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School-based Health Promotion: The Context of Local Wellness Policies

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School-based Health Promotion: The Context of Local Wellness Policies

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Abstract

Obesity rates in children and adolescents have continued to increase over the last 20 years creating a major public health concern not only for medical communities, but for schools as well. Obesity has been related to negative physical health and psychosocial outcomes. Most obesity prevention programs have focused on attempting to change dietary habits, increase time spent in physical activity, and teach behavioral change strategies (Fowler-Brown & Kahwati, 2004; Reiner, Brylak, Alezy, Kersting, & Andler, 2003). Additional research examining the obesity epidemic through an ecological framework has provided numerous opportunities for intervention efforts that have targeting key environmental systems at the community, school, home, and individual level. In 2004, federal law required all schools to develop a local wellness policy as a potential avenue to prevent obesity and promote health for all students.

The present study examined the extent to which schools participating in the School Health Policies and Programs Study (SHPPS) reported adopting wellness policies consistent with the minimum federal requirements of local wellness policies and the impact of contextual variables on wellness policy compliance. A model was created to examine the impact of school size, poverty level, urbanicity, perception of family involvement promotion, and wellness policy leadership. Although the model was not supported in the study, there were significant differences in wellness policy compliance between elementary and high schools. Further, wellness policy scores varied depending upon who completed the questionnaire. Implications of the findings and suggestions for future research are discussed.

CHAPTER I. INTRODUCTION

Childhood obesity rates have continued to increase over the last two decades. In fact, the rates have more than doubled as 12.4% of children ages 2 to 5 are overweight, 17% of children ages 6 to 11, and 17.6% of adolescents ages 12-19 (Ogden, Carroll, & Flegal, 2008). In addition, there are disparities in rates of childhood obesity that indicate that children from culturally diverse backgrounds and lower SES backgrounds may be at higher risk (Freedman, Khan, Serdula, Ogden, & Dietz, 2006). Such rates are troubling considering the negative trajectories associated with obesity in childhood.

Childhood obesity is associated with a number of poor physical heath and psychosocial health. Further, children who are overweight are at greater risk for the development of diabetes, heart disease, and morbidity (American Obesity Association, n.d.). In addition, children who are overweight are more likely to report depressive symptoms, social concerns, and poor quality of life (Falkner et al., 2001; Janssen, Craig, Boyce, & Pickett, 2004; Schwimmer, Burwinkle, & Varni, 2003; Tiggeman & Wilson-Barrett, 1998). Lastly, children who are overweight may be more at-risk for poor outcomes at school (Crosnoe & Muller, 2004; Tershakovec, Weller, & Gallagher, 1994).

Ecological framework of obesity prevention

Most obesity prevention programs have focused on attempting to change dietary habits, increase time spent in physical activity, and teach behavioral change strategies (Fowler-Brown & Kahwati, 2004; Reiner, Brylak, Alezy, Kersting, & Andler, 2003). Additional research examining the obesity epidemic through an ecological framework has provided numerous opportunities for intervention efforts that have targeting key

environmental systems at the community, school, home, and individual level. Based upon Bronfenbrenner's Ecological Systems Theory (EST; 1979), Davison and Birch (2001) propose an ecological framework for childhood obesity, which identifies risk factors and systems that contribute to obesity development, which can also potentially be targeted for prevention and intervention efforts. Within the EST model for obesity, child weight status is directly impacted by child characteristics or risk factors (i.e., dietary intake, physical activity, etc.), family variables (i.e., child feeding practices, types of food available in home), and community, demographic, and societal characteristics (i.e., ethnicity, school lunch programs, school physical education programs, socioeconomic status, etc.). The school setting in particular may be an ideal setting for obesity prevention due to the large number of students that can be targeted simultaneously and opportunities for developing a health-promoting environment (Power & Blom-Hoffman, 2004; Story, Kaphingst, & French, 2006). In fact, a meta-analysis of the obesity prevention literature revealed that 84% of the studies had been conducted in the school setting (Stice, Shaw, & Marti, 2006). Already existing programs such as physical education and school lunch programs provide a foundation to expand health promotion practices.

Federal policy has led to obesity prevention efforts in the schools. Section 204 of the Child Nutrition and WIC Reauthorization Act of 2004 required schools to develop and implement a local wellness policy in order to promote student health. Minimum requirements of the policy includes goals for nutrition, physical activity, and other health-promoting strategies, nutrition guidelines for all food sold on campus and reimbursable meals, a measurement plan, and community involvement. A small body of literature

suggests that some nutrition and physical activity policies may be positively related to child health outcomes, including BMI and dietary and physical activity practices (Gleason & Dodd, 2009; Fox et al., 2009; Sallis et al., 2003; Veugelers & Fitzgerald, 2005).

Limitations of current research

Schools have been recognized consistently as a key system to target for obesity prevention (Davison & Birch, 2001; Story et al., 2006). In fact, the Expert Committee on Obesity Prevention and Treatment identified schools as part of a chronic care model for obesity treatment and prevention and recommend that physicians advocate for increased physical activity in schools (Barlow et al., 2007). Furthermore, this recommendation reflects a need to move beyond an individual-focus of behavior change to a more ecological perspective that focuses on creating opportunities to engage in a healthy lifestyle. Despite the various school-based obesity prevention programs that have been developed, the results of the program have been modest and variable with an average effect size of .04 (Stice et al., 2006; Thomas, 2006). School-based health programs have lacked longitudinal and/or follow-up studies; therefore, it is unclear whether positive intervention effects last. In addition, school-based programs often involve curriculums and may be time- and resource-intensive compromising the sustainability of such programs once the research support (i.e., funding, staff) is gone.

Not only have school-based obesity programs resulted in limited empirical support, much research has focused on individual-level change rather than systems-level change, which serves as a significant limitation of the current literature. Further, the majority of intervention research has primarily focused on change at the individual-level

including interventions that focus on teaching health behaviors rather than interventions involving systems-level change, such as those that focus on developing an environment conducive of health promotion (Stice et al., 2006; Thomas, 2006). In line with an Ecological Framework for obesity prevention and intervention, there is a strong need to further examine prevention programs by examining environmental prevention programs, including school policies and practices that promote health and wellness. Section 204 of the Child Nutrition and WIC Reauthorization Act of 2004 mandated that all schools adopt a Local Wellness Policy.

Research that has examined environmental supports and policy adoption is limited both in size and breadth as much as focused solely on nutrition policies (Briefel et al., 2009; Finkelstein, Hill, & Whitaker, 2008; Fox et al., 2009; Gleason & Dodd, 2009). Yet, local wellness policies require a comprehensive health plan that not only includes nutrition policies, but physical activity as well. As discussed, the Expert Committee on Obesity Prevention and Treatment acknowledge the need for an increased focus on physical activity (Stice et al., 2006). In addition, the Center for Disease Prevention and Control's (CDC) Coordinated Health Plan consists of eight components: health education, physical education, health services (i.e., access or referral to primary care services), nutrition services, counseling and psychological services, healthy school (i.e., climate and culture of school), health promotion for staff, and family/community involvement. A coordinated health plan includes multiple components of health and wellness and has been found to be related to lower obesity rates (Veugelers & Fitzgerald, 2005). In addition, some studies are limited to policy implementation at the middle and high school levels (Delva, O'Malley, & Johnston, 2007; O'Malley, Johnson, Delva, Bachman, &

Schulenberg, 2007) or to examining wellness policies in just one state (Belansky et al., 2009; Metos & Nanney, 2007; Probart, McDonnell, Weirich, & Schilling, 2008).

Local Wellness Policy Implementation involves systems-level changes, which requires careful examination of the contextual factors that impact such change; however, the context of the school has not fully been examined in wellness policy research. Such variables are critical to the sustainability and initialization of local wellness policies. Not only do disparities exist in childhood obesity rates, but disparities are at the school-level as well (O'Malley et al., 2007). Studies have examined the differences in policy implementation as a function of grade, SES, urbanicity, school type, and ethnicity (Delva et al., 2007; Finkelstein, Hill, & Whitaker, 2008; Metos & Nanney, 2006); however, this small body of literature has primarily been conducted with students in secondary schools. Further, additional variables related to the sustainability of wellness policies, such as the wellness policy leadership and perception of family involvement promotion have not been fully examined. The federal mandate for local wellness policies calls for community involvement, which would allow for multiple systems to partner in order to promote student health.

Purpose

The purpose of the current study was twofold. First, this study examined the extent to which schools participating in School Health Programs and Policies Study (SHPPS) met the minimum federal requirements of the local wellness policy. Because the 2006 SHPPS data were collected when wellness policies were first required, the present study served as a baseline to understand the level of school wellness policy implementation when the law was first implemented as schools may or may not have

begun to implement the federal requirements at the time of the SHPPS data collection period. Second, the purpose was to explore local wellness policies from an ecological framework by closely examining contextual variables that impact systems-level change in elementary, middle, and high schools. Moreover, the study examined the relationship between contextual variables and the comprehensiveness and level of implementation of local wellness policies. Key contextual variables examined included school size, poverty level, urbanicity, perception of family involvement promotion, and wellness policy leadership.

The study expanded the literature on local wellness policies call for an ecological approach to obesity prevention and consider the macro- and micro-level variables within the school context (Story, Kaphingst, & French, 2006; Thomas, 2006). Therefore, the current study attempted to address limitations in the literature with regards to examining environmental interventions. In addition, both physical activity and nutrition policies were examined and elementary, middle and high schools from across the country were included. The study examined variables that are critical for systems-level change, which is essential to the successful institutionalization of local wellness policies (Suarez-Balcazar et al., 2007).

The specific research questions of the proposed study were: (1) To what extent have schools participating in the SHPPS study met the minimum federal requirements for a local wellness policy (e.g., goals for wellness promotion activities, nutrition guidelines for all foods available on school campus and reimbursable meals, plan for measuring implementation of policy, and community involvement)?; (2) What contextual variables (e.g, school size, poverty level, urbanicity, perception of family involvement promotion,

and wellness coordination) predicted the adoption of physical activity and nutrition policies and practices in elementary, middle, and high schools?

It was hypothesized that greater than 60% of the schools participating in SHPPS 2006 met the minimum federal requirements of local wellness policies, which would support previous research estimates of 68% to 100% of schools meeting these requirements (H1; Metos & Nanney, 2007; Moag-Stahlberg, Howley, & Luscri, 2008; Probart, 2008). It was hypothesized that low policy implementation would be associated with smaller schools, high poverty level, nonurban schools, low family involvement promotion, and absence of wellness coordination (H2). Previous research has found positive relationships between large, urban schools and higher policy adoption (Brener, Jones, Kann, & McManus, 2003; Jones, Brener, & McManus, 2003). Delva, O'Malley, and Johnston (2007) found that students from a low SES background were more likely to attend a school with a poor nutrition environment. Leadership has been identified as a critical component of systems-change and has been found to be related to policy implementation (Brener et al., 2004; Hoyle, Samek, & Valois, 2008; McDonnel et al., 2006; Probart et al., 2008). Although no research has examined the relationship between family involvement promotion and wellness policies, families have been identified as a critical component for systems change and obesity prevention (Epstein et al., 1994, Michael, Dittus, & Epstein, 2007).

CHAPTER II. LITERATURE REVIEW

The prevalence of children with obesity has continued to rise for over twenty years. According to data from the National Health and Nutrition Examination Survey (NHANES) conducted by the Center for Disease Prevention and Control (CDC), prevalence rates for children ages 2 to 19 ranged from 5 to 6.5% in 1980. In 2006, prevalence rates increased to 12.4% for children ages 2 to 5, 17.0% for ages 6-11, and 17.6% for children ages 12 to 19 (Ogden, Carroll, & Flegal, 2008). In addition, there are racial and ethnic differences in the prevalence rates. Over a thirty-year period, children from African American and Mexican American backgrounds had larger increases in overweight prevalence than children from Caucasian backgrounds (Freedman, Khan, Serdula, Ogden, & Dietz, 2006). These trends are troubling when one considers the various health consequences (e.g., cardiovascular disease, and Type II diabetes) that have been found to be associated with obesity. Further, childhood obesity has been found to be significantly related to an increase in health care use including clinic visits and hospitalizations (Hering, Pritsker, Gonchar, & Pillar, 2009).

Several health conditions have been reported to be associated with obesity. Asthma, Type II diabetes, sleep apnea, hypertension, and orthopedic complications (e.g., leg bowing) have all been found to be associated with childhood obesity (American Obesity Association, n.d.). In addition, childhood obesity is a strong predictor of adult obesity and related health problems (Deckelbaum & Williams, 2001). The relationship between obesity and poor health outcomes indicates an important need for early intervention and prevention efforts.

Impact on Psychosocial Health

Research has also examined the psychosocial risk factors for children that are overweight. After controlling for race, grade, and SES, one study found that students who were overweight reported fewer peer relationships and more depressive feelings than students who were of average weight (Falkner et al., 2001). One study found that children who were overweight, particularly boys, girls who are Hispanic, and girls who are White, had significantly lower self-esteem and were more likely to report being lonely, sad, and nervous (Strauss, 2000). It appears that children who are overweight may be at-risk for displaying symptoms consistent with depression and other internalizing disorders. Children who are overweight have been found to have a very negative outlook of their health-related quality of life. In fact, children who are severely overweight rated themselves similarly to children that are diagnosed with cancer on health-related quality of life questionnaires (Schwimmer, Burwinkle, & Varni, 2003).

Weight status is often examined in terms of negative stereotypes and stigma. One study found that children in grades 3 through 7 rated a figure that was overweight as lazier, less happy, less popular, and less attractive when compared to a figure of average weight (Tiggeman & Wilson-Barrett, 1998). The obesity stigma is found to continue on into adulthood. Adults who are obese were found to be more likely to experience daily interpersonal discrimination and mistreatment, employment discrimination, and lower levels of self-acceptance (Carr & Friedman 2005). Further, Carr, and Friedman (2005) also found that obese adults are three times more likely to report being denied treatment or receiving inferior medical care than adults of normal weight. It should also be noted

that this study used obese levels II and III, which is a BMI at or above 35, which indicates more severe cases of obesity.

Childhood obesity is a significant public health problem that can have detrimental effects on children's physical and psychosocial health. The rising prevalence rates of childhood obesity and the increased risk for diabetes, heart disease, depression, and obesity in adulthood make intervention and prevention critical. Examining childhood obesity through an ecological systems framework may provide a foundation for intervention and prevention programs that target the key environments that may promote healthy lifestyles.

Ecological Framework for Obesity Prevention

The Ecological Systems Theory (EST) explains human development as an interactive relationship between individual factors and the context in which the individual develops (Bronfenbrenner, 1979). Moreover, various systems in which an individual is centered interact with the individual and with each other to facilitate development. Specifically, Microsystems, or those systems closest to the child include the classroom, family, peers and religions center. Next in proximity are the exosystems, such as the school, health agencies, mass media, and community. Finally, macrosystems are most distal to the child but still impact child development includes political systems, culture, nationality, society, and economics.

Based upon EST, Davison and Birch (2001) proposed an ecological framework for childhood obesity, which identified risk factors and systems that contributed to obesity development, which can also potentially be targeted for prevention and intervention efforts. Within the EST model for obesity, child weight status is directly

impacted by child characteristics or risk factors, including dietary intake, physical activity, sedentary behavior, gender, age, and genetics. The next system impacting obesity development includes family variables, such as child feeding practices, types of food available in home, nutritional knowledge, caregiver dietary intake, caregiver food preferences, caregiver weight status, caregiver encouragement of child activity, caregiver activity patterns, caregiver preference for activity, caregiver monitoring of child TV viewing, family TV viewing, and peer and sibling interactions. Lastly, there are several community, demographic, and societal characteristics including, ethnicity, school lunch programs, work hours, leisure time, accessibility of recreational facilities, accessibility of convenience foods and restaurants, family leisure time activity, school physical education programs, crime rates and neighborhood safety, and socioeconomic status.

Despite the importance of the ecological framework on obesity prevention, most interventions for children who are overweight have focused on attempting to change dietary habits, increasing time spent in physical activity, and providing behavior therapy rather than on making environmental changes (Fowler-Brown & Kahwati, 2004; Reiner, Brylak, Alezy, Kersting, & Andler, 2003). Research supports the effectiveness of targeting the environment in obesity programming. For example, caregivers have been identified as a key intervention target given their influence on food availability and opportunities for physical activity (Epstein, Valoski, Wing, & McCuley, 1994; Golan & Crow, 2004). In fact, interventions including a family component are more effective than those without (Young, Northern, Lister, Drummond, & O'Brien, 2007).

Schools have also been a key environment for obesity prevention and health promotion programming. In fact, much of the childhood obesity prevention research is

conducted in school settings (Stice, Shaw, & Marti, 2006). Davison and Birch (2001) identified two school factors, physical activity programs and lunch programs, as factors that may contribute to weight status; therefore, health promotion may seem like a natural extension of these already existing programs. Further, schools are often targeted due to the large number of students that can be reached simultaneously (Story, Kaphingst, & French, 2006).

Given the important role that schools can play in promoting health, the World Health Organization (WHO) developed the concept of "health promoting schools." Nutbeam (1987) described the concept of a Health-Promoting School (HPS), which is holistic, whole-school approach to health promotion that not only focuses on teaching health lifestyle, but also on an environment that supports health and provides opportunities for children to practice health lifestyles. The HPS framework has been applied to international schools, such as those in South Africa, China, Australia, and Europe (de Jong, 2000; Lee, Cheng, & Leger, 2005; Mukoma & Flisher, 2004; Parsons, Stears, & Thomas, 1996). Although the HPS framework has yet to be explicitly implemented with U.S. schools, the idea of integrating the school environment with individual health behavior change strategies (e.g., health education) has been incorporated in school-based health promotion programs in the U.S. through the CDC's Coordinated School Health Plan (Allensworth & Kolbe, 1987). The Coordinated School Health Plan consists of eight components: health education, physical education, health services (i.e., access or referral to primary care services), nutrition services, counseling and psychological services, healthy school (i.e., climate and culture of school), health promotion for staff, and family/community involvement. Both the HPS framework and

the Coordinated School Health Plan reflect an ecological perspective of obesity intervention and prevention programming. Research examining programs in which specific aspects of the Coordinated School Health Plan have been incorporated into individual programs that have been implemented and evaluated within school settings have produced variable results.

Individual School-Based Health Promotion Programs

There are some promising school-based programs that have helped promote healthy lifestyles by focusing on single or multiple components of the CDC's Coordinated School Health Plan. The Coordinated Approach to School Health (CATCH; Luepker et al., 1996) is based on social learning theory and incorporates goal setting into the curriculum and has been found to be effective on improving diet and increasing physical activity for children in elementary schools (Luepker et al., 1996; Nader et al., 1999). Additionally, positive effects were also found three years later (Hoelscher et al., 2004). In addition, the High 5 program attempted to increase fruit and vegetable consumption by implementing a school-based curriculum in elementary classrooms (Reynolds et al., 2000). The curriculum focused on improving behavioral skills, social norms, self-efficacy, and outcome expectancies through modeling, self-monitoring, problem solving, and reinforcement. Similarly, the Fruit and Vegetable Promotion Program integrated behavioral change strategies (i.e., modeling and positive reinforcement) into an education-based curriculum, which also included home and lunchtime components (Blom-Hoffman, 2008; Blom-Hoffman, Wilcox, Dunn, Leff, & Power, 2008; Hoffman, Franko, Thompson, Power, & Stallings, 2010; Hoffman, Thompson, Franko, Power, Leff, & Stallings, 2011). The home component facilitated

home-school communication through the use of take-home activity books in order to send a consistent message of student health across the home and school settings. The lunchtime component involved using school staff to ask students to identify fruits and vegetables in their lunch and provide praise and stickers to students who ate fruits and/or vegetables. Results of the plate waste assessment, a direct measure of fruit and vegetable consumption, indicated that children in the experimental group consumed more fruit and vegetables at the end of year 1 and more fruit at the end of 2 years compared to a waitlist control group (Hoffman et al., 2010). A longitudinal study of the Fruit and Vegetable Promotion Program across 3.5 years indicated that by the delayed 1-year follow-up, there were no differences in fruit and vegetable consumption between children in the experimental and control groups (Hoffman et al., 2011). Across all data points, children in the experimental group had significantly more fruit and vegetable knowledge than children in control groups and there were no intervention effects on preference for fruits and vegetables nor BMI.

Despite the many promising school-based obesity prevention programs that have been created, most programs only produce modest effects. In a review of school-based obesity prevention programs, Thomas (2006) concluded that only 4 of the 57 identified articles resulted in clinically and statistically significant changes for the intervention groups. Moreover, these programs, SPARK (Sallis, Alcaraz, McKenzie, & Hovell, 1999), Gimme 5 (O'Neil & Nicklas, 2002), Planet Health (Gortmaker, Peterson, Wiecha, Sobol, Dixit, Fox, et al., 1999), and CATCH (Luepker et al., 1996) were implemented for two to three years indicated that significant change in child health outcomes requires a high dosage of intervention.

Similarly, a meta-analysis of obesity prevention programs implemented in the school and community, found that the body of literature as a whole produced trivial effect sizes on physical health outcomes (e.g., BMI) and nutrition and physical activity practices (r^2 = .04; Stice et al., 2006). Further, interventions that produced significant results were time-intensive as interventions were implemented for lengthy periods of time with many resources (e.g., curriculum materials and personnel). In addition, interventions were more likely to be successful when they were conducted with adolescents and females. Despite the positive findings of these programs, only 5% of the studies included in the meta-analysis included follow-up periods indicating that the long-term implications of obesity prevention programs and maintenance of the results is unclear.

School-based obesity prevention and intervention programs have focused on individual curriculums and relatively short interventions and have illustrated variable results. Given the difficulty in reversing childhood obesity trends, additional programs may need to focus on the multiple environments that impact childhood obesity development, including those identified by Davison and Birch (2001). Further attention may be needed on interventions that create sustainable, environmental changes that promote wellness over a longer period of time. Not only should research focus on individual behavior change and health and wellness education, but on providing opportunities for engaging in a healthy lifestyle, such as the availability of fruits and vegetables at school or opportunities for physical activity at school.

Local Wellness Policies

Current research on school-based health promotion programs have had moderate effects and have focused on individual components of a Coordinated School Health

Program (i.e., nutrition education). In addition, the school environment has often been left out of health programs as much research has not been grounded in Ecological Systems Theory. Initiatives, both at the federal and state level, have focused on making environmental changes in order to promote healthy lifestyles. The Section 204 of the Child Nutrition and WIC Reauthorization Act of 2004 required schools to develop a local wellness policy by June 30, 2006. The local wellness policy required schools to set goals for nutrition education, physical activity, and other activities to promote wellness. In addition, schools were required to develop nutrition guidelines for any food sold on campus including, but not limited to, meals, vending machines, and fundraising. Not only did Section 204 of the Child Nutrition and WIC Reauthorization Act require schools to develop goals and guidelines for promoting wellness, but they were also required to develop a plan to evaluate the implementation of the policy and develop leadership to ensure the policy is implemented within the school. Lastly, schools were required to include parents, students, school food authority representatives, school board, administrators, and community members in the development of policy.

Some research has examined the extent to which schools have complied with Section 204 of the Child Nutrition and WIC Reauthorization Act. Moag-Stahlberg, Howley, and Luscri (2008) examined 256 wellness policies from across the United States and compared the content of policy compared to federal requirements and Action for Healthy Kids Wellness Policy Fundamentals. Results revealed that 68% of policies met the minimum requirements; however, no policy met all requirements. Specific weaknesses were noted in the area of physical activity. Probart et al. (2008) assessed the wellness policies of 499 school districts in Pennsylvania and concluded that 85.6-100%

of the policies met the mandated requirements; however most of the goals were general and difficult to measure. In a study examining the language of local wellness policies in Utah, results indicated that 78% of districts met federal guidelines (Metos & Nanney, 2007). A study of the impact of local wellness policies in Colorado elementary schools on physical activity indicated that opportunities to engage in physical activity did not change much (Belansky et al., 2009). In addition, the authors reviewed the wellness policies of 45 elementary schools and found the weak wording of the policies may have been related to the lack of positive findings on student engagement in physical activity.

Research has examined the extent to which schools adopt specific nutrition and physical activity policies. One of the most comprehensive studies of such policies is the School Health Policies and Programs Study (SHPPS), which has been conducted every six years since 1994 by the Center for Disease Control and Prevention (CDC). SHPPS was the first national study to measure school health policies and practices. The purpose of SHPPS is to monitor characteristics of the CDC's Coordinated School Health Program, including health education, physical education, physical activity, health services, mental health and social services, nutrition services, healthy and safe school environment, faculty and staff health promotion, and family and community involvement (Kann, Brener, & Wechsler, 2007). More specifically, SHPPS purports to identify characteristics of school health programs, determine whether someone is responsible for coordinating the school health program and identify his or her qualifications and training, examine community outreach practices between school health programs and outside organizations, and explore how policies and programs have changed since the last SHPPS data collection. In addition, SHPPS attempts to measure six of the Healthy People 2010 (U.S.

Department of Health and Human Services, 2000) objectives, allows individual schools to compare their programs to a nationally representative sample, and help identify areas to target for funding and technical assistance. Surveys and computer-assisted interviews are conducted at the state-, district-, school-, and classroom-levels across elementary, middle and high schools across the U.S. Each data collection period, questionnaire content is expanded to include current topics of interest. For example, SHPPS 2006 included questions related to crisis preparedness and response, physical school environment, and school climate (Kann et al., 2007).

Key findings of SHPPS 2006 indicate schools reported that they had adopted more nutrition policies that reflected an increase in the availability of healthy food on school grounds and a decrease in junk foods from 2000 to 2006 (Kann et al., 2007). However, 32.7% of elementary schools, 71.3% of middle schools, and 89.4% of high schools had a vending machine, school store, or snack bar where students could purchase food indicating students still had access to snacks with minimal nutritional value (O'Toole, Anderson, Miller, & Guthrie, 2007). Although the number of schools requiring physical education increased since 2000, only 3.8% of elementary schools, 7.9% of middle schools, and 2.1% of high schools meet the recommendations of minutes engaged in physical activity (Lee, Burgeson, Fulton, & Spain, 2007). Overall, results of SHPPS 2006 indicate that states, districts, and schools have continued to adopt health promoting policies and practices related to physical activity and education and nutrition services and education; however, there are still changes that need to be made (e.g., physical activity recommendations, access to healthy snacks). Perhaps the positive changes in the reported adoption of health promotion policies are the result of the changes in the federal law

requiring schools to adopt a policy; however, given the period of data collection, it is unclear whether schools had officially adopted a wellness policy.

Effectiveness of Environmental Changes on Student Health

A small number of studies have examined the impact of environmental changes in schools, including the adoption of specific policies, on child health outcomes. One study examined the impact of having a coordinated school health plans in accordance with CDC recommendations on obesity rates and healthy lifestyle practices (Veugelers & Fitzgerald, 2005). A total of 5200 fifth grade students were surveyed and had height and weight measurements taken. In addition, parents and school principals were surveyed. Students in schools that had a coordinated school health plan were less likely to be overweight and reported to have a healthier diet and engage in more physical activity. Although the study is limited to fifth grade students and lacks a comprehensive examination of the integrity of the coordinated school health plan, it does offer some promising findings that school-wide health plans may have an impact on reducing childhood obesity.

In a randomized controlled trial of 24 middle schools, Sallis et al., (2003) examined the impact of physical activity and nutrition policy changes, such as providing low-fat foods and increasing opportunities for physical activity, on the health behavior of middle school students. The intervention was strictly limited to environmental changes, did not include a classroom educational component, and was implemented over a period of two years. Results revealed that the intervention was successful in increasing engagement in physical activity for boys; however, there were no significant changes found for girls and the intervention did not affect the children's fat-intake. In contrast, an

exploratory study of school nutrition environment found that middle and high school students who consumed less sugar-sweetened beverages attended a school that did not have a school store, snack bar, and a la carte offerings during lunch (Briefel, Crepinsek, Cabili, Wilson, & Gleason, 2009). Data were extracted from the School Nutrition Dietary Assessment Study (SNDA), which included 2314 students in grades one through 12. Further, surveys from principal and foodservice directors, as well as, direct observations, school menu analysis, and 24-hour diet recalls were used to examine nutrition policies and practices and child health behavior.

Not only have researchers examined the impact of environmental policies and interventions on dietary and physical activity practices, they have also examined the impact on overweight and obesity rates. For example, Gleason and Dodd (2009) examined the relationship between BMI and participation in school lunch or breakfast program using the SNDA-III data of 2228 students from 287 schools and found lower overweight and obesity rates when students participated in breakfast; therefore, the authors concluded that breakfast programs may be a protective factor against childhood obesity. Fox et al., (2009) also used data from SNDA and found that there was a relationship between environment and BMI in elementary and middle schools, but not high schools. More specifically, elementary schools that offered French fries or dessert more than once a week had higher rates of obesity than schools in which such items were never offered. Schools with vending machines that sold low-nutrient foods were associated with higher obesity rates.

In addition to examining nutrition practices, Foster et al. (2008) employed a policy-based intervention in urban schools. Students in grades 4th through 6th

participated in the School Nutrition Policy Initiative, which included nutrition education, nutrition policy, social marketing, and parent outreach. Results revealed that intervention schools had a 50% lower incidence of overweight (e.g., at-risk for obesity) than control schools after two years. No changes were found on obesity rates and the authors concluded that more intensive environmental interventions may be needed, particularly those that include physical activity components.

Obesity trends have also been examined at the state-level. Nanney, Nelson, Wall, Haddad, Kubik, Laska, and Story (2010) examined food services and nutrition, physical activity and education, and weight assessment items from the SHPPS 2006 dataset. State-level obesity prevalence rates for children ages 10 to 17 were extracted from the 2003 National Survey of Children's Health. Results indicated that obesity rates were correlated to food service policies, but not to physical activity or weight assessment policies. The authors also noted that states had adopted more policies related to nutrition than physical activity or weight assessment, suggesting physical activity is often neglected in school wellness.

Contextual Variables of the School

Changes to the school environment may produce promising results in promoting student wellness; however, such changes are not easy. Belansky and colleagues (2009) conducted a content analysis of interviews with principals and key school personnel, which identified competing pressures facing school districts, lack of resources to support local wellness policies, principals' lack of knowledge, and lack of accountability as barriers to wellness policy implementation. Schools are under tremendous pressure to meet the academic demands of No Child Left Behind (2002). Such academic pressure

often leaves little time to focus on wellness or promote student health as additional time is spent ensuring children receive ample instruction in reading and math. Often there is little time for nutrition, health, or physical education, and recess (Leviton, 2008). Additionally, schools have limited resources in terms of staffing, training, financial support, and classroom space that may impede the implementation of a health promotion program. Further understanding of the school context is critical when implementing systems-level changes such as local wellness policies. Such variables may impact the extent to which wellness policies are adopted and implemented with the school system.

Disparities in Childhood Obesity

Prevention and intervention strategies attempt to target behaviors that are related to a healthy lifestyle, such as nutritious diet and regular physical activity (Barlow et al., 2007). These lifestyle changes are difficult to address in at-risk populations, such as children from impoverished families or culturally and linguistically diverse backgrounds. For example, access to healthy foods may be limited for families living in poverty (Drewnowski, 2004; Kumanyika & Grier, 2006). In fact, research has found that children from low-income and minority families have more fast-food restaurants in their neighborhoods in comparison to families living in wealthier neighborhoods (Block, Scribner, & DeSalvo, 2004). Additionally, these families may lack the knowledge or have a different perception of proper diet and nutrition (Kaufman & Karpati, 2007; Kelly & Patterson, 2006; Kumanyika & Grier, 2006). Culture can play an important role and may be in conflict with what is considered healthy eating habits and physical activity (Barlow et al., 2007). There are also differences related to opportunities for physical activity for families from impoverished backgrounds. Families living in poverty may be living in

neighborhoods that are not safe; therefore, limiting children's ability to go outside and play (Kumanyika & Grier, 2006).

Disparities in obesity rates in schools are also apparent. In addition, schools also suffer from limited access to resources. In particular, urban schools are more likely to serve populations from impoverished backgrounds, as well as culturally and linguistically diverse backgrounds. Urban schools may serve such a large number of students that addressing needs such as health promotion may not be a top priority due to the number of students at-risk for academic difficulties and demands of No Child Left Behind (2001).

Policy and School Characteristics

The type of school and school size has been found to be significantly related to overweight and obesity rates in grades 8, 10, and 12 with public schools and mid-sized having higher rates (O'Malley et al., 2007). School SES was significantly associated with overweight and obesity rates as lower SES schools was associated with higher rates even after controlling for individual-level SES and ethnicity. The gap between low and high SES in obesity rates continues to grow as students enter higher grade levels. In addition to differences in obesity rates, O'Malley et al. (2007), Finklestein, Hill, and Whitaker (2008) found that school food environments and policies become less healthy as students enter higher grades in a sample of 395 public schools. Such differences may reflect additional options for purchasing food on campus through vending machines, school stores, and snack bars. There was no relationship between food environment and percentage of students eligible for free and reduced lunch or percentage of students who were racial/ethnic minority.

In contrast, Delva, O'Malley, and Johnston (2007) found that school food policies vary as a function of school type, SES, and ethnicity. Students from 345 secondary schools were exposed to less-healthy food environments if they were a high school student, Black or from low SES backgrounds. Because the study was part of a larger, longitudinal research project, only students in grades 8, 10, and 12, who attended private or public schools were included. In addition, Metos and Nanney (2006) found that urban school districts and those with a higher percentage of students participating in the free and reduced lunch program in the state of Utah were more likely to have mandated rather than recommended language within their policy, while there were no differences within school size or ethnicity. It should be noted that this study strictly examined the language of the policy and not whether specific policy or practices were implemented within the school as in the aforementioned studies. Further, Metos and Nanney (2006) examined wellness policies in Utah, whereas Delva et al. (2007) and Finklestein et al. (2008) included schools from across the country.

Jones, Brener, and McManus (2003) found that public schools, urban schools, and large schools had more health promoting policies based on SHPPS 2000. It should be noted that Jones et al. (2003) included health promotion policies beyond those related to nutrition and physical activity and included those related to injury and violence prevention, drug prevention, and mental health services and collapsed these items to create a total policy score. Moreover, only five of the 18 policies included in the study were related to nutrition and physical activity, which may account for the discrepancy between studies. A second study using SHPPS 2000 data attempted to examine school demographics and specific health policies and programs rather than collapsing across

programs (Brener, Jones, Kann, & McManus, 2003). Each of these areas received a summative score as the researchers gave one point for each specific policy within the following domains: health education, physical education, health services, mental health and social services, food service, school policy and environment, faculty and staff health promotion, and faculty and community involvement. Additional analyses were conducted on specific items of interests (e.g., whether a school had a specific program or policy). Targeted school demographic variables included school enrollment size, school type (e.g., private, public, Catholic) urbanicity, percent of college-bound students, percent of White students, and per-pupil expenditure. With regards to physical education, results indicated that public schools, schools with a higher percentage of White students, and schools with higher per-pupil expenditure had more policies and programs in place. Public schools and schools with a lower percentage of White students were found to have more nutrition policies and programs. The overall summative policy score (e.g., combining across all health programs) was higher for public schools, rural schools, and larger schools. Only specific items were examined from the physical activity and education and nutrition services questionnaires were used, which reflected a total of 16 items.

Variables Impacting Sustainability

Beyond the characteristics of the school, there are other variables that are key to systemic changes in the school that are applicable to the implementation of local wellness policies. Moreover, compliance with the Reauthorization Act of 2004 and the implementation of a wellness policy requires systemic change within the school setting. Researchers have emphasized the need to consider school contextual factors when

implementing interventions (Ringeisen, Henderson, & Hoagwood, 2003). Moreover, contextual factors including individual characteristics of a school, school climate, resource availability, accountability, financing, and service eligibility influence the extent to which schools can change in order to adopt and sustain new policies and practices. The research support is not sufficient when selecting an intervention, and must include the feasibility of the intervention implementation, which is contingent on the contextual variables mentioned above (Merrell & Buchanan, 2006). Organizational variables such as leadership of the policy and family and community involvement may impact the extent to which wellness policies are adopted and put into practice.

Because of the systems-level impact of creating and implementing a local wellness policy, an understanding of variables related to the readiness to change is critically important. Suarez-Balcazar et al. (2007) used a case study approach to examine the critical antecedents involved in systems-level change involved in changing the foods sold within Chicago public schools. In-depth interviews and extensive documentation of meetings with school personnel revealed that the following antecedents to the successful systemic change: dissatisfaction with status quo, existence of new knowledge, availability of additional resources and time within school personnel, solid networking and leadership, and formation of task force. Despite the success of the researchers in creating environmental change to support student nutrition, several barriers to the change were identified, such as staff resistance to change, competing priorities of stakeholder, lack of funding and resources, institutional bureaucracy, and unrealistic expectations about speed of change.

Wellness Policy Coordination. McDonnell et al. 2006 examined the perceptions of local wellness policies of 228 food service directors and 79 principals from Pennsylvania high schools. Findings indicated that policies related to club food sales were more likely to be enforced. In addition, principals were more likely than directors to indicate that policy was enforced, while directors were more likely to say 'not sure' and that policy exists, but not always enforced. It seems that although school personnel most commonly identify food service directors and principals as being responsible for overseeing the wellness policy (Probart et al., 2008), foodservice directors are not always sure whether policies are enforced indicate a questionable infrastructure of the leadership of wellness policy implementation.

A multidisciplinary team or a steering committee is often used to implement systemic change within schools (McNamara, Rasheed, & Delamatre, 2008). Although the federal mandate requiring local wellness policies requires the development of a wellness council to develop the policy, assignment of at least one person to oversee the policy, less than half (39.5%) of the schools reported having a school health council (Michael, Dittus, & Epstein, 2007). In contrast, 65.7% schools participating in SHPPS in 2000 reported having a wellness council (Brener, Kann, McManus, Stevenson, & Wooley, 2004). Further, schools with health councils were more likely to have health promotion programs and policies. Similarly, Chriqui and Chaloupka (2011) found that policy strength was predicted by the presence of an advisory council. Hoyle, Samek, and Valos (2008) discuss a case study of the procedures involved in building an infrastructure for school-based health promotion. The wellness council developed in the school was a critical component in building the capacity to develop and support the school's local

wellness policy. Further, the council included members of all stakeholders such as parents, administrators, teachers, community members, students, vendors for beverages and snacks, and school board members. Good leadership is critical for the successful implementation and sustainability of a local wellness policy.

School-wide obesity prevention programs, including the Pathways and CATCH programs have examined the sustainability of their programs once the study has been completed (Gittelson et al., 2003 & Parcel et al., 2003). Through the examination of both quantitative and qualitative data from 290 school administrators, food service managers, classroom teachers, PE teachers in 21 intervention schools, school administration, lack of family participation, and positive attitudes toward program were correlated with the implementation of the program. Parcel et al., 2003 examined the impact of school climate on the initialization of the CATCH program. Results revealed that schools with a more open climate were more likely to teach more hours of CATCH, but were also more likely to have greater percentage of calories from saturated fat in meals, indicating aspects of the nutrition service component of the intervention was not fully implemented. In addition, schools with more open principals were more likely to use CATCH lesson plans after the study had finished.

Perception of Family Involvement. Not only is the leadership critical for the successful implementation of local wellness policies, families may also play a critical role. Family involvement in education is related to a number of positive outcomes for children and the community (Christenson & Sheridan, 2001). Epstein (1995) provides a framework for understanding the constructs of family involvement, which includes six types: Parenting, Communicating, Volunteering, Learning at Home, Decision Making,

and Collaborating with Community. The Parenting type includes the ways in which schools assist families in developing a supportive home environment. The Communicating component of family involvement includes all mechanisms of both direct and indirect home-school communication. The ways schools recruit families for help and support are included the Volunteering type. Within the Learning at Home type, schools attempt to provide information to families regarding homework and academics. The Decision-Making type includes ways in which schools incorporate families into leadership roles and organizations (i.e., PTO/PTA). Lastly, the Collaborating with Community type involves integrating community resources with school programming. Michael, Dittus, and Epstein (2007) attempted to map items from across the SHPPS 2006 study onto the six components of family involvement. They concluded that schools did a variety of things to support family involvement in many aspects of wellness, but noted that schools could do much more to support involvement in health promotion and many schools were not engaging in fundamental family involvement techniques, such as communicating with PTA/PTO groups and including family members on wellness councils. Although the federal law required schools to include family members on wellness councils, about 55% of schools with councils reported including family members (Michael et al., 2007). Families play a critical role in the prevention of obesity (Epstein, Valoski, Wing, & McCuley, 1994; Golan & Crow, 2004) and family-based interventions have been found to produce larger effect sizes than treatment without a family component in producing weight loss outcomes (Young, Northern, Lister, Drummond, & O'Brien, 2007). It seems likely that the perception of family involvement promotion in school-based health promotion would also be important in the

implementation of local wellness policies; however, research has not yet examined such a relationship.

Contributions of the Proposed Study

Childhood obesity has become a national epidemic straining both school and health care systems (Hering et al., 2009; Story, Nanney, & Schwartz, 2009). School-based health promotion research has continued to grow and develop; however, research is needed in order to further understand environmental approaches to obesity prevention and intervention such as the implementation of local wellness policies. Research thus far has primarily focused on change at the individual-level rather than focusing on environmental or systems-level change. Second, research that has examined environmental supports and policy adoption is limited both in size and breadth as much as focused solely on nutrition policies. Research relating specifically to physical activity policies is needed as physical activity promotion is a required component of local wellness polices. Similarly, there is limited research examining policy adoption and implementation at the elementary school level. Lastly, the context of the school has not fully been examined. Several variables relating to the school setting are crucial when implementing systems-level interventions, including the characteristics of a school, school climate, resource availability, accountability, financing, and service eligibility are influence the extent to which schools can change in order to adopt and sustain new policies and practices. Although there are numerous school contextual variables, only school characteristics, wellness coordination, and perception of family involvement promotion will be examined. The current study intends to further examine the aforementioned gaps of the literature by examining the impact of critical school

characteristics, wellness policy coordination, and perceptions of family involvement promotion on wellness policy compliance prior to the Section 204 of the Child Nutrition and WIC Reauthorization Act.

CHAPTER III. METHODS

Overview of the SHPPS Study

SHPPS is the most comprehensive and largest examination of school health policies in the United States (Kann et al., 2007). The study is completed every six years since 1994 and is completed in collaboration with the Division of Adolescent and School Health (DASH), and National Center for Chronic Disease Control and Prevention (CDC). The purpose of SHPPS is to assess school health policies and practices within the following components: health education, physical education and activity, health services, mental health services, nutrition services, healthy and safe school environment, faculty health promotion, and family and community involvement. Further, assessment is conducted at the classroom, school, district, and state level and the data from each evaluation period is available to the public at the SHPPS website (http://www.cdc.gov/healthyyouth/shpps/2006/data/index.htm). Data at the school level from the Physical Education and Activity, Nutrition Services, Health Education, and Healthy School Environment are the focus of the current study.

Participants

Participants in the study were schools that participated in the 2006 School Health Policies and Programs Study (SHPPS). School sampling was intended to recruit a nationally representative sample based on urbancity, SES, school level (e.g, elementary, middle, and high), and enrollment size. The final sample included a total of 1103 schools from across the United States and reflected a 78% response rate. A total of 72% of the schools were from public school districts, while 13% included Catholic schools, 14% included private schools, and 1% were state-administered schools. On average, school

enrollment was 555 students (*SD*= 485). A total of 35% elementary schools, 33% middle/junior high schools, and 30% senior high schools participated in the study.

Measures

Overview of SHPPS Questionnaires. A total of 23 questionnaires were developed by the CDC to assess classrooms, school, and school districts on the each of the eight areas of health promotion policy and practice. School-level questionnaires used in the SHPPS study were administered using computer-assisted telephone interviews (CATI Technology) and were completed by the school-level personnel who was most familiar with the content of the specific questionnaire (Kyle et al., 2007). Food service managers were the most common respondent of the Food Service School Questionnaire, while physical education teachers most commonly completed the Physical Education School Questionnaire. Other school professionals that completed the questionnaires included principals, school administrators, athletic directors, teachers, food service staff, school counselor, and nurses.

Questionnaire development began in summer 2004 and consisted of several steps involving an item-by-item review of SHPPS 2000 questionnaires by content experts associated with the CDC, literature review for new topic areas, and interviews with stakeholders to assess the extent to which questions were understood as intended and further revision by the expert panel. During the survey development process, a re-interview and reconciliation methodology was used in order to estimate and reduce response errors and assess the validity of the questionnaires (Morton, Mullin, & Biemer, 2008). Although this study discusses the specific process for the 2000 SHPPS survey, it is almost identical to the 2006 version. Minimal changes were made to the questionnaires in

order to determine changes across the years. The re-interviews were conducted 2 weeks after initial interview, while the reconciliation interviews were conducted 1-2 weeks later with respondents who had a high number of discrepancies.

SHPPS Food Service and Physical Activity/Education Questionnaires. The Food Service and Physical Activity and Education Questionnaires were used to measure policy and practice implementation. The questionnaires consisted of a total of 88 and 114 items, respectively, and included Likert-scale, binary, and open-ended questions. Because the purpose of the current study was to examine wellness policies as a whole in terms of nutrition and physical activity, only some items from the questionnaires were used. Selected items pertinent to wellness policies were combined in order to produce a summative score. The following criteria were used to select items: a) item must have a binary scale; b) item must not be a follow-up question; and c) item must be assessing one of the five components of a wellness policy. Items were selected by the first author and then confirmed by an expert panel consisting of professionals familiar with school-based health promotion. Confirmation was defined as 100% agreement on the items and any discrepancies will be discussed and reassessed until consensus is reached. Appendix A includes the items that represent each of the federal requirements for a wellness policy. Once items were selected and combined into a new scale, Wellness Policies, Crohnbach's alpha of at least.70 was used in order to ensure the meaningfulness of each grouping of items used to create new scale.

SHPPS Healthy and Safe School Environment Questionnaire. The Healthy and Safe School Environment Questionnaire was used to measure the school characteristics and contextual variables including the school level (e.g., elementary,

middle, high), poverty level (e.g., high or low), enrollment size, and urbanicity (e.g., urban or nonurban). Six items from the Healthy and Safe School Environment Questionnaire, which were rated on a 4-point Likert-scale, were used to assess the perception of family involvement. Cronbach's alpha was used to verify the author's assumption that those items do in fact consistently measure perception of family involvement. In addition, the items map onto the six types of family involvement identified by Epstein (1995) which demonstrates content validity of the scale (See Appendix B). Wellness Policy Coordination will be assessed based on 1 question involving the presence someone who oversees student health.

Expert Panel. An expert panel was used to select items from the SHPPS questionnaires in order to create the Wellness Policy measure. The expert panel included 3 professionals who held a professional degree (i.e., MD, PhD, and MS) and had experience conducting health promotion research and participating in the developmental of local wellness policies by collaborating with local schools. Expert panel members received copies of the SHPPS Health Education Questionnaire, Nutrition Services Questionnaire, and the Physical Education and Activity Questionnaire, as well as the minimum federal requirements for a local wellness policy to review. In addition, panel members received the item criteria (see above) and completed a form to map the SHPPS items (Appendix A) onto the five federal requirements of local wellness policies.

Procedures

The first author carefully reviewed items from the SHPPS Health Education, Nutrition Services, and Physical Education Questionnaires in order to identify items that reflected the minimum federal wellness policy requirements. An expert panel

independently rated items that they believed related to the minimum requirements of wellness policies. The expert panel's ratings were compared to one another and 100% agreement was used to establish adequate agreement. Next, the data from the three SHPPS questionnaires were combined into one database in order to conduct analyses across the questionnaires. Missing data was handled through Maximum likelihood estimation (MLE) as it is less biased than listwise deletion (Byrne 2010). Maximum likelihood estimation assumes that the sample has a normal distribution and provides the most probable estimates of means and variances based on the data that is provided. Although by definition dichotomous variables are not normally distributed, MLE has been used with categorical or dichotomous variables (Allison, 2003; Little & Schulucter, 1985; Skrondal & Rabe-Hesketh, 2005).

Data analyses

Q1: To what extent have schools participating in the SHPPS 2006 study met the minimum federal requirements for a local wellness policy? Frequencies were conducted on the nutrition policy and physical activity policy in order to determine the number of schools that met minimum wellness policy requirements. In addition, descriptive analyses (e.g., mean, standard deviation) were conducted to determine the average percentage of policies that schools have adopted. Because anyone from the school could complete the SHPPS questionnaires, ANOVAs were conducted to determine whether or not there are differences in wellness policy implementation scores based upon who completed the questionnaire. For the Nutrition Service Questionnaire, there were 12 possible job titles, which were divided into three groups: a) Administrators/Directors (e.g., principals, assistant principals, athletic directors), b) Food Service Staff (e.g., food service managers,

commercial food service provider, other food service staff), and c) Other Staff (e.g., secretaries, counselors, nurses, teachers, other staff). Job titles for those who completed the Physical Education and Activity Questionnaire consisted of 13 possible job titles and were also collapsed into three groups: a) Administrators/Directors (e.g., principals, assistant principals, athletic directors), b) Teachers (e.g., physical education teachers, health teachers, other teachers), and c) Other Staff (e.g., secretaries, counselors, nurses, food service staff, other staff).

Q2: What contextual variables (e.g, school size, poverty level, urbanicity, perception of family involvement, and wellness coordination) predict the implementation of physical activity and nutrition policies and practices in elementary, middle, and high schools. Structural Equation Modeling (SEM) was used to determine whether school size, poverty level, urbanicity, wellness coordination, and perception of family involvement predict nutrition and physical activity policy compliance at elementary, middle, and high schools. These contextual variables were used to determine whether the model predicts wellness policies. AMOS was used to test the goodness of fit of the hypothesized model (See Figure 1). Goodness of fit was determined by examining the feasibility of parameter estimates, appropriateness of standard errors, and the statistical significance of the parameter estimates, as recommended by Byrne (2010). More specifically, a series of goodness of fit statistics were evaluated to examine the model as a whole, including chi-square and the Comparitive Fit Index (CFI; Hu & Bentler, 1999). In addition, the Normed Fit Index (NFI; Bentler & Bonnett, 1980) was computed and values closest to .95 reflecting good fit. Both the NFI and CFI compare the hypothesized model to the null model and takes sample size into account. These indices are classified as incremental and

have ample research support for their usage (Byrne, 2010). Lastly, root mean square error approximation (RMSEA) was examined as an additional measure of goodness of fit with values less than .05 reflecting a good fit (Hu & Bentler, 1999). Fan and Sivo (2007) suggested RSMEA were sensitive to model misspecification, but insensitive to irrelevant factors such as sample size or number of variables.

CHAPTER IV. RESULTS

Demographics

Data from 920 schools were included in the data analysis, including 302 elementary schools, 307 middle/junior high schools, and 311 senior high schools. Schools participating in the 2006 SHPPS study represented 43 states. School enrollment was variable (M = 559.72, SD = 491.14) with a range of 20 to 4359. The Food Service Questionnaire was completed by the food service manager for 75% of the schools. Other school personnel that completed the Food Service Questionnaire included principals (3%), other school administrators (3%), secretaries (1%), other school food service staff (9%), other staff (6%). The Physical Education Questionnaire was completed by the physical education teacher at the school in 68% of the cases. In other cases, the principal (6%), athletic director (7%), or other teacher (5%) completed the questionnaire.

Missing data and Assumptions

Missing data were examined for all variables of interest. A total of 28% of the data were missing for the urbancity and poverty variables. There was no missing data for school size, type, or wellness compliance summary score. Three percent of the data were missing for the wellness coordination item and 4% of the data were missing for perception of family involvement summary score. Examination of frequency counts revealed that there were no observed patterns of missing data; therefore, missing data appeared to be random. In order to evaluate normality, skewness and kurtosis were examined for wellness policy compliance score and family involvement, as both are continuous variables. Results revealed that no threats to normality were observed as skewness and kurtosis was between -1 and 1. Poverty, urbanity, size, and wellness

coordination were dichotomous variables, which by definition cannot be normally distributed. Previous research supports the use of dichotomous variables within structural equation modeling (Muthén, 1984; Skondal & Rabe-Hesketh, 2005). Fan, Thompson, and Wang (1999) recommend having at least 200 participants in order to conduct SEM, which was satisfied by the current dataset.

Measurement Development

The expert panel consisted of three professionals who have had direct involvement in the development of local wellness policies and school-based health promotion research. A rating scale was provided to each member. In order to develop a measure of wellness policy implementation, the expert panel selected items that appeared to be in line with the minimum federal requirements of local wellness policies. There was 100% agreement that 43 out of 98 items represented local wellness policies. The source of the items (i.e., Health Education Questionnaire, Physical Education Questionnaire, and Nutrition Services questionnaire), inter-item correlations, and item-total statistics were analyzed. Only four items that were selected by the expert panel were from the Health Education Questionnaire; therefore all items from this questionnaire were deleted in order to minimize error variance from combining several different questionnaires. Two items that were highly correlated were also omitted and two items suggested an improved Chronbach's alpha if deleted. See Appendix C for specific items that were deleted. The final measure included 35 items that had a Cronbach's Alpha of .704. Three items were reversed scored in order to represent wellness policy promotion. A summary score was then computed and used to present the construct of Wellness Policy Compliance. The

mean wellness policy implementation score was 17.44 (*SD* = 3.94) and scores ranged from 7 to 29 (out of a possible score of 35).

Research Question 1: Compliance with Federal Requirements

Frequencies were examined for each item in the wellness policy implementation metric. Five items represented requirement 1, goals for health promotion, based upon expert panel ratings. A total of 62% to 86% of schools reported that they adopted specific policies within requirement 1. Seven items represented Requirements 2 and 3, nutrition guidelines. Schools reported that they adopted specific policies consistent with requirements 2 and 3 ranged from 69% to 97%. For requirement 4, implementation measurement, two items were chosen and 90% to 94% of schools endorsed the items. Lastly, requirement 5, community involvement, included 20 items and endorsement ranged from 9% to 83%. See Table 1 for frequencies for individual items.

Overall, schools participating in the SHPPS 2006 study appeared to comply with federal local wellness policy requirements. Out of the 35 items representing wellness policy implementation, 18 items (51%) were items in which at least 60% of schools reported that they were implementing the item. Qualitatively, most schools followed requirements 1 through 4 while there was variability within requirement 5, which may indicate that schools do not consistently attempt to involve community members in health promotion.

Additional analyses were conducted in order to determine whether or not there were differences in total scores on the Nutrition Services Questionnaire and Physical Activity Questionnaire based upon who completed them. Two one-way ANOVAs were conducted and results revealed significant differences in scores based upon the job title

for who completed the questionnaire. for the Physical Education and Activity Questionnaire (F (2, 905) = 3.95, $p < .05$), but not for the Nutrition Services Questionnaire (F (2, 916) = 1.14, $p = .32$) and Tukey post hoc analyses revealed that teachers (M = 12.27; SD = 4.05) who completed the Physical Education and Activity Questionnaire were significantly more likely to report less implementation than other school staff (M = 14.52, SD = 4.93). Descriptive statistics based upon who completed the questionnaires are displayed in Table 2 for the Nutrition Services Questionnaire and Table 3 for the Physical Education and Activity Questionnaire.

Research Question 2: Contextual Variables

Contextual variables of interest were examined. A total of 255 schools (27%) represented schools of a low poverty level, 457 schools (48%) were considered urban, and 433 (47%) were small schools. Data for poverty and urbanicity was missing for 28% of the cases. Sixty percent of the schools reported having leadership related to health promotion. The perception of family involvement score revealed a mean of 33.37 (SD = 5.01), with a range of 10 to 40.

Relationships among the variables were examined by computing Pearson Correlation (see Table 4). Small, significant, positive correlations were observed between perception of family involvement and leadership (r = .095, p <.05); leadership and urbanicity (r = .101, $p < .01$). Small, significant, negative correlation between leadership and poverty level (r = -.117, $p < .01$) were found; however, the strength of the correlation indicated limited meaningfulness in the relationship.

AMOS software was used to conduct SEM, which indicated that the model was not supported (χ^2 (129) = 3220.93, p = .000 (see Figure 1). Examination of regression

weights indicated that school level, specifically whether the school was a high school significantly predicted wellness policy compliance. No other variables significantly predicted wellness policy implementation; therefore, fit indices were not examined. See Table 5 for selected fit indices. The lack of significant regression weights did not support an alternative model; therefore medication indices were not explored. Moreover, the data did not support an alternative model to be proposed as the contextual variables were not significantly related to the wellness construct. Within the SEM, the items relating to the latent construct of Perception of Family Involvement did not significantly load indicating that the measure did not have adequate construct validity.

In order to further examine the relationship between wellness policy compliance and school level, a one-way ANOVA was computed. Results revealed significant differences among wellness policy compliance scores and school level (F (2, 887) = 3.360, $p < .05$. Tukey's post hoc analyses indicated that the difference between wellness policy compliance scores for high schools (M = 17.08, SD = 4.08) were significantly lower than elementary schools (M = 17.91, SD = 3.79). In order to determine the meaningfulness of this relationship, an effect size was computed (i.e., eta squared, η^2). Results revealed a small effect size ($\eta^2 = .03$), indicating the relationship between wellness policy compliance and school type was clinically significant, but weak.

A post hoc analysis was completed in order to determine whether the contextual factors predicted the 5th federal wellness policy requirement of community involvement. Because there was no hypothesized relationship about the order or weight of the contextual variables, simultaneous multiple regression was computed. Results indicated

that there were no significant predictors of wellness policies consistent with community involvement (R^2 = .007, F (7, 658) = .679, p = .69).

CHAPTER V. DISCUSSION

The purpose of the current study was twofold. First, this study examined the extent to which schools participating in School Health Programs and Policies Study (SHPPS) have met the minimum federal requirements of the local wellness policy. Second, the purpose was to explore local wellness policies from an ecological framework by closely examining contextual variables that impact systems-level change in elementary, middle, and high schools. Moreover, the study examined the relationship between contextual variables (i.e., school size, poverty level, urbanicity, perception of family involvement promotion, and perception of wellness leadership) and compliance with local wellness policy federal requirements. Results indicated that schools participating in SHPPS reported implementing many aspects of local wellness policies. Wellness policy compliance did not appear to be related to any contextual variables, although weak relationships among contextual variables were observed. School wellness policy compliance appeared to be stronger for elementary schools than high schools, although the relationship was weak. Results of each research question are presented below in reference to previous literature. Limitations, directions for future research, and possible implications for school health promotion are also presented.

Compliance with Federal Wellness Policies

The present study found that 60% or more of the schools participating in SHPPS 2006 study reported implementing 18 out of the 34 nutrition and physical policies included in the study. Previous research has suggested compliance with wellness policies as much higher. Specifically, Probart et al. (2008) concluded that 85.6-100% of the policies in Pennsylvania schools met the mandated requirements, while Metos and

Nanney (2007) reported that 78% of districts in Utah were compliant. Moag-Stahlberg, Howley, and Luscri (2008) examined wellness policies from across the United States concluded that 68% of policies met the minimum requirements.

The current study found less compliance with federal wellness policies. It may be that the discrepancy was a result of the different measurement tools used. Previous research has focused on collecting actual school wellness policies and examining the language or content of the policy (i.e., Metos & Nanney, 2007; Moag-Stahlberg et al., 2008; Probart et al., 2008). Across studies, the methodology was similar; however, a consistent coding metric was not used. Currently, a comprehensive coding system has been developed to measure the quality of wellness policies (Schwartz et al., 2009). Preliminary research suggests the coding system is a reliable means to measure wellness policy quality. In contrast, the present study examined items that appeared to be consistent with federal requirements for local wellness policies, but did not examine actual wellness policies. In addition, there was greater discrepancy within items that were measuring the inclusion of community involvement in wellness activities (i.e., the 5th federal requirement) in the current study. Twenty items were included and asked about a school's involvement with a specific community organization or group. This level of detail may have contributed to the discrepancy between previous research's level of compliance as the current study utilized a more rigorous metric for the level of community involvement.

There was variability among the schools regarding who completed the survey (i.e., principals, nutrition managers, teachers, etc.). Further, there were significant differences in reported policy implementation for Physical Education and Activity

Questionnaire based upon who completed the survey. Further, other school staff were more likely to report that a school adhered to a specific policy item than teachers. No other differences were found and no differences were found among those who completed the Food Service Questionnaire. The small sample size within each group may have contributed to the lack of significant findings. Previous research has suggested that there are differences regarding report of wellness policy implementation depending upon who at the school is asked. Specifically, nutrition managers may have more knowledge than principals regarding nutrition policies. Previous research has indicated that principals were more likely to report that nutrition policies were implemented than food service directors, while the directors were better able to identify policies that were implemented but were unsure whether or not the policy was enforced (McDonnell et al., 2006). Additional research has suggested that food service directors and principals are responsible for overseeing wellness policy implementation (Probart et al., 2008).

Relationship among Contextual Variables and Wellness Policies

Results of the SEM analyses indicated that the model was not supported in the present study. Further, the combination of contextual variables including school level, size, urbanicity, poverty level, perception of wellness coordination, and perception of family involvement did not explain the variance in wellness policy compliance scores. Lack of significant regression weights did not allow for further analysis of the model. Wellness policy compliance was predicted by school level (i.e., elementary, middle, or high schools) only.

Relationships among specific contextual variables were observed. There was a small, positive correlation between wellness policy leadership and the perception of

family involvement. This finding is not surprising given that many wellness committees often include family members and other community members (Michael et al., 2007). In fact, the federal requirements of local wellness policies states that family members should be included in the development and implementation of federal wellness policies. Very small correlations were found among contextual variables (i.e., leadership and ubanicity, leadership and poverty, and urbanicity and school size); however, the correlations accounted for less than 1% of the variance, suggesting that the correlations are not socially valid.

Differences among School Level

One contribution of the present study was to include elementary, middle, and high schools. Previous research on wellness policies has focused on middle and high schools; however, the present study suggests that elementary and high schools may significantly differ in their ability to comply with the federal requirements of local wellness policies. Moreover, elementary schools were found to implement more wellness policies than high schools, although the relationship was weak and should be interpreted with caution. The finding is consistent with previous research that has found that school food environments and policies become less healthy as students enter higher grades (Finklestein, Hill, & Whitaker, 2008). Further, as students move to high school, access to a la carte items and vending machines increase, thus creating an increased opportunity to access to low-nutrient food. O'Malley et al. 2007 found differences in obesity rates among students in elementary schools and students in high school. The authors suggested the differences may reflect differences at the environmental level such as cultural factors, peer behaviors, and policy variations. Although the present study did not examine obesity rates,

differences in the school health environment were found and may provide rationale for further investigating the impact of wellness policy on the varying obesity rates as students enter older grades.

Limitations

The use of an existing database was a significant limitation. In addition, items were taken from two SHPPS questionnaires, which were not always completed by the same informant. For most schools, different people completed each of the SHPPS studies and significant differences were found between the respondent and policy compliance; therefore, variability may be attributed to who responded to the questions rather than variability in actual policy compliance. Data in the current study was obtained from a variety of school personnel, many of whom may not have had accurate or complete information regarding specific policies and practices that exist within the school.

An expert panel was used to identify variables from the SHPPS surveys that were consistent with the five federal requirements of local wellness policies. Panel members were selected that had expertise in school-based health promotion research and experience serving on wellness committees and developing school wellness policies. There was 100% agreement for each item that was selected; however, measures of construct validity were not utilized in this study. Further, there was little variability in the adoption of specific policies. With the exception of requirement 5, most schools positively endorsed items on the wellness policy implementation measure. Given the restricted range on these items, a ceiling effect may have impacted the findings in the current study. A more comprehensive measure of wellness policy could also examine

awareness and enforcement of the policy in order to provide more variance within the measurement of wellness policy compliance.

Although the Wellness Policy Compliance summary score that was used in the present study was meant to be an indicator of wellness policy, it may be that it was not actually measuring wellness policy requirements. For example, only two items were selected that were consistent with Requirement 4, measure of implementation. Such a small number of items may not have fully captured whether or not schools actually have a means to measure their implementation of wellness policies. Closer examination of the items used to measure wellness policy compliance reveals that the measure did not assess the full requirements of local wellness policy. The first requirement of local wellness policy states schools should provide goals for all health promoting practices. All items used to represent this requirement were drawn from the Physical Activity and Education Questionnaire. No items were related to nutrition, which is a significant limitation. Similarly, federal requirements 2 and 3 indicate that guidelines must be in place for all foods sold on campus; however, the items included only ask about breakfast and lunch programs. Local wellness policies attempt to promote healthy food throughout the school day, including regulations of vending machines, a la carte items, fundraising, and snacks, yet there were no items that addressed these areas within the metric used within the study. Such items may have produced more variability among schools regarding wellness policy compliance. Only two items were used to measure the 4th requirement and both items were concerned with someone who oversees physical education or nutrition services. No items captured whether or not a school had an evaluation tool or a plan for monitoring progress with wellness policy compliance and implementation.

An additional limitation of the study was the measure of contextual variables. The contextual variables that were examined in the current study represent a small number of variables that could be related to systems change. Further, the way in which contextual variables were measured may have posed limitations of the study. Contextual variables primarily consisted of dichotomous variables, which may have restricted the variability within items such as urbanicity, poverty level, and school size. In addition, only one item was used to indicate wellness policy leadership. Future research should attend to more reliable and valid measures of contextual variables as well as those that allow for more variability than binary variables.

The perception of family involvement metric was assessed using a set of 10 items that demonstrated good reliability; however, these items did not load onto the construct of family involvement indicating that the measure does not demonstrate construct validity. Not only are the psychometric properties of the metric weak, but the items themselves appear to measure the school's perception of how they attempt to involve families within the school. Closer examination of the items reveal that the items represent a school's perception of their ability to promote family involvement in academic aspects of their child's education and does not tap into family promotion of student wellness. Further, it is unclear if families would also view the school's involvement promotion in the same light.

The generalizability of the findings in the present study is limited. Only schools participating in the SHPPS 2006 data collection were included in the study. Although SHPPS is a nationally representative study, schools may have dropped out or declined to participate. Schools were not randomly selected to the current study; therefore, there may

be certain characteristics attributed to schools that chose to participate in SHPPS. Given the nature of the current study, an analysis could not be conducted of responders and nonresponders in order to determine whether or not there were any differences.

Future Research

Currently there is no national mechanism for measuring wellness policy compliance, adoption, and implementation, although a promising coding system has been developed (Schwartz et al.., 2009). The ability to tie the national SHPPS dataset to wellness policy is useful for schools and policymakers to assess schools' compliance with federal requirements and monitor progress with health promotion policies. Similarly, examining variables that both support or restrict schools' ability to comply with the federal requirements of wellness policies is critical for understanding the types of schools that may be more able to implement wellness policies. The present study was unable to make the connection about contextual variables and wellness policies; however, future research is warranted given the limitations of the current study.

Given the importance and utility of the SHPPS studies, the inclusion of items specific to wellness policy would be an excellent way to monitor schools from across the U.S. Careful consideration of the how the items represent each of the minimum federal requirements is warranted as the current SHPPS questionnaire items do not fully capture each requirement. Special attention should be placed on plans for monitoring implementation and evaluation, as stated in requirement 4, as there are currently no pertinent items.

In addition, a reliable and valid measure of family involvement is critical given the important role families play in health promotion. There are items within the SHPPS

study that attempt to assess specific aspects of involving families in wellness, such as conducting taste tests with caregivers. Additional items are needed to further capture the relationship between schools and families surrounding systemic efforts to promote student wellness. In addition, the particular items that were used to assess perception of family involvement in the current study primarily focused on academics, rather than a climate for school-family connectedness, which may be more meaningful. In order to assess perception of family involvement from a global perspective, it is important to consider a variety of domains as proposed by Christenson and Sheridan (2001) including beliefs and values of family-school partnerships (approach), mutual respect and problem solving (attitudes), climate and communication (atmosphere), and policies and practices to promote home-school connectedness (actions). Ideally, measures of family involvement should represent both perspectives of the school and of families; however, this is not always possible. A comprehensive measure of global family involvement would be a great asset to the SHPPS study as positive family-school relationships is a power protective factor to promote student success and wellness (Christenson & Sheridan, 2001).

Variables that have been found to be related to systems-level change were examined; however, it may be that these variables are not related to wellness policy implementation. Simply having a policy may not necessarily be consistent with a systems-level change. Previous research has examined differences in the language used in wellness policies (Chriqui & Chaloupka, 2011; Metos & Nanney, 2007). Specifically, these studies have examined whether or not the policy was required, suggested, or encouraged. It may be that actual systems-level change for school wellness policies is

much more than to just have a specific policy adopted. Further, schools may vary in their ability to actually enforce and monitor the school's ability to implement the policy. Schools may also vary in how aware school personnel, students, and parents are aware that a policy exists. It seems that wellness policy implementation is likely a more complicated construct than just whether or not a school has a policy. It may be that contextual factors are not related to policy adoption, but to other factors (i.e., enforcement, awareness, etc.) of the wellness policy. Such concerns are not just limited to wellness policies, but public health research in general. In order to full examine the impact of a policy, one may attend to several other variables in order to fully evaluate the impact of a policy or intervention. The RE-AIM framework (Glasgow, Vogt, & Boles, 1999) may provide a useful framework for examining wellness policy in more comprehensive manner by considering both individual and institutional factors.

The RE-AIM model includes five factors that are critical to examining the impact of an intervention: Reach, Efficacy, Adoption, Implementation, and Maintenance (Glasgow et al., 1999; Glasgow, 2003; Glasgow, Klesges, Dzewaltowski, Estabrooks, & Vogt, 2006). Reach includes the participation and the characteristics of the participants of the intervention. Efficacy focuses on both the positive and negative outcomes of the intervention, including satisfaction and economic impact. Adoption is defined as the target setting and staff that will implement the intervention. Implementation targets the consistency and cost effectiveness of an intervention. Lastly, maintenance includes the sustainability of an intervention and the long-term effects. Research has applied RE-AIM to health promotion research such as a school-based physical activity and nutrition curriculum (Dunton, Lagloire, & Robertson, 2009). Further, Jilcott and collegues (2007)

state the RE-AIM model is useful in health policy research as a mechanism to plan for policy change, compare policies, and evaluate the impact of a policy when randomized-control trials are not feasible or not appropriate. Thus far, policy research is challenging and there is not agreed upon methodology for determining the effectiveness or public health significance of a policy. Consistent with the RE-AIM model, a meeting of national experts on environmental and policy interventions for pediatric obesity concluded that one major priority of policy research was to examine the implementation, enforcement, community satisfaction, and impact on obesity rates over time (Sallis, Story, & Lou, 2009). It seems the RE-AIM framework may facilitate the additional research needed in wellness policy research.

A more comprehensive examination of the variables impacting systems-level change may help to further explore health promotion from an ecological model. Given the inter-connectedness of the systems contributing to wellness policy development and implementation, fully implementing practices consistent with wellness policies can be challenging. A series of surveys, interviews, and focus groups conducted with school board members, wellness advocates, state public health nutrition directors, and state school board association leaders further evaluated the perceptions and barriers about wellness policies (Agron, Berends, Ellis, & Gonzalez, 2010). Results revealed very different perspectives across group members. For example, the vast majority of board members reported that they were "very confident" that their district's policy reflected best practices, while 42% of public health directors and 30% of wellness advocates were "not at all confident." The groups also differed regarding their belief of their school's capacity to implement and sustain wellness policy initiatives, with board members being

more optimistic. It is not surprising that various stakeholder groups view policy implementation very differently. Board members often have a variety of school initiatives to monitor that cut across a range of topics, while wellness advocates and state public health directors are more closely tied to issues specific to nutrition. Given the challenges of managing financial and legal aspects of school nutrition, state public health nutrition directors may be more aligned with the difficulties of creating healthy food environments as research suggests that students have access to unhealthy food at school (O'Toole et al., 2007).

School board members, state public health nutrition directors, and wellness advocates all agreed that the top barriers to wellness policy implementation includes money, time, educating and gaining support from students and parents, and having adequate tools to support those responsible for monitoring the policy (Agron et al., 2010). Similarly, Belansky (2009) found that school stakeholders expressed concern regarding having adequate resources to support wellness policy implementation, competing pressures of other initiatives and demands, and lack of accountability regarding compliance with federal requirements. Both of these studies (Agron et al., 2010; Belansky, 2009) are limited to stakeholders within the school; however, students and families represent critical stakeholders as well. Research is limited on examining student and family perspectives specific to local wellness policies; however, caregivers have reported a lack of involvement in health education because they were unsure how to participate, believed that the school did not want to participate and were concerned that their child may be embarrassed if they participate (Winnail, Geiger, & Nagy, 2002). Stakeholders from both schools and communities view barriers and challenges to

promoting student health; however, there is limited research examining the interconnectedness of these perspectives and attempting to facilitate strategies for reducing tensions across systems.

The current study suggested that there are weak, clinically significant differences between elementary and high school implementation of wellness policies. Future studies may want to further examine these differences in order to determine why elementary schools may have higher compliance with federal requirements of wellness policy. Previous research has examined nutrition and physical activity policies within middle and high schools; however, it is important to examine elementary schools as well as federal requirements for local wellness policies are not restricted by the type of school.

Given the lack of significant findings in the current study, much more research in the area of wellness policy implementation is warranted. One significant concern in the current body of literature is that lack of a measurement of wellness policy implementation to examine national differences and monitor progress. Schwartz et al. (2009) developed a coding system to use to measure the quality of wellness policy. To date, two studies have used the tool to measure the quality of wellness policies in specific states, Washington (Johnson, Bruemmer, Lund, Evens, & Mar, 2009) and Colorado (Belansky et al., 2009). No studies have yet used to the coding system to examine differences in wellness policy implementation across states. Additional research is needed to use the measure to conduct national evaluations of wellness policies from across the United States. Further, the wellness policy coding system has been shown to be a reliable and valid measure, but additional research is needed on the psychometric properties of the measure.

The current study only examined contextual variables of convenience as they were included in the SHPPS study. When considering systems-level change, there are numerous variables that may impact a school's ability to adopt a whole school policy. The study only examined specific school demographics (e.g., urbanicity, poverty level, size, school level), perception of leadership, and perception of family involvement. There may be additional variables such as the school climate and resources, such as staff, community support, and financial resources that may also impact a wellness policy implementation. Additional research is needed in order to further understand the variables that contribute to the implementation and sustainability of local wellness policies.

Implications for Practice

As prevalence rates for childhood obesity continue to increase, the need for effective prevention and intervention programs becomes critical. Schools are a natural setting to front prevention efforts for promoting health and wellness (Power & Blom-Hoffman, 2004). Section 204 of the Child Nutrition and WIC Reauthorization Act mandated that all schools develop a school wellness policy aimed at proving a supportive environment to promote student health. Further, addressing obesity prevention through the local wellness policy is a theoretically sound mechanism for school-promotion given the ecological framework for obesity prevention proposed by Davidson and Birch (2002) and the conceptualization of the health-promoting school (Nutbeam, 1987). However, additional research is needed to determine whether or not environmental interventions change the trajectory for obesity rates.

Local wellness policies may provide an infrastructure for schools to become more of a health-promoting environment. School-wide policies often require systematic change

and are impacted by the context in which they are implemented. Several variables relating to the school setting are crucial when implementing systems-level interventions, including the characteristics of a school, school climate, resource availability, accountability, financing, and service eligibility and influence the extent to which schools can change in order to adopt and sustain new policies and practices.

The current study sheds light on the difficulties of measuring policy change from an ecological perspective. Future research is needed to examine how to best measure the interconnectedness among systems in order to monitor progress in the implementation of systems-change, such as wellness policies. Moreover, the measure of systems-level change is critical not only for child and adolescent obesity, but for all public health problems. It is important for researchers, policymakers, schools, medical personnel, and schools to consider the tensions among systems that may serve as barriers of systemic change in order to adopt practices to promote partnerships across systems.

In sum, the current study failed to support a model of the impact of school characteristics, wellness policy leadership, and perception of family involvement promotion on wellness policy implementation, but suggested that the more than half of schools participating in SHPPS 2006 implemented policies consistent with federal wellness policies. In addition, differences in policy implementation were observed between elementary and high schools. Given the limitations of the study, additional research is needed to further examine wellness policy implementation and schools ability to monitor their progress with the sustainability of health promotion programming.

Table 1

Compliance with Specific Wellness Policy Items

Requirement	Item	%
(1) Goals nutrition education, physical activity and other school-based activities that are designed to promote student wellness in a manner that the local educational agency determines is appropriate	PEAQ2: Does this school follow any national, state, or district physical education standards or guidelines?	86%
	PEAQ5a: Are those who teach physical education at this school provided with goals, objectives, and expected outcomes for physical education or a physical education curriculum?	83%
	PEAQ5b: Are those who teach physical education at this school provided with a physical education curriculum?	76%
	PEAQ8: Must students attending this school take any physical education as a requirement for graduation or promotion to the next grade level or school level?	80%
	PEAQ46: Are staff at this school allowed to use physical activity, such as laps or push-ups, to punish students for bad behavior in physical education?	62%
	PEAQ48: Are staff at this school allowed to exclude students from all or part of physical education as punishment for bad behavior in another class?	78%
(2) Nutrition guidelines selected by LEA for all foods available on each school campus with the objectives of promoting student health and reducing childhood obesity and (3) Guidelines for reimbursable school meals, which are no less restrictive than regulations and guidance	NSQ8: Each day for breakfast, are students at this school offered at least one appealing low-fat or non-fat dairy product, including milk?	74%
	NSQ15: Each day for lunch, are students at this school offered at least one appealing fruit?	96%
	NSQ16: Each day for lunch, are students at this school offered at least one appealing non-fried vegetable?	94%
	NSQ17: Each day for lunch, are students at this school offered at least one appealing low-fat or non-fat dairy product, including milk?	97%
	NSQ21: When salad dressing is offered to students, are they able to select a low-fat dressing?	80%
	NSQ22: Each week during breakfast or lunch, are students at this school offered 5 or more foods containing whole grain?	69%
	NSQ25: Does this school offer brand-name fast foods from companies such as Pizza Hut or Taco Bell?	82%
(4) A plan for measuring implementation of the local wellness policy, including designation of one or more persons within the LEA or at each school, as appropriate, charged with operational responsibility for ensuring that each school	NSQ67: Currently, does someone at this school oversee or coordinate food service, such as a school food service manager?	94%
	PEAQ86Currently, does someone at this school oversee or coordinate physical education?	90%

fulfills the district's local wellness policy.

(5) Community involvement, including parents, students, and representatives of the school food authority, the school board, school administrators, and the public in the development of the school wellness policy.	NSQ57a : During the past 12 months, has this school collected suggestions from students about the school food service program?	61%
	NSQ58: Does this school have a committee that includes students who provide suggestions for the school food service program?	26%
	PEAQ68a: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local health department?	15%
	PEAQ68b: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local hospital?	12%
	PEAQ68c: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local mental health or social services agency?	9%
	PEAQ68d: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a health organization, such as the American Heart Association or the American Cancer Society?	42%
	PEAQ68e: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local college or university?	25%
	PEAQ68f: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local business?	16%
	PEAQ68g: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local parks or recreation department?	31%
	PEAQ68h: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local youth organization (i.e., YMCA, Boys/Girls Club, Boys/Girls Scouts)?	21%
	PEAQ68i: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local service club (i.e., Rotary Club)?	9%
	PEAQ68j: During the past 12 months, have the school physical education staff worked on physical education activities with staff or members from a local health or fitness club?	13%
	PEAQ69a: During the past 12 months, has this school met with a parents' organization (PTA) to discuss school physical education?	35%
	PEAQ69b: During the past 12 months, has this school provided families with information on school physical education?	73%

PEAQ69c: During the past 12 months, has this school discussed student performance in physical education as part of parent-teacher conferences?	83%
PEAQ69d: During the past 12 months, has this school family members to attend physical education classes?	50%
PEAQ69e: During the past 12 months, has this school invited family members to tour the physical education facilities?	65%
PEAQ69f: During the past 12 months, has this school offered any physical education or physical activity programs to families?	19%
PEAQ69g: During the past 12 months, has this school collected suggestions from family members of students about school physical education?	33%
PEAQ69h: During the past 12 months, has this school collected suggestions from students about school physical education?	65%

Table 2

Participants who Completed the Nutrition Services Questionnaire

Job Title Group	***N***	***M***	***SD***
Administrators/Directors	59	9.05	2.03
Food Service Staff	792	9.33	1.94
Other Staff	68	9.06	1.96

Note. Administrators/Directors consisted of principals, assistant principals, and athletic directors. Food Service staff included food service managers and other food service staff. Other school staff included secretaries, physical education teachers, health education teachers, other teachers, school counselors, other social services professional, and other staff.

Table 3

Participants who Completed the Physical Education and Activity Questionnaire

Job Title Group	***N***	***M***	***SD***
Administrators/Directors	163	12.52	4.77
Teachers	717	12.27	4.05
Other Staff	28	14.52	4.94

Note. Administrators/Directors consisted of principals, assistant principals, and athletic directors. Food Service staff included food service managers and other food service staff. Other school staff included secretaries, physical education teachers, health education teachers, other teachers, school counselors, other social services professional, and other staff.

Table 4

Pearson Correlations for Variables of Interest

Variable	**1**	**2**	**3**	**4**	**5**	**6**	**7**
1. Wellness	1.00						
2. Leader	-.004	1.00					
3. Sch Level	-.089**	-.052	1.00				
4. Family	-.002	.095**	.031	1.00			
5. Size	.049	.025	.041	-.014	1.00		
6. Urban	.068	.101**	-.120**	-.034	.333**	1.00	
7. Poverty	-.004	-.117**	.044	.007	-.024	-.107**	1.00

*Note. **p<.01*

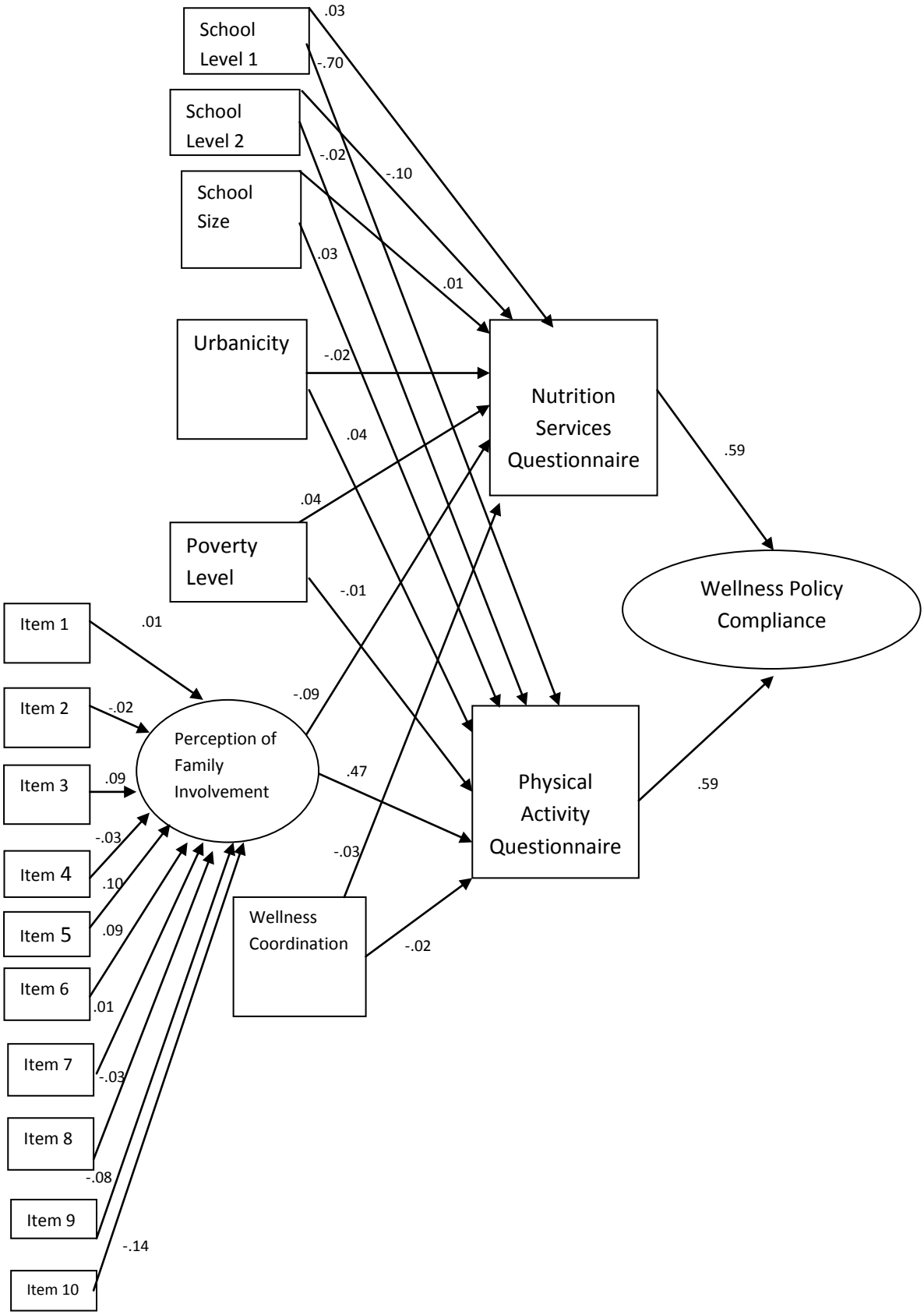
Table 5

Fit Indices

Model	**CFI**	**NFI**	**TLI**	**RMSEA**
Default Model	.000	.008	-.333	.161
Saturated Model	1.000	1.000		
Independence Model	.000	.000	.000	.140

CFI= Comparative Fit Index; NFI= Normed Fit Index; TLI= Tucker-Lewis Index; RMSEA= Root Mean Square Error of Approximation

Figure 1 Hypothesized Model



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Appendix A

Items from the Nutrition Services and Health Education Questionnaire Reflecting Local Wellness Policy

Local Wellness Policy Requirement	SHPPS Nutrition Services/Health Education Item
1. Goals for nutrition education, physical activity, and other school-based activities that are designed to promote student wellness	HEQ2. Follow guidelines for health education
	HEQ4a. Goals and objectives
	HEQ4b. Health education curriculum
	HEQ7c. Nutrition and dietary behavior
	HEQ7d. Physical activity
	HEQ22. School assemblies about health topics
	HEQ23. Health education centers to promote health topics
	HEQ24. Health fairs to provide information on health topics
	HEQ25. Provide health topic information through other means
2. Nutrition guidelines for all foods available on school campus; and 3. Guidelines for reimbursable school meals	7. Offer at least 1 appealing fruit at breakfast
	8. Offer lowfat/nonfat dairy products at breakfast
	9. Offer 3+ types of milk at breakfast
	15. Offer at least 1 appealing fruit at lunch
	16. Offer at least one nonfried vegetable at lunch
	17. Offer lowfat/nonfat dairy products at lunch
	18. Offer 3+ types of milk at lunch
	19a. Offer choice of 2+ entrees at lunch
	19b. Offer choice of 2+ nonfried vegetables at lunch
	19c. Offer choice of 2+ fruit or juice options at lunch
	25. Offer brand-name fast foods
4. Plan for measuring implementation of policy, including designation of 1 or more persons within the local education agency, charged with operational responsibility for ensuring	23. Outside food service management
	58. Committee that provides suggestions for food and nutrition services

that each school fulfills district's local wellness policy	67. Designated person that oversees or coordinates food service
5. Community involvement, including parents, students, and representatives of the school food authority, the school board, school administrators, and the public in the development of the school wellness policy	57A. Past 12 months, asked for suggestions from students regarding food service
	57B. Past 12 months, asked for suggestions from staff regarding food service
	57C. Past 12 months, asked for suggestions from families regarding food service
	57D. Past 12 months, conducted taste tests with students
	57D. Past 12 months, conducted taste tests with families

Items from the Physical Education Questionnaire Reflecting Local Wellness Policy

Local Wellness Policy Requirement	**SHPPS Physical Education Item**
1. Goals for nutrition education, physical activity, and other school-based activities that are designed to promote student wellness	2. Follow any national standard
	5A. Provided with goals
	5B. Provided with physical education curriculum
	47. Staff discouraged from using PE to punish
	49. Do not exclude student to punish
	62. Maximum student teacher ratio for PE
	70. Participate in intramural activities
	80A. Outside school hours community sports teams
	80B. Outside school hours community classes
	81A. PE offered before school
	81B. Any PE offered after school
	81C. Any PE offered in evenings
	81D. Any PE offered on weekends
	81E. Any PE offered during vacation

2. Nutrition guidelines for all foods available on school campus; and 3. Guidelines for reimbursable school meals	NA
4. Plan for measuring implementation of policy, including designation of 1 or more persons within the local education agency, charged with operational responsibility for ensuring that each school fulfills district's local wellness policy	86. Oversee or coordinate PE
5. Community involvement, including parents, students, and representatives of the school food authority, the school board, school administrators, and the public in the development of the school wellness policy	69A. Past 12 months, met with a parent organization
	69B. Past 12 months, provided families with information
	69C. Past 12 months, discussed student performance
	69D. Past 12 months, invited family members to attend physical activity
	69E. Past 12 months, invited family members to tour PE facilities
	69F. Past 12 months, offered PE to family
	69G. Past 12 months, collected suggestions from family
	69H. Past 12 months, collected suggestions from students

Appendix B.

Items from the School Policy and Environment Questionnaire Reflecting Perception of Family Involvement Promotion

Family Involvement Construct *(Epstein, 1995)*	**SHPPS Item**
1. Parenting	NA
2. Communicating	a. Provided students' families with a way to communicate directly with teachers?
	d. Contacted families to communicate problems with their child?
	e. Contacted families to communicate praise about their child?
	i. Encouraged families to attend parent-teacher conferences.
3. Volunteering	f. Encouraged families to volunteer at the school, for example by asking parents for assistance with fundraising efforts?
4. Learning at Home	b. Provided families with the opportunity to review curricula?
	c. Provided families with copies of assignments?
	g. Discussed with families ways to reinforce learning at home?
	h. Requested that families regularly review and sign homework assignments?
5. Decision Making	j. Encouraged family participation in parent teacher organization (PTO) meetings?
6. Collaborating with Community	NA

Appendix C.

Omitted Items from Wellness Policy Compliance Measure

Reason	Item	Wellness Policy Requirement
Health Education Questionnaire	HEQ7c. Are students required to receive instruction on nutrition and dietary behaviors?	1 (Goals)
	HEQ41. Currently, does someone oversee or coordinate health education?	4 (Implementation Plan)
	HEQ40f. During the past 12 months, has school collected suggestions from family members about school health education?	5 (Community Involvement)
	HEQ40g. During the past 12 months, has school collected suggestions from students about school health education?	5 (Community Involvement)
Improved Cronbach's Alpha	NSQ57b. During the past 12 months, has this school collected suggestions from family members about the school food service program?	5 (Community Involvement)
	NSQ57c. During the past 12 months, has this school collected suggestions from school staff about the school food service program?	5 (Community Involvement)
Inter-item Correlation	NSQ62d: During the past 12 months, has this school met with a parents organization, such as the PTA, to discuss food service program?	5 (Community Involvement)
	NSQ7. Each day for breakfast, are students at this school offered at least one appealing fruit?	2 (Guidelines)

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Jitendra, A.K., Star, J.R., Strarosta, K., Leh, J.M., Sood, S., Caskie, G., **Hughes, C.L.,** & Mack, T.R. (2009). Improving seventh grade Students' learning of ratio and proportion: The role of schema-based instruction and self-monitoring. *Journal of Educational Psychology*, 34, 250-264.

PRESENTATIONS:

Shriver, M., McCurdy, M., **Hughes, C.L.,** & Bleck, A. (2011). *A program evaluation of academic outcomes from clinic-based parent training in academic interventions.* Poster presented at the Association for Behavior Analysis Internation in Denver, CO.

Benson, J.L. & **Hughes, C.L.** (2011). *Psychology in Primary Care: Scope of School Involvement.* Poster presented at the National Association of School Psychologists Convention, San Francisco, CA.

Hughes, C.L., Helwig, J., Mautone, J.A., Power, T.J., Nissley-Tsopinis, J., & Butler, A. (2010). *Partnering to achieve school success for children with ADHD*. Paper presented at the National Association of School Psychologists Convention, Chicago, IL.

Hughes, C.L., Benson, J.L., & Ash, A. (2010). *Preventing childhood obesity: A preliminary examination of a family-based program.* Paper presented at

the National Association of School Psychologists Convention, Chicago, IL.

Benson, J.L. & **Hughes, C.L**. (2010). *Improving outcomes for children who experienced child maltreatment.* Poster presented at the National Association of School Psychologists Convention, Chicago, IL.

Booster, G.D., **Hughes, C.L.,** Helwig, J., & Mautone, J. (2009) *Partnering to achieve school success: A case study.* Paper presented in a Symposium: Pediatric School Psychology: Enhancing Children's Health in School Settings at the 2009 National Association of School Psychologists Convention, Boston, MA.

Hughes, C.L. & Helwig, J. (2009). *Conducting a needs assessment to promote wellness*. Paper presented in a Symposium: Pediatric School Psychology: Enhancing Children's Health in School Settings at the 2009 National Association of School Psychologists Convention, Boston, MA.

Benson, J.L. & **Hughes, C.L.** (2009). *Improving outcomes for students with diabetes: The school psychologist's role.* Poster presented at the 2009 National Association of School Psychologists Convention, Boston, MA.

Starosta, K., **Hughes, C.L.,** & Jitendra, A.K. (2008). *Meeting students' diverse needs: Assessment of a mathematics unit for seventh graders*. Poster presented at the 2008 Council for Exceptional Children Conference, Boston, MA.

Hughes, C.L., Benson, J.L., Hojnoski, R. (2008). *Caregiver variables and mathematical development in young children.* Paper presented at the 2008 National Association of School Psychology Convention, New Orleans, LA.

Hughes, C.L., Barnabas, E.R., Manz, P.H., & Bracaliello, C. (2008). *Examining early literacy research: Are culturally diverse families sufficiently considered?* Paper presented at the 2008 National Association of School Psychology Convention, New Orleans, LA.

Hughes, C.L., & Norvilitis, J. (2005). *Body dissatisfaction in sixth grade students: Does the school setting have an effect?* Poster presented at the 17th Annual American Psychological Society Convention, Los Angeles, CA.

Hughes, C.L. & Norvilitis, J. (2005). *Asthma knowledge in head start children and their parents.* Poster presented at the Eastern Psychological Association Convention, Boston, MA.

SCHOLARLY ACTIVITY:

Guest Reviewer: Journal of Behavioral Education (August 2010)
Guest Reviewer: School Psychology Review (June 2010)
Guest Reviewer: Psychological Reports (May 2010)

PROFESSIONAL ORGANIZATIONS:

American Psychological Association (APA) Division 16, student member
American Psychological Association (APA) Division 54, student member
National Association for School Psychologists (NASP), student affiliate

TRAINING:

National Association for School Psychology (NASP) PREPARE Two-day Workshop on Crisis Training, 2008.

AWARDS/HONORS:

2009	**Lehigh University College of Education Leiser Scholar**
2004	**NIMH (R25) Regional Summer Research Program in Mental Health Issues in Applied Life Span Development Student Fellow**
2003 to 2005	**Psi Chi Psychology Honor Society**
2001 to 2005	**Phi Theta Kappa Honor Society**
2001 to 2005	**Dean's List and President's List**

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