement, “Uniforms make getting ready for school easier” (Bodine, 2003b, p. 57). Student responses to the same statement showed that older students were more likely than younger students to agree that uniforms made getting ready for school easier (Bodine, 2003b).

Uniform proponents have also argued that common dress establishes a climate of serious study and raises achievement rates (Isaacson, 1998; Huss, 2006, as cited in Firmin et al., 2006; Pickles, 2000), improves attendance (Caruso, 1996; Isaacson, 1998), and improves student behavior and attitudes in school (Starr, 2000). In addition, school uniforms create a greater sense of the school as a community and give a school greater recognition in the community (Caruso, 1996).

Many supporters also believe that students will be better prepared to enter the workforce if they are taught how to dress appropriately for school by the use of school uniforms (LaPoint, 1992). In some communities where school officials require uniforms, businesses, parents, and school personnel collaborate to design, produce, and sell for a small profit, unique styles of school uniforms to help quell the desire among students for status label clothing (Holloman et al., 1998). However, there are many who feel that mandatory school uniforms are not beneficial and are opposed to such policies.

**Arguments against School Uniforms**

As momentum for school uniform policies builds, opposition mounts as well. Opponents to school uniform policies believe that uniforms are not the way to solve the much larger problems facing school leaders. Brunsma (2006a) argued that school uniform policies are mere quick fixes and do not address the deeper issues in American schools. These policies are easy to implement, politically expedient, inexpensive, but they detract
from more costly, difficult reforms that school reformers need to implement (Brunsma, 2006a). Siegel (1996) argued that uniforms allow leaders to ignore the real issues facing school leaders, like crumbling buildings, diminished funds, and crowded classrooms.

A plethora of existing research indicated those against mandatory uniform policies feel the policies impede on students’ First Amendment rights while stifling students’ creativity (Brunsma & Rockquemore, 1998; Caruso, 1996; Isaacson, 1998; LaPoint Holloman, & Alleyne., 1993; Murray, 2002). In addition, researchers have also revealed concern that uniforms infringe on adolescents’ developmental need for identity experimentation through clothing or other bodily adornment (Caruso, 1996; Isaacson, 1998; LaPoint, 1992; Murray, 2002).

The belief that uniforms will create a more equitable environment by eliminating expensive clothing is not valid, according to opponents, because students will continue to find more subtle ways to distinguish themselves, such as with jewelry, shoes, and other accessories that are not usually regulated by uniform policies (Caruso, 1996; Isaacson, 1998). In addition, opponents have argued that families actually had to spend more on clothing because of the purchase of the uniform in addition to the clothes students still need to wear outside of school and during the summer months (Boutelle, 2008; Thomas, 1994).

In making a case against school uniforms, Thomas (1994) argued that policies restricting student dress are racist because the majority of schools where uniform policies have been enacted are urban, where gang-style dress is common, and enroll students who are poor and ethnically diverse. Stanley (1996) argued that uniform dress code policies may actually be counter to the effort to get students to appreciate diversity. In addition to
these objections to school uniforms, there is a lack of empirical evidence to support the claims of school administrators and that uniforms achieve the results they are seeking (Brunsma, 2006a; Brunsma & Rockquemore, 1998). The following section will discuss the various instruments used to collect data and study student perceptions of school uniforms.

Survey Instruments Used to Study Student Perceptions

Studies that depend on opinions and perceptions rely on a variety of instruments, from untested researcher-created surveys to fully vetted and tested psychometric assessments. Although not all, the majority of researchers who rely on an instrument they created are doctoral candidates writing a dissertation or thesis (Burkemper, 2008; Draa, 2005; Reynolds, 2004). Researcher-created surveys and the steps that were taken to ensure validity and reliability will be discussed below.

**Surveys created by researchers.** One researcher who created her own survey was Bodine (2003); she created a survey to study the impact uniforms had in Milpitas, California. Bodine conducted an ethnographic study, which included a survey in addition to interviews and observations. The survey and solicitation for participation in the study were attached to a district survey and mailed home to all families with students in schools where a uniform policy was implemented. There was no information included in the study as to how the survey was assessed for reliability or validity.

Padgett (1998) created a survey to assess teachers’ opinions on the need for a strict dress code or uniform policy at an elementary school in central Georgia. A 20-item Likert-type survey instrument was developed to assess the dress code at the time of the study and its effect on student behavior. The principal of the school and the
superintendent of the district approved the survey. No factor analysis of the survey items was conducted by the researcher.

Burkemper (2008) wanted to study student opinions and attitudes toward school uniforms in a suburban high school. A 32-item Likert-type survey was developed by the researcher. Reliability of the instrument was measured by analyzing the correlation of each of the questions within the survey. The instrument was also analyzed for content validity, and Cronbach’s alpha coefficient (α) was used to measure internal consistency, resulting in .943 score for the overall survey. Burkemper was one of the few researchers to assess reliability and validity of a researcher-created survey instrument.

Ward (1999) conducted a quantitative, causal comparative study to examine the relationship between a mandatory uniform policy and attendance, academic achievement, and perceptions of classroom environment. To capture classroom teachers’ perceptions of classroom environment, the researcher developed a 33-question Likert scale survey with input from classroom teachers, and based on previously used surveys by Hughes (1996) and Shook (1996). The researcher followed procedures outlined by Dillman (1978) to assist in survey construction. School administrators in a dissertation seminar class were recruited to check the survey for content validity. Administrators were directed to assess each item in three areas: domain relevance, strength of association with the domain, and clarity of the item. Data were analyzed and frequencies, means and standard deviations were generated for each of the 33 items on the survey. Questions that received 70 percent or more of the ratings were included on the final survey. Ward (1999) was more thorough than most researchers whose surveys were examined for this review of literature.
Draa (2005) created a survey that was much less thoroughly vetted than the survey Ward (1999) created. Draa (2005) developed a survey for the purpose of matching schools for a quantitative, causal comparative time-series study. Building administrators were sent the survey, which was intended to identify school improvement measures each site had implemented other than school uniforms during the relevant time period. Four current and former building administrators field-tested the survey, provided feedback and suggested changes to the researcher. The feedback was incorporated into the final instrument.

Incorporating an existing survey with a researcher-created survey is a technique McGloin (2009) utilized. McGloin used *Wisconsin’s Information Network for Successful Schools* (WINSS) in conjunction with a researcher-created questionnaire to study the effects of a school uniform policy in an elementary school. The survey was created by Learning Point for WINSS and was administered to students in grades four, five, and six with the intention of gathering school climate data. Faculty of schools with and without uniform policies participated in the study by filling out the researcher-created questionnaire, along with completing the Learning Point survey, which contained different subsets of similar questions as the researcher-created student survey. McGloin (2009) acknowledged there was no information on the reliability or validity of the Learning Point survey instrument, but it was piloted to 300 staff and parents throughout Wisconsin and has been used widely in the state. In referring to the researcher-created survey instrument, McGloin (2009) wrote, “Due to the questionable design of the instrument used in the study, it was difficult to glean any substantial conclusions from the survey” (p. 49). As a result, McGloin performed a factor analysis on the data. The
researcher-created questionnaire consisted of two sections: seven yes/no response questions, and four open-ended questions. A two-tailed t-test was performed on the nominal data and themes emerged from the open-ended questions. There was no indication that any assessment was performed to test the questionnaire for reliability or validity.

This section examined five researcher-created surveys, which are typical of the instruments created and used by doctoral students to quantify stakeholder opinions regarding school uniforms. The next section will discuss three studies that utilized existing surveys that were already established as reliable and valid.

**Existing surveys instruments.** In their 2003 article Public School Uniforms: Perceptions of Violence and Gang Presence, Wade & Stafford (2003) employed several established and vetted surveys to gather data. Each of the survey instruments will be discussed individually.

**Self-Perception Profile for Children (SPPC).** The *SPPC* (Harter, 1985) is a 36-item self-report questionnaire designed to elicit student perceptions of their self-worth, as well as five domain specific competencies. The *SPPC’s* five domains are: Scholastic Competence, Social Acceptance, Physical Appearance, Behavioral Conduct, Athletic Competence, and Global Self-Worth. Norms were established for grades 6-8, and Harter suggested the survey is appropriate for students age 8-13. Internal consistencies, as measured by test-retest reliability coefficients, ranged from .68 to .80. Multiple factor analyses validated the five-factor structure of the survey, although the norm group was predominantly Caucasian. However, the instrument has been used extensively with
minority populations and is considered a valid measure for use with Hispanic populations (Alva & de Los Reyes, 1999; Okagaki, Frensch, & Dodson, 1996; Enochs, 1997).

The National Association of Secondary School Principal’s Comprehensive Assessment of School Environments, School Climate Survey (CASE). The 55-item CASE (Keefe, 1987) is a self-report measure used to assess student, teacher, and parent perceptions of a school’s climate and organization. The instrument measured ten subscales: teacher-student relationships, student activities, student academic orientation, student behavioral values, student-peer relationships, administration, guidance, parent and community-school relationships, security and maintenance, and instructional management. The instrument had strong construct validity (Halderson, 1990), and had 20,500 respondents for the normative data. Internal consistency ranged from .67 to .92. Test-retest reliability ranged from .63 to .92. Murray (1996) also used the CASE to evaluate the climate in two urban middle schools in Charleston, SC, one with a uniform policy and one with no uniform policy.

Gang Presence and Identity Questionnaire (GPIQ). Although the GPIQ was created for the study Public School Uniforms: Perceptions of Violence and Gang Presence (Wade & Stafford, 2003) and is a researcher-created survey, it is included here because it was used in conjunction with the surveys discussed in the previous two sections, the CASE and the SPPC. The GPIQ is a 10-item, Likert-type scale questionnaire that quantifies respondents’ perceptions of gang presence and activity. The questionnaire seeks to ascertain respondents’ perceived ability to identify gang members based on clothing and accessories, known as markers (Wade & Stafford, 2003). Data from a pilot study indicate internal consistency was .67 overall, and .69 for each of the two identified
factors. Internal consistency from the teacher data was .72 overall, .71 for gang presence, and .60 for gang markers (Wade, 2003). Wilson (2009) utilized a different survey to ascertain the perceived level of violence in schools.

Wilson (1999) adapted the American Teacher Survey, Violence in America’s Public Schools: The Family Perspective, originally developed by Metropolitan Life, to conduct a telephone survey of 141 principals. Wilson used specific questionnaire items that were pertinent to the investigation, which was to study the level of perceived violence among middle and high school principals in schools with and without a uniform policy. Middle and high school principals were then asked to pre-test the instrument to evaluate: (a) individual questions; (b) the questionnaire as a whole; (c) procedures for coding and computerizing the data; and (d) content validity. The test group offered criticism on the wording of the telephone questionnaire, which along with feedback from members of the research committee, was incorporated into the final instrument. The survey was administered following the Total Design Method (Dillman, 1978). Although this survey was not a researcher-created instrument, there was still no information regarding reliability or validity.

Fosseen (2006) employed a similar method as Wilson (1999) in that she selected specific items from multiple measures in her quantitative, causal-comparative study of school climate in two middle schools. The majority of items on the final instrument came from the Psychological Sense of School Membership survey (PSSM) (Goodenow, 1993) and the Student Sense of (Classroom and School as a) Community measure (Battistich, Solomon, Kim, Watson, M., & Schaps, 1995). Items were constructed using a Likert-type scale and were adapted to reflect middle school aged children. The questionnaire contains
six sub-scales: individual perceptions of belonging, safety, emotional connections, peer relationships, teachers/school relationships, and classroom influence (Fosseen, 2006). The two primary instruments used to create this questionnaire are described in more detail below.

**Psychological Sense of School Measurement (PSSM).** Goodenow (1993) developed this 18-item Likert survey to measure youths’ perceptions of belonging and psychological engagement in school. The alpha score for reliability was .88, and was recommended for students age 12-18.

**Student Sense of (Classroom and School as a) Community.** A 38-item survey was constructed to assess students’ sense of school community (Battistich et al., 1995). The instrument is composed of three subscales: (a) caring and supportive relationships in the classroom; (b) caring and supportive relationships throughout the school; and (c) student autonomy and influence on classroom norm setting and decision-making. The internal consistency was .91.

The previous section of this literature review examined some of the current instruments used to gather data on student, teacher, administrator, and parent perceptions of school climate and safety. Most of the surveys used were researcher-created and have not been factor analyzed or tested for reliability and validity. There are only a few studies on school uniforms that rely on survey instruments that have been thoroughly vetted. The following section will present an overview of current research on school uniforms.

**Uniforms in Public Schools: A Decade of Research and Debate**

In an effort to address the lack of published empirical research on school uniforms, Brunsma (2006a) published and edited a collection of studies on school
uniforms. In the introduction, he dispelled the misconception that there is a lack of empirical research on the effectiveness of school uniforms, contending that the majority of research that exists had not been published. Much of the research is in the form of dissertations and policy briefs (Brunsma, 2006a). A review of some of the dissertations that are typical of those written over the last 10 years follows later in this literature review. The following section of this review of research will look specifically at the studies reported by Brunsma (2006a).

Pate (2006) examined the implementation of a mandatory uniform policy in 64 of the 202 elementary schools in Dade County, Florida. The impetus for the policy was a 1994 report that revealed 40% of Florida teenage males had carried a weapon to school in the previous 30 days (Pate, 2006). The primary objective of the research was to determine if the mandatory uniform policy reduced the incidents of violence and crime, as well as if the number of elementary students referred to juvenile authorities decreased as a result of the policy (Pate, 2006). The results showed a statistically significant reduction in the number of incidents of crime and violence, and as a result, the number of students referred to juvenile authorities for the year following the mandatory uniform policy. This trend continued four years later (Pate, 2006). The next researcher included in Brunsma (2006a) examined school uniforms’ impact on academic achievement and discipline.

Brunsma (2006b) conducted a study in a rural elementary school in Pennsylvania. The purpose of the study was to examine the effectiveness of a uniform policy in regards to academic achievement and disciplinary actions. The results of his study showed that there might have been a negative impact on academic achievement and behavior as a result of the implementation of a mandatory uniform policy. Reading and math scores
declined in the year following the uniform policy, 2000-2001, and continued to drop relative to similar schools in the same area (Brunsma, 2006b). Attendance rates did improve the year uniforms were introduced. Data concerning behavior and discipline were difficult to assess because of vague entries and descriptive data. As Brunsma stated, “The data received from MCASD were weak indeed. I was given a hard copy of a word processor document….with no explanation or documentation describing the exact nature of these violations” (p. 35). As a result, Brunsma said there was no way to measure whether the uniform policy had an impact on the detention and suspension rates at the elementary school studied.

Fosseen (2006) also studied the effect school uniforms policy had on discipline, but also assessed school uniforms and their relationship to attendance. He found that school uniforms did not affect student attendance, but they did positively impact student discipline referrals. Discipline referrals dropped 45% at one of the middle schools and 11% at the other middle school involved in the study (Fosseen, 2006). Parent and faculty perceptions of the uniforms were positive, with both groups supporting the uniforms. However, teachers were more supportive of the uniforms than were parents, and sixth grade parents were more supportive than seventh and eighth grade parents. Students, on the other hand, were not supportive of the uniforms in either school (Fosseen, 2006). Teachers did report improved classroom environments at both schools (Fosseen, 2006).

Hughes (2006) examined the role of uniforms in enhancing a sense of belonging, identity, social cohesion, safety, and security in sixth, seventh, and eighth grade students in Houston and San Antonio, Texas. The results of Hughes’ study indicated that students who wore a school specific identifying logo, or uniform, had a greater sense of belonging
in their school community than did students in the standard dress group. The significance
of this finding rested in earlier research that suggested a sense of belonging is a major
motivational dimension of the school environment and plays an important role in the
development of a student’s sense of community within the school and in the larger
community (Fosseen, 2006; Goodenow, 1992; McMillan & Chavis, 1986; Osterman,
2000).

Tucker (2006) surveyed teachers in the middle school where he taught to assess
the impact a mandatory uniform policy had on teacher perceptions of climate and
academic orientation. The results of his study revealed that the teachers at schools with
the uniform policy had a more positive view of the climate and safety of their school than
teachers at a school without a uniform policy (Tucker, 2006). Teachers indicated that
outsiders were more easily identified and students could not hide weapons as easily
because there was less baggy clothing. In addition, the teachers at the school with
uniforms perceived a higher academic orientation among the students than the teachers at
the school without a uniform policy (Tucker, 2006).

Kim and DeLong (2006) included data on international students and school
uniforms. They compared student, parent, and teacher attitudes in the United States and
Korea on various issues surrounding school uniforms. Three schools in each country
were chosen for the study based on similar demographics and dress policy. One school
had a strict uniform code, another school had a flexible uniform policy, and the third
school had no uniform requirement, but did have a dress code. The results of this study
indicated that the parents and teachers in both countries had a more favorable perception
of school uniforms than did students. Students in both countries did not feel that wearing
uniforms would improve the school environment or student behavior; however, the parents in both countries disagreed with the students (Kim & DeLong, 2006). One unique result of the Kim and DeLong study was that students had a more positive attitude toward uniforms the longer they wore them. The authors posited that maybe having students wear uniforms in elementary school may help students be more accepting of uniforms in secondary school (Kim & DeLong, 2006).

Stamison (2006) argued that although the purported success the uniform policy had on reducing crime, improving attendance, and student academic success, the data are unreliable at best. Stamison pointed out that there have been no empirical studies conducted with reliable data, but that all of the data provided for the studies on Long Beach were descriptive data, which represents specified behaviors. Furthermore, the survey LBUSD administered the year following uniform implementation merely measured participants’ perceptions of uniforms as opposed to their actual effects (Stamison, 2006).

Researchers cite several possible factors that contributed to the dramatic improvements in LBUSD the year the mandatory uniform policy took effect. That same year several other initiatives were implemented, both at the district and state level. In addition to the uniform policy, LBUSD also enacted several policies to improve student behavior, such as increasing the number of teachers in halls during class changes and tougher sanctions for behavior violations (Siegel, 1996). A “Zero Tolerance” truancy ordinance that included monetary and educational penalties was also put into effect (Stamison, 2006), along with a greater emphasis on parental involvement. LBUSD also implemented school decentralization strategies (Gerstenzang, 1996). At the same time
LBUSD was implementing uniforms and the other aforementioned initiatives, California passed class size reduction legislation. As a result, many researchers are reluctant to attribute all of the success in Long Beach to uniforms (Stamison, 2006).

**Theoretical Basis of School Uniforms**

There are three primary theoretical frameworks researchers and supporters of school uniform policies cite when examining common dress codes: Role Theory (Mead, 1934; Sarbin, 1954), Social Control Theory (Joseph & Alex, 1979), and Critical Theory (Foucault, 1980). These three theories will be discussed in more detail below.

**Role Theory.** Role theory is one theory of clothing and appearance that is used as the basis for studying uniforms in school settings. Role theory asserts that individuals act in a particular way in any given situation and that uniforms may influence the role a person plays (Mead, 1934; Sarbin, 1954). Clothing impacts not only the perceptions of the person wearing a uniform, but it also signifies the role the person wearing the uniform is supposed to fill to others, or whether a role is to be played at all.

Clothing might also influence the self-concept and make wearing a uniform easier (Biddle & Thomas, 1966; Goffman, 1959; Kaiser, 1990; Kaiser, 1998; Sarbin, 1982). Clothing is a simple way to identify individual roles in social situations. Locating oneself in the continuum of roles is important to accurately play the appropriate role; it is a cognitive process.

The cues to locating the position of another person, of course, are his acts and appearances (...) A catalog of such cues would include gross skeletal movements, verbal acts, physique, stature, clothing, facial expression,
posture, gait, carriage, accent, pitch, tattoo marks, and so on” (Sarbin, 1982, p. 47).

Once a person accurately locates the position of other interactants, the number of possible role behaviors is reduced.

For example, to a person entering a school building, the number of possible positions he will consider for any person he encounters is reduced from the thousands of positions known to him to four or five (…) student, teacher, principal, secretary, or custodian” (Sarbin, 1982, p. 49).

Student uniforms help interactants more easily locate the roles of other interactants.

Clothing choice is also influenced by group dynamics (Kaiser, 1998). Every group has its own idioculture or “system of knowledge, beliefs, behaviors, and customs shared by members of an interacting group” (Fine, 1987, p. 125). The group, therefore, determines what is acceptable behavior and appearance for individuals who wish to belong (Kaiser, 1998). Most individuals are willing to jeopardize their own individuality for the security that comes from a group, and every group exerts a force that determines clothing choice. Group acceptance and approval offer security for individuals, and this is particularly important for adolescents (Damhost, 1985; Kaiser, 1998; Roach, 1969).

Understanding adolescent developmental characteristics and clothing behavior is central to the study of school uniforms. One of the primary developmental tasks of adolescents is to experiment with clothing and appearance. This enables them to form their identity (Kommer, 1999). Goffman (1959) called their clothing choices and adornment practices identity kits, which adolescents use to play different roles within
their peer group. Adolescents between the ages of 12-14 years showed lower self-esteem, greater self-consciousness, and a more unstable self-image than 8-11 year olds, and placed a greater emphasis on looks, popularity, and relationships than in earlier years (Kommer, 1999). Adolescence is a time of role experimentation, and a limited amount of preoccupation with clothing and appearance is expected and generally accepted as normal adolescent behavior. Studies indicate that individuals’ dress is nonverbal communication and can affect the way others see individuals, and possibly the way individuals view themselves (Eicher, Evenson, & Lutz, 2000).

The over emphasis on clothing and appearance at a time when the developing adolescent is particularly vulnerable to peer pressure has created an environment where many adolescents believe it is necessary to wear certain status-labels or expensive brands of clothing (Murray, 2002). Holloman et al. (1998) pointed out:

At one end of the spectrum, these problems, which frequently include factors related to students’ ethnicity, social class, and neighborhood residence, include peer competition, ostracism, and teasing about dress. They also include poor academic achievement and attendance resulting from dress-related concerns. At the other end, serious threats to students’ health and safety include those related to gang-affiliated clothing and clothing theft that may be accompanied by violent assaults and even murder. (p. 286)

The marketing of status-label clothing through television, movies, popular music, and sports, combined with the mass consumerism that typifies American culture, has led to adolescent-oriented product manufacturers joining the home, family, peer group, and the school as the major socializing agents of young people (Holloman et al., 1998; Alleyne et al., 1993).
The pressure on young people to wear popular, status label clothing has led to violence and even murder in a number of cases. Students have been robbed at knife and gunpoint for the clothing they were wearing (Holloman, 1995). The most popular items of clothing that attackers seek have been professional sports team jackets, bomber jackets, leather coats, designer sneakers, and gold jewelry (Holloman, 1995).

Gang activity is often associated with particular dress. Gangs adopt colors and combinations of colors that signify to others who their members are. Students who wear the wrong colors or color combinations to school risk becoming targets of violence by gang members. Many of the school dress policies that have been put into place were designed to specifically control gang clothing styles that emerged from the urban culture (Volokh & Snell, 1997).

**Uniforms and Social Control**

Social Control theory is also used by proponents of school uniforms to support the implementation of uniform dress codes in public schools. Joseph and Alex (1979) attempted to define the aspects of the school uniform that can be used to address the problems of organizational control, such as differentiation of members and non-members, articulation of individual status sets, immediate recognition and validation of uniformed status, creation of uniformed positions are key statuses, and identification of insiders and outsiders. The role and membership of an individual are certified by the uniform, and in turn the individuals internalize the group norms of the organization. In addition, peers add pressure to conform to the organizational norms (Joseph & Alex, 1979). Common dress is one way that school administrators impose conformity on students and ease some of the tensions naturally present in schools because of differences in background, socio-economic status, and affiliations (Holloman...
et al., 1998). School leaders hope uniforms will reduce distractions and serve as a means of social control (Kommer, 1999; Roach 1969).

**Critical Theory**

Critical theorists operate under certain assumptions, as described by Kincheloe and McLaren (2005):

That all thought is fundamentally mediated by power relations that are socially and historically constituted; that facts can never be isolated from the domain of values or removed from some form of ideological inscription; that the relationship between concept and object and between signifier and signified is never stable or fixed and is often mediated by the social relations of capitalist production and consumption; ….that certain groups in any society and particular societies are privileged over other and, although the reasons for this privileging may vary widely, the oppression that characterizes contemporary societies is most forcefully reproduced when subordinates accept their social status as natural, necessary, or inevitable. (p. 304)

Looking at common dress in public schools through a critical lens puts uniform policies in a different light. As the influence of popular youth culture continues to affect the climate, culture, and safety of public schools across the United States, the implementation of a uniform dress code in public schools from a critical perspective can be seen as an attempt by the parents and school administration to wrest control of the school environment from the influence of capitalist marketers of popular culture. The recent rise in popularity of high-priced, name brand status label clothing, along with the marketing of the hip-hop culture and the adoption of certain
clothing styles by street gangs, has made the adolescent social environment, including schools, a dangerous place (Hollman, 1995; Kommer, 1999).

On the surface, policies requiring common dress for students may appear to be institutional efforts to control students and their behavior. However, uniform policies in schools can be seen as an effort to challenge the power exerted by manufacturers and marketers of popular youth culture have over adolescents, which in turn has negatively impacted the learning environments in schools (Holloman et al., 1998; LaPoint et al., 1993).

Foucault (1980) argued that power should not be studied from the top down, but from the bottom up. Rather than focus on the intentions of those who hold power, one should focus on those continuous processes that govern our actions, subjugate our bodies, and dictate our behaviors (Foucault, 1980). One way capitalist enterprises continue to subjugate the youth is through the marketing of clothing and other forms of popular culture. Foucault believed that criticism identifies the problem, not the answer. Criticism attempts to expose the thinking behind even the most inane institutions, to show not only that they can be changed but that they must be changed, and that which was once accepted as self-evident will no longer be accepted as such (Foucault, 1980).

Public school administrators are increasingly less able to halt the invasion of popular culture into the learning environment and resist the capitalist takeover of school culture. McLaren and Farahmandpur (2005) argued that it has become increasingly difficult to resist the influence of corporations and capitalist agendas, which are conscripting the school curriculum and culture into its goal of accumulating capital. However, the implementation of common dress policies in public schools challenges this
notion and resists the commercialization of the school environment. The real power struggle is not between school administration and students and parents, the power differential and the struggle for control is between the stakeholders in schools, which includes administrators, teachers, parents and students, and capitalist manufacturers and marketers of trendy clothing and other items of popular youth culture. As Parenti (1998) wrote:

Capitalism is a system without a soul, without humanity. It tries to reduce every human activity to market profitability. It has no loyalty to democracy, family values, culture, Judeo-Christian ethics, ordinary folks, or any of the other shibboleths mouthed by its public relations representatives on special occasions. It has no loyalty to any nation; its only loyalty is to its own system of capital accumulation. It is not dedicated to “serving the community”; it serves only itself, extracting all it can from the many so that it might give all it can to the few. (pp. 84-85)

Textile manufacturers and other marketers of popular culture are not concerned with the social, emotional, and intellectual development of youth, but they are dedicated to selling products and making a profit. Youth product manufacturers utilize mass media to control the adolescent market and play a major role in the socialization of American youth (Holloman et al., 1998; LaPoint et al., 1993).

Role theory, social control theory, and critical theory are all used by supporters of common dress codes in public schools to justify the implementation of uniform policies. Understanding the socio-emotional development of
adolescents and the theories pertaining to it is an important component of uniform
codes of dress. Adolescent developmental needs and characteristics are also
important to consider.

**School Uniforms and Child Development**

In response to a complaint filed by disgruntled parents in Akron, OH regarding
the implementation of a mandatory school uniform policy in 2007, Vopat (2010) wrote an
article supporting the right of the school district to implement such a policy, but he
questioned the developmental appropriateness of uniforms when one considers the way
children acquire substantive expression. The crux of Vopat’s (2010) argument was the
idea that, although school districts have the right to impose uniform policies that are
supported by the courts, doing so limits the opportunities of adults to guide children as
they move from mere expression to substantive expression. Substantive expression,
according to Vopat, occurs when a person intentionally communicates or expresses
something. Mere expression, on the other hand, is unintentional and in most cases “non-
cognitive in that I am not aware, nor am I attempting to say anything to anyone” (Vopat,
2010, p. 208). This is particularly troublesome in Vopat’s view because the research on
school uniform policies and their ability to produce their intended results is inconclusive
(Vopat, 2010).

What makes Vopat’s (2010) article interesting is that he did not question the
legality of school uniforms, or even the effectiveness of uniforms in achieving the stated
goals of school leaders and district officials that implement mandatory uniform policies.
Rather, Vopat questioned the wisdom of requiring students to dress in uniform because
educators may be missing a valuable opportunity to help students acquire the higher-level
cognitive skill of substantive expression. Although children may not have the capacity for substantive expression when they are young, over time they will develop the ability to intentionally express their ideas. As a result, adults should provide guidance and support as children move from one developmental level to the next. Because clothing is a form of communication, school policy makers who require students to wear uniforms are missing an opportunity to guide students in their development of substantive expression (Vopat, 2010).

The theoretical basis of Vopat’s (2010) argument stemmed from four researchers: (1) Vygotsky’s (1978) concept of zone of proximal development (ZPD); (2) Russell’s (2007) study that supports the idea that children function at a higher cognitive level within collaborative structures; (3) Brennan’s (2002) gradualist view of children’s rights; and (4) LaFollette’s (1998) work regarding circumscribed normative autonomy. Each of these concepts is discussed in more detail below.

**Vygotsky.** Vygotsky (1978) contended that children exhibited two types of cognitive development: actual developmental level and zone of proximal development (ZPD). The actual developmental level of a child is demonstrated by the things he or she can do on his or her own without the help of others. A child’s ZPD, however, is a measure of the potential development of a child as demonstrated by their ability to solve problems with guidance from an adult or a more advanced peer (Vygotsky). Because children are constantly developing and acquiring more advanced skills, Vopat (2010) argued that adults should provide support, or scaffolding, to help children move to the next developmental level. By requiring students to wear uniforms, educators miss the opportunity to guide students in making meaningful choices about the clothing they wear,
and therefore do not provide the support students need in developing the capacity for substantive expression (Vopat, 2010).

**Russell.** Russell (2007) conducted research in Ireland that supported Vygotsky’s (1978) assertion that students function at a higher intellectual level when working in collaborative structures. In her study, Russell examined the nature and extent of the moral development of children beginning at age seven or eight, and ending when they are 12 or 13. The group’s moral development was gauged by the researcher during structured class discussions, using various moral frameworks such as justice, care, and fairness (Russell, 2007). Russell noted that as the students received more support, and interacted with others, they were able to make significant leaps in reasoning that they otherwise would not have been able to make. According to Vopat (2010), this suggested that students would be better served in their development from mere expression to substantive expression by allowing them to dress in clothing of their choice, while providing them with guidance and support to ensure they understand how to appropriately express themselves.

**Brennan.** Brennan (2002) proposed the idea of gradualism, which suggests that children’s rights are gradual. When children are young they are not able to make the types of choices that require protection, so adults need to ascribe them rights that protect their interests. As children get older and become more capable of making choices, those choices need protection. The relevant aspect of this is that the ability to make choices that require protection happens incrementally over an extended period of time. It does not happen all of a sudden overnight. Using this logic, Vopat (2010) argued that as children develop the ability to make choices they need to be nurtured and guided over time.
LaFollette. Vopat (2010) drew comparisons between substantive expression and LaFollette’s (1978) concept of circumscribed normative autonomy (Lafollette). Just as the ability to express oneself in meaningful and deliberate ways develops over time, so does the ability to make rational and informed decisions based on experience and knowledge, which LaFollette called descriptive autonomy. Normative autonomy, according to LaFollette, is the recognition that agents capable of descriptive autonomy should have their choices respected, or at the very least protected, and that those choices carry moral force. Historically, children were not seen as descriptively autonomous, and therefore were not granted normative autonomy. LaFollette argued that instead of granting children full normative autonomy all at once at some predetermined age, adults and caregivers should give children normative autonomy gradually, which Lafollette called circumscribed normative autonomy. Vopat (2010) used LaFollette’s argument to support his assertion that educational leaders should not implement uniform dress policies because students need scaffolding to acquire higher cognitive skills like substantive expression and descriptive autonomy.

Vopat’s (2010) was very clear in his argument that school uniforms are not appropriate for some students and his position is one that can be used to discourage the adoption of mandatory uniform policies. Theoretical arguments can be made to support and refute school uniform mandates. The following section moves the discussion away from theory and examines the legal and constitutional issues surrounding school uniforms.
Legal Aspects of School Uniforms in Public Schools

Court decisions regarding school attire have given support to plaintiffs on both sides of the uniform issue. During the rebellious and free-spirited 60’s, *Tinker v. Des Moines School District* (1969) prohibited schools administrators from disciplining students for nonverbal expressions unless it disrupted the classroom. McCarthy (2001) argued the *Tinker* decision created an environment in which uniform dress policies were discouraged. In the 1980’s, courts seemed to be more in favor of limiting student expression, with rulings that prohibited students from dressing in ways that did not support the local schools’ mission. However, the courts were clear that school administrators’ authority over dress was limited to the school. In the *Bethel Schools v. Fraser* (1986) decision, the U.S. Supreme Court supported school officials’ right to punish students for using lewd, vulgar, or offensive communication, noting that educators had the responsibility to teach the habits and manners of civility (*Bethel School District v. Fraser*, 1986). School uniforms were addressed more specifically by the U.S. Supreme Court in *Canady v. Bossier* (1998) which supported school officials’ right to implement a school uniform policy. These cases are discussed in more detail below.

Before discussing the court decisions that have shaped the current landscape of common dress in public schools in the United States, it is important to first examine the factors the U.S. Supreme Court considers when hearing cases on the rights of students and school leaders in implementing dress and speech policies. Mitchell and Knechtle (2003) identified the factors as “(a) type of speech (e.g., pure vs. symbolic); (b) type of restriction (i.e., Spence Test); (c) the O'Brien analysis; and (d) the surrounding context” (p. 488). In addition, Mitchell and Knechtle (2003) discussed the limitations on First
Amendment rights imposed on students by the U.S. Supreme Court. Each of these elements is discussed in more detail below.

**Type of Speech.** The Supreme Court has recognized two types of speech when determining the constitutionality of regulations on speech in schools: symbolic speech and pure or verbal speech (Mitchell & Knechtle, 2003). All pure speech receives some First Amendment protection, as in *Tinker v. Des Moines* (1969), but some pure speech, such as obscenity or defamatory words, is not fully protected by the First Amendment (Mitchell & Knechtle, 2003).

Symbolic speech is subjected to a two-fold test by the courts: (a) was there intent to convey a particular message, and (b) was there a great likelihood that the message would be understood (Imber & Van Geel, 2004; Mitchell & Knechtle, 2003)? The courts consider non-verbal acts symbolic speech as if the act is intended to communicate a message. Hence, conduct is considered symbolic speech in the eyes of the judiciary (Mitchell & Knechtle, 2003; Rangaard, 2008). As a result, some conduct is protected under the First Amendment as expressive symbolic speech (Mitchell & Knechtle, 2003; *Texas v. Johnson*, 1989). Clothing choice satisfies both criteria because it can be used to convey a message and there is every reason to believe that the message will be understood by those who view it; therefore, student dress is considered symbolic speech and is protected under the First Amendment. However, the Supreme Court recognizes that there are times when restrictions on student dress are acceptable (Mitchell & Knechtle, 2003; Rangaard, 2008).

**Types of restrictions: The Spence test.** The courts identified two types of restrictions that qualify as symbolic speech protected by the First Amendment: content-
based and content-neutral. These two types of restrictions are known as the Spence test, after *Spence v. Washington* (1974) when protesters wanted injunctive relief from a statute that prohibited demonstrating within 500 feet of the Soviet Embassy. The U.S. Supreme Court ruled that the regulation was a content-based restriction because it was targeted toward one form of speech and not all forms (*Spence v. Washington*, 1974; Mitchell & Knechte, 2003). School uniform policies pass this part of the Spence Test because they ban all choice in dress, not particular categories of dress. However, the Court has repeatedly upheld students’ First Amendment right to protest through dress (*Tinker v. Des Moines*, 1969; *DePinto v. Bayonne Board of Education*, 2007). Mitchell and Knechte (2003) contended that it is unlikely the Court will consider a total ban on expression through dress. The use of buttons to express opposition to a uniform policy (*DePinto v. Bayonne Board of Education*, 2007) and the use of armbands to protest the Vietnam War (*Tinker v. Des Moines*, 1969) have been supported by the U.S. Supreme Court. Any dress code that specifically prohibits students from wearing symbolic clothing that is not disruptive to the school environment, does not pass the Spence Test and is, therefore, a violation of the First Amendment (Mitchell & Knechte, 2003).

Content-neutral regulations of speech do not prohibit any one form of speech or message, rather they may inhibit speech by controlling the time, place, and manner of speech. Content-neutral regulations seek to avoid some type of negative behavior unconnected to the speech. To enact content-neutral restrictions on speech there must be compelling evidence that the regulation “meets a substantial government purpose” (Mitchell & Knechte, 2003, p. 490). Because school uniform policies are equitably applied to all students and the intent of the policies are to improve the safety and welfare
of children, which is in the government’s interest, they pass the second part of the Spence Test (Mitchell & Knechte, 2003).

**The O’Brien analysis.** In *United States v. O’Brien* (1968) the U.S. Supreme Court established a four-fold test to determine if a content-neutral regulation infringes on First Amendment rights. The following standards for statutes regulating symbolic speech are known as the O’Brien Test: (a) the regulation is within the government’s interest, (b) the regulation furthers an important or substantial government interest, (c) the government interest is unrelated to the suppression of free expression, and (d) the incidental restriction on First Amendment rights is no greater than necessary to further the government interest (*United States v. O’Brien*, 1968).

School officials contend that school uniforms improve school safety and the welfare of students, which is within the government’s interest and satisfies the first part of the O’Brien analysis. Secondly, school officials point to research that uniforms help reduce gang violence (Holloman, 1995). Because schools are neutral environments that are supposed to be conducive to learning, the state has a vested interest in eliminating gang violence and protecting the educational environment in schools; therefore, school uniform policies satisfy the second part of the O’Brien analysis. Next, the O’Brien test is concerned with the intent of the interference on symbolic speech. School uniforms are not intended to deny students’ individuality or the freedom of expression, but rather to reduce undesirable behavior such as gang activity and violence. Common dress codes meet the third part of the test. The fourth part of the test mandates that the extent of the infringement on speech is no greater than necessary to further the state interest. School officials point to research that suggests uniforms level the playing field for students by
eliminating status clothing, reduce violence, enhance school pride and self-esteem, make schools safer, reduce clothing costs, and eliminate distractions caused by revealing clothing and urban hip-hop styles as reasons to adopt uniform policies (Ramirez et al., 2011; Stanley, 1996; Stamison, 2006). Weighed against denying students the right to choose their own school clothes, common dress proponents argue that the fourth part of the O’Brien test is met and the courts have agreed (Mitchell & Knechtle, 2003; United States v. O’Brien, 1968).

**Context of speech.** In *Texas v. Johnson* (1968) the U.S. Supreme Court ruled that the context surrounding speech is relevant when determining the limitations placed on First Amendment rights (*Texas v. Johnson*, 1968). When Gregory Lee Johnson was arrested for burning an American flag at a political demonstration in Dallas, he appealed his conviction based on the grounds that the law banning flag desecration violated his First Amendment rights. The court found that his actions were expressive conduct and were protected by the First Amendment because the government may not prohibit expression of an idea simply because society finds the idea itself offensive or disagreeable (*Texas v. Johnson*, 1968). Mitchell and Knechtle (2003) explained that the court takes into consideration the context in which symbolic speech takes place when deciding if speech is protected by the First Amendment. However, if the government has a compelling interest or obligation to establish a safe environment, such as schools, limits on the First Amendment may be applied. Mandatory school uniforms do not impinge on the rights of students as long as the uniform policy does not target a specific message, but is applied evenly to all forms of dress. A student may wear a button in protest to the uniform he or she is being required to wear, but a policy directed at prohibiting the button
may be unconstitutional if is deemed that the button is not disruptive to the learning environment (DePinto v. Bayonne Board of Education, 2007).

**First Amendment Rights of Minors.** Although all citizens of the United States are protected by the First Amendment, different classes of citizens enjoy varying degrees of protection (Killen, 2000). The courts have recognized the need for school districts to impose limitations on students’ freedoms in order for schools administrators to provide a safe environment that is conducive to learning (Barbarosh, 1995; New Jersey v. T.L.O., 1985). As a result, school officials have been given the latitude to impose dress codes and uniform policies that support the mission of the school, namely the teaching of school-supported knowledge and values (Bethel School District v. Fraser, 1986; Levin, 1986; Mitchell & Knechte, 2003).

Although school officials have been supported by the U.S. Supreme Court in limiting First Amendment rights in schools for the purpose of maintaining order, policies targeting speech that promote a message school personnel simply disagree with are not constitutional (Mitchell & Knechte, 2003; Tinker v. Des Moines Independent School District, 1969). Because dress code policies tend to prohibit styles, appearance, and messages inconsistent with school administrators’ values, they tend to encounter more First and Fourteenth Amendment challenges than uniform policies that consistently enforce a required common style and do not single out any one particular style or message (Bannister v. Paradis, 1970; Breen v. Kahl, 1969; Canaday v. Bosier Parish School Board, 1997; Tinker v. Des Moines, 1969).

**Court Cases Establishing Precedent for School Uniforms.** The seminal case addressed by the Supreme Court regarding school officials’ right to control student dress
is *Tinker v. Des Moines Independent Community School District* (1969). Three public school students were suspended from school for wearing black armbands to protest the United States’ policies in Vietnam. The plaintiffs argued that school officials knew of their plan to wear black armbands to school and created a policy to prohibit the protest. The U.S. Supreme Court heard the case and overturned the 8th District Court’s support of the school officials’ right to prohibit the students’ demonstration against the government. In handing down the opinion of the court, Justice Fortas wrote:

> As we have discussed, the record does not demonstrate any facts which might reasonably have led school authorities to forecast substantial disruption of or material interference with school activities, and no disturbances or disorders on the school premises in fact occurred. These petitioners merely went about their ordained rounds in school. Their deviation consisted only in wearing on their sleeve a band of black cloth, not more than two inches wide. They wore it to exhibit their disapproval of the Vietnam hostilities and their advocacy of a truce, to make their views known, and, by their example, to influence others to adopt them. They neither interrupted school activities nor sought to intrude in the school affairs or the lives of others. They caused discussion outside of the classrooms, but no interference with work and no disorder. In the circumstances, our Constitution does not permit officials of the State to deny their form of expression. (*Tinker v. Des Moines Independent Community School District*, 1969).

The U.S. Supreme Court ruled that the students had the protection of the First and
Fourteenth Amendments. The decision stated that (a) the students were quiet and passive and did not impinge on the rights of others and were protected by the Free Speech Clause of the First Amendment and the Due Process Clause of the Fourteenth, (b) students and teachers are protected under the First Amendment, and (c) a prohibition of expression of opinion is prohibited under the First and Fourteenth Amendments if there is no evidence it is necessary to avoid substantial interference with school discipline or the rights of others (Tinker v. Des Moines, 1969). The decision went on to say that since the policy was directed at a particular symbol, the armband, and the policy did not ban other symbols, such as the Iron Cross or political buttons worn by some students, the policy violated the students’ First Amendment rights (Rangaard, 2008; Tinker v. Des Moines, 1969).

After the Tinker decision school officials shied away from dress code policies. In 1970, the federal courts again sided with plaintiffs in Bannister v. Paradis (1970) in New Hampshire District Court D, further dampening judicial support for dress codes in public schools. Mr. Paradis, principal of Pittsfield High School, implemented a dress code policy that prohibited “dungarees” because he felt that discipline created an environment conducive to learning, and that if students wore relaxed clothing they would have a more relaxed attitude which would undermine discipline and the educational climate (Bannister v. Paradis, 1970). Kevin Bannister was suspended for wearing blue jeans to school, which violated the dress code, but when specifically asked what dungarees were and what students should wear, Principal Paradis replied, “I apply the dress code as I see it. We don’t define the term dungarees” (Bannister v. Paradis, 1970). The court ruled that because there was no evidence wearing blue jeans disrupted the educational environment
the dress code was unconstitutional (*Bannister v. Paradis*, 1970; Rangaard, 2008).

In a case 37 years later that echoed the *Tinker v. Des Moines* (1969) decision, the 8th District Court of Appeals in Arkansas heard *Lowery v. Watson Chapel School District* (2008). After Watson Chapel School District officials implemented a mandatory uniform policy, which specifically stated in paragraph 17 that “any attempt to defeat the uniformity intended by this policy is prohibited” (*Lowery v. Watson Chapel*, 2006), several students wore small armbands to school to protest the policy. Students wore the armbands so that they did not overlap any part of the uniform, which would have been a violation of the uniform policy that allowed adornments that did not overlap, but they were disciplined anyway (*Lowery v. Watson Chapel*, 2006). The court affirmed the lower court’s decision that the students’ First and Fourteenth Amendment rights were violated because the district failed to prove that the armbands disrupted the educational environment (Rangaard, 2008; *Lowery v. Watson Chapel*, 2008).

Another recent ruling in *DePinto v. Bayonne Board of Education* (2007) again applied the Tinker precedent to allow elementary students to wear buttons in opposition of the uniform policy (Rangaard, 2008; *DePinto v. Bayonne Board of Education*, 2007). School officials objected to the image on the button of uniformed adolescents reminiscent of the Hitler Youth, with a red circle and a line through the picture with the words, *No Uniforms* (*DePinto v. Bayonne Board of Education*, 2007). The court ruled that the button did not disrupt the school and gave the students permission to wear the button but not distribute it at school. It appears that the justice system protects students’ First and Fourteenth Amendment rights in cases that do not demonstrate a valid reason for a uniform policy, and in cases that do not prove a disruption to school.
Although the courts have made it clear that students have the protection of the First Amendment, they have also made it clear that schools officials have the right to limit speech if it is disruptive to the learning environment. In *Bethel School District v. Fraser* (1986), Matthew Fraser was suspended from school and was prohibited from speaking at graduation because of a lewd and offensive speech he gave at an assembly in support of a fellow classmate who was running for office. Throughout the speech, Fraser referred to the candidate in sexual terms the administration found offensive (*Bethel School District v. Fraser*, 1986). Fraser sued the school district on the grounds that his First and Fourteenth Amendments were violated because he had no way of knowing the speech would be considered offensive and that he might be suspended from school and prohibited from speaking at graduation. The Supreme Court found that school personnel did not violate his Fourteenth Amendment due process rights because faculty members had advised him that his speech might get him in trouble and that it could be offensive to the administration and some of the other students. Furthermore, the Supreme Court ruled that school administrators were justified in disciplining Fraser for speech that was lewd and offensive. The court felt that it is a very appropriate function of school leaders to prohibit inappropriate speech in a public school setting (*Bethel School District v. Fraser*, 1986).

As a result of *Bethel v. Fraser* (1986) there was growing support in the judicial system, and consequently in schools and districts across the country, for uniform policies if there was evidence that the policy was intended to reduce gang violence and gang attire that disrupted schools, which has become the primary justification for common dress codes (*Caruso*, 1996; *DaCosta*, 2006; *Kelly*, 2008; *Kizis*, 2000; *Konheim-Kalkstein*, 2002).
In Olsen v. Board of Education (1987) school officials prohibited the wearing of gold earrings by male students because it was a symbol of gang affiliation. The court upheld the school stakeholders’ right to institute a dress code policy that prohibited gang activity that disrupts school (Burkemper, 2008). Again in 1993, the courts made it very clear that there must be evidence that a dress code policy is not unfairly limiting students’ First Amendment rights in Jeglin v. San Jacinto Unified School District (1993). Students and parents at a San Jacinto middle school and elementary school challenged a district dress code policy that prohibited any student in the district from wearing clothing that bore the logo or insignia of any professional sports team or college. The district justified the policy by claiming that these items of clothing were gang identifiers and should not be allowed at school during the school day or during school activities and functions. The court stated that “curtailment of the student's exercise of the right of free speech does not demand a certainty that disruption will occur, but only the existence of facts which might reasonably lead school officials to forecast substantial disruption” (Jeglin v. San Jacinto Unified School District, 1993). In light of this standard, the court upheld the dress code for the high school but felt the district failed to meet the burden of proof that there was gang activity in the middle and elementary schools (Jeglin v. San Jacinto Unified School District, 1993).

In Nevada, the right of school administrators to enforce dress code policies was solidified in Jacobs v. Clark County School District (2008). The 9th Circuit Court of Appeals found that the policies were content neutral, sustained intermediate scrutiny (United States v. O'Brien, 1968), and did not unfairly limit students’ First Amendment
rights (Jacobs v. Clark County School District, 2008; Walsh, 2008). Kimberly Jacobs sued the Clark County School District after being suspended five times for a total of 25 days for violating Liberty High School’s mandatory uniform policy. At least one of the suspensions was for wearing a shirt that displayed her religious beliefs. Plaintiffs argued that the stricter standard used in Tinker v. Des Moines (1969) should be applied in Jacobs (2008). The 9th Circuit Court disagreed and upheld the school’s mandatory uniform policy (Jacobs v. Clark County School District, 2008).

One of the primary reasons school leaders cite as a reason for implementing school uniforms is to reduce the presence of gang attire and crime on campus and promote safety (Jacobs v. Clark County School District, 2007; Ramirez et al., 2011). The following section is a brief review of literature related to school crime.

**School Violence**

In 2009-2010 there were 1.9 million crimes reported in public schools in the United States, with 33 school-associated violent deaths that same year (Robers, Zhang, Truman, & Snyder, 2012). In addition, 22% of American public school students reported a gang presence, while 33% of the nation’s Hispanic students reported a gang presence at school (Robers et al., 2012). Homicide rates at schools nearly doubled from 11 in the 2000-2001 school year to 21 in the 2004-2005 school year (Ramirez et al., 2011). Not all of the school crime is committed in urban districts and schools, as is commonly believed; crimes happen in rural and suburban schools, as well (Landen, 1992; Rossman & Morely, 1996).

A 1994 survey conducted by the National School Boards Association reported that 82% of responding school districts reported a rise in violent activity, while 35%
reported that violence in the school had increased significantly. Survey participants “most frequently cited student-to-student assaults (78%), weapons (like guns and knives) in schools (61%), student-to-teacher violence (28%), racial/ethnic (28%), and gang related incidents (24%)” (Blumberg, Dowling, Horton, Majestic, Shartz, Shaw, & Smith, 1995, p. vii). School districts identified the “primary sources of school violence as: changing family situations (77%), media violence (60%), alcohol and drugs (45%), access to guns (43%), and poverty (40%)” (Blumberg et al., 1995, p. vii).

In more recent studies, Tillyer, Fisher, and Wilcox (2011) reported that officials at 17% of public schools reported at least one serious violent incident in the 2005-2006 school year, while officials at 85% of public schools reported at least one crime during the 2009-2010 school year. Robers et al. (2012) also found that 28% of students age 12-18 identified being bullied at school in 2009, with middle school students reporting bullying at 33% and 32% for seventh and eighth graders, respectively.

Despite the increase in the number of public school administrators implementing a uniform dress code policy, there is scarce published research on the effectiveness of uniform policies and their ability to achieve the results proponents of such policies tout (Brunsma, 2006a). The following section is a review of the current research on school uniforms.

**Review of Research on School Uniforms**

A search of peer-reviewed journals in EbscoHost using key words “school uniforms” had 77 results. The research to date tended to fall into one of four categories: (a) academic achievement, (b) behavior (c) attendance, and (d) climate and culture. Many studies combined two or more of these broad topics into one study. The majority of the
studies were stakeholder perceptions of the effects of uniforms. As noted earlier in this literature review, Brunsma (2006a) identified the need for more published empirical studies on the effects of mandatory uniform policies to achieve the stated goals of those implementing such policies. Much of the current research exists in the form of dissertations (Brunsma, 2006a).

**Dissertations**

A search of the Dissertations and Thesis database in ProQuest, using the key words “school uniforms” in the title returned 67 results, 49 of which were germane to actual school uniform policies. The most recent dissertation was written in 2012 (Sowell, 2012), and the oldest was written in 1995 (Sher, 1995). Of the relevant results, 14 of the dissertations were written in the last ten years. The studies in the search results had four common themes: behavior, school climate, attendance, and academic achievement. Most of the research combined two or more of these themes in one study.

The dissertations included here were selected because they employ both qualitative and quantitative methodologies, and they are representative of the type of research currently being conducted on school uniforms. The first study examined graduation, suspension, and attendance rates in a comparison study (Gouge, 2011); one of the studies focused on academic achievement (Rangaard, 2010), another on climate and culture (Burkemper, 2008), and the fourth study explored safety and academic achievement (Reynolds, 2004).

Gouge’s (2011) dissertation demonstrates the types of studies that have been conducted over the last few years. This quantitative study examined the graduation,
attendance, and suspension rates at two Tennessee high schools with similar demographics. After leaders at one of the schools implemented a mandatory uniform policy, a comparison was made to compare the dependent variables of graduation, attendance, and suspension rates. The results of the study showed that there was a positive significant effect on the graduation rate, but there was no significant difference in attendance or suspension rates. A second comparison was made at the school that was the dependent variable before and after it adopted a uniform policy. The results showed a positive impact on graduation rates at the same school after the adoption of a uniform policy, but no significant effect on attendance or suspension rates (Gouge, 2011).

Rangaard’s (2010) dissertation implemented a mixed methodology approach to explore the perceptions of the various stakeholders at two schools in southwest Minnesota. The researcher conducted student focus groups and administered surveys to students, teachers, and administrators. Survey questions were designed to elicit participant feedback in regards to the effectiveness of school uniforms on improving students’ attitude, behavior, and academic achievement. The results of this research indicated that of all of the stakeholders, student perception of the effectiveness of school uniforms was the lowest. Teachers had a more positive opinion of the effectiveness of uniforms, and administrators had the highest perception of the impact school uniforms had on student behavior, attitude, and academic achievement.

Burkemper’s (2008) work is another unpublished dissertation that exemplifies the recent research on school uniforms. Burkemper (2008) used quantitative methods to assess the attitudes and perceptions of students in a public high school about a mandatory school uniform policy and the dress code’s impact in five areas: behavior, school climate,
academic achievement, policy implementation, and social standards (Burkemper, 2008). Administrators distributed 2,100 surveys to students and had an 81% return rate. The results indicated that support for and opposition to the mandatory uniform policy varied depending on grade level, GPA, and gender. Students overwhelmingly opposed the implementation of a mandatory school uniform policy, but male students in the 12th grade indicated mandatory uniforms would improve student behavior and academic achievement (Burkemper, 2008). Surprisingly, students in all grades with a GPA between 4.0 and 1.0 reported that uniforms would either not help or would lower achievement, while students with a GPA less than 1.0 believed uniforms would improve academic achievement.

Reynolds (2004) used a bibliometric approach to conduct a review of current quantitative research in his dissertation. The researcher reviewed nineteen articles to answer his research questions: Does the available quantitative primary research on school uniforms support adopting a mandatory uniform policy to improve academic performance, and, does the available quantitative primary research support implementing a mandatory uniform policy to improve student social behavior? One of the central goals of Reynolds’ (2004) study was to create a policy statement for school districts when considering the adoption of a uniform policy. Reynolds (2004) evaluated the quality of each study’s research design and found that of the nineteen studies evaluated, six were rated as excellent, nine were rated good, and four were fair. Of the nineteen studies, only one was found to have external validity, and that study found no direct cause and effect relationship between school uniforms and improved achievement or improved behavior.
The dissertations discussed in this section illustrate the types of studies currently being conducted on school uniforms. The majority of the research is focused on behavior, school climate, attendance, and academic achievement. However, much of the research has conflicting results, and researchers cannot agree on the effects of uniforms. The following section will discuss one very public disagreement between three prominent researchers (Brunsma & Rockquemore, 1998; Bodine, 2003).

**Conflicting Research Results**

As more research began to appear on school uniforms, a notable controversy emerged between researchers (Brunsma & Rockquemore, 1998; Bodine, 2003a). After Bodine’s (2003a) article contested Brunsma and Rockquemore’s (1998) use, or misuse, of sector analysis and findings, Brunsma and Rockquemore (2003) responded with another article in which they defended their original research. The following section discusses these conflicting findings.

Brunsma and Rockquemore (1998) conducted a longitudinal study of the impact of school uniforms on attendance rates, academic achievement, and behavior problems. The researchers used the National Educational Longitudinal Study of 1988 (NELS:88) to track a random sample of students beginning in 8th grade, and again in 10th grade to test their hypotheses. Because there were not a large number of public schools with a uniform policy at the time the data were collected, there was not a public-private school comparison in their study (Brunsma & Rockquemore, 2003). The dependent variables were absenteeism, behavior problems such as fighting or truancy, substance use including tobacco, alcohol, and marijuana, and academic achievement based on standardized
achievement tests in reading and mathematics. In addition, the researchers looked at student attitudes toward school and whether or not students came to class prepared (Brunsma & Rockquemore, 1998).

Brunsma and Rockquemore (1998) found a correlation \( r = .05 \) of uniforms with academic achievement. There was no significant correlation with uniforms and absences, behavior, or substance use. Of the 5.6% of Catholic schools included in the study, 65.4% had a uniform policy. After a weighted comparison of schools with uniforms and those without a uniform policy, the authors found a correlation \( r = .05 \) with increased absenteeism and lower academic achievement in Catholic schools with uniforms, leading the researchers to conclude that “those policies with results not immediately identifiable and those that are costly and demand energy and a willingness to change on the part of school faculty and parents are unacceptable” (Brunsma & Rockquemore, 1998, p. 60).

Anne Bodine (2003a) disputed the findings of Brunsma and Rockquemore (1998), accusing them of the “misleading use of sector analysis” to arrive at their conclusion that school uniforms are negatively correlated with student achievement (Bodine, 2003a, p. 68). In addition, Bodine stated that three of the four variables for which data were available in the NELS: 88 report “were based on survey results of student recollection and self-report: (a) attendance… (b) behavior…and (c) substance use” (Bodine, 2003a, p. 68). The core of Bodine’s assertions of misleading and inaccurate use of sector analysis by Brunsma and Rockquemore (1998) was best illustrated in her argument that:

Uniformed public school students must have scored considerably higher than non-uniformed public school students in order for the differences between means of uniformed versus non-uniformed students in their
various sectors (Catholic = -3.02 points, private-but-not-Catholic = +0.59 points, public = X) to produce the 2.31-point mean difference by which uniformed students outperformed non-uniformed students in the total sample. (Bodine, 2003a, p. 69)

Brunsma and Rockquemore’s (2003) response to the criticism of faulty sector analysis was forthcoming. Their rebuttal countered Bodine (2003a) by stating, “Contrary to Bodine’s guesswork, if one separates out only public school 10\textsuperscript{th} graders, there is a very weak negative correlation between school uniform policies and the composite standardized achievement scores” (Brunsma & Rockquemore, 2003, p. 73). They continued to argue that despite the few cases in certain cells, their methodology was sound because correlations, \textit{t} tests, and multiple regression models still showed a statistically significant pattern suggesting that uniform policies did not benefit students’ achievement scores in the early 1990’s. However, they also acknowledged that these data were only tenth graders (Brunsma & Rockquemore, 2003). It is evident from the robust debate among these three established researchers that there is not a clear consensus on whether school uniforms help or hinder students and schools officials in their quest for improving student academic achievement, behavior, or other desired improvements advocates purport when implementing uniform policies.

One of the criticisms of the modern school uniform movement is that recent uniform policies are most prevalent in schools in urban, low SES neighborhoods, in need of academic gains, and behavioral improvement (Brunsma, 2004, 2006; DaCosta, 2006). If this is truly the case, the data may be skewed when comparing uniformed public school students to their non-uniformed peers. As uniform policies become widespread and more
schools serving affluent students begin to adopt uniform dress policies it will be interesting to see if the data continue to support Brunsma and Rockquemore’s (2003) assertion that the negative effects of school uniforms will be magnified when the $N$ size of public school students wearing uniforms gets larger. This is an area that would benefit from further research using more recent data.

**Summary**

School uniforms are increasing in popularity among school leaders and communities hoping to address a variety of issues from gang activity to self-esteem (Bodine, 2003b). However, there is no consensus on the ability of mandatory school uniforms to achieve the results uniform proponents tout (Brunsma, 2006a). There are many instruments currently in use to measure student perceptions of the benefits, or lack thereof, of school uniforms. Most of the instruments used by doctoral candidates are researcher created and have not been assessed for reliability and validity. Several researchers have used survey instruments that have been thoroughly vetted, but do not measure the variables this research intends to explore.

This research intends to assess the reliability and validity of a researcher-created survey that purports to measure student perceptions of the benefits of wearing school uniforms. This chapter provided the context and theoretical framework for studying school uniforms, as well as an overview of the survey instruments currently used by researchers to measure student perceptions. The following chapter will discuss the methodology to be used for this study. Chapter IV will present the results of the study, and Chapter V will discuss interpretations as well as areas of further study suggested by this study.
CHAPTER III

The debate over mandatory school uniforms continues to command attention due to the conflicting research findings regarding academic achievement, behavior, and attendance. Much of the current research is based on anecdotal data and perception surveys that have not been tested for reliability and validity (Brunsma, 2006a; Stanley, 1996). In addition, studies that rely on quantitative student data, such as attendance and discipline data, can be influenced by extenuating circumstances, such as other school improvement initiatives implemented along with school uniforms (Stamison, 2006). This study was designed to investigate the factor structure of a survey instrument created by Sanchez et al. (2012) that was developed to measure student perceptions of the benefits of wearing student uniforms. This research also investigated the relationships among student responses based on identified demographic groupings.

The methodology of this study will be discussed in this chapter in four sections. The problem addressed by this study will be presented in the first section, as well as a review of the research questions. The instrument under investigation will be discussed in the second section of this chapter. Data acquisition methods will be outlined in detail in the third section. The data analysis procedures employed are the focus of the fourth and final section of this chapter. The purpose of this chapter is to establish a framework for the study and describe the methodology in enough detail to allow future researchers to build upon it.

Problem and Purpose

As educational leaders increasingly turn to school uniforms as a means to improve academic performance and student behavior, it is imperative that their decisions are based
on evidence supported by research. The current research on school uniforms has conflicting findings on the effectiveness of mandatory school uniforms to achieve the results school administrators are seeking when implementing such policies. The problem is that there are currently few instruments with construct validity that can be used to measure student perceptions of existing uniform policies.

The researcher’s purpose for conducting this study was to investigate the factor structure of a researcher-created survey instrument developed to measure student perceptions of the benefits of wearing school uniforms. Knowing the factor structure can inform validity of the survey instrument. Additionally, the researcher sought to identify differences in student responses based on demographic groups. The first part of the study was guided by the research questions presented in Chapter I, which are:

1. Given the survey dataset, what are the empirical factors of the survey instrument?
2. Given the empirical factors established in Research Question 1, what are the internal reliabilities of each factor?
3. Do relationships exist among the identified factors from Research Question 1?
4. Are the perceptions of various groups, as identified by the demographic variables, different on the newly identified factors of the survey instrument? Of specific interest, are groups established by grade level, ethnicity, and gender.

The researcher aimed to identify the empirical factors present in the survey and their alignment with the developer’s intent. The identified empirical factors were examined for reliability and their correlation to one another. Lastly, the responses from the various demographic groups, including gender, ethnicity, and grade level, were analyzed for differences of perception on the identified variables. It is hoped that school leaders, when
implementing a mandatory school uniform policy, will be able to use the survey and the findings of this study to inform their decision.

**Instrumentation**

The survey instrument analyzed in this study is a researcher-created instrument that was designed to measure student perceptions of the benefits of wearing a school uniform at the conclusion of the first year of a mandatory uniform policy at an urban middle school in Nevada. School administration of the middle school approached the University of Nevada, Reno Educational Leadership department with the intent of finding a researcher to develop a survey that could measure the perceived benefits of the school uniform policy. The development of the Student School Uniform Survey is discussed in detail below.

After conducting a review of literature, the lead developer of the survey worked with the school principal to identify areas of inquiry and determine factors to be measured by the Student School Uniform Survey (J. Sanchez, personal communication, August 28, 2013). The instrument was constructed around six perceived factors: Decreases in Discipline, Gang Involvement, Bullying and Increases in Safety, Ease of Going to School, Confidence, and Self-Esteem. After developing an initial set of questions for the instrument, Sanchez et al. (2012) consulted with the school administration and modified the survey based on the administration’s feedback. Student leaders in the school also provided feedback for the survey.

The survey questions consist of 4 and 5 point Likert-type items and dichotomous yes/no questions. Items 15-46 on the survey ask respondents to select a, b, c, or d with a = Strongly Disagree and d = Strongly Agree. These 32 items were the items tested with
exploratory factor analysis to determine alignment with the originally purported factors stated above. The survey utilized in this study is comprised of 49 questions with the last three questions asking students to self-identify gender, ethnicity, and grade level. The items that are appropriate for factor analysis are items 15-46, which are Likert-type questions with four options. A copy of the survey can be found in Appendix A.

The finalized survey instrument was used to collect data, which was analyzed for a study published in *The Journal of School Violence* (Sanchez et al., 2012). In all, the Student School Uniform Survey was administered in three middle schools in the same northern Nevada school district over two years. For one school, the survey was administered during the 2008-2009 school year; the survey was then administered at two additional schools the following year when a uniform policy was implemented during the 2009-2010 school year.

However, the Student School Uniform Survey has never been tested using factor analysis to ensure the purported factors of Decreased Discipline, Gang Involvement, Bullying and Increases in Safety, Ease of Going to School, Confidence, and Self-Esteem, are present. Sanchez et al. (2012) collected data from 1848 middle school students during the 2008-2009 and 2009-2010 school years.

**Data Acquisition**

Sanchez et al. (2012) administered and collected 1848 Student School Uniform Survey responses from students in three middle schools in northern Nevada; students responded from one school during 2008-2009; then additional students responded from two more schools during 2009-2010.
The survey was administered to students in their English or advisory class by the lead researcher and Institutional Review Board (IRB)-trained assistants. Students were informed that their responses to the survey would not impact the mandatory school uniform policy. In addition, students were told they did not have to complete the survey if they did not want to. The current research utilized the data collected with this survey instrument to conduct an exploratory factor analysis of the Student School Uniform Survey.

**Dataset Development**

Upon IRB approval for this study, a request was made via e-mail to Sanchez for the existing de-identified data. After receipt of the data it was reviewed to identify how variables were coded; where necessary, variables were recoded to ensure that responses coded as one indicated a negative response and those coded as four indicated a positive response. Next, data were screened to ensure completeness of response patterns. Missing data were coded nine to be excluded from data analysis.

Next, the data were evaluated for multivariate outliers by calculating Mahalanobis distance. A chi square value of $p < .001$ was used to identify outliers, which were deleted from the dataset. The final step in developing the dataset was to check for univariate normality. If the data were skewed, the data were transformed following Tabachnik and Fidell’s (2007) recommendations. For example, if the data were moderately skewed in the positive direction, the data would be transformed by using the square root of the variable. If the data showed a moderate negative skew, the data would be transformed using the inverse and square root of the original variable.
Data Analysis

Once the dataset had been screened for missing values, outliers, and univariate normality, an exploratory factor analysis was conducted. Factor analysis is a viable method of assessing the internal validity of a survey instrument (Harman, 1976). Factor analysis is a statistical method that can be used to identify latent factors in an instrument. It is a reduction process that identifies which items cluster together to measure a factor (Mertler & Vannatta, 2004).

Factor analysis was chosen as the appropriate statistical analysis because it is typically exploratory and is used to identify the underlying factor structure in a survey instrument. (Mertler & Vannatta, 2004). Various factor extraction methods were explored to find the best linear combination of variables. Factor analysis requires many decisions to be made throughout the process. The first decision to be made is how many factors to retain. Mertler and Vannatta (2004) identify four criteria when determining the number of factors to retain.

The first criterion is the Kaiser rule, which states that only those factors with an eigenvalue greater than 1 should be retained. This criterion is fairly reliable when the number of variables is less than 30 and the communality is greater than or equal to .60. The second method involves the examination of a scree plot. The appropriate number of factors to retain is determined by looking for the point on the scree plot where the sharp descent flattens out. This criterion is fairly reliable when the number of individuals is greater than 250 and the communalities are less than .30. A third criterion for determining the number of factors to retain is to retain as many factors as will account for a certain percent of the variance. A rule of thumb, as identified by Stevens (2001), is to retain the
number of factors that account for 70% of the variance. The final criterion suggested by Mertler and Vannatta (2004) is the assessment of model fit. This method for determining the number of factors to retain involves computing the reproduced correlations and comparing them to the original, observed correlations. If the number of correlations that are reasonably close (within .05) is small, it can be assumed the model is consistent with the empirical data. For this study all four methods were employed and compared to one another to determine the appropriate number of factors to retain. However, if the number of retained factors was too small or too large using all four methods, the eigenvalue threshold of 1 was changed to force the number of factors generated to an acceptable number.

The next decision to be made is whether to use orthogonal rotation or oblique rotation. Rotation is a process that makes the factor solution more interpretable without changing the underlying mathematical structure (Mertler & Vannatta, 2004). Orthogonal rotation results in factors being uncorrelated with one another, which is the intent of this research. Therefore, orthogonal rotation was used for this study. Orthogonal rotation methods of quartimax, varimax, and equamax were applied to derive unique solutions. The resulting computer output included a loading matrix. Factor loadings for each variable ranged from -1.00 to 1.00 on the matrix. Factor loadings for each rotation method were analyzed in the loading matrix to identify correlations between observed variables and each factor. Those factors with relatively high (≥.45) and pure (≤.33) loadings were retained for further analysis. Variables that did not load high and pure were discarded from further analysis. For this research the Statistical Package for the Social
Sciences (SPSS) was used to conduct the factor analysis of the survey variables and identify latent constructs.

**Research Question 1**

Given the survey dataset, what are the empirical factors of the survey instrument?

The instrument analyzed in this research has a large number of variables (32) and a large sample size (at least 1848) as identified by Comrey et al. (2000). Muthen (1984) proposed a three-stage estimation method when using ordinal data with factor analysis. Rummel (1976) cautioned that when using ordinal data, such as a Likert-type scale, the researcher needs to check the distributions to ensure no one scale value gets too large.

This was done upon approval of this proposal and IRB approval. It was assumed that the instrument had interval data, based on the attributes of the data, and six factors (Allen & Seaman, 2007). To identify the factor structure of the survey instrument, the data analysis procedures outlined in the dataset development and data analysis sections above were followed.

**Research Question 2**

Given the empirical factors established in Research Question 1, what are the internal reliabilities of the items that contribute to each factor?

To determine an estimation of internal consistency and reliability of the survey instrument, Cronbach’s alpha coefficient (α) was utilized. Cronbach’s alpha coefficient (α) is often calculated to assess the internal consistency, or average correlation, of items in a survey instrument to determine if the questions will elicit consistent and reliable responses (Santos, 1999). All items identified as measuring a construct in Research Question 1 were included in the computations of Cronbach’s alpha coefficient (α) for that
factor. A reliability analysis was then conducted for each of the identified factors using only the questions related to that factor. Factors with a Cronbach’s alpha coefficient (α) reliability coefficient of .7 were considered reliable for this study (Nunnaly, 1978).

**Research Question 3**

Do relationships exist among the newly identified factors from Research Question 1?

Using the Likert-scale ratings, a mean score was calculated for each of the newly identified factors. To determine if correlations existed between the newly identified factors Pearson’s product moment correlation coefficient was computed among factors. Pearson’s product moment correlation does not establish a causal relationship, but confirms a relationship exists, which is expressed as a correlation coefficient ranging from -1.00 to 1.00. The farther the score is from 0 the stronger the correlation between the two variables (Sprinthall, 2007). The Pearson’s product moment correlation was determined using the mean factor score. Based on the assumptions of a linear relationship and interval data, a Pearson’s product moment correlation was deemed the appropriate method of analysis.

**Research Question 4**

Are the perceptions of various groups, as identified by the demographic variables, different on the newly identified factors of the survey instrument? Of specific interest, are groups established by grade level, ethnicity, and gender?

After factors were identified by factor analysis, a one-way multivariate analysis of variance (MANOVA) was calculated to expose response differences between demographic groups (grade level, ethnicity, and gender) on the newly identified factors.
A MANOVA was deemed the appropriate statistical analysis based on Mertler and Vannatta’s (2004) definition of factors and the items that contribute to them: (a) Factors consist of different measures of the same construct; (b) Items that contribute to a factor have a shared conceptual meaning; and (c) Items that contribute to a factor can be grouped together (Mertler & Vannatta, 2004). MANOVA allows a researcher to consider a holistic analysis of differences based on the identified factors.

To test for homogeneity of variance-covariance a Box’s M statistic was generated by conducting a separate MANOVA for each demographic subgroup. A Wilks’ Lambda was interpreted for significance if the assumption of variance-covariance was met. Wilks’ Lambda is used to test the null hypothesis that group means are all equal. Pillai’s Trace was interpreted for significance if the assumption was not met. An appropriate post hoc test was conducted where significance was found to determine where differences exist and obtain an effect size.

**Summary**

This study used the procedures outlined in the preceding chapter regarding data acquisition and analysis to address the research questions and reach conclusions. This chapter provided an overview of the methodology that was employed in this study, as well as a description of the data and procedures used. Chapter IV will present the findings of the study. Chapter V, the final chapter, will include the discussion of key findings, implications of the study, and recommendations for further exploration.
CHAPTER IV

The primary purpose of this study was to investigate the factor structure of the Student School Uniform Survey. The authors of the survey intended to measure student perceptions of six factors related to the implementation of a mandatory school uniform policy: Discipline, Gang Involvement, Bullying and Increases in Safety, Ease of Going to School, Confidence, and Self-Esteem. A secondary purpose of this study was to investigate relationships among responses based on student membership in specific demographic groupings.

The survey instrument under study was a researcher-created instrument (Sanchez et al., 2012) that was administered to 1848 students during the 2008-2009 and 2009-2010 school years. The existing de-identified data are based on sixth, seventh, and eighth grade students in three middle schools in northern Nevada. A mandatory uniform policy was implemented at one of the middle schools at the beginning of the 2008-2009 school year and at the other two middle schools in 2009-2010. Data were collected at each middle school at the conclusion of the first year of the uniform policy in the respective schools. The survey questions consisted of four and five point Likert-type items and dichotomous yes/no questions. Items 15-46 on the survey asked respondents to select a, b, c, or d with a = Strongly Disagree and d = Strongly Agree. These 32 items were the items tested with factor analysis to determine alignment with the originally purported factors as described in the previous paragraph. The survey utilized in this study was comprised of 49 questions with the last three questions asking students to self-identify gender, ethnicity, and grade level. A copy of the survey is found in Appendix A.
The results of the survey administration at one middle school were analyzed and
the resulting study was published in the *Journal of School Violence* (Sanchez. et al.,
2012). As discussed in Chapter 3, the data are assumed to be interval and appropriate for
factor analysis based on the attributes of the data and six intended factors.

The purpose of this chapter is to present the results of the data analysis to address
the research questions:

1. Given the survey dataset, what are the empirical factors of the survey
   instrument?
2. Given the empirical factors established in Question 1, what are the
   internal reliabilities of each factor?
3. Do relationships exist among the identified factors from Research
   Question 1?
4. Are the perceptions of various groups, as identified by the demographic
   variables, different on the newly identified factors of the survey
   instrument? Of specific interest, are groups established by grade level,
   ethnicity, and gender.

**Existing Data**

Upon approval of the IRB at the University of Nevada, Reno (Appendix C), de-
d-identified existing raw data were obtained from Dr. Sanchez. This study utilized de-
d-identified existing data collected in the 2008-2009 and 2009-2010 school years at three
middle schools. These middle schools had mandatory uniform policies in a northern
Nevada school district. The demographic data used in this study were identified by three
groupings: gender, ethnicity, and grade level. Incomplete student surveys were included
among the 1848 completed surveys collected. Missing data were coded nine to be excluded from analysis.

**Descriptive Statistics**

The existing data used for this study included demographic variables related to gender, ethnicity, and grade level. A summary and discussion of the demographic variables follows. In addition, a table for each demographic variable is included below.

**Ethnicity.** The de-identified, existing data included ethnicity based on five choices: White/Caucasian, Hispanic/Latino, Black/African American, Asian/Pacific Islander, Native American/Alaskan Native. Of the 1848 surveys collected, 85% (n = 1577) had the ethnicity question completed, while 15% (n = 271) of the surveys did not have this question completed. White/Caucasian accounted for 31% of the data (n = 567), 44% identified as Hispanic/Latino (n = 807), 3% identified as Black/African American (n = 60), 5.0% identified as Asian/Pacific Islander (n = 93), and 2% identified as Native American/Alaskan Native (n = 40). The data analysis indicated that the largest ethnic group was Hispanic/Latino (n = 807). Ethnicity frequency and percentage data are summarized in Table 1 below.
Table 1

*Frequencies and Percentages of Groups Established by Ethnicity*

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>White/Caucasian</td>
<td>567</td>
<td>31%</td>
</tr>
<tr>
<td>Hispanic/Latino</td>
<td>807</td>
<td>44%</td>
</tr>
<tr>
<td>Black/African American</td>
<td>60</td>
<td>3%</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>93</td>
<td>5%</td>
</tr>
<tr>
<td>Native American/Alaskan Native</td>
<td>40</td>
<td>2%</td>
</tr>
<tr>
<td>No Response</td>
<td>271</td>
<td>15%</td>
</tr>
<tr>
<td>Total</td>
<td>1848</td>
<td>100%</td>
</tr>
</tbody>
</table>

**Gender.** De-identified existing data included information on gender, which was either male or female. Responses relating to gender were completed on 91% of the surveys (n = 1681). The data showed that 46% (n = 846) of surveys were coded male, while 45% (n = 832) were female. Nine percent (n = 167) of the surveys had this question blank. Frequencies and percentages of gender data are summarized in Table 2 below.

Table 2

*Frequencies and Percentages for Groups Established by Gender*

<table>
<thead>
<tr>
<th>Gender</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>846</td>
<td>46%</td>
</tr>
<tr>
<td>Female</td>
<td>832</td>
<td>45%</td>
</tr>
<tr>
<td>No Response</td>
<td>167</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>1848</td>
<td>100%</td>
</tr>
</tbody>
</table>
Grade level. This study utilized existing de-identified data pertaining to students in sixth, seventh, and eighth grades. Survey respondents attended a middle school where a mandatory school uniform policy was in the first year of implementation. Sixth grade students accounted for 7% (n = 135), seventh grade students 39% (n = 728), and eighth grade students 44% (n = 808) of the survey participants. The low number of sixth grade students relative to seventh and eighth grade students is because only one middle school had sixth grade students attending at the time the survey was administered. Missing data accounted for 9% (n = 160) of the data. A summary of the frequencies and percentages of the grade level of participants is presented in Table 3 below.

Table 3

Frequencies and Percentages of Groups Established by Grade Level

<table>
<thead>
<tr>
<th>Ethnicity</th>
<th>Frequency</th>
<th>Percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sixth</td>
<td>135</td>
<td>7%</td>
</tr>
<tr>
<td>Seventh</td>
<td>728</td>
<td>39%</td>
</tr>
<tr>
<td>Eighth</td>
<td>808</td>
<td>44%</td>
</tr>
<tr>
<td>No Response</td>
<td>160</td>
<td>9%</td>
</tr>
<tr>
<td>Total</td>
<td>1848</td>
<td>99%*</td>
</tr>
</tbody>
</table>

*Note: Does not equal 100 because of rounding error

Results and Analyses

The results of the data analysis for each of the four research questions are presented in this section. For Research Question 1, an exploratory factor analysis was conducted. Cronbach’s alpha coefficient (α) was computed to assess the internal
reliability of the survey instrument and address Research Question 2. Pearson’s product moment correlation matrix was computed for Research Question 3. Research Question 4 was addressed by calculating multivariate analysis of variance (MANOVA) for each demographic grouping (gender, ethnicity, and grade level). The appropriate post hoc analyses were conducted where appropriate.

**Missing data.** The 32 items used in the factor analysis were screened for missing values. Missing responses accounted for 13.2% of the total dataset. With the exception of Research Question 3, listwise deletion of data was used for all statistical analysis in this study. Listwise deletion of data does not include any cases with missing data in any question. Listwise deletion is robust to data missing completely at random (MCAR) and data missing at random (MAR). Furthermore, “the estimated standard errors produced by listwise deletion are usually accurate estimates of the true standard errors…listwise deletion of data is an ‘honest’ method of handling missing data, unlike some other conventional methods” (Allison, 2002, p. 76). After listwise deletion of data, 896 cases remained in the data set for factor analysis. Sixth grade student responses were included in the factor analysis despite the low number of cases remaining after listwise deletion ($n = 26$). Sixth grade student responses were excluded from MANOVA calculations because of the low number of cases compared to seventh ($n = 423$) and eighth ($n = 743$) grade cases.

A Pearson’s product moment correlation coefficient was computed to address Research Question 3. The default option for handling missing data when calculating Pearson’s product moment correlation in Statistical Package for the Social Sciences (SPSS) is pairwise deletion. Pairwise deletion of data includes cases with missing data.
Pairwise deletion of missing data allows for more of the data to be utilized than with listwise deletion. Although the parameter estimates may be biased, these biases tend to be small with empirical data (Graham, 2009).

**Pre-analysis:** The 32 items used in the factor analysis were examined to ensure that responses coded one indicated a negative response and four indicated a positive response. Five questions required coding reversal: 15, 21, 22, 28, and 29.

To check for outliers Mahalanobis distance was calculated. The $\chi^2_{crit} (df = 32)$ was 59.70 ($p < .01$), which identified 105 outliers. This number did not represent a significant percentage of cases (5.7%). Cases identified as outliers were removed from the dataset. The resulting dataset had a total of 1,743 cases before listwise or pairwise deletion of data. The N sizes resulting from listwise and pairwise deletion are discussed below in relevant sections.

Univariate normality was assessed by examining the skewness statistic and comparing it to the standard error. If the skewness statistic is greater than two times the standard error, the distribution may be skewed (Green & Salkind, 2008). The results of the analysis indicated moderate skewness, but because of the large sample size and the robustness of subsequent tests to non-normality, it was determined that no transformation of the data would be necessary for the factor analysis (Tabachnik & Fidell, 2007).

**Research Question 1**

Given the survey dataset, what are the empirical factors of the survey instrument?

To determine the empirical factors reflected in the survey instrument, an exploratory factor analysis was conducted on 32 of the 49 original survey items. The remaining 17 items on the survey were not appropriate for factor analysis due the nature
of the questions. The 17 excluded items were dichotomous yes/no questions or used a
different scale. The 32 items selected for factor analysis were four-point Likert-type
questions. The following discussion details the data analysis procedure that relates to the
factor analysis of this dataset.

**Factor analysis.** An exploratory factor analysis was conducted to establish
empirical factors. Factor analysis provides an eigenvalue measure for each factor. A
factor with an eigenvalue greater than 1 indicates a strong factor that should be retained
(Mertler & Vannatta, 2004). The initial factor analysis revealed five factors with an
eigenvalue greater than 1, accounting for 57.16% of the variance. However, after
examination of the data in light of Mertler and Vannatta’s (2004) guidelines for
determining how many factors to retain, further explorations were conducted.

Mertler and Vannatta (2004) suggested four approaches to determine the
appropriate number of factors to retain, all of which should be weighed against the goal
of parsimony. The first criterion was the Kaiser rule, which states that only those factors
with an eigenvalue greater than 1 should be retained. The second criterion was the
examination of a scree plot. Only factors on the steep descent of the line should be
retained. The third criterion suggested by Mertler and Vannatta was to retain the number
of factors that account for at least 70% of the total variability. The final criterion was the
assessment of model fit, which involves retaining factors generated by the model if only a
few residuals (differences between observed and reproduced correlations) exceed .05. If
the number of observed correlations is reasonably close to the number of reproduced
correlations (within .05), it can be assumed the model is consistent with empirical data.
Further explorations of various factor solutions were conducted employing additional extraction and data rotation methods to find the most parsimonious set of factors. Subsequent factor extraction methods included generalized least squares, unweighted least squares, and maximum likelihood, each producing five factors with eigenvalues of 1. Orthogonal rotation methods of equamax, varimax, and quartimax were used with each extraction method to derive unique solutions. Changing the eigenvalue threshold to produce three- and four-factor solutions was also explored because the initial five-factor solution did not present the best fit, even after various rotations. The most parsimonious result was achieved with three factors and employing unweighted least squares extraction with varimax rotation. A discussion of the data reduction process resulting in a three factor solution follows.

**Three-factor solution.** Examination of the various factor solutions revealed that three factors utilizing unweighted least squares with varimax rotation yielded the best fit. Varimax rotation minimizes factor complexity by maximizing the variance for each factor. The cumulative variance accounted for with three factors and varimax rotation was 47.75%. Factor loadings represent the correlation of a variable with a factor (Mertler & Vannatta, 2004). Using the guidelines established by Comrey et al. (2000) there were 14 variables that loaded high (≥ .45) and pure (≤ .33) on three factors. A variable was considered as loading high if the loading was greater than or equal to .45 on its primary loading, and it was considered as loading pure if its loading on other factors was less than or equal to .33 (Comrey et al., 2010). Variables that did not load high and pure were removed and the data were analyzed again until all variables loaded high and pure. After four analyses, 13 variables were retained, although one variable loaded high (.54) but not
pure (.37). However, due to the exploratory nature of this research and because the difference between the highest and next highest loading exceeded .12 the variable in question, Has Improved My Behavior, was retained.

A summary of the results of the three-factor solution utilizing unweighted least squares with varimax rotation is presented in Table 4. The resulting rotated factor matrix of unweighted least squares with varimax rotation is presented in Appendix B.

Table 4

*Three-Factor Solution Unweighted Least Squares with Varimax Rotation*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Number of Items Loading High</th>
<th>Initial Eigenvalue</th>
<th>Percentage of Variance Accounted for by the Factor</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5</td>
<td>5.48</td>
<td>38.30</td>
</tr>
<tr>
<td>2</td>
<td>4</td>
<td>1.26</td>
<td>5.98</td>
</tr>
<tr>
<td>3</td>
<td>4</td>
<td>1.00</td>
<td>3.47</td>
</tr>
<tr>
<td></td>
<td><em>Total Variance Explained</em></td>
<td></td>
<td>47.75</td>
</tr>
</tbody>
</table>

The next step in the analysis was to name the empirical factors based on the items that loaded high and pure on each of the factors. The three factors were named Safety and Behavior of Others, Acceptance and My Behavior, and Ease of Going to School. The factor names were determined after evaluating the associated variables. The content of the highest loading variables on each factor was considered when naming the factors. The intended constructs of the survey authors were also taken into account. Finally, the factor names were discussed with members of the dissertation committee to determine construct validity based on the content of the items that related to each factor.

The items that contributed to Factor 1 (Safety and Behavior of Others) are: There Are Fewer Problems at School (.70), School is Safer (.67), There is Less Gang Activity at
School (.63), Uniforms Have Reduced Behavior Problems (.53), and Uniforms Have Improved Others’ Behavior (.52). The survey authors had six purported factors. Three of these factors were Decreased Discipline, Increased Safety, and Gang Involvement and Bullying. The newly named factor of Safety and Behavior of Others encompasses those constructs. The items that contributed to Factor 1 have high loadings (all ≥ .53) and relatively small cross loadings (≤ .33) lending strength to the empirical validity of the construct (Comrey et al., 2000). All five items describe the behavior of other students and the general perception of safety. Because gang activity is associated with an unsafe school environment, the two items School is Safer and There is Less Gang Activity at School directly relate to the construct of Safety. The variables There Are Fewer Problems at School, Uniforms Have Improved Others’ Behavior, and Uniforms Have Reduced Behavior Problems relate to the behavior of other students and behavior problems at school. Because all five of the items that loaded high and pure on Factor 1 are related to safety and others’ behavior, it was decided to name the construct Safety and Behavior of Others.

Factor 2 (Acceptance and My Behavior) was comprised of four variables: Now That I Wear a Uniform Teachers Treat Me Better Than Before, (.72), Wearing a Uniform Makes Me Feel More Accepted By Teachers (.60), Now That I Wear a Uniform Students Treat Me Better Than Before (.55), and Wearing a Uniform Has Improved My Behavior (.54). These four variables loaded higher than or equal to .54 on Factor 2. The cross loadings for each variable were between .06 and .37. Although .37 exceeds Comrey et al.’s (2010) suggestion of a .33 loading as the upper limit for purity, because of the exploratory nature of this research, the variable with the loading of .37, Wearing a
Uniform Has Improved My Behavior, was included in Factor 2. Additionally, the decision to include the item was based on the size of the differential between the highest and next highest loading (.17) which exceeds the .12 difference suggested by Comrey et al. Confidence and Self-Esteem were two of the originally intended constructs. The name, Acceptance and My Behavior, was chosen based on the content of the questions that related to Factor 2. Students feeling accepted by their teachers and other students is very important to their success in school. This construct may help teachers and administrators understand how well uniforms help improve student behavior as well as how uniforms impact students’ perceptions of acceptance by teachers and other students.

Four variables loaded high and pure on Factor 3 (Ease of Going to School): With Uniforms, I Worry Less About My Appearance at School (.64), With Uniforms, I Worry Less About How Others Look at School (.59), My Family Likes That I Wear a Uniform to School (.47), and I Think Uniforms Save Money on Clothes (.45). The significant variables that contributed to Factor 3 (Ease of Going to School) relate to decreased stress and expense associated with going to school. If students worry less about their appearance, as well as worrying less about what their peers are wearing, it may make going to school easier. In addition, going to school may be easier if the required uniform a student wears costs less than trendy, popular fashions. As well, if a student’s family supports a uniform policy it could make going to school easier for a middle school student, which is why the decision was made to name Factor 3 Ease of Going to School. The developers of the Student School Uniform Survey intended to measure Ease of Going to School. The variables that contributed to Factor 3 are all related to ease of going to school, thereby supporting the developer’s original intent of measuring students’
perception of how uniforms might make going to school easier. Table 5 provides a list of
the factors and the retained variables that loaded high and pure on each factor, as well the
primary factor loading associated with each item.

Table 5

<table>
<thead>
<tr>
<th>Factor Names and Corresponding Items Retained with Primary Factor Loading</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor</td>
</tr>
<tr>
<td>Safety and Behavior of Others</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Acceptance and My Behavior</td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td></td>
</tr>
<tr>
<td>Ease of Going to School</td>
</tr>
<tr>
<td></td>
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<tr>
<td></td>
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<tr>
<td></td>
</tr>
</tbody>
</table>

Research Question 2

Given the empirical factors established in Research Question 1, what are the
internal reliabilities of the items that contribute to each factor?

To determine the reliabilities of the empirical factors established as a result of the
factor analysis in Research Question 1, Cronbach’s alpha coefficient (α) was calculated
Reliability. Cronbach’s alpha coefficient (α) is commonly used to assess the internal reliability and consistency of survey instruments (Santos, 1999). Internal reliability is a measure of how close items in an instrument relate to one another. For this study, internal reliability was calculated using Cronbach’s alpha coefficient (α) for all of the individual survey items, as well as for the groups of items that contributed to each of the three identified factors in Research Question 1. An alpha coefficient of .70 on a scale of 0 to 1 was used as the threshold of reliability (Nunnaly, 1978).

Cronbach’s alpha coefficient (α) was calculated four times: once for all 13 variables that contributed to the three empirical factors, and once for the variables that composed each individual factor. The 13 items that contributed to the three identified factors had a computed Cronbach’s alpha coefficient (α) of .88 (n = 896). Factor 1 (Safety and Behavior of Others) was composed of five variables, and had a computed Cronbach’s alpha coefficient (α) of .83 (n = 896). Factor 2 (Acceptance and My Behavior) was composed of four items, and had a computed Cronbach’s alpha coefficient (α) of .77 (n = 896). The computed Cronbach’s alpha coefficient (α) for the four variables that related to Factor 3 (Ease of Going to School) was .72 (n = 896). The n-size difference among factors was a result of listwise deletion, discussed earlier in this chapter. Based on Nunnaly’s (1978) standard of reliability for social science research, a Cronbach’s alpha coefficient (α) greater than .70 indicates a high degree of reliability.
The results of each reliability analysis indicate a high degree of reliability among the newly identified empirical factors. A summary of the reliability scores is presented in Table 6.

Table 6

*Cronbach’s alpha (α) Reliability Scores*

<table>
<thead>
<tr>
<th>Description</th>
<th>Number of Variables</th>
<th>Cronbach’s alpha coefficient (α)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reliability of Revised Survey</td>
<td>13</td>
<td>.88</td>
</tr>
<tr>
<td>Reliability of Factor 1: Safety and Behavior of Others</td>
<td>5</td>
<td>.83</td>
</tr>
<tr>
<td>Reliability of Factor 2: Acceptance and My Behavior</td>
<td>4</td>
<td>.77</td>
</tr>
<tr>
<td>Reliability of Factor 3: Ease of Going to School</td>
<td>4</td>
<td>.72</td>
</tr>
</tbody>
</table>

**Research Question 3**

Do relationships exist among the newly identified factors from Research Question 1?

Pearson’s product moment correlation coefficients were computed to determine if correlations existed among factors identified in Research Question 1. Pearson’s product moment correlation does not describe the nature of a correlation but simply confirms that a mathematical relationship exists. Pearson’s product moment correlations range from -1.00 to 1.00, with the strongest correlations between variables having a coefficient farthest from 0. The results of the computed Pearson’s product moment correlation for the three identified factors in Research Question 1 indicate a positive correlation among
all three factors, with the strongest correlation between Factors 1 and 3 ($r = .60$). The following section details the data analysis methods.

**Pearson’s product moment correlation $r$**. To determine if relationships existed among the three identified factors of Safety and Behavior of Others, Acceptance and My Behavior, and Ease of Going to School, Pearson’s product moment correlations were computed among all factors. In order to calculate the Pearson’s product moment correlation, a mean score was calculated for each factor.

**Factor scores**. Mean scores for each factor were calculated based on participant responses for the variables that loaded high and pure on the three identified factors. Each case had three computed factor scores. For the purpose of this research, the results from the factor analysis were assumed to approximate continuous data; therefore, parametric calculations were deemed appropriate for further statistical analysis.

The reported Pearson’s product moment correlation ($r$) was significant in all cases, with Factor 1 (Safety and Behavior of Others) and Factor 3 (Ease of Going to School) showing the strongest correlation ($r = .60$). Factor 2 (Acceptance and My Behavior) and Factor 3 showed the weakest correlation ($r = .52$). A summary of the correlations is presented in Table 7.
Table 7

Pearson’s Product-Moment Correlation Coefficient (r) among Three Factors

<table>
<thead>
<tr>
<th>Factor</th>
<th>Behavior of Others</th>
<th>Acceptance and My Behavior</th>
<th>Ease of Going to School</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Behavior of Others</td>
<td>1.00</td>
<td>.59**</td>
<td>.60**</td>
</tr>
<tr>
<td>Acceptance and My Behavior</td>
<td>1.00</td>
<td></td>
<td>.52**</td>
</tr>
<tr>
<td>Ease of Going to School</td>
<td></td>
<td></td>
<td>1.00</td>
</tr>
</tbody>
</table>

**Note: Correlation is significant at the .01 level (2-tailed).**

Research Question 4

Are the perceptions of various groups, as identified by the demographic variables, different on the newly identified factors of the survey instrument? Of specific interest are groups established by grade level, ethnicity, and gender.

After cases with missing data were removed using listwise deletion, discussed above, three separate multivariate analysis of variance (MANOVA) were conducted. One MANOVA was calculated for each of the demographic groups of grade level, ethnicity, and gender. The mean factor scores calculated in Research Question 3 were used to calculate the MANOVAs. Each of the newly identified factors was also assessed for normality ($n = 896$).

Normality. The newly identified factors were assessed for normal distribution by examining the standard error. If the standard error is more than twice the absolute value of the skewness statistic, a dataset may have a skewed distribution (Green & Salkind, 2008). Factor 1 had a skewness statistic of .35 and a standard error of .07. Factor 2 had an initial skewness statistic of .64 and a standard error of .06. Factor 3 had a skewness
statistic of .04 and a standard error of .07 and was deemed to approximate a normal distribution. Therefore, Factor 3 was not transformed. Factors 1 and 2 fell outside of the normal distribution and needed to be transformed in order for them to approximate a normal distribution. Table 8 summarizes the normality of the factors before and after transformation.

Table 8

*Factor Normality Before and After Transformation*

<table>
<thead>
<tr>
<th>Factor (Transformation)</th>
<th>Skewness Before</th>
<th>Standard Error Before</th>
<th>Skewness After</th>
<th>Standard Error After</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1- Safety and Behavior of Others (Square Root)</td>
<td>.35</td>
<td>.07</td>
<td>.01</td>
<td>.07</td>
</tr>
<tr>
<td>Factor 2- Acceptance and My Behavior (Square Root)</td>
<td>.64</td>
<td>.06</td>
<td>.05</td>
<td>.06</td>
</tr>
<tr>
<td>Factor 3- Ease of Going to School (None)</td>
<td>.07</td>
<td>.07</td>
<td>---</td>
<td>---</td>
</tr>
</tbody>
</table>

Factor 1 and Factor 2 were both transformed by taking the square root of the mean score. After transformation, Factor 1 had a skewness statistic of .01 and a standard error of .07 and was deemed to approximate a normal distribution. Factor 2 had a skewness statistic of .05 and a standard error of .06 and also approximated a normal distribution. Table 9 provides a summary of the transformed factor means.
**Table 9**  
*Factor Means Before and After Transformation*

<table>
<thead>
<tr>
<th>Factor</th>
<th>Before Transformation</th>
<th>After Transformation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Factor 1</td>
<td>2.08</td>
<td>1.44</td>
</tr>
<tr>
<td>Factor 2</td>
<td>1.69</td>
<td>1.30</td>
</tr>
<tr>
<td>Factor 3</td>
<td>2.35</td>
<td>--</td>
</tr>
</tbody>
</table>

**Multivariate Analysis of Variance (MANOVA).** To determine if differences in response patterns existed across demographic groupings of grade level, gender, and ethnicity, a MANOVA was calculated for each grouping. The MANOVA was calculated using the transformed factor means discussed above. Although there were three possible grade levels (sixth, seventh, and eighth), sixth grade students were not considered in the MANOVA because of the low number of cases remaining after listwise deletion ($n = 26$). There were five possible ethnicities: White/Caucasian, Hispanic/Latino, Black/African American, Asian/Pacific Islander, and Native American/Alaskan Native. All ethnicities except White/Caucasian ($n = 374$) and Hispanic/Latino ($n = 522$) were excluded because of the small $n$-size after cases with missing data were removed. After conducting the MANOVA for each demographic group, if significance was found an ANOVA was calculated to determine where differences existed. The mean scores of each group were then examined to identify which group responded higher on the factor.

**Ethnicity.** After removing cases with missing data, Hispanic/Latino ($n = 522$) and White/Caucasian ($n = 374$) were the two ethnicities that were considered because of the
large number of cases remaining. A one-way MANOVA was conducted to investigate potential differences in the mean survey scores of the two groups on the three identified factors. Homogeneity of variance-covariance was assessed by interpreting Box’s M statistic. The assumption of variance-covariance was met (Box’s M > .01) and as a result, Wilk’s Lambda was determined to be the appropriate test. The one-way MANOVA revealed a multivariate main effect for ethnicity [Wilk’s Lambda = .97, $F(3, 892) = 9.56$, $p < .05$], and effect size was small ($\eta^2 = .31$).

Analysis of variance (ANOVA) results were interpreted which revealed that ethnicity had a significant effect on Factor 2 and Factor 3. Examination of mean scores indicated that Hispanic/Latino students (Factor 2 mean = 2.41; Factor 3 mean = 1.44) responded higher on both factors than White/Caucasian students (Factor 2 mean = 2.18; Factor 3 mean = 1.41). Table 10 summarizes the univariate main effects.

Table 10

<table>
<thead>
<tr>
<th>Variable</th>
<th>df</th>
<th>ms 2</th>
<th>F</th>
<th>Sig</th>
<th>$\eta^2$</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Behavior of Others</td>
<td>1</td>
<td>.24</td>
<td>3.69</td>
<td>.06</td>
<td>.00</td>
</tr>
<tr>
<td>Error</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Acceptance and My Behavior</td>
<td>1</td>
<td>1.00</td>
<td>17.88</td>
<td>.00*</td>
<td>.02</td>
</tr>
<tr>
<td>Error</td>
<td>894</td>
<td>.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of Going to School</td>
<td>1</td>
<td>10.23</td>
<td>19.12</td>
<td>.00*</td>
<td>.02</td>
</tr>
<tr>
<td>Error</td>
<td>894</td>
<td>.54</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Significance at the .05 level.
**Gender.** A one-way MANOVA was conducted to determine if differences existed in survey response patterns between gender categories male \((n = 442)\) and female \((n = 450)\). Mean factor scores based on the three identified factors were used for the MANOVA. Box’s M was not significant and the assumption of variance-covariance was met. As a result, Wilk’s Lambda was used to interpret the MANOVA. The main effect revealed there were no significant differences in response patterns between males and females \([F(3, 888) = 1.84, p > .05]\).

**Grade level.** A one-way MANOVA was conducted to determine if differences in mean scores existed in response patterns by grade level. De-identified data existed for three grade levels: sixth, seventh, and eighth. However, because of the small number of sixth grade cases \((n = 26)\), only seventh grade \((n = 423)\) and eighth grade \((n = 473)\) data were interpreted for differences. Box’s M statistic was significant; therefore, Pillai’s Trace was chosen as the appropriate statistic to interpret the MANOVA. Main effects indicated statistical significance \([\text{Pillai’s Trace} = .001, F (3, 892) = 9.53, p < .05]\). A subsequent ANOVA indicated differences existed between grade levels on Factor 1 and Factor 3. Examination of mean scores indicated seventh grade students responded higher on both factors than eighth grade students. The mean scores for seventh grade respondents were 1.47 on Factor 1 and 2.47 on Factor 3. Eighth grade mean scores were 1.38 on Factor 1 and 2.30 on Factor 3. Table 11 summarizes the main effects of the univariate ANOVAs for Factors 1 and 3.
Table 11

Univariate Main Effects for Grade Level on Three Factor Scores

<table>
<thead>
<tr>
<th>Variable</th>
<th>df</th>
<th>ms²</th>
<th>F</th>
<th>Sig</th>
<th>η²</th>
</tr>
</thead>
<tbody>
<tr>
<td>Safety and Behavior of Others</td>
<td>1</td>
<td>1.58</td>
<td>25.23</td>
<td>.00*</td>
<td>.03</td>
</tr>
<tr>
<td>Error</td>
<td>894</td>
<td>.06</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Ease of Going to School</td>
<td>1</td>
<td>5.88</td>
<td>10.88</td>
<td>.00*</td>
<td>.01</td>
</tr>
<tr>
<td>Error</td>
<td>894</td>
<td>.54</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Note: Significance at the .05 level.

Summary

The purpose of this chapter was to provide in detail the results of the statistical tests used to address the four research questions. To answer Research Question 1, an exploratory factor analysis was conducted to identify the empirical factors present in the Student School Uniform Survey. Three empirical factors were present in the survey. To assess Research Question 2, Cronbach’s alpha coefficient (α) was calculated to determine internal reliabilities of the newly identified survey factors. The results of the Cronbach’s alpha coefficient (α) indicated a high degree of reliability among the newly identified factors. Research Question 3 was addressed by calculating a Pearson’s product moment correlation to determine if correlations existed among the three identified factors. The Pearson’s product moment correlation indicated a strong correlation among all of the newly identified factors.

To address Research Question 4, a multivariate analysis of variance (MANOVA) was conducted to expose any differences in mean response scores among demographic
groups identified by grade level, gender, and ethnicity. A MANOVA test indicated that differences did exist. Post hoc ANOVAs were conducted to identify which factors demographic groups responded to differently. The results of the ANOVAs indicated that differences existed on Factors 2 and 3 for Hispanic/Latino and White/Caucasian respondents. Hispanic/Latino students responded higher on both factors than White/Caucasian students. There were no differences in response patterns between males and females on any factor. Respondents grouped by grade level indicated that seventh grade students responded higher than eighth grade respondents on Factors 1 and 3. Chapter V will provide a summary of the results of the statistical analyses, as well as a discussion of the results. In addition, Chapter V will draw conclusions based on the findings and make recommendations for application of the findings as well as suggestions for further research.
CHAPTER V

The primary purpose of this study was to assess the construct validity of the Student School Uniform Survey. The Student School Uniform Survey was developed by Sanchez, Yoxsimer, and Hill (2012) to gather data on student perceptions of a mandatory school uniform policy. A secondary purpose was to investigate response patterns of specific demographic groups identified by gender, grade level, and ethnicity.

Four research questions were addressed using quantitative data and corresponding analysis procedures. To identify the empirical factors present in the Student School Uniform Survey an exploratory factor analysis was conducted with appropriate extraction and rotation methods. Cronbach’s alpha coefficient (α) was used to assess the internal reliability of the survey factors. Pearson’s product moment correlation was calculated to reveal relationships among the identified factors. Finally, multivariate analysis of variance (MANOVA) with appropriate post hoc tests was utilized to identify differences in response patterns among demographic groups. Chapter V presents a discussion of the key findings of the research, implications for educational stakeholders, and possible areas for future research.

Research Questions

Research Question 1

Given the survey dataset, what are the empirical factors of the survey instrument?

The Student School Uniform Survey was developed to assess the perceptions of middle school students’ attitudes of a mandatory school uniform policy at an urban middle school in northern Nevada. The researchers who developed the survey instrument intended to measure six factors: Decreases in Discipline, Gang Involvement, Bullying
and Increases in Safety, Ease of Going to School, Confidence, and Self-Esteem. The purpose of this study was to investigate the underlying factor structure of the Student School Uniform Survey.

An exploratory factor analysis was conducted utilizing various factor extraction methods in combination with various rotation methods to derive unique solutions with the intent of finding the best linear combination of variables. Factor extraction methods included unweighted least squares (ULS), generalized least squares (GLS), and maximum likelihood (ML). Orthogonal rotation methods included varimax, quartimax, and equamax. Three factors utilizing ULS with varimax rotation resulted in the best linear combination of variables. Of the 32 original variables only 13 were found to significantly contribute to the three identified factors. The 19 variables that did not load high and pure on any factor were removed for the remainder of the study.

The three identified factors were assigned names that reflected the content of the 13 survey items associated with them: Factor 1 (Safety and Behavior of Others), Factor 2 (Acceptance and My Behavior), and Factor 3 (Ease of Going to School). Members of the dissertation committee agreed that the factor names have construct validity based on the items associated with each empirical factor.

**Research Question 2**

Given the empirical factors established in Research Question 1, what are the internal reliabilities of the items that contribute to each factor?

To examine the internal reliability of the survey items that contributed to each of the newly identified factors, Cronbach’s alpha coefficient (α) was calculated using only the 13 survey items that contributed to the three identified factors. The computed alpha
for the 13 survey items ($\alpha = .89$) indicated reliability ($\alpha > .70$). The three identified factors each had an alpha score that exceeded the threshold of reliability ($\alpha > .70$) using only the variables that contributed to each factor. The alpha scores ranged from an alpha coefficient of .72 for Factor 3, to an alpha coefficient of .82 for Factor 1f. These findings suggest the Student School Uniform Survey has a high level of internal consistency and exceeds the standard for reliability ($\alpha > .70$) in social science research (Nunnaly, 1978).

**Research Question 3**

Do relationships exist among the newly identified factors from Research Question 1?

Research Question 3 sought to determine whether relationships existed among the newly identified factors from Research Question 1. Mean factor scores were calculated for each of the identified factors and were used to compute Pearson’s product moment correlation coefficient. The results were statistically significant among all three factors, with the strongest relationship ($r = .60$) between Factor 1 (Safety and Behavior of Others) and Factor 3 (Ease of Going to School). The data analysis revealed the weakest correlation ($r = .52$) existed between Factor 2 (Acceptance and My Behavior) and Factor 3 (Ease of Going to School). All of the correlation coefficients were between $r = .52$ and $r = .60$ which suggested that correlations among all of the factors identified in Research Question 1 have a strong, positive correlation (Taylor, 1990).

**Research Question 4**

Are the perceptions of various groups, as identified by the demographic variables, different on the newly identified factors of the survey instrument? Of specific interest are groups established by grade level, ethnicity, and gender.
A multivariate analysis of variance (MANOVA) was conducted for each of the demographic groups identified by gender, ethnicity, and grade level, to investigate differences in response patterns that might exist. After checking the data for normality and transforming Factors 1 and 2, differences were found to exist on Factors 2 and 3 for ethnicity, and on Factors 1 and 3 for grade level. There were no differences on any factor for gender. Mean scores were then examined, which revealed Hispanic/Latino students responded higher than White/Caucasian students on Factors 2 and 3, and seventh grade students responded higher than eighth grade students on Factors 1, and 3.

**Discussion of Key Findings**

The results of this research revealed two key findings:

- The primary finding of this research was that there are three empirical factors present in the Student School Uniform Survey: Safety and Behavior of Others, Acceptance and My Behavior, and Ease of Going to School. These three factors are congruent with the constructs the survey developers’ intended to measure.

- Differences in response patterns based on demographic groups were found to exist on all three factors. These findings support the conclusions of previous research by Sanchez et al. (2012).

Both of the key findings will be discussed in more detail below.

**Key Finding 1**

The primary finding of this research reported three empirical factors based on 13 variables. The results indicated that the three empirical factors were reliable and have
construct validity. These empirical results were developed after an extensive series of factor analysis. The three factor solution was the most parsimonious set of factors.

Factor names were determined by examining the content of the items that related to each factor. The factor names also took into account the constructs the survey developers’ intended to measure. Reducing the number of variables on the Student School Uniform Survey makes it easier to administer in terms of time to complete the survey and the time needed to interpret the data.

The findings of this research indicate the potential to provide school administrators, parents, and other stakeholders a vetted, psychometrically sound instrument to gather data on student perceptions on the three identified factors. The conclusions of this research support a more efficient, psychometrically sound instrument.

In part, this study addressed the need for an empirically based instrument to assess student perceptions related to the benefits of school uniforms. Therefore, this research may contribute to the growing body of knowledge and the instruments used to gather data on school uniforms. There are many studies that examined differences in the perception of students and faculty regarding uniforms between schools (DeMitchell, Fossey, & Cobb, 2000; Draa, 2005; Firman et al., 2006); however, very few researchers have examined the differences in student perceptions among various demographic groups within schools.

**Key Finding 2**

Differences in students’ attitudes were identified based on demographic groups. The first distinction was found when exploring differences by grade level. Specifically, in Factor 1(Safety and Behavior of Others) seventh grade students reported higher level of
perceived benefits than eighth grade students. Similarly, seventh grade students reported higher levels of perceived benefits for Factor 3 (Ease of Going to School). Statistically significant differences were also found when comparing perceptions between Hispanic/Latino and White/Caucasian students. In particular, Hispanic/Latino students responded more favorably than White/Caucasian students on Factor 2 (Acceptance and My Behavior) and on Factor 3. Of note is the fact that there were no differences between males and females on any factor.

The findings in demographic differences suggest that the instrument can help detect how mandatory uniform policies impact particular groups. The positive impacts may help to address students’ social-emotional needs, such as feelings of safety, acceptance, and ease of going to school, thus fostering student learning (Zins, Weisberg, Wang, & Walberg, 2004).

This study lends support to the conclusions reached by Sanchez et al. (2012). Both studies concluded that there were differences in response patterns in the data by grade level and ethnicity. Sanchez et al. calculated chi-square statistical tests to identify differences in response patterns on individual items. The differences in response patterns Sanchez et al. discovered in the demographic groups of ethnicity and grade level were also found in this study, although individual item analysis was not conducted for this study.

**Recommendations for Further Research**

This quantitative study utilized existing, de-identified data to investigate the factor structure of a researcher-created survey instrument. The findings of this study have generated recommendations for future research. It is hoped that this study can be used to
help educators and researchers develop a tool to accurately assess the impact of school uniform policies. The results of this study indicated that a revised version of the Student School Uniform Survey including only the 13 questions that support the three factors identified in Research Question 1 is psychometrically sound. Future research could be conducted to gather additional data on the revised instrument’s application to a broader audience, stability over time, insight into student perceptions of the benefits of wearing a school uniform, and use as a tool to critically examine school uniform policies. A discussion of future research opportunities utilizing a revised version of the survey instrument follows.

**Additional Demographic Studies**

Three demographic categories were considered for this study: grade level, gender, and ethnicity. Additional demographic variables to be considered for future research could include socio-economic status, different grade levels, and number of years a student has attended a school with a mandatory school uniform policy. One of the prevalent criticisms of the mandatory school uniform movement is that uniform policies are disproportionately implemented in poor, urban schools with high minority populations (Brunsma, 2006a). As more schools in affluent communities implement mandatory school uniform policies, future research could shed light on the differences between the perceptions of students who attend predominantly high socio-economic status schools and those who attend schools with mostly poor and minority students. This study only examined data relating to seventh and eighth grade students for the purpose of identifying differential response patterns. This survey instrument could be administered to elementary and high school level students to determine the reliability of the instrument.
with younger and older students. In addition, the only ethnic groups with enough cases for inclusion in this study were White/Caucasian and Hispanic/Latino. Future research should be conducted in more ethnically diverse schools to gather data on different ethnic groups, which may provide additional insight.

**Further Item Analysis**

Three factors were identified as a result of the exploratory factor analysis conducted on the 32 items analyzed for this study. Nineteen of the original items were not found to be statistically significant and did not relate to the three identified factors. These 19 items should be further analyzed to determine if they contribute to understanding student perceptions of the benefits of wearing school uniforms.

Furthermore, items that loaded high on a factor but had high cross loadings were removed from the factor analysis. These variables should be reexamined to determine if they contribute to an unidentified construct. These items could be rewritten to more accurately measure a construct.

**Longitudinal Analysis**

The existing, de-identified data utilized for this study related to middle school students in three middle schools at the conclusion of the first year of a mandatory school uniform policy. Repeated analysis over multiple years in the same three schools could add to the body of knowledge surrounding the impact of school uniforms on students, and if student perceptions of the benefits of wearing a school uniform change the longer a policy has been in place. Additionally, researchers could expand this study to include teacher and administrator perceptions of the benefits of school uniforms over time.

**Replication on a Larger Scale**
Replication of this study in more schools would contribute to the validity of the survey instrument. Future research could expand the scope of this study to include schools that serve all socio-economic levels, as well as schools with a more diverse student body, so that broader conclusions could be drawn about the survey instrument. Administering the survey to students in more grade levels than sixth, seventh and eighth grades would also allow researchers to draw broader conclusions about the instrument.

**Examination of Mandatory School Uniform Policies**

Broader administration of the Student School Uniform Survey might allow for a more critical examination of school uniforms and the perceptions of students about such policies. As well, broader administration of the survey instrument might have the potential to help researchers compare different school uniform regulations and draw conclusion about what aspects of school uniform codes contribute to more positive responses on the survey items. A better understanding of how mandatory school uniform policies impact student perceptions surrounding the three identified factors could help school leaders craft more effective and impactful guidelines regarding mandatory school uniforms.

**Summary**

A factor analysis of the Student School Uniform Survey revealed an underlying factor structure of three empirical factors. The revised survey instrument provides a reliable measurement of student perceptions of the benefits of wearing a school uniform regarding the three identified factors of: Safety and Behavior of Others, Acceptance and My Behavior, and Ease. These three factors are closely aligned with the six original factors intended by the developers, thereby lending credibility to the reliability and
validity of the revised instrument. Additionally, an examination of the demographic data showed significant differences \((p < .05)\) in response patterns in the demographic groups of ethnicity and grade level. These findings suggest that the revised instrument could be used more broadly among diverse student populations. Lastly, recommendations were made based on the findings of this research for possible areas of future exploration with this instrument.
References


Jacobs v. Clark County, 526 F. 3d. 419 (9th Cir. 2008).


*Educational and Psychological Measurement, 20,* 141-151.


*NASSP Bulletin, 73,* 35-43.


Public Schools: A Decade of Research and Debate (137-150). Lanham, MD: Rowan and Littlefield Education.


Lowery, et al. v. Watson Chapel School District et al., 540 F.3d 752 (8th Cir., 2008)


Appendix A

Student School Uniform Survey
1. How much do you like or dislike wearing a uniform to school?
   a. Strongly like it
   b. Like it
   c. Dislike it
   d. Strongly dislike it

2. Do you like wearing a uniform to school?
   a. Yes
   b. No

   How often do you SEE the following issues occur at your school?
   1=Never and 5=Always

<table>
<thead>
<tr>
<th>Circle One Number for Each Item</th>
<th>Never</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>Always</th>
</tr>
</thead>
</table>
   3. Bullying                     | 1     | 2 | 3 | 4 | 5 |        |
   4. Teasing                      | 1     | 2 | 3 | 4 | 5 |        |
   5. Gang Activity               | 1     | 2 | 3 | 4 | 5 |        |
   6. Drugs                       | 1     | 2 | 3 | 4 | 5 |        |
   7. Violence/Fighting           | 1     | 2 | 3 | 4 | 5 |        |

8. Do you believe wearing uniforms might help to reduce discipline issues?
   a. Yes
   b. No

9. Complete the statement: If I had a choice at school, I would…
   a. Wear a uniform
   b. Not wear a uniform

10. Are you easily distracted in the classroom?
    a. Yes
    b. No

11. Does wearing a uniform help you focus in school?
    a. Yes
    b. No

12. Do you think wearing a school uniform helps other students focus in school?
    a. Yes
    b. No

13. At school, I have gotten detention because I did not wear my uniform.
a. True
b. False

14. At school, I have gotten detention because I wore my uniform inappropriately.
a. True
b. False

Now, thinking about student uniforms, please circle how much you agree or disagree with the following statements, where a=Strongly Disagree (SD), b=Disagree (D), c=Agree (A), and d=Strongly Agree (SA).

<table>
<thead>
<tr>
<th>Circle One Value for Each</th>
<th>SD</th>
<th>D</th>
<th>A</th>
<th>SA</th>
</tr>
</thead>
<tbody>
<tr>
<td>15. There are behavior problems at my school.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>16. Uniforms have reduced behavior problems at my school</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17. Now that I wear a uniform, students treat me better than before.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18. Now that I wear a uniform, teachers treat me better than before.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19. I think most students like wearing uniforms.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20. I think uniforms save money on clothes.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22. I get teased because of my uniform.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23. I still have my identity when I wear a uniform.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24. I feel more comfortable at school because I wear a uniform.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25. My school is safer because we wear uniforms.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26. I feel safer wearing a uniform at school.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27. My family likes that I wear a uniform to school.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28. In the past, I was distracted by the clothes that students wore.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29. I am distracted by other items that students wear with their uniforms.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30. With the uniforms, there are fewer distractions at school.</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31. With the uniforms, there are fewer problems at school.</td>
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<tr>
<td>32. With a uniform, I worry less about my appearance at school.</td>
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<tr>
<td>33. With a uniform, I worry less about how others look at school.</td>
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<tr>
<td>34. With a uniform, I can focus more on learning in school.</td>
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<tr>
<td>35. Wearing a uniform makes me feel equal to other students.</td>
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<tr>
<td>36. Wearing a uniform makes me feel more accepted by other students.</td>
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<tr>
<td>37. Wearing a uniform makes me feel more accepted by teachers.</td>
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<tr>
<td>38. Wearing a uniform has improved my behavior.</td>
<td></td>
<td></td>
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<tr>
<td>39. Wearing a uniform has improved other students’ behavior.</td>
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<tr>
<td>40. With uniforms, there is less gang activity at school.</td>
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<tr>
<td>41. Wearing a uniform makes me feel more confident at school.</td>
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<tr>
<td>42. Wearing a uniform has improved my self-esteem at school.</td>
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<tr>
<td>43. Wearing a uniform makes it easier for me to go to school.</td>
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</tr>
</tbody>
</table>
44. It would be a good idea for students to continue wearing uniforms.  
45. I think uniforms help our school look better.  
46. I think uniforms help our school succeed.

47. What is your race/ethnicity?  
   a. White/Caucasian  
   b. Hispanic/Latino(a)  
   c. Black/African American  
   d. Asian/Pacific Islander  
   e. Native American/Alaskan Native

48. What is your gender?  
   a. Male  
   b. Female

49. What grade are you in?  
   a. 7th grade  
   b. 8th grade

Thank you for completing the survey!

More importantly, thank you for sharing your opinions about the new school uniform policy. Your principal will receive information about the results of this survey, and the information will be shared with you when the survey responses are analyzed.
Appendix B

Three Factor Solution: Unweighted Least Squares with Varimax Rotation
Rotated Factor Matrix
<table>
<thead>
<tr>
<th></th>
<th>Factor 1</th>
<th>Factor 2</th>
<th>Factor 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Uniforms have reduced behavior</td>
<td>.528</td>
<td>.222</td>
<td>.252</td>
</tr>
<tr>
<td>problems</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Students treat me better</td>
<td>.266</td>
<td>.499</td>
<td>.186</td>
</tr>
<tr>
<td>Teachers treat me better</td>
<td>.165</td>
<td>.741</td>
<td>.069</td>
</tr>
<tr>
<td>School is safer</td>
<td>.651</td>
<td>.273</td>
<td>.295</td>
</tr>
<tr>
<td>Fewer Problems</td>
<td>.705</td>
<td>.223</td>
<td>.280</td>
</tr>
<tr>
<td>I worry less about my</td>
<td>.273</td>
<td>.258</td>
<td>.639</td>
</tr>
<tr>
<td>appearance</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I worry less about how others</td>
<td>.236</td>
<td>.280</td>
<td>.576</td>
</tr>
<tr>
<td>look</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Makes me feel more accepted by</td>
<td>.151</td>
<td>.668</td>
<td>.275</td>
</tr>
<tr>
<td>teachers</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has improved my behavior</td>
<td>.331</td>
<td>.561</td>
<td>.369</td>
</tr>
<tr>
<td>There is less gang activity</td>
<td>.642</td>
<td>.132</td>
<td>.245</td>
</tr>
<tr>
<td>Uniforms save money on clothes</td>
<td>.216</td>
<td>.102</td>
<td>.465</td>
</tr>
<tr>
<td>My family likes that I wear a</td>
<td>.290</td>
<td>.114</td>
<td>.480</td>
</tr>
<tr>
<td>uniform</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Has improved others' behavior</td>
<td>.523</td>
<td>.292</td>
<td>.312</td>
</tr>
</tbody>
</table>
Appendix C

IRB Approval
DATE: June 20, 2014
TO: Gus Hill, MEd
FROM: University of Nevada, Reno Social Behavior and Education IRB
PROJECT TITLE: [602388-2] A factor analysis of the Student School Uniform Survey
REFERENCE #: New Project
SUBMISSION TYPE: DETERMINATION OF NOT HUMAN SUBJECT RESEARCH
ACTION: June 20, 2014
DECISION DATE: June 20, 2014

Thank you for your submission of New Project materials for this project. The Research Integrity Office has reviewed the scope of work for the above referenced project, and determined that it does not require human research protection oversight by this Institution Review Board.

Project Summary:
De-identified existing data will be requested via e-mail from the principal researcher in the original study, Dr. Sanchez. The data are saved as an electronic version in SPSS, which will be saved on this researcher's University account where he will access the data. There will be no interactions with participants. The de-identified existing data will be analyzed with factor analysis techniques to identify the factor structure of the instrument used in the original study under protocol # SB08/09-131. The data analysis will be conducted at the University of Nevada, Reno.

The regulations at 45 CFR 46.102(d) state: "Research means a systematic investigation, including research development, testing and evaluation, designed to develop or contribute to generalizable knowledge."

The regulations at 45 CFR 46.102(f) state: "Human subject means a living individual about whom an investigator (whether professional or student) conducting research obtains (1) Data through intervention or interaction with the individual, or (2) Identifiable private information."

If you have any questions, please contact Valerie Smith at 775.327.2370 or valeries@unr.edu. Please include your project title and reference number in all correspondence with this committee.

Sincerely,

Nancy Moody JD MA
Director, Research Integrity Office
University of Nevada Reno