ABSTRACT

The Church and Obesity Today: The Role of the Church in Promoting Physical Activity among South Texas Hispanic Populations

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The purpose of this study was to determine what physical activity resources are provided by churches within south Texas Hispanic communities and to determine if the Physical Activity Resource Assessment (PARA) instrument is valid when adapted for online assessments. Churches were identified within four cities of the Lower Rio Grande Valley and physical activity resources on the churches' property were surveyed through Google Maps using the PARA instrument (n=195). The most often identified physical activity resources included basketball courts, soccer fields, play equipment, sidewalks, open fields, and fenced-in open fields. In-person PARA assessments were also conducted for 30 churches. Percent agreement and Spearman correlation coefficient calculations between in-person and Google assessments for these 30 churches suggest the PARA is suitable for online use. Churches within Hispanic communities may potentially serve as a viable resource by which to promote physical activity among Hispanic populations. Further research should be conducted to survey internal resources and programming of churches.

The Church and Obesity Today: The Church's Role in Promoting Physical Activity among South Texas Hispanic Populations

by

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A Thesis

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CHAPTER ONE

Introduction

Purpose and Significance

Churches have the ability to gather support from the community, are able to reach minority and underprivileged populations that otherwise would not have been reached, and can motivate and inspire members of the community (Kaplan, Calman, Golub, Ruddock & Billings, 2006). Capitalizing on this resource and its influence within society, churches have become avenues by which to facilitate positive behavior change. Beyond the fact that religious engagement may already enhance a person's health, the church is a familiar environment that provides a level of comfort and stability that other environments may not (Campbell et al., 2007).

This is a factor that may be especially relevant in Hispanic culture. Religion is a central aspect of the Hispanic culture, where 70% of Hispanics are Roman Catholic (Perl, Greely, & Gray, 2006). Various studies have demonstrated that religion is particularly beneficial for Hispanic women by fostering emotional health during times of adversity as it functions as a coping mechanism by which stress and anxiety is alleviated (Rojas, 1996; Higgins & Learn, 1999).

This is important to note as the Hispanic population is one of the largest minority populations in the United States, and it is only growing (U.S. Census Bureau, 2012c). However, Hispanic people also face great health disparities, including mounting rates of obesity and diabetes (Office of Minority Health, 2012). Given that this population faces

the highest rates of diabetes in the U.S., they also have the greatest need in terms of adequate health care, for example proper glucose management (Cusi & Ocampo, 2011). Moreover, an individual's acculturation level may further hinder her/his access to medical health care, health services, and may encourage negative health behaviors (Taverno, Rollins, & Francis, 2010; Khan, Sobal, & Martorell, 1997). New-immigrant Hispanic populations living along the border are subject to even higher rates of health disparity, and acculturation levels are generally low (Salinas et al., 2010).

Because of the church's role in the community and because of its ability to reach minority and underprivileged populations such as the Hispanic population, churches have been utilized as an environment by which to promote healthier lifestyles through faith-based health interventions (Bopp, Fallon & Marquez, 2011; Davis et al., 1994; Hsu et al., 2007; Duan, Fox, Derose & Carson, 2000; Kaplan, Calman, Golub, Ruddock & Billings, 2006; Simmons, Voyle, Fou, Feo & Leakehe, 2004). Moreover, the church fosters an interplay between social and religious factors, which can support effective deliverance of health messages (Campbell, Hudson, Reniscow, Blackeney, Paxton & Baskin, 2007; Bopp & Fallon, 2011). A review of faith-based health interventions has shown that they produce positive health effects in various health arenas such as encouraging screening behavior and promoting readiness to adopt positive health behavior (DeHaven, Hunter, Wilder, Walton & Berry, 2004). Success of faith-based health interventions has specifically been observed in addressing screening behavior of cervical cancer, increasing physical activity education, mammography promotion, and hepatitis-B prevention (Davis et al., 1994; Bopp, Fallon & Marquez, 2011; Duan, Fox, Dersose & Carson, 2000; Hsu et al., 2007).

Furthermore, churches may allow for the deliverance of targeted health messages to large audiences in an environment perceived as more stable than other social institutions within society (DeHaven, Hunter, Wilder, Walton, & Berry, 2004; Campbell et al, 2007). In terms of efforts emanating from the church itself to promote healthy behaviors, namely physical activity, studies have found that churches provide resources such as sports leagues, exercise programs, health education programs focusing on exercise, and clubs or interest groups concerning physical activity (Welty & Lindner, 2007; Emory Prevention Research Center, 2011; Bopp & Fallon, 2012; Bopp & Fallon, 2011; Webb, Bopp & Fallon, 2011).

In the present study, the external environment of the church within three cities of one county of the Lower Rio Grande Valley of South Texas along the U.S./Mexico border were assessed. The purpose of this study was to gain insight as to what types of external physical activity resources are available at churches within Hispanic communities. Physical activity resources present on the churches' properties were surveyed using the Physical Activity Resource Assessment (PARA) instrument through Google Map's Street View. Google Street View has been shown to be a viable manner in which to conduct environmental assessments in a timely and accurate fashion (Rundle, Boder, Richards, Neckerman & Tietler, 2011), although the PARA has not been used in this fashion to date. The PARA instrument is a tool utilized to assess publicly available physical activity resources in terms of the resource's overall characteristics, type, number, and availability (Lee, Booth, Reese-Smith, Regan & Howard, 2005). A secondary aim of this study was to examine validity of using the PARA instrument through Google Street View assessments.

Environmental supports to physical activity such as sidewalks, enjoyable scenery and lighting have been positively associated with physical activity. Higher resource availability, feature quality, number of amenities and fewer incivilities have been associated with lower BMI and obesity prevalence (Heinrich et al., 2008). Moreover, individuals who have made use of environmental supports report higher rates of physical activity (Brownson, Baker, Housemann, Brennan & Bacak, 2001). Neighborhoods with higher rated environmental factors such as walkability, aesthetics, and safety were found to lead to higher rates of physical activity as well (Saelens, Sallis, Black & Chen, 2003). The PARA was formulated using findings of Brownson et. al (2001) and others (Lee at al., 2005) showing that incivilities are associated with lower physical activity levels.

Findings from this research identified the types of physical activity resources available at churches in these communities and can be used to gain insight as to whether the church presently has the potential to serve as a physical activity resource and the potential to which they can promote physical activity among Hispanic populations. Furthermore, findings helped determine if the PARA instrument can serve as a valid and reliable instrument to assess physical activity resources when utilized through geographic information system (GIS) technology.

Results of this study showed that the most commonly reported physical activity resources among churches were sidewalks, open fields, fenced-in open fields, and play equipment. The most common incivilities found were a lack of grass, litter and overgrown grass. When comparing results across the cities through chi-squared tests, significant differences were seen among the presence of play equipment, open fields and

fenced-in open fields. When comparing ratings of items across the cities using ANOVAS, significant differences were found for play equipment, open fields and landscape efforts.

When examining validity of the online-adapted PARA instrument, findings suggested that the PARA instrument is suitable for use in online assessments. Percent agreement was calculated for each item assessed with the PARA instrument. Perfect agreement was found for 81.58% of items, with other items ranging from 46.67% to 86.67% agreement. Cohen's Kappa statistics were calculated for items with adequate variability to determine validity between the two assessments and found between fair and substantial agreement among items. Spearman correlation coefficients calculated for QPAR, features, amenities and incivilities composite scores showed significantly strong correlations for each score except the amenity composite score.

Implications for public health include the realization of existing physical activity resources among Hispanic churches of South Texas that can be used to encourage more active lifestyles if they are not already being used for this purpose. A second implication is that better insight will be gained concerning the potential role the church plays in promoting physical activity to help guide future research and serve as a basis in formulating physical activity initiatives among Hispanic populations.

Research Questions

In order to explore the role of the church in promoting physical activity among Hispanic populations, two questions were considered.

Question 1: What types of physical activity resources are most commonly provided by churches located in south Texas Hispanic communities?

Question 2: When the PARA is adapted for web-assessment, is it valid?

Assumptions

The above questions were formulated based upon a number of assumptions. These assumptions include:

Assumptions of Question 1: It was assumed that churches within Hispanic communities located in south Texas presently have some types of physical activity resources existent on their properties. A second assumption for the first research question is that such resources may be used by the church to promote engagement in physical activity.

Assumptions of Question 2: It was assumed that the PARA instrument could be used with Google Maps to assess physical activity resources found within churches.

Limitations

A limitation of this study is that Google images of churches were captured over a year before the time in which assessments were made for this study thus a number of churches may not have been included within the study as they were constructed after that time. Churches that had just recently occupied buildings, which were present at the time of the Google Maps update, may not provide the most up-to-date assessments of the property as the church may have been greatly altered in terms of external physical activity resources since that time.

Another limitation is that only the external environment of churches was included in this study. Thus, resources found within the church buildings or intangible resources, such as sports teams, provided by the church were not identified. Moreover, although resources of the church were identified, frequency of their utilization was not determined.

This study merely identified the resources that could potentially be utilized for physical activity and those that were nonexistent.

A final limitation is that findings of this study may not be generalizable to all Hispanic churches within the United States. For one, it is merely inferred that all churches serve a predominantly Hispanic population due to the large proportion of Hispanics in the area. However, there may be some churches included within the study that serve non-Hispanic populations. Secondly, cities from which churches were surveyed are Texas-Mexico border towns and, thus, may be very different from other churches around the country due to potentially lower acculturation levels within this population.

Delimitations

All churches within four cities of varying population sizes within one county of the lower Rio Grande Valley were identified. An assessment of the external environment of each church was made using Google Maps to conduct PARAs to examine both the availability and quality of resources. Thirty in-person PARA assessments of randomly selected churches within one city were conducted to assess the feasibility and validity of adapting the PARA instrument to conduct web-assessments. Chi squared tests were conducted to determine differences among the presence of features, amenities and incivilities between cities. ANOVAS were conducted to examine differences among ratings of items between cities. Percent agreement and Spearmen correlations coefficients were run to determine the accuracy of web-assessments when compared to in-person assessments.

Terms

Health Behavior. An action taken by an individual to enhance, maintain, or restore health (McAlister et al., 2008).

Health Promotion. The process of enabling people to adopt positive health behavior in order to attain an optimum level of health (McAlister et al., 2008).

Physical Activity Resource Assessment (PARA). An instrument developed to assess publicly available physical activity resources in terms of the resources' cost, features, amenities, quality, and incivilities (Lee, Booth, Reese-Smith, Regan, & Howard, 2005).

Physical Activity. Any body movement that requires more energy than a resting state. It is a movement that works your muscles and enhances health (National Heart, Lung, and Blood Institute, 2011).

CHAPTER TWO

Background

Health Disparity Among the Hispanic Population

Hispanic Population Demographics

Hispanics comprise 16.3% of the United States population and 37.6% of the 26 million people in the state of Texas (U.S. Census Bureau, 2012). It is predicted that, by 2050, Hispanics will make up 30% of the American population (U.S. Census Bureau, 2008). In 2010, Mexicans were ranked as the largest Hispanic subgroup, totaling 63% of the Hispanic population. The next largest subgroups are Central and South Americans (13%) and Puerto Ricans (9.2%; Office of Minority Health, 2012).

Many characteristics of the Hispanic population contribute to its mounting health disparities, such as linguistic, educational, and economic disadvantages (Kreps, 2006; Vega, Rodriguez & Gruskin, 2009). Data collected from the 2010 U.S. Census shows that 37% of Mexican-Americans were not yet fluent in English. Only 62% of the Hispanic population had earned a high school diploma, compared to 90% of non-Hispanic whites. Approximately 13% of Hispanics, compared to 31% of non-Hispanic whites, had earned a bachelor's degree (Office of Minority Health, 2012). Sixty-nine percent of Hispanics over 16 years of age were in the civilian workforce in 2008, with only 18% working in management, professional, or related occupations. The average income for Hispanic households in 2008 was $37,913, down 5.6% from the previous year. Poverty rates and

percentage of Hispanics who lack health insurance are both high, 23.2% and 30.7% respectively with the national rates being 15% and 16.3% respectively (U.S. Census Bureau, 2010; DeNavas-Walt, Proctor & Smith, 2012). These statistics are particularly alarming when considering the increase in number of Hispanics in the U.S from 35.3 million in 2000 to 50.5 million in 2010. There are 16 states with at least half a million Hispanic residents, and Hispanics are the largest minority group in 21 of our 50 states. Hispanics make up 29% of the population of the West, 16% of the South, 13% of the Northeast, and 7% of the Midwest (U.S. Census Bureau, 2010).

Obesity Prevalence among the Hispanic Population

Obesity is a pressing health disparity as well a great economic burden to our U.S. economy with the annual obesity-related medical expenditures estimated at $75 million and approximately half of these expenditures being financed through Medicaid or Medicare (Finkelstein, Fiebelkorn & Wang, 2004). Although obesity is a nation-wide epidemic, it is an especially pressing issue for the U.S. Hispanic population. Obesity is a growing epidemic among U.S. Hispanics with 76% of women and 71% of men being obese (BMI=>30; National Heart and Lung Institute, 2010). In 2008 the prevalence of obesity for all races/ethnicities combined was 32.2% among men and 35.5% among women, rates well below that of Hispanics (Flegal, Carroll, Ogden, & Curtin, 2010). Moreover, a review of the National Health and Nutrition Examination Survey (NHANES) conducted between 1999 - 2008 revealed that Mexican-Americans had the second highest percentage of overweight and/or obese individuals (37-45.1%) in the United States, regardless of gender or age group (49.6-53.9%; Flegal et al., 2010).

Obesity disproportionately affects Hispanic children as well. One study evaluated 128 overweight/obese Hispanic children (11.1 ± 1.8 years old at initial visit) who had family history of type 2 diabetes. These children were followed over the course of four years to assess the prevalence of pre-diabetes. Although at the end of the four years none of the children had developed type 2 diabetes, 47% of them had intermittent pre-diabetes and 13% had persistent pre-diabetes. Children exhibiting pre-diabetes also had diminished β-cell function due to a lower acute insulin response and a higher amount of visceral fat. Findings among this group were alarming and pose the need for focused interventions among overweight/obese children of Hispanic descent (Goran, Lane, Toledo-Corral, & Weisenberg, 2008).

On the other end of the age spectrum, older Mexican-Americans (Individuals 65 year or older) also have the highest rates of obesity as compared to all other races and ethnicities; 23% of men and 35% of women are obese (Ostir, Markides, Freeman & Goodwin, 2000). Obesity contributes to the problems of hypertension, diabetes, and arthritis among older Mexican-Americans, as has been found with other samples. These trends are particularly concerning as the older Mexican-American population is the fastest growing subgroup of the 65 and older population in the United States (Ostir et al., 2000; Administration of Aging, 2010).

As obesity is a problem for all segments of the Hispanic population, research is needed to identify and better understand risk factors contributing to the high rate of obesity within this population. Health behaviors, such as dietary habits and physical activity rates, are the main causal factors of obesity, with susceptibility genes for obesity only acting as effect modifiers (Marti, Martinez-Gonzalez & Martinez, 2008). Taking into

consideration the mounting obesity rates among Hispanic populations, it is crucial to observe and promote healthier dietary and physical activity behaviors among this population (Flegal et al., 2010). Swinburn and colleagues (2004) performed a review of the evidence of the causes of obesity and found a general consensus that sedentary behavior and unhealthy eating habits cause weight gain. Conversely they found regular physical activity and a high intake of non-starch foods to be protective factors against obesity (Swinburn, Caterson, Siedell & James, 2004). One of the objectives set forth by Healthy People 2020 is to promote health and reduce the risk of chronic disease through the consumption of healthy diets and the attainment and maintenance of healthy weights. Healthy People 2020 views nutrition and weight status as important for proper growth and development of children and in the prevention of obesity, heart disease, diabetes, high blood pressure, and other chronic illnesses (Healthy People 2020, 2012a). Another objective of Healthy People 2020 is to improve health, fitness and quality of life through physical activity in an effort to as well prevent obesity-relate illness such as diabetes, cancer, high blood pressure, and coronary heart disease (Healthy People 2020, 2012b).

Physical Activity Rates among Hispanic Populations

According to data from the 2010 National Health Interview Survey (NHIS) Hispanic adults were the most likely to be inactive at 44.7% compared to 33% being the national rate (American Heart Association, 2012). Physical activity rates are even lower among women and this may be attributed to gender roles, familial responsibility, language barriers, and isolation in the community (Evenson et al., 2002). A study looking at determinants of physical activity among Mexican-American adults in San Diego, California found that individual, social and environmental factors all have an effect upon

physical activity levels (Martinez et al., 2012). Factors that were identified include social support, acculturation levels, safety, neighborhood cohesion, community resource awareness and satisfaction and self-efficacy beliefs (Martinez et al., 2012).

A review of the 2003 National Survey of Children's Health showed that 22.5% of immigrant Hispanic children were physically inactive compared to 9.5% of U.S. born white children (Singh, Yu, Siahpush & Kogan, 2008). Moreover, a study by the Kaiser Family Foundation found that Hispanic youths (aged 8-18 years old) have 13 hours a day of media exposure compared to just over 8.5 hours a day for white youth. Looking at just the amount of time spent watching television daily, Hispanic youth spend an average of 5.21 hours a day watching TV compared to 3.36 hours for white youth (Rideout, Foehr & Roberts, 2010). Physical inactivity rates among Hispanic adolescents are high with 30.5% of female adolescents and 17.4% of male adolescents being inactive as compared to the national rates of physical inactivity for girls and boys being 29.9% and 17% respectively. Although physical inactivity rates of Hispanic children are comparable to national rates, they are still higher than national rates and high in general (American Heart Association, 2012).

Acculturation in Relation to Physical Activity

Acculturation is the means by which an individual adapts to another culture through continuous contact and interaction (Merriam Webster, 2011). Although there have been varied results when researching the influence of acculturation levels upon health behavior and obesity prevalence among Hispanics, current research suggests that an individual's acculturation level influences his/her access to healthcare and preventative care (Perez-Escamilla, 2011). DuBard and Gizlice (2008) found that 55% of Spanish-

speaking Hispanics lacked health insurance in comparison to 23% of English-speaking Hispanics. Spanish-speaking Hispanics were almost twice as likely not to have a personal doctor. Moreover, 45% of this group had not had a check-up in the past year, with 27% reporting they had not been able to receive medical care in the past year due to medical costs. Also important to note is that a review of the National Health Interview Survey database (1999-2007) revealed that Mexican-Americans were 13% less likely to have medical insurance than non-Mexican Latinos (Bustamante, Fang, Rizzo, & Ortega, 2009).

Researchers in one self-report study found that a lower acculturation level lead to preservation of traditional behaviors of Hispanic adults, acting as a protective factor to obesity. In this study, data was collected from the Behavioral Risk Factor Surveillance System Survey from 2003-2005. Spanish-speaking Hispanics had lower rates of obesity, chronic disease, and smoking across the years as compared to English-speaking Hispanics. Although there was not a large difference in obesity rates between Spanish-speaking and English-speaking Hispanics, language remained to be a strong indicator of obesity, even after adjusting for age, gender, and educational level (DuBard & Gizlice, 2008).

On the contrary, there is also evidence suggesting that less acculturated Hispanics display poorer physical activity patterns in conjunction with poorer dietary habits (Taverno, Rollins & Francis, 2010; Crespo, Smit, Carter, Pokras & Andersen, 2001; Liu, Probst, Horun, Bennett & Torres, 2009). A study examining the relationships among generational status, language use, BMI, and physical activity among Hispanic children found that 1st and 2nd generation Hispanic children were two times more likely to be obese when compared to 3rd generation Hispanic children. First generation children were also half as likely to engage in regular physical activity and sports as compared to 2nd and 3rd

generation children (Taverno et al., 2010). Language preference has also been associated with BMI among Mexican-American adults. Mexican-American adults who preferred English had lower BMIs than those who preferred Spanish (Khan et al., 1997).

In addition to these studies, there are also those that have not found an association between acculturation level and health behaviors or have found other confounding factors, such as social acceptance, to be causal factors (Montoya et al., 2011; Arcia, Skinner, Bailey & Correa, 2001). One such study used the Los Angeles Family and Neighborhood Study to look at Mexican immigrant acculturation in relation to dietary and physical activity patterns and obesity prevalence (Creighton et al., 2012). The study utilized questions from the National Health Interview Survey looking at vigorous activity performed for over 20 minutes within the past week. Types of exercise were categorized into three types being housework, work and leisure. An association was not found between acculturation and physical activity behavior, but it was inferred by the authors that if acculturation levels of Mexican-Americans increased, they would then be less likely to engage in physical activity. This trend, however, was not apparent in the data (Creighton et al., 2012).

Cultural Appropriateness and Health Interventions among Hispanic Populations

It is important to consider an individual's acculturation level and particular culture when determining appropriate manners by which to deliver health education in an effort to incite positive health behavior change (Elder, Ayala, Parra-Medina, & Talavera, 2009). Elder and others (2009) suggest that health communication with Hispanic populations should focus on the family and cultural traditions while paying heed to the individual's national origin, language preference and acculturation level.

The term Hispanic was developed by the Office of Management and Budget in 1977 for the purpose of data collection and it refers to an individual of Spanish-speaking background who traces their origin to Mexico, Puerto Rico, Cuba, Central and South America, and other Spanish-speaking countries. Latino/a is a broader term referring to any individual from Latin American origin or ancestry (Passel & Taylor, 2009). Thus, Mexican-Americans are a sub-population of Hispanics and Latinos. Some of the studies reviewed within this thesis were conducted among Hispanic populations, while others were conducted specifically with individuals of Mexican descent. Nonetheless, there are many similarities among Hispanic/Latino cultures such as religious beliefs, family values, cultural celebrations, and food (Pew Forum on Religion and Public Life and Pew Hispanic Center, 2007; Smith, 2000; Winchester, 2000; Sanjur, 1994).

It has been recognized that health promotion interventions and materials are more effective when they are constructed to be culturally appropriate for the target population (Reniscow, Baronowski, Ahluwalia & Braithwaite, 1999). Cultural appropriateness has been highlighted as important within studies targeting Hispanic populations, where cultural traditions, generational gaps, linguistic barriers, and acculturation differences within groups have been identified as essential considerations (Elder et al., 2009). Although there are many similarities within Hispanic sub-cultures, not every Hispanic population is the same across different geographic regions as acculturation levels may differ due to varying demographic makeup of the region. Because Hispanic populations vary a great deal, more research is needed to examine risks and protective factors of various Hispanic cultures (Gallo, Penedo, Espinosa de los Monteros, & Arguelles, 2009). Nonetheless, as was seen with a faith-based health intervention conducted with Latinos,

cultural appropriateness of material presented and clear communication through the use of bilingual speakers is imperative for successful health initiatives within this population (Bopp et al., 2011).

The Hispanic population is an underserved U.S. population that places a high value on religion within its culture (Campesino & Schwartz, 2006). A review of twelve national surveys conducted between 1990 and 2005 concluded that approximately 70% of Hispanics religiously identify as Catholic and 20% identify as Protestant or other Christian. Given this review, at least 90% of Hispanics identify with some denomination of Christianity (Perl, Greely, & Gray, 2006). Although some Mexicans have become part of various denominations other than Roman Catholicism, a central belief in Mexican culture is that an individual's health is ultimately the will of God and a Rite of the Anointing of the Sick is done if the person is severely ill (de Paula et al., 1996).

The Role of Religion among Mexican-American Culture and Health Practices

Numerous studies have been conducted observing relationships among spirituality, religiosity, and health and health behaviors within Latino and Hispanic populations (Mann, Mannan, Quinones, Palmer & Torres, 2010; Skinner, Correa, Skinner & Bailey, 2001; Kane & Williams, 2000; Ransford, Carrillo & Rivera, 2010; Arredondo, Elder, Ayala, Campbell & Baquero, 2005). Church attendance has been found to be associated with more positive nutritional and physical activity behavior among Latinas (Arredondo et al., 2005). Religion has also been related with coping mechanisms of Latino families with children burdened with developmental delays. Religiosity aided in that both faith and institutionalized religion provided instrumental and emotional support, with faith providing a higher degree of support (Skinner et al., 2001).

Religion has been found to be especially influential among low-income Hispanic women as a source of comfort in dealing with the troubles of poverty and to maintain general wellbeing (Rojas, 1996). Religion has also been observed as a coping mechanism for stress, and daily integration of spiritual dimensions has been seen as an important factor for healthy living among Hispanic women (Higgins, 1999). This holds important implications for promoting public health interventions among women of this population. Specifically, spirituality could be used to foster health promotion and religious traditions could be used to encourage positive health behaviors (Musgrave, Allen & Allen, 2002). In a study examining the health perceptions of Mexican American women, respondents identified health as more than just physical, but also embodying emotional and spiritual components. These women also felt that in order to achieve health there needed to be a balance among all components (Mendelson, 2002). This holistic view of health within the Hispanic population is a strength when considering the potential of public health interventions among Hispanic communities to encourage positive health behavior as efforts would be able to incorporate factors from multiple areas of wellness (Musgrave et al., 2002).

Moreover, Kane and Williams (2000) found that Hispanic Catholics were more likely than Anglo Catholics to prefer the help of a priest when seeking help with life concerns or mental health issues. This finding suggests the importance of the church and religion for Hispanics regarding mental health. A study using the 2002 National Health Interview Survey documented that 49.5% of Hispanics prayed for health reasons, a proportion only less than that of African-Americans (Gillum & Griffith, 2010).

However, there are some studies with negative or minimal impacts of religiosity. Franzini and others (2002) found such results when examining the effect of religiosity upon health through face-to-face interviews with 2,144 individuals, of which 1,692 were Hispanic (Franzini et al., 2002). They found that religiosity (assessed by the researchers as an individual's attendance at worship services and other activities at a place of worship) was not a significant predictor of health and that spirituality (assessed by how much the person prayed, values placed on spiritual beliefs, and importance placed on spiritual beliefs in determining meaning in life) was negatively related with self-perceived health (Franzini et al., 2002). Another instance in which religiosity was not observed to have a positive effect upon health was in a study conducted by Mann and others (2010), which analyzed the effect of religiosity and spirituality upon perceived stress of postpartum and pregnant women. Surveys were administered to 248 postpartum/pregnant Hispanic women and it was found that religiosity/spirituality was actually related with higher levels of perceived stress for women who elected to complete the survey in English. There was no relationship seen, however, among women who completed the survey in Spanish, where among these respondents social support and a healthy relationship with a significant other were seen to result in reduced stress (Mann et al., 2010).

Faith-Based Interventions

Partially due to evidence suggesting that religion is a positive factor in relation to health (Seybold & Hill, 2001; Green & Elliott, 2009), churches have been utilized as settings to implement health interventions (Samuel-Hodge, Keyserling, Park, Johnston, Gizlice & Bangdiwala, 2009; Dodani & Fields, 2010). However, the main strength of

utilizing churches is that churches have the ability to greatly garner support within the community, can reach individuals who would have otherwise not been reached, and can motivate and inspire participants (Kaplan, Calman, Golub, Ruddock & Billings, 2006). The church environment encourages interplay between social and religious factors, whereby all potentially contribute to a successful deliverance of health messages (Campbell, Hudson, Reniscow, Blackeney, Paxton & Baskin, 2007; Bopp & Fallon, 2011). Health interventions in religious institutions focusing on issues such as diabetes self-management and prevention, nutrition, mammography adherence, and cardiovascular health have been conducted (Davis et al., 1994; Bopp, Fallon & Marquez, 2011; Hsu et al., 2007; Duan, Fox, Derose & Carson, 2000; Simmons, Voyle, Fou, Feo & Leakehe, 2004). However, the majority of the studies focused on predominantly African-American congregations (Campbell et al., 2004; Kotecki, 2002, Sternberg, Munschaeur III, Carrow & Sternberg, 2007; Christie, Watkins, Weerts, Jackson, Brady, 2010; Samuel-Hodge et al., 2009; Young & Stewart, 2006; Bopp et al, 2007).

Churches, particularly African American churches, have been involved in the health of their congregations since the 1920s (Mays & Nicholson, 1933). An example of an earlier health intervention, taking place in the early 1970s was a program geared towards Catholic clergymen implemented by the mental health center of St. Joseph's Hospital in Florida. Psychiatric nurses, psychiatric residents and staff psychiatrists helped clergymen develop skills in working with the terminally ill, the aging, and those with marital problems (Quinn & Talley, 1974). Another example of an earlier intervention took place in the late 1970s among eight churches of Chatham County in North Carolina. Health professions students from the University of North Carolina and

health professionals of the community visited with participants selected by the church. Intervention sessions took place weekly for 12 weeks and covered prevalent health issues and manners in which to promote health within church settings (Hatch & Lovelace, 1980). Hatch and others (1986) conducted further work in North Carolina including the "Fitness Through Churches" program aimed at cardiovascular disease prevention and cardio exercise promotion, which was funded by the American Heart Association and sponsored by the University of North Carolina (Hatch, Cunningham, Woods & Snipes, 1986). Although faith-based health interventions are not a new occurrence, much research still needs to be conducted as few initial studies utilized randomized and controlled designs. Moreover, the sharing of results of earlier faith-based health interventions has often times been done through church periodicals (Petersen, Atwood & Yates, 2002).

In a systematic literature review of faith-based health interventions published a decade ago, faith-based programs were found to produce positive effects in the following health arenas: increasing health knowledge and awareness, encouraging screening behavior among members of the congregation, and promoting readiness to change in regards to health behavior (DeHaven, Hunter, Wilder, Walton, & Berry, 2004). A second, yet similar literature review concluded that churches provided an opportunity for which to convey targeted health messages to a vast audience in an environment, which is more stable than other social or organizational institutions within society (Campbell et al, 2007). Campbell and colleagues concluded that successful interventions approached health behavior change from a socio-ecological perspective, utilized formative research to determine appropriate health messages, used elements of community-based

participatory research, and when addressing African-American populations incorporated spiritual and cultural components (2007). An example of a socio-ecological, multi-level intervention is Wellness for African Americans through Churches (WATCH; Campbell et al., 2004). WATCH included tailored newsletters (intrapersonal level) and access to a lay health advisor (LHA) (interpersonal level) to improve nutrition and physical activity behavior with hopes of preventing colorectal cancer. Although the intervention did not produce the desired results, the evaluation showed the LHA intervention had potential to promote positive behavior change and supported a multi-level approach (Campbell et al., 2004).

Another example of a program which made use of the strengths of a faith-based organization is the Faith-Based Training Program, which brought together individuals from three hospitals, a school of nursing, and leaders from churches to collaborate on effective health education strategies for urban African-American churches (Kotecki, 2002). A partnership was developed among the three entities and attention was paid to the special needs of the community. Positive changes resulting from the intervention were the development of health fairs, referral of individuals for drug rehabilitation, and care for the young and the old (Kotecki, 2002).

An important faith-based intervention that proved to be effective was one that was implemented among a Catholic community focusing on obesity prevention (Krukowski, Lueders, Prewitt, Williams & West, 2010). As stated earlier, 70% of Hispanics identify as Roman Catholic, so assessing the feasibility of administering a catholic-tailored intervention that incites positive behavior change is important (Perl et al., 2006). Participants of the study were randomized into either a faith-based obesity prevention

program or a standard obesity prevention program. At the conclusion of the 16-week programs greater satisfaction and smaller weight gain at six month post-assessment was seen among participants of the Catholic-tailored program (Krukowski et al., 2010).

Other factors may contribute to the success of a faith-based health interventions beyond those previously mentioned. For instance, Sternberg and colleagues (2007) identified factors that have contributed to the success of faith-based cardiovascular health promotions. These included support from church leaders, congregants, the faith setting, and secular organizations; proper training of pastors and church volunteers to aid in leading health education and recruitment efforts; education of health professionals concerning spiritual and cultural awareness; and a caring and trusting environment (Sternberg, Munschaeur III, Carrow, & Sternberg, 2007). However, impedance of the efficacy of these interventions has also been identified and includes factors such as mistrust of the church towards outside institutions or the medical world in general (Ammerman, Corbie-Smith, George, Washington, Weathers & Jackson, 2003). Some pastors may be concerned with the separation of church and state and could decline any offers to participate in programs funded by the government (Pipes & Ebaugh, 2002). Researchers and health professionals should be sensitive to the values, beliefs, and cultural norms of the church with which they are working in order to not impede faith-based initiatives (Kreuter & McClure, 2004). Finally, ethical concerns may arise when thinking through participant recruitment and study design (Campbell et al., 2007).

Moreover, additional factors could impede the successful deliverance of health messages within a faith-based setting, including a church leader's (pastor, priest, etc…) own thoughts and attitudes towards health or a specific health behavior or disease. In

recent sample of 20 pastors from Baptist (n=14) and non-denominational Christian churches (n=6), Watson (2012) found that obesity awareness within these communities was not the main contributing factor to successfully addressing obesity prevention within the churches. Watson found that the church's role in obesity prevention was directly related to the role of the pastor within the church and the community. Thus, she recommended health professionals work closely with pastors (church leaders) to clearly establish what their role and function within the church will be to foster the establishment of health and wellness ministries within their church (Watson, 2012). Another study examining the same issue within the context of research-based health programs in church settings conducted focus groups among eleven Baptist churches from a small Southeastern town (Timmons, 2009). Again, the pastor's approval of a health intervention and his/her willingness to partner with the researchers and health professionals played a vital role in the intervention success, beyond congregant needs (Timmons, 2009).

Physical Activity Interventions among Minority Populations

Minority populations could especially benefit from faith-based health interventions as they are more likely to be burdened with health disparity due to factors such as lack of communication within the healthcare setting and the environment in which they live in (Saha, Arbelaez & Cooper, 2003; Gordon-Larsen, Nelson, Page & Popkin, 2003). Moreover, disparities in healthcare have also been noted among insured minority populations (Fiscella, Franks, Doescher & Saver, 2002). These issues pose the need for an effective mechanism to deliver health messages to these populations in an effort to counteract the effects of health disparity. Given that churches (faith-based

institutions) may have a strong social influence among minority populations (Davis et al., 1994), the church may potentially serve as this mechanism. A review of the literature to identify church-based health interventions among minority populations was conducted for the present study. Faith-based health interventions were found to look at broad range of health issues such as Hepatitis B prevention and HIV prevention (Hsu et al., 2007; Francis & Liverpool, 2009). However, most of the interventions focus on obesity-related health issues (e.g., cardiovascular health, diabetes, and weight management; Yanek, Becker, Moy, Gittlesohn & Koffman, 2001; Boltri et al., 2008; Kim et al., 2008). Results indicated that obesity-related health interventions targeting minority populations have predominantly focused on African-American churches; although faith-based interventions have also focused on other minority groups, the second most prevalent being Hispanics (Bopp, Peterson & Webb, 2012; Davis et al., 1994; Bopp, Fallon & Marquez, 2011; Hsu et al., 2007; Duan, Fox, Derose & Carson, 2000).

An example of a faith-based intervention looking specifically at physical activity for Latinos was conducted near Manhattan, Kansas among three Catholic churches (Bopp, Fallon, & Marquez, 2011). Within the study, two of the three churches were assigned to the intervention condition, while the third served as a comparison site. Before the intervention was designed, interviews were conducted with congregants to identify barriers to physical activity engagement. The intervention, *Faithful Footsteps*, was then formulated based on interview responses to target Latino church members. All materials were culturally relevant and instilled Roman Catholic doctrines by using scriptures to reinforce health messages. Other program elements were a walking contest and a health fair. At the end of the intervention a post assessment showed that

participants had greater knowledge of positive health behaviors concerning cardiovascular disease, diabetes, cancer, and mental health problems. Actual health behavior change was not measured in this study (Bopp, Fallon, & Marquez, 2011). Several lessons were learned and highlighted by the researchers though. First, interventions should be conducted around activities that are attended by or led by other Latinos, such as Spanish-speaking services or a Spanish bible study. Another lesson learned was the need for clear communication using translators to convey intervention details and expectations (Bopp, Fallon, & Marquez, 2011). Moreover, this study emphasized the importance of health education interventions being culturally appropriate when working with Hispanic populations.

Congregational Health Ministries

Beyond faith-based health interventions, a growing trend among churches is the development of congregational health ministries, services usually directed by a registered nurse emphasizing preventative healthcare. Parish nursing came as a result of the work of Reverend Granger Westberg, who strongly believed that medicine and religion were not separate entities and that the minister and doctor had more in common than they realize (Westberg, 1957). Westberg believed that the church had hindered rather than fostered the progress of medicine and felt this should be changed. Westberg wanted the air of mystery cleared from each realm and to bring the two disciplines together (Westberg, 1957).

Westberg ignited the modern concept of congregational health ministries. The first parish nursing program was established in 1984 in the Pastoral Care Department of Lutheran General Hospital in Park Ridge, Illinois (Westberg & McNamara, 1990; Miskelly, 1995). The National Parish Nurse Resource Center was established the same

year and serves to distribute information for and about parish nurses, publishes related materials on the subject, and offers an annual international parish nursing convention entitled the Westberg Symposium (Westberg & McNamara, 1990; Miskelly, 1995).

Parish nurses are a valuable resource providing services such as health education, health counseling, health screening activities, referrals, and a liaison with community sources (McDermott & Burke, 1993). Parish nurses have the potential to provide holistic, spiritual, culturally sensitive care for indigent populations (Brudenell, 2003). Their care is an invaluable supplement to traditional care as the services integrate faith and health for the patient (Chase-Ziolek & Iris, 2002). Interviews among individuals utilizing nursing services in two urban Catholic churches shared that the convenience, time allowed for care, and connection between faith and health was seen as appealing characteristics of the congregational health setting (Chase-Ziolek & Iris, 2002).

A national study examined pastors' views on congregational health ministries (n= 349 churches). Churches with established health ministries (n=53%) reported higher frequencies of health promotion and disease prevention activities, although churches without specific health ministries also reported these types of activities (Catanzaro, Meador, Koening, Kuchibbatla, & Clipp, 2006). This may be an indicator that regardless of the presence of a specific church health ministry, churches value the importance of health education and health promotion.

Trinitapoli, Ellison & Boardman, (2009) found, however, that although congregational health ministries are impactful, they may not be serving the populations that need their services their most. Conclusions were reached using data of the National Congregation Study surveying a nation-wide sample of congregations in the United States

conducted in 1998 in conjunction with the General Social Survey. It was found that 10% of congregations report sponsoring at least one type of health-related programming. It was found that clergy education level and resource mobilization had an effect on the presence of these resources while membership composition and collaboration with other congregations did not have a bearing on the likelihood of such programming. However, as stated earlier, given the fact that membership composition did not dictate the presence of health-related programming, the results suggest that such programs are not reaching the most underserved communities. Moreover, the results suggest that churches are not taking advantage of the resources present within the church that may facilitate the provision of health-related services (Trinitapoli, Ellison & Boardman, 2009).

The Church's Role in Addressing Physical Activity Needs

Seeing that religion has an impactful influence upon physical, mental, and emotional health and that health interventions within church settings have been successful, it is important to examine and understand the role churches themselves play in promoting or hindering the health and well-being of their congregants.

Researchers at the Emory Prevention Research Center (2011) conducted a study examining the roles of occupational, religious, and home environments in healthy living. Within a sample of 527 individuals, 268 reported attending church at least a few times each month. These 268 were then asked if the church delivered health messages to them, in what context they were given, and which area of healthy living was the focus of the messages. Forty-seven percent reported hearing sermons on exercise and physical activity. Interviews were conducted to elucidate trends in survey results. Through interviews it was found that sermons with a message geared towards healthy lifestyles

occurred more within African-American churches as compared to white churches. Interviewees shared that pastors would touch upon the importance of weight control and used biblical references to reinforce the idea of properly taking care of one's body. Another survey question asked about the kind of programs churches offered to encourage healthy lifestyles. Resources relating to physical activity were sports leagues (33%), exercise facilities (16%), and exercise programs (14%) (Emory Prevention Research Center, 2011).

The Congregational Health Ministry Survey was distributed to a nation-wide sample of over 88,000 congregations (Welty & Lindner, 2007). A total of 6,037 surveys were returned with the majority of respondents belonging to the United Methodist Church. The survey touched upon the presence of health education efforts, provision of health services and advocacy activities for health care policy made available by congregations around the nation. Although the sample was majorly made up of Caucasian congregations (90%), the results showed that over 65% of congregations run a health education program and 80% of those congregations run multiple programs. Of these health education programs 24% focused on exercise and 10% focused on obesity. In terms of direct services 70% of congregations reported providing direct services with 23% providing exercise services (Welty & Lindner, 2007).

Another example of a nation-wide survey assessing efforts made by the church to address health needs of the congregation, is a study in which researchers distributed online surveys examining faith-based health and wellness programming (Bopp & Fallon, 2012; Bopp & Fallon, 2011; Webb, Bopp & Fallon, 2011). For each respective state, the top three denominations present within the state were identified and email addresses of

churches within the state belonging to the identified denominations were gathered from web sites of the denomination's state-level governing organization. The survey addressed the presence of health and wellness activities, barriers and facilities to conducting such activities, parent organization support for health and wellness programming, demographics of the faith leader and fatalism beliefs. In relation to physical activity, 54.8% of churches reported providing clubs, teams, or interest concerning sports or recreation. Churches with faith leaders reporting a master's degree or higher and those with leaders reporting a better perceived health status were more likely to provide health and wellness programming generally (Bopp & Fallon, 2012; Bopp & Fallon, 2011; Webb, Bopp & Fallon, 2011). However, 92.4% of respondents were white/Caucasian, 72.1% had attained a masters degree or higher, and only 9% of respondents were faith leaders who served congregations of 50% or more minority members.

Role of the External Environment upon Engagement in Physical Activity

Health behavior theories have been effective in understanding influences upon health behavior choices and factors that should be modified to habilitate positive health behavior change (Brug, Oenema & Ferreira, 2005). Lee (2005) concluded through a review of physical activity interventions among minority populations that it is vital to approach physical activity behaviors of minority populations using a socio-ecological approach. Lack of engagement in physical activity among minority populations must not be merely looked at in regards to one individual/intrapersonal factor as many social, cultural, and environmental factors as well play a role in determining an individual's participation in physical activity (Lee, 2005).

One of the unique contributions of the socio-ecological framework is the acknowledgement of environmental influences. During the past decade, research has consistently recognized this influence in physical activity behavior (Wendel-Vos, Droomers, Kremers, Brug & Lenthe, 2007). For instance, a study examining neighborhood-based differences in physical activity found that higher rated environmental factors such as walkability, higher residential density, land use mix, street connectivity, aesthetics and safety were found to lead to higher levels of physical activity (Saelens, Sallis, Black & Chen, 2003). A review of studies examining the physical environment's influence upon physical activity levels found neighborhood design and metropolitan development patterns were strongly associated with active travel choices (Ewing, 2005). Moreover, a higher prevalence and access to facilities such as walking trails, or gyms has been associated with higher physical activity levels (Brownson, Baker, Houseman, Brenan & Bacak, 2001). Sidewalks, enjoyable scenery and hills have been seen to be environmental supports to physical activity and people who utilize these resources report higher physical activity levels (Brownson, Baker, Hosemann, Brennan & Bacal, 2001). Roux and others (2007) examined whether the density of physical activity resources influenced physical activity levels. It was concluded that individuals who reside in areas with the highest density of physical activity resources do indeed report higher physical activity levels suggesting that availability of the resource is an important factor.

Studies using examining the relationships between physical activity resources within a community and physical activity have been mixed. However, accessibility of resources and neighborhoods with higher resource availability, feature quality, number of

amenities and fewer incivilities have been associated with lower BMI and obesity prevalence (Henrich et al., 2008; McAlexander, Banda, McAlexander & Lee, 2009; McAlexender, Mama, Medina, O'Connor & Lee, 2011). Important to note is that minority populations are often times at a higher risk of living in communities with environments less amenable to physical activity, such as a lack to accessible programs, and safety concerns. This may be related with higher rates of inactivity and other poor health outcomes for minority populations (Seefeldt, Malina & Clark, 2002).

Physical activity environments have been assessed using a variety of tools (Hoehner, Ivy, Ramirez, Handy & Brownson, 2007; Kaczynski, Stanis & Besenyl, 2012; Hoehner, Ramirez, Elliot, Handy & Brownson, 2005; Emery, Crump & Bors, 1998). An example of such a tool is the Active Neighborhood Checklist, which assesses land use, public transit services, street characteristics, environmental quality for pedestrians, and availability of areas for active travel. The tool was found to have high reliability and suitable for use among a variety of different environments (Hoehner et al., 2007). Another example is the Community Park Audit Tool (CPAT), which assesses public parks in terms of accessibility, surrounding neighborhoods, physical activity areas, quality of park and safety. The CPAT was found to have high reliability and has been considered a viable manner in which to assess a park's ability to promote physical activity (Kaczynski et al., 2012).

The instrument utilized within this study, the Physical Activity Resource Assessment (PARA) instrument, assesses a broad variety of publicly accessible physical activity resources including fitness clubs, sports facilities, schools and churches (Lee, Booth, Reese-Smith, Regan, & Howard, 2005). The PARA instrument has also been

implemented in numerous studies (DeBate et al., 2011; McAlexander, Banda, McAlexander & Lee, 2009). One such study used PARA to assess physical activity resources geared towards children present in two low-income urban neighborhoods. Researchers of the study found the PARA instrument to be effective in identifying physical activity resources and produced a strong foundation from which to begin analyzing resources. Research has suggested a few limitations of the instrument, however, in that the tool cannot always determine all factors outside of the resource's features, amenities, and incivilities that may deem the area as unfavorable for child's play. Nonetheless, it has been found to be an excellent resource, especially when supplemented with other data (DeBate et al., 2011).

Another tool that assesses physical activity resources that may be used to assess churches is the Rural Active Living Perceived Environmental Support Scale (RALPESS; Umstattd et al., 2012). The tool measures perceptions of rural environments in relation to physical activity looking at seven factors including: church facilities, town center connectivity, indoor areas, areas around the home/environment, town center physical activity resources, school grounds and outdoor areas (Umstattd et al., 2012). The Rural Active Living Assessment (RALA) tool also assesses rural environments in the context of physical activity (Youefian et al., 2009). A portion of the RALA tool touches upon religious organizations and their availability and program offerings for physical activity provided for the community (Yousefian et al., 2009). The PARA instrument does not measure rural communities exclusively and it only assesses barriers and facilitators to physical activity of the resource being examined, being churches in this study. Although these tools may have been suitable for this study, because the tools were developed for

rural environments and various features of the community as a whole are measured, the PARA instrument was seen as a more suitable choice for this study.

Geographic Information Systems (GIS) have been used to observe neighborhood environments in the context of physical activity resources. Studies have used GIS to compare the walkability of environments of poor versus non-poor neighborhoods (Neckerman et al., 2009). GIS has also successfully been used to observe the built environment's effect on people's walking habits and its effect on people's physical activity habits in general (Forsyth, Oakes, Lee, & Schmitz, 2008; Borwnson, Hoehner, Day, Forsyth, & Sallis, 2009).

Olders and others (2012) tested the usability of the GIS tool, Google Street View, to measure positive and negative factors of neighborhoods in light of the environment's effect upon children. Features analyzed were street decay, dangerousness, and safety of the neighborhoods. Agreements between Street View and field assessments varied between .48 and .91. One other study also had similar findings comparing Street View to field assessments among 588 New York City blocks further providing evidence that valid measures can be drawn from digital images (Puriel et al., 2009).

Google Earth has also been found to be resourceful for creating community maps. The program is particularly useful in that it is easy to use and is free of cost to anyone. Moreover, direct addresses are not needed to observe items such as walking trails or other informal areas. Google Maps can be used to look at the social and physical environment of individuals to better ascertain risks and benefits to leading healthy lifestyles (Lefer et al., 2008).

Although GIS offers a myriad of benefits there are still limitations to its usage.For one, it is hard to analyze factors that vary over time such as traffic speed and volume (Wilson et al., 2012). More importantly, it is difficult to determine the relationship between the time the image was captured and the time physical activity behaviors or outcomes occur, if any (Wilson et al., 2012). Other challenges of using GIS data is that if for some reason the data is inaccurate or incomplete then results will be of no value. GIS can provide much data, but only by cross-referencing with field data can there be 100% accuracy. Lastly, there are measures of the environment that cannot always be assessed using GIS, such as physical activity resources found internally and some indicators of quality or incivilities of resources (Porter, Kirtland, Neet, Williams, & Ainsworth, 2004). Although Google Map's accuracy and utility have been justified through prior research, this has not been examined with the PARA

Given evidence supporting the impact of environmental resources for physical activity, the unique role of churches within Hispanic populations, and the dearth of information describing physical activity resources of Hispanic churches, the aim of this study was to examine the physical activity environment of Hispanic churches. Moreover, although the feasibility of utilizing GIS to assess physical environments in relation to physical activity is supported, the applicability of the PARA instrument through GIS has not been examined. Thus a second aim of this study was to assess the validity of using a web-adapted version of the PARA instrument to examine physical activity environments.

CHAPTER THREE

Methods and Measures

In order to examine the physical activity environment of churches serving Hispanic communities, environmental assessments of churches were conducted. Hispanic churches in three cities within one county of the lower Rio Grande Valley were identified through local newspapers, local phone books, and Internet search engines. Environmental assessments of the churches were carried out using a modified version of the Physical Activity Resource Assessment (PARA) instrument adapted for web-use using Google Maps. Validity of the online assessment was examined using a subset of churches comparing in-person PARA scores with PARA scores obtained through Google Map assessments.

Research questions to be addressed within this study include:

Question 1: What types of physical activity resources are most commonly provided by churches located in south Texas Hispanic communities?

Question 2: When the PARA is adapted for web-assessment, is it valid?

In looking into these matters, there was an expectation that the majority of Hispanic churches would lack many physical activity resources. However, it was expected that most churches would have some resources, such as open fields, readily available for church members to potentially use for physical activity participation. It was also hypothesized that conducting PARAs using Google Maps would produce results consistent with conducting PARAs in person.

The present study surveyed only the external environment of churches in three south Texas communities and did not survey internal physical activity resources or program offerings of these churches involving physical activity. Moreover, faith leader and church member perceptions of physical activity promotion within the church settings were not assessed. Lastly, current utilization of external physical activity resources or barriers to using such resources was not examined within this study.

Church Identification

All churches were identified within four cities within a Texas county in the Lower Rio Grande Valley. Cities were identified and selected to represent varying population sizes to allow for observation of different sized communities with potentially differing resources. In order to protect the anonymity of the cities, they additionally were selected based on similarities to cities located in a neighboring county within the Rio Grande Valley. Both counties are classified as "small in a metro area with fewer than 1 million residents" by the Urban Influence Codes (USDA, 2008). One city was selected for each of the following population categories: over 100, 000 residents (City A), 50,000 to 99,999 residents (City B), 20,000 to 49,999 residents (City C), and under 5,000 residents (City D).

Cities located in South Texas were selected based on having a high density of Hispanic residents. Preliminary searches of churches within the cities were conducted via Internet search engines and online phonebook directories. In order to obtain a comprehensive list of churches in each community, all Christian and non-Christian denominations found within the United States were entered as search queries within an Internet search engine followed by the city name. An excel sheet was created taking note

of the church's name, physical address, contact information, denomination, and web address (if applicable). Remaining churches were identified via local newspapers and phone books. Given that the percentage of Hispanic individuals comprising each county's population within the four counties of the Rio Grande Valley (Starr, Hidalgo, Willacy and Cameron) ranges from 86% to 97%, each church was considered to serve a predominantly Hispanic congregation (U.S. Census Bureau, 2010). All identified churches within the four cities were included in the study.

Instruments

Physical Activity Environment

A geographic information system (GIS) was used in this study to complete an online assessment of the physical environment of the churches. Google Street View was used to observe whether a church had physical activity amenities present on its property such as a playground, basketball hoop, volleyball net, a sports field, an open field, a fenced-in open space, tetherball, or any other physical activity resource. Google Maps Street View takes aerial imagery to the next level in that it provides street level detailed images. The viewer can navigate through multiple images of the chosen location providing a 360-degree digital representation of the location all without losing the map context. Images are captured from cameras mounted on top of Google vehicles and most images have been updated since Street View's launch in 2007 (Vincent, 2007).

Because in-person evaluations of neighborhoods and communities can be costly and time-consuming, Google Street View is a valuable tool for conducting these assessments in a timely fashion. A study looking at the feasibility of using Google Street

View to audit neighborhood environments showed that it is a reliable and valid method (Rundle, Boder, Richards, Neckerman & Tietler, 2011). In this study, items including aesthetics, physical disorder, pedestrian safety, motorized traffic and parking, infrastructure for active travel, sidewalk amenities and social activity were examined (Rundle et al.,2011). The walkability index developed for and utilized within this study included five components being population density, ratio of intersections to land area, minimum distance to nearest subway stop, balance in type of land use, and ratio of retail floor area to retail land use (Neckerman et al., 2009).

Google assessments conducted within this study were based upon the PARA instrument (Lee, Booth, Reese-Smith, Regan & Howard, 2005). The instrument was developed to assess publicly available physical activity resources in communities (e.g., parks, playgrounds, school grounds, churches, etc…). The tool evaluates the overall characteristics, number, type, and availability of resources within the community. Resources are coded by their primary function and its features and amenities are rated as "good", "mediocre", or "poor" in regards to their overall appearance and utility with possible scores ranging from 0 to 3. A score of 0 indicates that the item is not existent and a score of 3 indicates a more favorable rating. Examples of features measured by the PARA instrument include baseball fields, basketball courts, sidewalks and play equipment. The PARA protocol provides instructions in how to determine the proper rating for each item. For example, a sidewalk is given a score of '1' if it has major damage and is almost unusable. It is scored '2' if it has an uneven surface but is otherwise usable and is scored '3' if it smooth and clear of debris. Examples of amenities

assessed by the PARA instrument include access points, benches, landscape efforts and lighting (Lee et al., 2005).

Each resource is then rated on incivilities, which are features of the resource that hinder its usage. Examples of incivilities include graffiti, litter, unattended dogs, and vandalism. Incivilities are coded on a scale from 0 to 3 with 3 being "a lot" and 0 being "not present". The PARA protocol gives directions of how to assign a rating for each incivility in the same way that it does for features and amenities. An example of how to determine a rating for overgrown grass is to assign a score of 0-3, where '0' means the incivility was not present., a '1' indicates that it was hardly noticeable, a '2' that there was moderate amount noticeable and '3' indicates that there was a large amount of overgrown grass and that it obstructed use of some equipment. Once each item has been scored a Quality Physical Activity Resource (QPAR) composite score is calculated by adding all the features and amenities scores and subtracting the incivilities score from that score (Lee et al., 2005).

The PARA instrument provides an objective way to quantify physical activity resources and rate their quality. A composite quality physical activity resource (QPAR) score was calculated by adding the features and amenities score and subtracting the incivilities score from that score. A higher QPAR score indicates a higher level of quality of the physical activity resource. A features composite score was calculated by adding the scores for items 13 to 25 from the PARA instrument assessment form. An amenities composite score was calculated by summing scores of items 26 to 37 and an incivilities composite score was calculated by summing items 38 to 49 (Lee, Booth, Reese-Smith, Regan, & Howard, 2005).

The original PARA was adapted in two manners for use in this study. First, two additional features were included for this study; open fields and or fenced-in open fields that may be utilized for physical activity. These items were added to the instrument based on the findings by Umstattd Meyer et. al (2013) that the yard and patio space were common locations for physical activity among *colonias* families in Hidalgo County, a county as well within the Lower Rio Grande Valley. Because of safety concerns, such as unleashed dogs, traffic, and child kidnappings, the yard and areas around the home may be perceived as safer environments than public areas for children play (Umstattd Meyer, Sharkey, Patterson & Dean, 2013). Because South Texas border towns are home to some *colonias* (Mier, Ory, Zhan, Conkling, Sharkey & Burdine, 2008), these items were seen as relevant to consider.

Furthermore, other tools used to assess areas in the context of physical activity such as the Rural Active Living Assessment (RALA) tool and the Active Neighborhood Checklist include open spaces such as field and empty lots within their assessments (Yousefian et al., 2010; Hoehner, Ivy, Ramirez, Handy & Brownson,2007).

Second, several items were removed from the original PARA for Internet use. Although the PARA has not previously been used via the Internet, the PARA instrument has been seen to be a viable method of assessing a physical activity resource's external environment (DeBate et al., 2011) and Google Map's accuracy and utility have been justified through prior research (Taylor et al., 2011; Rundle et al., 2011). The current study used field data to examine reliability of this methodology with the PARA. Since some items of the PARA instrument could not be assessed using Google tools, they were excluded from the PARA Google assessment methodology. Please see Table 1 for a

listing of these items and the reason(s) for their exclusion. The exclusion of items for online assessments due to the infeasibility of properly assessing items is consistent with other studies aimed at modifying in-person assessments for use with online approaches (Taylor et al., 2011; Rundle et al., 2011). As with the items excluded within the study conducted by Taylor and others (2011), items were excluded if they were too small for the satellite resolution provided by Google Maps to detect the item, or if the item could not be assessed using GIS technology alone. Examples of items excluded from previous studies include dog litterbags, signs and water fountains (Taylor et al., 2011).

Table 1
PARA Items Excluded for Online Assessments and Associated Rationale

Item	Reason for Exclusion
Auditory Annoyance	Audio is not provided through GIS technology thus it is not possible to assess item using Google Maps
Broken Glass	Item is too small to properly assess using Google Maps
Dog Refuse	Item is too small to properly assess using Google Maps
Evidence of Substance Abuse	Items such as syringes, baggies or rolling papers are too small to assess via Google Maps
Sex Paraphernalia	Contraceptive devices are too small to assess using Google Maps

Procedures

Research Question 1: What types of physical activity resources are most commonly provided by churches located in south Texas Hispanic communities?

Web PARA assessments were conducted between October 2012 and February 2013. Each church address was entered into Google Maps. Upon identification of each church's correct location, Google Maps was taken to Street View to thoroughly assess the

church. Prior to data collection, the PARA Protocol and Definitions Guide were read. When surveying the church's physical environment, Street View was at times alternated with the satellite view in order to assess posterior view of the church if it was not viewable using Street View.

Research Question 2: When the PARA is adapted for web-assessment, is it valid?

Out of the 104 viable churches located in City A, 30 were randomly selected (28.8%) for in-person PARA assessments and subsequent comparisons between Google and in-person methodologies. Churches were considered viable if they could be located using Google Map tools. Due to the fact that online assessments are limited in assessing certain characteristics that are measured by the PARA instrument, in-person PARA assessments were conducted to verify accuracy of Google Map assessments. Items of the PARA instrument that could not be assessed via the web included auditory annoyance, broken glass, dog refuse, evidence of alcohol or substance abuse, and sex paraphernalia, as these were either difficult to identify using an online assessment that prohibited clear imagery at that detail.

In-person PARA assessments were completed by the researcher during daylight hours, as instructed in the PARA protocol. Prior to conducting the assessments, the researcher read the Protocol and Definitions guide to the PARA instrument to ensure accurate assessment of resources (Lee, Reese-Smith, Regan & Howard, 2005). The researcher did not look over results of online assessments before conducting in-person assessments, which were conducted on average 8.6 weeks (range: 2 to 12 weeks) from in-person assessments. Church ID numbers were assigned to each respective church within the study

Results of the web and in-person PARA assessments were entered into an Excel sheet. Date of when assessments were conducted and month and year of Google Maps image was noted. Web assessment results were entered into an Excel file immediately upon assessment and an ID number assigned for the purposes of this study was used to identify each church. Results of the in-person PARA assessment were recorded on a hard-copy form of the PARA instrument, and then entered into a separate Excel file. A listing of church names, addresses, and ID numbers were used to correctly match the church with its respective ID number when conducting in-person assessments. As with the online assessments, the ID number was used to identify the church on the assessment form and within the Excel file. Excel files were stored on a password protected website and in-person PARA assessment forms were kept in a locked filing cabinet.

Dependent Measures

Research Questions #1 & 2*:*Dependent variable measures included the physical activity and exercise resources available at the church or faith-based institution as measured with the PARA using Google Maps using both the total QPAR and individual resources.

Independent Variables

For Research Question #1, environmental characteristics are described for all south Texas churches and differences by type of church are described. For Research Question #2, the independent variable was the field PARA assessments (Lee et al., 2005).

Data Analysis

Research Question#1: Google assessments based upon the PARA instrument are presented in an aggregated fashion. PARA scores were entered in to the Statistical

Package for the Social Sciences (SPSS v 19) to obtain descriptive statistics. Differences found among presence of features, amenities and incivilities among church cities were determined through Chi Square tests. The Chi Square test was chosen as it examines differences in distributions of variables among two or more groups. Differences among cities in the rating scores determined for all features, amenities and incivilities assessed through the PARA instrument were calculated using ANOVAs, which are used to examine if means are significantly different between groups.

Research Question #2: Web and in-person PARA assessments were conducted with 30 Hispanic churches. PARA scores obtained from field assessments were compared to PARA scores obtained from web assessments via Google Maps. Reliability and percent agreement between Google and in-person assessments was examined for each of the PARA items. A Cohen's Kappa statistic was calculated to determine the reliability between online and in-person assessments for items with adequate variability. Items were deemed to have adequate variability if more than two churches scored differently on that item within either the online or in-person assessment. Percent agreement was also calculated for each item. A Spearman Rho correlation coefficient was calculated for the features, amenities, incivilities and QPAR composite scores between the online and in-person assessments to determine convergent validity between the methods of assessments. All analyses were conducted using the Statistical Package for the Social Sciences (SPSS v 19).

CHAPTER FOUR

Results

Study Sample

Two hundred and seventy churches were identified using Internet phone directories, local newspapers and local phonebooks within four south Texas cities. However, only 196 churches were identified using Google Maps and therefore assessed using the PARA instrument within this study. Of these, 104 churches (53.1%) were from City A, 61 churches (31.1%) from City B, 30 churches (15.3%) from City C, and 1 church (.5%) from City D. Due to the fact that only one church was identified using Google Maps within City D, this city was not included within further analyses. Thus, only 195 churches within three cities were analyzed.

Images from Google Maps of churches assessed were taken between March 2011 and July 2011 with the largest number of images being taken during May of 2011 (45.9%). Google assessments of each church occurred between October 2012 and February 2013. Average assessment time using Google Maps was 2.05 minutes per church across all cities, 2.11 minutes per church of City A, 1.91 minutes per church of City B, and 2.11 minutes per church of City C. Churches from 29 denominations were identified with the most common denominations being Baptist (14.9%), Catholic (11.8%), and non-denominational (8.2%). The most common denomination within City A was Catholic (13.5%), and Baptist was the most common denomination within cities B (18%) and C (20%).

The PARA instrument defines a physical activity resource (parks, churches, playgrounds, etc) as small if the resource occupies half a street block or less, medium if it occupies half a block to a full block, and large if the resource is larger than one street block. Nearly half of churches (46.2%) were classified as medium sized. Please see Table 2 for a more detailed description of the cities and churches.

Research Question #1

PARA Results of all Cities

The first research question aimed to examine what types of physical activity resources churches located within Hispanic communities most commonly provide. As described in Chapter 3, several items from the original PARA assessment were not included for this study; auditory annoyance, broken glass, dog refuse, evidence of substance abuse, and sex paraphernalia. These items were not included as they were either impossible to identify using GIS technology alone or items were too small or difficult to identify through images provided by Google Maps. After eliminating these items and including two items adapted for this study (open field, fenced-in open field), the possible range of QPAR scores was -18 to 84. The possible range of QPAR scores for the original version of the PARA instrument is -36 to 75. In looking at all the churches examined from the three cities the average QPAR score for churches was 9.95 (SD=3.35) with scores ranging from -5 to 19.

Across all churches (n=196), the average number of resources was .0923 (SD=.01), the average number of amenities .2504 (SD=.25), and the average number of incivilities was .0765 (SD=.03). Twenty churches did not have any physical activity

Table 2
Study Sample Characteristics

Variable	All Cities	City A	City B	City C
Churches	195 (100%)	104 (53.3%)	61 (31.3%)	30 (15.4%)
Image Date				
March 2011	20 (10.3%)	0 (0%)	20 (32.8%)	0 (0%)
April 2011	72 (36.9%)	7 (6.7%)	39 (63.9%)	26 (86.7%)
May 2011	90 (46.2%)	90 (86.5%)	0 (0%)	0 (0%)
June 2011	11 (5.6%)	5 (4.8%)	2 (3.3%)	4 (13.3%)
July 2011	2 (1%)	2 (1.9%)	0 (0%)	0 (0%)
Denomination				
Apostolic Assembly	2 (1%)	1 (1%)	1 (1.6%)	0 (0%)
Assembly of God	10 (5.1%)	7 (6.7%)	3 (4.9%)	0 (0%)
Baptist	29 (14.9%)	12 (11.5%)	11 (18%)	6 (20%)
Bible	3 (1.5%)	0 (0%)	3 (4.9%)	0 (0%)
Catholic	23 (11.8%)	14 (13.5%)	5 (8.2%)	4 (13.3%)
Christian	13 (6.7%)	6 (5.8%)	3 (4.9%)	4 (13.3%)
Christian Methodist Episcopal	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
Church of Christ	9 (4.6%)	6 (5.8%)	2 (3.3%)	1 (3.3.%)
Church of God	6 (3.1%)	0 (0%)	4 (6.6%)	2 (6.7%)
Disciples of Christ	1 (.5%)	3 (2.9)	0 (0%)	0 (0%)
Episcopal	3 (1.5%)	1 (1%)	0 (0%)	1 (3.3%)
Evangelical	3 (1.5%)	3 (2.9%)	0 (0%)	0 (0%)
Gospel	1 (.5%)	0 (0%)	1 (1.6%)	0 (0%)
Jehovah's Witness	2 (1%)	2 (1.9%)	0 (0%)	0 (0%)
Jewish	2 (1%)	1 (1%)	1 (1.6%)	0 (0%)
Latter Day Saints	4 (2.1%)	3 (2.9%)	0 (0%)	1 (3.3%)
Lutheran	6 (3.1%)	2 (1.9%)	3 4.9%)	1 (3.3%)
Mennonite	2 (1%)	1 (1%)	0 (0%)	1 (3.3.%)
Methodist	8 (4.1%)	4 (3.8%)	3 (4.9%)	1 (3.3%)
Mormon	1 (.5%)	0 (0%)	1 (1.6%)	0 (0%)
Nazarene	5 (2.6%)	2 (1.9%)	1 (1.6%)	2 (6.7%)
Non-denominational	16 (8.2%)	11 (10.6%)	5 (8.2%)	0 (0%)
Pentecostal	15 (7.7%)	11 (10.6%)	3 (4.9%)	1 (3.3%)
Presbyterian	11 (5.6%)	4 (3.8%)	5 (8.2%)	2 (6.7%)
Seventh Day Adventist	3 (1.5%)	2 (1.9%)	1 (1.6%)	0 (0%)
Transdenominational	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
Undetermined	13 (6.7%)	5 (4.8%)	5 (8.2%)	3 (10%)
Unitarian Universalist	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
Korean Missionary	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
Approximate Size				
Small	52 (26.7%)	25 (24%)	14 (23%)	13 (43.3%)
Medium	90 (46.2%)	47 (45.2%)	30 (49.2%)	13 (43.3%)
Large	53 (27.2%)	32 (30.8%)	17 (27.9%)	4 (13.3%)

resources present on their property. The most frequently identified physical activity resources included: sidewalks (52.8%), open fields (47.7%), fenced-in open fields (24.1%), play equipment (15.9%), basketball courts (3.1%), and soccer fields (1.5%). The most common incivilities were areas without grass (85.6%), litter (3.6%), graffiti/tagging (1.5%), and overgrown grass (1.0%).

PARA Results per City

City A. The population size of City A was over 100,000 residents. QPAR scores ranged between 4 and 17 with the average score being 9.22 (SD=2.84). The average number of features reported was .0817 (SD=.05), the average number of amenities reported was .2508(SD=.01), and the average number of incivilities reported was .0785 (SD=.08). There were 13 churches (12.5%) in City A where no physical activity resources were identified. The most common physical activity resources identified within City A were sidewalks (54.8%), fenced-in open fields (31.7%), and open fields (30.8%). The most common amenities were access points (100%), landscape efforts (100%), and lighting (100%). The most common incivilities were no grass (86.5%), litter (4.8%), and graffiti/tagging (2.9%; please refer to Tables 3 and 4).

City B. City B had a population between 50,000 to 99,999 residents. QPAR scores ranged from -5 to 19 with the average QPAR being 10.70 (SD=3.57). The average number of resources found was .1076 (SD=.06), the average number of amenities found was .2486 (SD=.02), and the average number of incivilities found was .0765 (SD=.03). There were 3 churches (4.92%) in City B where no physical activity resources were identified. The most common physical activity resources identified within City B were

open fields (70.5%), sidewalks (47.5%), and fenced-in open fields (18%). The most common amenities identified included access points (100%), lighting (98.4%), and landscape

Table 3
Mean and Standard Deviations of PARA Results

Variable	All Cities (mean/std. dev.)	City A (mean/std. dev.)	City B (mean/std. dev.)	City C (mean/std. dev.)
Baseball field	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Baseball field rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Basketball courts	.03 (.173)	.01 (.098)	.07 (.250)	.03 (.183)
Basketball courts rating	.07 (.437)	.03 (.294)	.16 (.663)	.03 (.183)
Soccer field	.02 (.123)	.02 (.138)	0 (0.00)	.03 (.183)
Soccer field rating	.04 (.312)	.04 (.309)	0 (0.00)	.10 (.548)
Bike rack	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Bike rack rating	0. (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Exercise stations	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Exercise stations rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Play equipment	.16 (.367)	.09 (.283)	.30 (.460)	.13 (.346)
Play equipment rating	.46 (1.071)	.22 (.763)	.89 (1.380)	.40 (1.037)
Pool >3ft deep	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Pool >3ft deep rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Sandbox	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Sidewalk	.53 (.500)	.55 (.500)	.48 (.504)	.57 (.504)
Sidewalk rating	1.47 (1.430)	1.44 (1.371)	1.43 (1.511)	1.67 (1.493)
Sandbox rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Tennis courts	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Tennis courts rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Trails	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Trails rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Volleyball courts	.02 (.142)	.02 (.138)	0 (0.00)	.07 (.254)
Volleyball courts rating	.03 (.188)	0.2 (.138)	0 (0.00)	.10 (.403)
Wading pool <3ft	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Wading pool <3ft rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Open field	.48 (.501)	.31 (.464)	.70 (.460)	.60 (.498)
Open field rating	1.02 (1.241)	.64 (1.088)	1.51 (1.260)	1.30 (1.317)
Fenced-in open field	.24 (.429)	.32 (.468)	.18 (.388)	.10 (.305)
Fenced-in open field rating	.49 (.965)	.66 (1.094)	.31 (.743)	.23 (.774)
Other	.01 (.072)	0 (0.00)	0 (0.00)	.03 (.183)

(continued)

Variable	All Cities (mean/std. dev.)	City A (mean/std. dev.)	City B (mean/std. dev.)	City C (mean/std. dev.)
Other rating	.02 (.215)	0 (0.00)	0 (0.00)	.10 (.548)
Access points	1 (0.00)	1 (0.00)	1 (0.00)	1 (0.00)
Access points rating	2.99 (.143)	2.98 (.196)	3 (0.00)	3 (0.00)
Bathrooms	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Bathrooms rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Benches	.01 (.072)	0 (0.00)	0 (0.00)	.03 (.183)
Benches rating	.02 (.215)	0 (0.00)	0 (0.00)	.10 (.548)
Drinking fountain	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Drinking fountain rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Fountains	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Fountains rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Landscape efforts	.98 (.123)	1 (0.00)	.97 (.180)	.97 (.183)
Landscape efforts rating	2.65 (.683)	2.50 (.697)	2.85 (.601)	2.73 (.691)
Lighting	.99 (.072)	1 (0.00)	.98 (.128)	1 (0.00)
Lighting rating	2.86 (.494)	2.79 (.569)	2.92 (.458)	3 (0.00)
Picnic tables shaded	.01 (.072)	0 (0.00)	0 (0.00)	.03 (.183)
Picnic tables shaded rating	.02 (.215)	0 (0.00)	0 (0.00)	.10 (.548)
Picnic tables no-shade	.01 (.101)	0 (0.00)	.03 (.180)	0 (0.00)
Picnic tables no-shade rating	.03 (.303)	0 (0.00)	.10 (.539)	0 (0.00)
Shelters	.01 (.072)	.01 (.098)	0 (0.00)	0 (0.00)
Shelters rating	.02 (.215)	.03 (.294)	0 (0.00)	0 (0.00)
Shower/locker room	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Shower/locker room rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Trash containers	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Trash containers rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Dogs unattended	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Dogs unattended rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Evidence of alcohol abuse	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Evidence of alcohol abuse rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Graffiti/tagging	.02 (.123)	.03 (.168)	0 (0.00)	0 (0.00)
Graffiti/tagging rating	.02 (.124)	.03 (.169)	0 (0.00)	0 (0.00)
Litter	.04 (.187)	.05 (.215)	.03 (.180)	0 (0.00)
Litter rating	.07 (.367)	.08 (.360)	.08 (.458)	0 (0.00)
No grass	.86 (.352)	.87 (.343)	.87 (.340)	.80 (.407)
No grass rating	2.10 (1.092)	2.10 (1.071)	2.20 (1.062)	1.93 (1.230)
Overgrown grass	.01 (.101)	0 (0.00)	.02 (.128)	.03 (.183)

(continued)

Variable	All Cities (mean/std. dev.)	City A (mean/std. dev.)	City B (mean/std. dev.)	City C (mean/std. dev.)
Overgrown grass rating	.02 (.226)	0 (0.00)	.05 (.384)	.03 (.183)
Vandalism	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)
Vandalism rating	0 (0.00)	0 (0.00)	0 (0.00)	0 (0.00)

Table 4

Frequencies and Percentages of PARA Results

Variable	All Cities (Frequency/%)	City A (Frequency/%)	City B (Frequency/%)	City C (Frequency/%)
Baseball field	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Baseball field rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Basketball courts	6 (3.1%)	1 (1%)	4 (6.6%)	1 (3.3%)
Basketball courts rating				
0	189 (96.4%)	103 (99%)	57 (93.4%)	29 (96.7%)
1	2 (1%)	0 (0%)	1 (1.6%)	1 (3.3%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	4 (2%)	1 (1%)	3 (4.9%)	0 (0%)
Soccer field	1 (3.5%)	2 (1.9%)	0 (0%)	1 (3.3%)
Soccer field rating				
0	192 (98%)	102 (98.1%)	61 (100%)	29 (96.7%)
1	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	2 (1%)	1 (1%)	0 (0%)	1 (3.3%)
Bike rack	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Bike rack rating				
0	104 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Exercise stations	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Exercise stations rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Play equipment	31 (15.9%)	9 (8.7%)	18 (29.5%)	4 (13.3%)
Play equipment rating				
0	165 (84.2%)	95 (91.3%)	43 (70.5%)	26 (86.7%)
1	2 (1%)	2 (1.9%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	29 (14.8%)	7 (6.7%)	18 (29.5%)	4 (13.3%)

(continued)

Variable	All Cities (Frequency/%)	City A (Frequency/%)	City B (Frequency/%)	City C (Frequency/%)
Pool >3ft deep rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Sandbox	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Sandbox rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Sidewalk	103 (54.8%)	57 (54.8%)	29 (47.5%)	17 (56.7%)
Sidewalk rating				
0	93 (47.4%)	47 (45.2%)	32 (52.5%)	13 (43.3%)
1	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
2	20 (10.2%)	19 (18.3%)	0 (0%)	1 (3.3%)
3	82 (41.8%)	37 (35.6%)	29 (47.5%)	16 (53.3%)
Tennis courts	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Tennis courts rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Trails	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Trails rating				
0	195 (100%)	104 (100%)	61 (100%0	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Volleyball courts	4 (2%)	2 (1.9%)	0 (0%)	2 (6.7%)
Volleyball courts rating				
0	192 (98%)	102 (98.1%)	61 (100%)	28 (93.3%)
1	3 (1.5%)	2 (1.9%)	0 (0%)	1 (3.3%)
2	1 (.5%)	0 (0%)	0 (0%)	1 (3.3%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Wading pool <3ft	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Wading pool <3ft				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Open field	94 (48%)	32 (30.8%)	43 (70.5%)	18 (60%)
Open field rating				
0	102 (52%)	72 (69.2%)	18 (29.5%)	12 (40%)
1	35 (17.9%)	11 (10.6%)	16 (26.2%0	7 (23.3%)
2	13 (6.6%)	7 (6.7%)	5 (8.2%)	1 (3.3%)
3	46 (23.5%)	14 (13.5%)	22 (36.1%)	10 (33.3%)

(continued)

Variable	All Cities (Frequency/%)	City A (Frequency/%)	City B (Frequency/%)	City C (Frequency/%)
Fenced-in open field rating				
0	149 (76%)	71 (68.3%)	50 (82.0%)	27 (90%)
1	17 (8.7%)	11 (10.6%)	5 (8.2%)	1 (3.3%)
2	12 (6.1%)	8 (7.7%)	4 (6.6%)	0 (0%)
3	18 (9.2%)	14 (13.5%)	2 (3.3%)	2 (6.7%)
Other	1 (.5%)	0 (0%)	0 (0%)	1 (3.3%)
Other rating				
0	194 (99%)	104 (100%)	61 (100%)	29 (96.6%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	1 (.5%)	0 (0%)	0 (0%)	1 (3.3%)
Access points	195 (100%)	104 (100%)	61 (100%)	30 (100%)
Access points rating				
0	0 (0%)	0 (0%)	0 (0%)	0 (0%)
1	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	194 (99.5%)	103 (99%)	61 (100%)	30 (100%)
Bathrooms	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Bathrooms rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Benches	1 (.5%)	0 (0%)	0 (0%)	1 (3.3%)
Benches rating				
0	194 (99.5%)	194 (99.5%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	1 (.5%)	1 (.5%)	0 (0%)	0 (0%)
Drinking fountain	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Drinking fountain rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Fountains	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Fountains rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Landscape efforts	192 (98%)	104 (100%)	59 (96.7%)	29 (96.7%)

(continued)

Variable	All Cities (Frequency/%)	City A (Frequency/%)	City B (Frequency/%)	City C (Frequency/%)
Lighting	194 (99%)	104 (100%)	60 (98.4%)	30 (100%)
Lighting rating				
0	1 (.5%)	0 (0%)	1 (1.6%)	0 (0%)
1	10 (5.1%)	8 (7.7%)	1 (1.6%)	0 (0%)
2	6 (3.1%)	6 (5.8%)	0 (0%)	0 (0%)
3	179 (91.3%)	90 (86.5%)	59 (96.7%)	30 (100%)
Picnic tables shaded	1 (.5%)	0 (0%)	0 (0%)	1 (3.3%)
Picnic tables shaded rating				
0	194 (99.5%)	104 (100%)	61 (100%)	29 (96.7%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	1 (.5%)	0 (0%)	0 (0%)	1 (3.3%)
Picnic tables no-shade	1 (.5%)	0 (0%)	2 (3.3%)	0 (0%)
Picnic tables no-shade rating				
0	193 (99%)	104 (100%)	59 (96.7%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	2 (1%)	0 (0%)	2 (3.3%)	0 (0%)
Shelters	1 (.5%)	1 (1%)	0 (0%)	0 (0%)
Shelters rating				
0	194 (.5%)	103 (99%)	61 (100%)	30 (100%)
1	0 (0%)	1 (1%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	1 (.5%)	0 (0%)	0 (0%)	0 (0%)
Shower/locker room	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Shower/locker room rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Trash containers	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Trash containers rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)

(continued)

Variable	All Cities (Frequency/%)	City A (Frequency/%)	City B (Frequency/%)	City C (Frequency/%)
Dogs unattended rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (0%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Evidence of alcohol abuse	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Evidence of alcohol abuse rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Graffiti/tagging	3 (1.5%)	3 (2.9%)	0 (0%)	0 (0%)
Graffiti/tagging rating				
0	192 (98%)	101 (97.2%)	61 (100%)	30 (100%)
1	3 (1.5%)	3 (2.9%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Litter	7 (4.1%)	5 (4.8%)	2 (3.3%)	0 (0%)
Litter rating				
0	188 (95.9%)	99 (95.2%)	59 (96.7%)	30 (100%)
1	3 (1.5%)	2 (1.9%)	0 (0%)	0 (0%)
2	4 (2%)	3 (2.9%)	1 (1.6%)	0 (0%)
3	1 (.5%)	0 (0%)	1 (1.6%)	0 (0%)
No grass	168 (85.7%)	90 (86.5%)	53 (86.9%)	24 (80%)
No grass rating				
0	27 (13.8%)	14 (13.5%)	8 (13.1%)	6 (20%)
1	25 (12.8%)	15 (14.4%)	5 (8.2%)	5 (16.7%)
2	43 (21.9%)	24 (23.1%)	15 (24.6%)	4 (13.3%)
3	100 (51%)	51 (49%)	33 (54.1%)	15 (50%)
Overgrown grass	2 (1%)	0 (0%)	1 (1.6%)	1 (3.3%)
Overgrown grass Rating				
0	193 (99%)	104 (100%)	60 (98.4%)	29 (96.7%)
1	1 (.5%)	0 (0%)	0 (0%)	1 (3.3%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	1 (.5%)	0 (0%)	1 (1.6%)	0 (0%)
Vandalism	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Vandalism rating				
0	195 (100%)	104 (100%)	61 (100%)	30 (100%)
1	0 (0%)	0 (0%)	0 (0%)	0 (0%)
2	0 (0%)	0 (0%)	0 (0%)	0 (0%)
3	0 (0%)	0 (0%)	0 (0%)	0 (0%)

efforts (96.7%). The most common incivilities found were no grass (86.9%), litter (3.3%), and overgrown grass (1.6%; please refer to Tables 3 and 4).

City C. City C had a city population between 20,000 to 49,999 residents. QPAR scores ranged from 4 to 19 with the average score being 10.93 (SD=4.01). The average number of resources was .0979 (SD=.06), the average number of amenities was .2528 (SD=.03), and the average number of incivilities was .0694 (SD=.04). There were 4 churches (13.33%) in City C that did not have physical activity resources. The most common physical activity resources were open fields (60%), sidewalks (56.7%), and play equipment (13.3%). The most common amenities were access points (100%), lighting (100%), and landscape efforts (96.7%). The only incivilities found were no grass (80%) and overgrown grass (3.3%; please see Tables 3 and 4).

Comparison of PARA Results across Cities

Chi squared tests were conducted to compare the three cities included within this sample in regards to the presence of features, amenities, and incivilities. An analysis of variance (ANOVA) was conducted to determine differences among the cities in the rating of the various features, amenities, and incivilities according to the PARA instrument. Upon conducting the chi-squared test, only three items showed a significant difference in the presence of the item being play equipment x^2=12.68 (df=2, n=195, p=.002), open fields x^2=26.47 (df=2, n=195, p=.00), and fenced-in open fields x^2=7.80 (df=2, n=195, p=.02).

Significant differences in ratings of items were detected only among play equipment, open fields, and landscape efforts ratings. There was a significant difference among play equipment ratings between City A and City B [F=7.981 (2,192), p=.00], where City B had higher ratings than City A. Open field ratings were significantly

different between City and both cities B and C [F= 11.335 (2,192), p=.00]. Specifically, City A had lower ratings for open fields than both cities B and C. Landscape ratings were significantly different between City A and City B [F= 5.663 (2,192), p=.004], where City B had higher landscape ratings than City A. No other significant differences between cities were identified.

Research Question #2

Percent agreement calculations were conducted for each item within the PARA assessment resulted in 100% agreement among 31 (81.58%) of items. Percent agreement ranged from 46.6% to 86.67% among items not reaching perfect agreement. Cohen's Kappa statistics were calculated for items with adequate variability to determine reliability between the two assessments. As suggested by Landis and Koch (1977), Kappa statistics were interpreted to signify poor agreement if below κ=0.00, slight agreement if between κ=0.00 and κ=0.20, fair agreement if between κ=0.21 and κ=0.40, moderate agreement if between κ=0.41 and κ=0.60, substantial agreement if between κ=0.61 and κ=0.80 and almost perfect agreement if falling between κ=0.81 and κ=1.00 (Landis & Koch, 1977). Of the seven items for which Kappa statistics were calculated, three items showed fair agreement, two items showed moderate agreement, and two items showed substantial agreement. Table 5 shows the percent agreements for all items, and Cohen's Kappa statistics and confidence intervals for items with adequate variability.

Table 5

Percent Agreement and Cohen's Kappa coefficients for in-person and Google assessed PARA items

Item	Percent Agreement	κ statistic (CI) Poor <0.00	Slight 0.00-0.20	Fair 0.21-0.40	Moderate 0.41-0.60	Substantial 0.61-0.80	Almost Perfect 0.81-1.00
Baseball field	100%						
Basketball court	100%						
Soccer field	100%						
Biker rack	100%						
Exercise stations	100%						
Play equipment	86.67%				.44 (-.01, .90)		
Pool >3ft deep	100%						
Sandbox	100%						
Sidewalk	86.67%					.77 (.57, .98)	
Tennis courts	100%						
Trails	100%						
Volleyball courts	100%						
Wading pool <3ft	100%						
Open field	66.67%				.449 (.22, .67)		
Fenced-in open field	86.67%					.76 (.53, .98)	
Other	100%						
Access points	100%						
Bathrooms	100%						
Benches	100%						
Drinking fountain	100%						
Fountains	100%						
Landscaping	76.67%			.24 (-.17,.64)			
Lighting	100%						
Picnic tables-shaded	100%						
Picnic tables-no shade	100%						
Shelters	100%						
Shower/locker room	100%						
Trash container	100%						
Dogs unattended	100%						
Evidence of alcohol abuse	100%						

(continued)

Item	Percent Agreement	κ statistic (CI) Poor <0.00	Slight 0.00-0.20	Fair 0.21-0.40	Moderate 0.41-0.60	Substantial 0.61-0.80	Almost Perfect 0.81-1.00
Litter	100%						
No grass	100%						
Overgrown grass	100%						
Vandalism	100%						
Signage hours	80%			.23 (-.17,.63)			
Signage rules	100%						
Approximate size	46.66%			.35 (.10, .61)			

Note: CI = confidence intervals (lower CI, upper CI).

In examining the Spearman Rho correlation coefficients calculated for the QPAR, features, amenities, and incivilities composite scores between the online and in-person PARA assessments, there were significant correlations at the $p < 0.01$ level for every item except the amenity composite score. The Spearmen correlation coefficient was $\rho=0.650$ for the QPAR composite scores, $\rho=0.704$ for the features composite scores, and $\rho=0.618$ for the incivilities composite scores. The correlation coefficient among the amenities composite score was $\rho=-0.040$. Correlation coefficients were interpreted as a high correlation if above 0.60, a moderate correlation if between 0.40 and 0.59, and a low correlation if below 0.40 (Cohen, Cohen, West & Aiken, 2003). Thus, there were high correlations among QPAR, features, and incivilities composite scores; and a low correlation for amenity composite scores.

CHAPTER FIVE

Discussion

In this study, researchers surveyed churches of four cities within one county of the Lower Rio Grande Valley using the PARA instrument through Google Maps in an effort to determine the kinds of physical activity resources available at these churches. By identifying such resources, it was hoped that more insight would be gained regarding the potential role the church plays in promoting physical activity for Hispanic populations. This information could be used to raise awareness of possibly untapped resources provided by some churches. In addition, the in-person assessments of randomly selected churches were conducted to examine the reliability and validity of using the PARA instrument in online assessments.

Online assessments were conducted for 196 churches among the four cities; however, since only one church was located using Google Maps within City D only 195 churches were included within the analysis of this project. When first identifying churches within the four cities, 270 churches were found using online directories, local phone books, and local newspapers. When searching for churches through Google Maps, 25 of the unidentified churches were found to have residential addresses. This could be a result of an incorrect listing of the address, it may be due to the principal church leaders listing their own address instead of the church address, or it could be that these churches are actually taking place within homes. Because of the uncertainty of interpretation, such churches were excluded and not accessed.

Other unidentified church addresses led to other businesses, empty lots, or buildings in which a sign was not found thus it could not be determined if the church was truly taking place at that location. As image dates of Google Maps were captured over a year before the assessments for this study were conducted, it could be these churches are currently taking place in these buildings or that churches have recently been constructed in these areas. Nonetheless, there is still the possibility that the listing of the church address was incorrectly made. In regards to City D with a population of under 5,000 inhabitants, five churches were originally identified but only one was found using Google Maps. This may suggest that using Google Maps within smaller cities or areas could be challenging.

Within churches that were assessed, it was found that the most common physical activity resources present were sidewalks, open fields, fenced-in open fields, and play equipment. Findings were in agreement with the researcher's hypothesis in that open fields and fenced-in open fields were among the most prevalent physical activity resources among these churches. In a review of studies examining the effect of the physical environment on children's physical activity levels, it was evident that recreational facilities such as playgrounds and the presence of sidewalks can increase physical activity levels (Davison & Lawson, 2006). Umstattd Meyer et. al (2013) found that open spaces such as yards and patios were a common location reported for physical activity among Mexican-origin *colonias* children within the Lower Rio Grande Valley. Moreover, the presence of sidewalks has been seen to be associated with higher physical activity levels among adults (Brownson et al., 2001). These findings suggest that the

resources found among these churches may be used to promote physical activity among children and adults.

In a study surveying recreational resources among minority populations, it was seen that minority populations are more likely to not have access to recreational facilities than non-Hispanic whites (Moore, Roux, Evenson, McGinn & Brines, 2008). The researchers did find, however, that recreational resources such as parks offered free of charge were more prevalent among minority populations. On the contrary, recreational facilities offering resources for a fee were most commonly found among white, higher-income areas (Moore et al., 2008). Estabrooks and others (2003) looked at physical activity resources present among demographically and socio-economically differing communities as well, and found that populations of lower socio-economic status had a lower prevalence of physical activity resources accessible to the community free of charge. These findings suggest that minority populations may have a limited ability to take control of their physical activity levels (Estabrooks, Lee & Gyurcsik, 2003). Both of the aforementioned studies did not include churches within their assessment. Although physical activity resources outside of the context of churches were not assessed within this study, resources found among churches in this study mirror those commonly found in parks and those found within these studies (Bedimo-Rung, Mowen & Cohen, 2005; Moore et al., 2008; Estabrooks et al., 2003).

Although there is evidence to support that a more favorable built environment for walkability may lead to higher rates of physical activity, a review of the effects of the built environment on obesity in disadvantaged populations found that this may not be the case for these populations. Research suggests that other personal barriers may be

stronger predictors of an individual's engagement in physical activity (Lovasi, Hutson, Guerra & Neckerman, 2009). Within a study surveying first generation Latina immigrants, barriers to physical activity identified were lack of transportation, lack of facilities, cost and safety. When asked what changes could take place to encourage physical activity, women suggested that the efforts incorporate the entire family (Evenson et al., 2008). These findings suggest that an effective avenue by which to reach these populations is needed to help overcome such barriers to physical activity and foster positive physical activity behavior. Given the findings of this study, the church may serve as that entity and future research should be conducted to assess in what capacity resources of the church are being and can be utilized to promote physical activity among Hispanic communities. These findings also suggest that it is important to look beyond the influence of the physical environment when determining which factors potentially influence engagement in physical activity. More importantly, it is vital to look beyond the physical environment of the church to determine which ways it can promote physical activity and help overcome obstacles to engagement in physical activity.

Nonetheless, results of this study lead to insight into resources churches offer that can potentially promote physical activity, amenities that are present, and existing incivilities that may pose as barriers to physical activity. This study is the first to entail an examination of churches exclusively utilizing the PARA instrument. Although it is useful to become aware of what resources are present on these churches' properties, it is also necessary to examine in what manner, if any, these resources are being utilized to promote physical activity. Research should be conducted to determine the types of programs that encourage or promote physical activity, internal physical activity resources

that exist within churches, and how church-specific physical activity resources are currently used in Hispanic communities. Moreover, research should be conducted to determine faith leaders' perceptions of the appropriateness of the church serving to promote physical activity and how effective these efforts may be. Lastly, surveying the surrounding environment of churches for other potential physical activity resources and/or barriers to physical activity exist for this population.

From prior research, it has been determined that churches provide resources other than those assessed within this study to promote positive health behaviors, including physical activity (Emory Prevention Research Center, 2011; Welty & Linder, 2007; Bopp & Fallon, 2012; Bopp & Fallon, 2011; Webb, Bopp & Fallon, 2011). Such resources found within these studies included sports teams, interest clubs in physical activity, exercise classes, and sermons focused on exercise and physical activity. In seeing these results, it becomes evident that there is much more to be discovered about the physical activity resource offerings of churches within this population.

Two issues arose when assessing churches via Google Maps. One issue was that, in some instances, the address was approximate and not exact. In these cases it was necessary to navigate through Google Street View around the area to identify the exact location of the church. Another issue was that Street View would not allow for assessment from each side of some of the churches as the church was located on a street corner or another area without streets thus images were not captured by Google from each angle. For these churches, Google Satellite View was utilized to survey the church from a bird's eye view. This method was sufficient for this project, but it did not provide as closely zoomed-in images as Street View provided.

Issues faced with assessing churches using the PARA instrument through Google Maps were difficulty in determining the approximate church size, and the feasibility in correctly assessing some items. When determining the approximate size of a physical activity resource, being the church in this study, the researcher decides whether the resource is small, medium, or large according to their size in relation to a street block. Because street blocks are not a standard size this was difficult to conclude in some areas. Within urban metropolitan areas this was slightly easier as there was a consistent structure of street blocks, but in smaller towns and rural areas this would be difficult as street blocks highly vary in size. Moreover, it was also a challenge to determine at the exact perimeter of the church's property was, especially when churches did not have fences.

In terms of evaluating all of the items included within the PARA instrument, auditory annoyance was one item, which was impossible to assess using GIS technology alone. Other items such as evidence of substance abuse, dog refuse, and sex paraphernalia were too small to assess via Google Maps. Google Maps images do allow the viewer to zoom in, but these items are still difficult to view when not being at the actual location in person. Rundle and others (2011) conducted a similar study surveying neighborhood environments for walkability. When conducting Google Maps assessments of the environments items such as noise, odors and traffic speeds were excluded as well as they were impossible to survey online (Rundle et al., 2011). Although excluding items has been done in previous studies, excluding items may pose as a limitation as it does not allow for true comparison of scores using the scale or instrument in which in-person assessments are done.

A second issue encountered when assessing items within the PARA instrument, was the determination of "no grass" as an incivility to physical activity. When surveying churches, those churches with large parking lots and very little room for grass were given the highest rating of "no grass". However, when looking at smaller churches that either did not have parking lots at all or had grassy areas that may serve as parking areas, these churches received lower ratings and thus higher QPAR scores in some cases. If these grassy areas are indeed used as parking lots then these areas could possibly not serve to provide an area for physical activity, as it would serve the same purpose as a cemented parking lot. Nevertheless, as stated previously, more research should be conducted to determine how these areas are used. A study looking at physical activity among Mexican-origin children in Texas border *colonias* within the Lower Rio Grande Valley found that yard space and patios were the second most frequently reported locations utilized for physical activity (Umstattd Meyer, Sharkey, Patterson & Dean, 2013). Although not all of these churches are present within *colonias*, they are close to the border. Within the aforementioned study it was found that safety issues such as unleashed dogs, traffic, and child kidnappings were major concerns for families causing them to use areas such as the porch, driveway, or yard as play areas for children due to their close proximity to the house and perceived higher safety level. This may be occurring with some of these churches. Churches may be utilizing front or back areas of the church as opposed to the open fields, or they may even be utilizing the paved parking lots, which were scored as an incivility in this study.

When considering whether the PARA instrument when adapted for online assessment is a valid instrument, the results suggest that it is suitable for online

assessment usage. Percent agreement among items assessed both online and in-person was perfect for 81.58% of the items, and the range of agreement for those items not reaching perfect agreement was between 46.66% and 86.67%. Cohen's Kappa statistics calculated for items with adequate variability showed between fair (0.21-0.40) and substantial (0.61-0.80) agreement. Furthermore, Spearmen Rho calculations showed significant correlations at the $p < 0.01$ level for the features, incivilities, and QPAR scores.

The approximate size variable was the item for which there was the lowest percent agreement found. As was mentioned earlier, this could be due to the difficulty in determining the size of the church property as prescribed by the PARA instrument. When assessing the approximate size via online assessments, Google Satellite View was utilized. This feature allowed for an easier assessment, as the entire block was visible. When conducting assessments in person this feature is not available and perceptions of size may be different. Items, which did not result in perfect agreement, were play equipment, sidewalks, open fields, fenced-in open fields and landscaping. It is possible that the presence of these items changed over time or could have been due to error by the observer.

Although it is a strength of the current study that only one individual conducted both the in-person and online PARA assessments, this may also be considered a limitation. Having only one individual conduct the assessments did not allow for inter-rater reliability using Google Assessments to be examined to properly determine accuracy of assessments. Another limitation is that only thirty percent of churches within one city were assessed by both online and in-person methods.

In conclusion, more research should be conducted to establish the validity and reliability of utilizing the PARA instrument for online assessments. Future research should make use of multiple observers and should compare online and in-person assessments for more than 30% of locations. Within this study Cohen's Kappa statistics were only calculated for seven items due to a lack of variability within the majority of items. Future research should increase the number of churches assessed and sample churches from cities that are both demographically and geographically diverse. By surveying cities in different locations and of various demographic make-ups, as opposed to being in close proximity to each other as the cities in this study, variability within PARA items could potentially increase. Increasing variability will allow for the calculation of Cohen's Kappa statistics for more items.

Further research should as well be conducted concerning physical activity resources provided by Hispanic churches. Future studies should survey more churches than the current study does to ensure generalizability of findings. Lastly, physical activity resources located inside churches and physical activity programming provided by churches should be surveyed to determine to the full extent what role the church plays in promoting physical activity for Hispanic populations.

Although there is much more room for future research, findings from this study can be utilized to foster the formulation of future health initiatives within Hispanic populations. It is has already been found that the church is an important part of Hispanic culture and now this study highlights the potential of the church to play a role in promoting physical activity among this population. Health education efforts should be made to raise awareness among these churches of the manners in which positive physical

activity behaviors may be promoted among their congregations with resources they already currently possess. Churches may not currently realize how valuable a resource such an open field can be to the health of their congregants. Raising awareness of the potential of the church to serve as a motivator for positive health behavior change may encourage churches to increase the amount of physical activity resource and programming offerings made by the church in relation to physical activity.

Although this study merely provides insight as to what type of external physical activity resources are present among churches within four communities located in south Texas, this insight may be used as a basis to guide future health promotion efforts within a larger Hispanic population. A manner in which churches could be reached to initiate health initiatives would be to begin by contacting the Catholic diocese and other parent faith organizations in the area. By such contacts, rapport can be established among churches and more information can be gained regarding the parent faith organization's stand on physical activity promotion within the church setting. Findings of this research can be used to address outdoor physical activity. This research can be used to raise awareness of potentially untapped resources and can be used to recommend measures to improve the external environment of churches with the aim of fostering and encouraging physical activity among the congregants and communities the churches serve. Although additional factors affect physical activity that were beyond the scope of this project, findings of this study provide perspective of what potential churches may have within this context and can be used to begin health promotion efforts and community partnerships.

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