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Physical Activity Levels and Related Factors in Midwestern Rural Hispanic or Latino Adults

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**PHYSICAL ACTIVITY LEVELS AND RELATED FACTORS IN MIDWESTERN
RURAL HISPANIC OR LATINO ADULTS**

by

Alison Clevette

A DISSERTATION

Presented to the Faculty of
the University of Nebraska Graduate College
in Partial Fulfillment of the Requirements
for the Degree of Doctor of Philosophy

Nursing Graduate Program

Under the Supervision of Professor Bunny J. Pozehl

University of Nebraska Medical Center
Omaha, Nebraska

April, 2016

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**PHYSICAL ACTIVITY LEVELS AND RELATED FACTORS IN MIDWESTERN
RURAL HISPANIC OR LATINO ADULTS**

Alison Clevette, Ph.D., RN

University of Nebraska, 2016

Supervisor: Bunny J. Pozehl, Ph.D., RN, APRN-NP, FAHA, FAAN

The purpose of this dissertation was to examine physical activity levels and specific intrapersonal, interpersonal and community physical environment factors that influence physical activity in Midwestern rural Hispanic or Latino adults. Instruments used in the study included: Self-Efficacy for Exercise Behaviors Survey, Social Support for Exercise Survey, Short Acculturation Scale for Hispanics (SASH), and Neighborhood Environment Walkability Scale (NEWS). Physical activity was measured by 7-Day Physical Activity Recall and ActiGraph[®] accelerometer data. In the study of 54 participants, it was found that there was a very low level of physical activity. For example, 97% of the time was spent in either sedentary or light physical activity according to the ActiGraph[®] data. These findings were similar to the results from the 7-Day Physical Activity Recall questionnaire. This research also showed that men were more active than women and those performing manual labor work were highly active. Results from a linear regression model showed percent moderate and vigorous physical activity (%MVPA, the ActiGraph[®] measure), the best model ($R = .529$) used the predictors of gender ($p = .009$), land use mix – access (NEWS) ($p = .006$), and street connectivity (NEWS) ($p = .006$). Results from a linear regression model showed Individual daily Energy Expenditure (IEE, the 7-Day Physical Activity Recall measure), the best model ($R = .714$) used the predictors of gender ($p = .028$), labor ($p = .000$), and pedestrian traffic safety (NEWS) ($p = .040$). Continued research based on an ecological model is necessary to determine more specifically what persuades or affixes physical activity behavior in rural Hispanic or Latino adults.

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Chapter 1

Introduction

Background

The purpose of this study is to examine physical activity levels and specific intrapersonal, interpersonal and community physical environment factors that influence physical activity in Midwestern rural Hispanic or Latino adults. National reports show 22.8 percent of non-Hispanic whites and 14.4 percent of Hispanics have low physical activity (Centers for Disease Control and Prevention, 2008). Twenty five percent of adults in the U.S. reported a lack of leisure time physical activity within the past month, and approximately one third of adults in the U.S. do not meet the minimum levels of aerobic exercise (Centers for Disease Control and Prevention, 2008; Agency for Healthcare Research and Quality – AHRQ, 2011). Over 38 percent of Hispanic or Latino Americans are obese and they are the most inactive minority group in the United States (Giardina, Laudano, Hurstak, Saroff, Fleck, et al., 2009; Nijamkin, Campa, Sosa, Baum, Himburg & Johnson, 2012).

One of the top priorities of the Healthy People 2020 includes increasing the physical activity of adults because more than 80 percent of the population fails to meet physical activity guidelines (U.S. Department of Health and Human Services, 2011; The National Physical Activity Plan, 2010). A 2008 National Health Interview survey showed levels of leisure time physical activity levels were lower in Hispanic or Latinos than non-Hispanic whites (Neighbors, Marquez & Marcus, 2008). The results from the National Health Interview Survey show Hispanic or Latinos were 2.09 times more likely than non-Hispanic whites to report less than 30 minutes of moderate exercise at least 3 days per week or vigorous exercise for less than 20 minutes at least three days per week (McGruder, Malarcher, Antoine, Greenlund & Croft, 2004).

Rural environments provide an even more challenging environment to maintain physical activity levels thus rural Hispanic or Latino adult residents are in an even more disadvantaged position (Apovian, 2010; Boehmer, Lovegreen, Haire-Joshu, & Brownson, 2006; Burke,

Chomitz, Rioles, Windslow, Brukilacchio, 2009). Sixteen percent of the general population is Hispanic or Latino, and even higher rates (approximately 21%) of Hispanic or Latino Americans live in rural areas (Kim, Sillah, Boucher, Sidebottom & Knickelbine, 2013; United States Census Bureau, 2012; United States Department of Agriculture, 2007). Rural populations have marked risks for energy imbalances, meaning more food intake than energy expended, resulting in obesity because of their high levels of physical inactivity and poor nutritional intake (Eberhardt, Ingraham, Makue, 2001; Martin, Kirkner, Mayo, Matthews, Durstine et al., 2005). Research has shown within rural populations there is a large variability in physical activity levels, such as no daily exercise to multiple episodes of daily exercise, within race/ethnicity groups and that obesity was more prevalent in rural adults (Patterson, Moore, Probst, & Shinogle, 2004).

By 2030, there will be a dramatic increase in minorities and ethnic diversity and one in five Americans will be over 65 (U.S. Department of Health and Human Services, 2011). The population of older Americans is predicted to expand from 35 million to 70 million in 2030, along with an increase of 20 percent in health care spending (Agency for Healthcare Research and Quality, 2011). Chronic diseases have now surpassed infectious disease because of modern lifestyles, and substantial predictions have been made that the entire global population will shift from having communicable and acute diseases to chronic health problems, due in part to obesity and lack of physical activity (Anderson & Horvath, 2004; Averill, 2003; Flegal, Carroll, Ogden & Curtin, 2010; Gracey & King, 2009). Hispanic minorities have experienced the largest growth in the United States, particularly in the older adult population (U.S. Bureau of the Census, 1998).

This trending towards a higher percentage of minorities and older adults with chronic health problems will inevitably lead to increased health costs. Ewing, Thompson, Wachtel and Freeza (2011) found morbidly obese individuals missed 33 days of work per year versus an average worker's three work days missed work per year. An estimated 10 percent of total healthcare expenses relate to obesity, and morbidly obese medical expenses are 1.4 – 2.8 times than that of other insured members (Frezza & Wachtel, 2009). Review of National Health

Expenditure Data revealed health care expenditures in 2009 cost of \$8,086 per person or accounted for 17.6% of the gross domestic product (Centers for Medicare & Medicaid Services, 2011). Globally, physical inactivity results in 19 million disability adjusted life years and 1.9 million deaths per year (Hamer & Chida, 2008).

Chronic health problems including obesity could be improved with regular physical activity, regardless of health status. The incalculable health benefits of physical activity are well documented in reductions in cardiovascular disease, cancer, diabetes, and many other chronic conditions (Friedenreich, 2001; Hamer & Chida, 2008; Orozco, Buchleitner, Gimenez-Perez, Roque, Figuls, et al., 2008; Roumen, Blaak, & Corpeleijn, 2009). Physical activity has been explained as a key variable that can be modified in the formula whereby energy consumed (food) minus energy expended (physical activity) equals weight gain or loss (Church, Thomas, Tudor-Locke, Katzmarzyk, Earnest, et al., 2011). Because physical activity results in health benefits and levels can be modified, many public policy, community and organizational actions have been implemented. United States population predictions project thirty percent Hispanic population proportions in 2050, and Hispanics now have devastatingly high rates of cancer, coronary artery disease, diabetes, hypertension, liver disease, metabolic disease and stroke (American Heart Association, 2005; Bernstein & Edwards, 2008; Burke, Williams, Gaskill, et al., 1999; Ford & Zhao, 2010; Hunt, Resendez, Williams, Huffner, Stern, et al., 2003; Ostchega, Dillon, Hughes, Carroll & Yoon, 2007). Hispanic death rates per 100,000 Americans related to cardiovascular disease in males are 197.4 and in females 136.4 (Mozaffarian et al., 2016). In fact, it is proposed that physical activity variations among Hispanic communities are connected to obesity rates which may be explained through ecological model components (intrapersonal, interpersonal and community elements) (Boeckner, Pullen, Walker & Hagemen, 2006). Therefore, it is important to evaluate physically inactive lifestyle patterns and implement changes in order to change this

downward trajectory of health behavior that impacts overall health status in the rural Hispanic population.

Significance

This research project affords the opportunity to survey specific lifestyle elements of physical activity in Hispanic or Latino rural community-dwelling adults, thus producing information to formulate evidenced-based culturally tailored interventions for this quickly growing disadvantaged population. The Hispanic population in the United States is the nation's largest and fastest growing ethnic minority, comprising approximately 17 percent of the nation's total population in 2012 with predictions for expansion to 28.6 percent by 2060 (U.S. Census Bureau, 2016). While some might argue other minority groups may have more prevalence and incidence of negative outcome from a lack of physical activity, the sheer volume of Hispanic or Latino population far exceeds any other minority population. Umstattd Meyer, Sharkey, Patterson and Dean (2013) report current immigration trends towards Midwest and Southeast rural areas, and two thirds of these populations are Hispanic, of which 48 percent have Mexican descent. The neglected healthcare needs of the Hispanic or Latino individuals, particularly those living along the USA-Mexico border, could be better addressed if their issues were studied and culturally specific approaches towards health improvement, such as increasing physical activity, were substantiated with evidence based research results (Ramirez, Perez, Munoz, Garcia, Trevino & Lara, 2011).

Despite expanding minority populations in rural areas, there is a scant amount of research that has been conducted in these areas. This is particularly surprising, considering the significant impact chronic diseases have on the overall health picture of the United States, because Hispanics have particularly higher rates of diabetes and hypertension (Grassi Gonzalez, Tello & He, 1999; Ostchega, Dillon, Hughes, Carrol, Yoon, 2007).

The scant research to date that considers physical activity levels in rural Hispanic or Latino adult populations is also limited in terms of generalizability. Recently, the Texas Rio Grande Valley (RGV) area has been a focus of research in rural Hispanic populations living in the rural border “colonias” located in the southernmost Texas counties, and barriers to physical activity have been identified such as hot weather, lack of streetlights and parks for exercise, traffic, and unleashed dogs (Umstattd Meyer, Sharkey, Patterson & Dean, 2013; Bautista, Reininger, Gay, Barroso & McCormick, 2011). The research among “colonias” populations demonstrated that there are perceived and actual or objective individual, social and environmental influences upon physical activity in rural Hispanic or Latino populations that require further exploration (Umstattd Meyer, Sharkey, Patterson & Dean, 2013; Bautista, Reininger, Gay, Barroso & McCormick, 2011). One noted limitation of these studies in the RGV areas related to self-reported measurement of physical activity with no objective physical activity measurements (e.g. accelerometry) to validate the self-report. Consideration is also given that the RGV area with “colonias” near the Texas-Mexico border consist of a very economically depressed locale often lacking potable water and sewage systems with houses made of recycled material producing overall substandard housing among extremely hot temperatures and no air conditioning.

Christensen, Alcalá-Sánchez, Leal-Berumen, Conchas-Ramírez & Brage (2012) studied the associations between cardiorespiratory fitness and physical activity energy expenditure in rural Mexican Tarahumara villages of Agua Zarka, Caborachi, Kirare and Tonachi and in the town of Guachochi. They measured physical activity via accelerometer in only 15 of the 64 study participants. Generally, the research showed high rates of hypertension and obesity in the rural Mexican Tarahumara population could potentially be influenced through physical activity and fitness. While their research found a risk factor for hypertension may be cardiorespiratory fitness and high physical activity energy expenditure may decrease rates of diabetes, they could not

assume physical activity impacted health because of the lack of longitudinal data and overall small sample size (64) in the study (Christensen et al., 2012).

These conditions definitely limit generalizability of the physical activity findings to Hispanics in other less economically depressed areas of the U.S. Research conducted in the California Joaquin Valley over a decade ago among rural cities with populations of 10,000 to 12,000 Hispanic or Latino residents involved the analysis of physical activity and review of physical activity barriers over time (Grassi, Gonzalez, Tello, & He, 1999). Information regarding perceived barriers, physical activity, and demographics was obtained via interview and overall results showed decreases in physical activity based on self-reported data and decreases in perceived barriers to physical activity over time in response to the self-paced family inclusive walking clubs (Grassi, et al., 1999). As the timeline of their study progressed, it showed participants became more aware of their actual amounts of physical activity performed and their knowledge of physical activity venues increased. Nonetheless physical activity declines were seen because of agricultural work responsibilities increasing during the research project, so family and work commitments limited their physical activity time (Grassi, et al., 1999). These interdisciplinary research projects received funding and support from a myriad of local, state, private and federal sources. Their geographic locales are very exclusive, and their individual and community support networks have very unique dynamics, not to mention the time elapsed since the Grassi, Gonzalez, Tello & He (1999) study was conducted, thus the findings are not generalizable to Midwestern Nebraska populations or a large proportion of the United States.

Understanding specific factors that impact physical activity in the inactive minority group of rural American Hispanic or Latinos is critical in order to plan effective interventions to address the physical inactivity problem and prevention of chronic diseases. This research is important because rural adults were found to be less than 50 percent as active than urban adults, Hispanic or Latino adults were found to have the least amount of leisure time physical activity, and physical

inactivity was identified as a major contributor to chronic illness in the Hispanic or Latino population (Crespo et al., 2001; Reis, Bowles, Ainsworth, Dubose, Smith & Laditka, 2004).

Statement of the Problem

There has been a plethora of research that has looked at community dwelling populations and physical exercise from an overall perspective, yet very little research addresses Hispanic or Latino rural populations, in terms of describing physical activity levels and reporting on factors that influence physical activity in this population. To this author's knowledge, the only research project conducted with rural Hispanic or Latino adults involving physical activity influences in the Midwestern United States was a descriptive study performed in Wisconsin with a low-income group utilizing focus groups (Kaiser & Bauman, 2010). Not only do Hispanic or Latino populations have a propensity for increased chronic diseases because of genetic associations, the main reasons for health problems have been tracked to non-biological factors such as acculturation stress and lack of exercise (Bassett, Fitzhugh, Crespo, King, & McLaughlin, 2002). Physical activity is an underutilized prescription to prevent or slow declines in health, yet it is an economically feasible solution to consider. Clearly, these modifiable factors have high potential for change if the influences of these elements are more comprehensively understood in the physical activity patterns of Midwestern Hispanic or Latino adults.

Specific Aims

The specific aims of this study include:

Aim One - To describe physical activity levels (Seven Day Physical Activity Questionnaire and objective accelerometry -- time spent in sedentary, light, moderate and vigorous intensity activity) in rural Hispanic or Latino adults.

Aim Two - To examine factors that influence physical activity in rural Hispanic or Latinos: (a) intrapersonal factors (age, gender, ethnicity, employment, body mass index (BMI)

and self-efficacy for physical exercise) and (b) interpersonal factors (acculturation and social support for exercise from friends and family) and (c) community physical environment (neighbourhood walkability).

CHAPTER 2

Conceptual Framework and Review of the Literature

Conceptual Framework

The ecological theory selected for this research is based on the premise that individual behaviors cannot be understood unless a comprehensive examination of their life context is conducted. Physical activity research focusing on small groups or individuals has been based on many theories such as the health promotion model, the theory of planned behavior, social cognitive theory, theory of reasoned action, and the transtheoretical model; however, nursing researchers recommended the use of ecologic interventions because of their great potential for increased impact and applicability among large population groups (Plonczynski, 2000; Robbins, Pender, Conn, Frenn, Neuberger, Nies, Topp, Wilbur, 2001). Environmental and individual concepts have been used in various ecological models to account for the multiple levels of influences upon physical activity behavior (Kaiser, Brown & Bauman, 2010; McLeroy, Bibeau, Steckler & Glanz, 1988; Scott & Wilson, 2011). Ecological models are instrumental in the implementation of long-term physical activity changes because of their comprehensive descriptive situational platform which incorporates environmental interventions that influence change, taking into account ethical influences and diversity of influential factors (Sallis, Cervero, Ascher, Henderson, Kraft & Kerr, 2006; McLeroy, Bibeau, Steckler & Glanz, 1988; Northridge, Sclar, & Biswas, 2003).

This research will utilize an ecological model to specifically focus on the intrapersonal, interpersonal, and community physical environment. While this study does not examine organizational and public policy influences, literature findings suggest Hispanic or Latino adult populations are investing less in physical activity and/or health promotion activities compared to other large groups of adult populations. Once the intrapersonal, interpersonal and community physical environment influences are more clearly understood more impactful public policy and

organizational issues can be taken to improve physical activity levels in the Hispanic or Latino adult population.

Ecological models have been used by many disciplines and nursing researchers have only recently incorporated them for use. This model was adapted from McLeroy, Bibeau, Steckler, Glanz (1988) ecological perspectives and Sallis, Cervero, Ascher, Henderson, Kraft & Kerr's (2006) creation of active living communities. These concepts were further modified in nursing research involving the description of, "...influences on physical activity and diet in low-income, rural adults" (Kaiser, Brown & Baumann, 2010, p.67). This author further adapted these concepts for use in the current ecological model presented in Figure 1 and described below.

Concepts and Sub-concepts

The primary concept being examined in this research is physical activity. The physical activity definition for this project is, "bodily movement produced by the contraction of skeletal muscle that increases energy expenditure above the basal (i.e. resting) level" (Committee on Physical Activity, Health, Transportation and Land Use, 2005, p.33). Three of the five main concepts of physical activity influence in the ecological model adapted for this research will be studied: intrapersonal, interpersonal, and community physical environment. The areas of organizational and public policy will not be addressed in this project. There are several intrapersonal conventionally defined demographic variables such as age, body mass index, employment status, ethnicity gender and self-efficacy for physical activity. Body mass index (BMI) will be calculated with individual height and weight measurements. Gender will be self-reported, age self-reported in years, employment status explained as full time, part time, volunteer disabled, retired, homemaker, etc. Hispanic or Latino ethnicity will be defined, "...as a person of Cuban, Mexican, Puerto Rican, Dominican, South or Central American, or other Spanish culture or origin, regardless of race" (Evenson, Sarmiento, Tawney, Macon & Ammerman, 2003; U.S. Census Bureau, 2010). Self-efficacy beliefs for physical activity are generally reflected in actual exercise adherence and overall health management behaviors (Bandura, 1997). This will be

measured through the Self-efficacy for Exercise Behaviors Survey. Interpersonal factors include acculturation and social support for exercise from friends and family. Social support will be evaluated through the Social Support for Exercise Survey. Social support is defined as, "... the availability of people whom the individual trusts, on whom he can rely, and who make him feel cared for and valued as a person" (McDowell & Newell, 1996, pp.125). Acculturation, the integration of attitudes, beliefs and values into a group or individual's own adaption of a new culture, will be measured through the Acculturation Scale for Hispanics (Peragallo, Fox & Alba, 2000).

Neighborhood walkability will be studied in the community environment through the use of the Neighborhood Environment Walkability Scale. Neighborhood walkability has three subconcepts: land use mix diversity, convenient recreation facilities, and pedestrian safety. Neighborhood walkability is a subconcept of the community physical environment and is, "defined by residential density, proximity of shops and services, and street connectivity" (Sallis, Slymen, Conway, Frank, Saelens, Cain & Chapman, 2011, p.1274). Land use mix diversity is defined by the, "...diversity of 5 types of land uses – residential, retail, entertainment, office, institutional" (Sallis et al., 2011, p. 1278). Pedestrian safety is defined by the safety from traffic, and convenient recreation facilities that are, "...either on a frequently traveled route (e.g. to and from work) or within a 5-min drive or 10-min walk from a participant's home or work" (Sallis et al., 2011, p.1278). This study will measure physical activity levels by self-report (Seven Day Physical Activity Questionnaire) and through objective accelerometry measurements over seven days.

There is a compelling rationale for the use of an ecological model to review the intrapersonal, interpersonal and community physical environment concepts, and each area will be reviewed for current research findings. This comprehensive approach will address promising aspects of physical activity research as it relates to individual concepts, and how they are currently presented in the literature. This approach will facilitate identification of salient

formative research findings and strategies that can augment rural Hispanic adult physical activity research.

Intrapersonal

The study of the intertwining multiple individual factors that impact physical activity can be very complex and vary across domains. Broad perspectives of various age, gender, employment, acculturation, ethnicity and self-efficacy can contribute toward understanding the various interrelationships and strength of influence on physical activity. While the demographic structure alone could be considered a preponderant determinant of physical activity, further study of how all of the individual factors are embedded in life contexts through examination of acculturation and social support of family and friends could generate further insights toward physical activity in Midwestern rural Hispanic adult populations.

Age & Gender

Research reports from four main databases (National Health and Nutrition Examination Survey (NHANES), 1999 – 2002; the Behavioral Risk Factor Surveillance System (BRFSS), 2003; National Household Travel Survey (NHTS), 2001; National Health Interview Survey (NHIS) Cancer Supplement, 2000) show low average levels of once per week physical activity in the overall population (Ham, Yore, Kruger, Heath & Moeti, 2007). The combined data from these four reports showed adult Latinos had 28.7 percent activities of daily living which included walking and strengthening physical activity, 42.8 percent leisure time physical activity, 34.4 percent household physical activity, 32.6 percent occupational physical activity and 30.6 percent related (transportation) physical activity (Ham, Yore, Kruger, Heath & Moeti, 2007). These combined study results showed 38 percent of Latino males had usual daily physical activity levels whereas women reported only 19.1 percent usual daily physical activity levels, and the numbers show a general trend that Latino women are half as active as men across all of the reported age groups, a finding which is consistent across all databases (Ham, Yore, Kruger, Heath & Moeti,

2007; Neighbors, Marquez, Marcus, 2008; Troiano, Berrigan, Dodd, Masse, Tilert, et al., 2008). Physical activity research results in Latino populations have been criticized because the self-reported estimations of physical activity do not account for Hispanic males' participation in occupational physical activity or the physical activity associated with household tasks performed by Hispanic women (Latinas). It is proposed these physical activities may not be self-reported by Latinas because the activities are performed as an integral part of a regular daily routine and so they are not perceived as physical activity (Hovell, Mulvihill, Buono, et al., 2008; Larkey, 2006; Pekmezi, Neighbors, Lee, Gans, Bock, Morrow, Marquez, Dunsiger & Marcus, 2009). In particular, younger adult Hispanic Latinas were found to have higher physical activity levels when they connected socially with community and religious groups (Voorhees & Rohm Young, 2003). Conversely, research showed self-efficacy levels were more predictive of physical activity in older Latina Hispanic populations while group participation or social interactions were much less influential in physical activity levels (Laffrey, 2000).

Studies of various Hispanic gender and age groups do not consistently show relationships or differences in physical activity levels. This may in part be due to the interrelationships with other factors such as self-efficacy and social support. Literature does show that Hispanic males have fewer community social connections and increased physical activity levels because they are working in physical or manual labor type jobs (Marquez, Neighbors & Bustamante, 2010). Since male Hispanics are physically active in their jobs there has been less research to examine physical activity male Hispanics, because published research has yet to identify adult Hispanic males as a high-risk focus group (Ickes & Sharma, 2012). Initial reviews of the 2009 Behavioral Risk Factor Surveillance System (BRFSS) survey information revealed the lowest physically active groups were rural unemployed Hispanic females (Clevette, 2012). The larger proportion of Latino physical activity research focusing on Hispanic females is therefore justified, particularly when considering that 60 percent of Latinas do not meet Federal guidelines for physical activity and

only 29 percent are participating in sustained activity throughout the day (National Center for Health Statistics, 2007; National Heart and Lung Blood Institute, 2008).

Contradictory physical activity information is found in the study of female Hispanic populations. Research showed Hispanic women believed their overall well-being and fitness were supported through physical activity, yet more than 70 percent of Latinas reported no leisure-time physical activity (LTPA) in the 1988-1994 National Health and Nutrition Examination Survey (Crespo, Smit, Carter-Pokras & Andersen, 2001; Perez, Fleury & Keller, 2010; Vorhees & Rohm Young, 2003). Literature shows that Latinas believe there is never a time when responsibilities for family or anything/anyone fails to exist, and because they put their families and others before their own needs, these findings align with current Latina beliefs (Marquez & McAuley, 2006). Older Latinas appear to hold these family beliefs most strongly because statistics show they are the least active group in the United States (Brownson, Eyler, King, et al., 2000).

Research in white midlife women and Mexican origin women revealed their physical activity was impacted by lack of time in their daily schedules (Im, Lee, Chee, Stuifbergen, eMAPA Research Team, 2011; Parra-Medina & Hilfinger Messias, 2011). In particular, Hispanic women's attitudes were that physical activity is a waste of time because they believed they are healthy and have better things to do such as take care of their family (Im, Lee, Hwang, Yoo et al, 2010). Examinations of multiple physical activity barriers within Latina populations have cited acculturation, child-care / family support, cost, lack of facilities, transportation and safety as main themes (Voorhees & Rohm Young, 2003). The Women's Cardiovascular Health Network Project showed very few environmental correlates with physical activity level variations (Eyler, Matson-Koffman & Young, et al., 2003).

Because this study did not exclude adult females of childbearing years, this literature review also includes overall research findings of pregnant Latinas that shows this group has significant declines in their physical activity levels. This is particularly concerning because

Latina Hispanics have the highest immigration and birth rates (Lynch, Landsbaugh Whitcomb, et al., 2012). Only sixteen percent of pregnant women participated in any moderate to vigorous physical activity activities according to 2000 Behavioral Risk Factor Surveillance System (BRFSS) data (Petersen, Leet & Brownson, 2005). Compared to non-Hispanic whites, approximately 50 percent of Hispanic Latinas are not likely to meet the American College of Obstetricians and Gynecologists (ACOG) guidelines (Evenson & Wen, 2010). Lynch, Landsbaugh, Whitcomb et al. (2012) studied pregnant Hispanic population utilizing results from the Pregnancy Physical Activity Questionnaire (PPAQ) which includes household/caregiving physical activities and their research showed 69.7 percent of pre to early pregnancy and 45 percent early pregnancy met ACOG physical activity guidelines. This illustrates that it is important to consider the definition for what constitutes physical activity. Inclusion of household and caregiving activities resulted in much higher reported physical activity levels. In this study it was an advantage to use the 7-Day Physical Activity Questionnaire because it captured these types of activities when collecting the data.

Overall multiple databases show physical activity rates are higher in men than women yet these findings are questionable considering female occupational and family household physical activities are potentially excluded in these findings. The literature results become more complicated through the study of female Hispanic beliefs that physical activity supports good health, yet decreased physical activity rates were noted in Latinas because of their work and family responsibilities. The lack of results specific to Hispanic male populations limits the conclusions that could be made to contrast female and male Hispanic physical activity findings. This research project provided the opportunity to learn more about these physical activity patterns through the collection of data in both male and female Hispanic study participants.

Employment Status

Physical activity studies that include exercise performed in multiple work and leisure domains have shown minority populations, including only 27 percent of Mexican-Americans, meet or exceed recommended physical activity levels of 30 minutes of moderate activity five days per week or vigorous activity for 20 minutes at least three days per week (CDC, 1990; Ham & Ainsworth, 2010). While this level is low it is encouraging because overall time constraints, low socioeconomic status, family obligations and historical developments in occupational activity have led to negative impacts in physical activity engagement (Church, Thomas Turdo-Locke, et al, 2011; Kirk & Rhodes, 2011). Evaluation of NHANES 1999-2000 data revealed increased occupational physical activity has shown positive associations with leisure time physical activity levels in men, and increased occupational physical activity is associated with lower levels of education (Wolin & Bennet, 2008). While some literature cites positive relationships between high occupational physical activity and leisure time physical activity, results are mixed (Kruger, Yore, Ainsworth & Macera, 2006). Some studies have actually documented that employed Latinos were less likely to meet physical activity recommendations (Evenson, Sarmiento, Tawney, Macon, Ammerman, 2003; Voorhees & Rohm Young, 2003). These mixed findings may be partially explained by the type of occupational work that is being performed. Studies have shown that individuals in sedentary occupational work do not participate in enough LTPA to achieve recommended physical activity levels (Caban-Martinez, Lee & Fleming, 2007; Kirk & Rhodes, 2011). This has even led some researchers to believe occupational physical activities are of limited value because they are not likely to be performed at the intensity or duration to achieve health benefits (Kruger, Yore, Ainsworth & Macera, 2006; Marquez, Neighbors & Bustamante, 2010). Another consideration is that many minorities, particularly Hispanics, are employed in physically active work settings and as a result of the physical demands of their occupation they

are deterred from leisure time physical activities (He & Baker, 2005; Ruzic, Heimer, Misigoj-Durakovic, Matkovic, 2003).

The inconsistent findings in the literature related to occupational versus leisure time physical activity may relate to the instrument or method of measurement being used in the study. Subjective self-report measures of physical activity in Hispanic populations may be providing an inaccurate picture of overall physical activity levels if they only consider leisure time physical activity without inclusion of occupational activity. Ham and Ainsworth (2010) found Latino physical activity levels are inconsistently measured as evidenced through objective accelerometry measurements showing Healthy People 2010 objectives are met and questionnaires showing Latinos fail to meet the objectives.

Troiano et al. (2008) emphasized the need for objective accelerometry measurements in order to provide a more accurate picture, especially in the male Mexican American populations where occupational activities may result in higher levels of overall physical activity (Troiano, et al., 2008). Data from accelerometer measured physical activity however showed less than five percent of Latinos met physical activity guidelines (Troiano, et al., 2008). A review of all physical activity studies including Hispanics with accelerometry was performed by Layne, Parker, Soltero, Rosales Chavez, O'Connor, Gallagher & Lee (2015) and showed 75 percent of the articles reported the wear time for an acceptable day, 7 percent reported an acceptable hour, 11 percent reported missing data procedures, and 25 percent reported procedures to address wear time interruptions. Considering the wide variability in accelerometer data and lack of standard reports it is difficult to compare and contrast findings from Hispanic studies and other ethnic populations.

Regardless of the reason for the mixed findings in occupational and leisure time physical activity in Hispanics, there is a clear indication of the need to include both occupational and leisure time activities in the self-report of overall physical activity levels in this population.

Therefore, the 7 Day Physical Activity Recall self-report measure was used in the study because it includes both occupational and leisure time activity. An objective accelerometer measurement of physical activity was included in this study with specific definitions of an acceptable hour and acceptable day in order to provide a more accurate assessment of overall activity levels.

Self-Efficacy

Self-efficacy to exercise has been shown to have the most consistent intrapersonal factor effect on physical activity levels (Crain, Martinson, Sherwood, & O'Connor, 2010; Laffrey, 2000; Ory, Lee Smith, Mier & Wernicke, 2010; Richards, Enderlin, Beck, McSweeney, Jones & Robertson, 2007). Bandura's (1994) perceived self-confidence is one's perception of task performance. Perceived self-efficacy refers to, "...beliefs in one's capabilities to organize and execute the courses of action required to produce given attainments" (Bandura, 1997, p.3). Self-efficacy to exercise is defined as an individual's confidence that they can perform exercise behaviour. According to Bandura, this confidence should lead to a behavior change, such as increasing physical activity. Individual associations, comparative efficacy, observations and impressions of norms undoubtedly provide intrapersonal psychological influences that significantly affect physical activity participation. Various experience such as past performance, verbal influence, social modelling, and other components persuade individual's self-efficacy expectations (Bandura, 1997).

The discussion of self-efficacy for physical activity introduces the concepts of values and motives that are determined by individual discernment for physical activity. Physical activity is based on physical and mental abilities, and the sustainment and success of physical engagement often hinges upon the individual's cognitive self-efficacy skilfulness. High self-efficacy levels for physical activity adherence have been noted in individuals with higher education levels and executive function, with self-efficacy mediation (McAuley, Mullen, Szabo, White, Wojcicki, Mailey, Gothe, Olson, Voss, Erickson, Prakash, & Kramer, 2011). High English language

proficiency (ELP) levels were associated with perceived physical activity self-efficacy ($\beta = 234.2$, $p = .004$) (Salinas, Hilfinger Messias, Morales-Campos, Parra-Medina, 2014). Research has shown effective physical activity behaviour changes have occurred as a result of intervention techniques that have specifically targeted self-efficacy for physical activity (Williams & French, 2011).

Research to examine factors related to physical activity may not focus on self-efficacy as a variable but it has been shown to be a mediator. Individually tailored exercise programs have shown success because of consideration for individual diversity of motives and goals. Positive research results have been obtained when interventions consider an individuals' outcome will not only depend upon what they do (e.g. behavior change) but how they think (e.g. motivational strategies, opinions and perceptions) (Cohen, Inagami & Finch, 2008; Keele-Smith & Leon, 2003; Nijamkin, et al., 2012; Reyes, Oliver, Klotz, et. al., 2012; Zauszniewski, 2012). Meta analysis of literature focusing on self efficacy and physical activity changes showed study participants benefited most from specific goal descriptions and reasonable, realistic plans for execution of physical activity (Williams & French, 2011). Research results also showed positive results from discussions revolving around how an individual can successfully perform a physical activity (versus descriptions of barriers), cues towards others successfully performing tasks were helpful, and avoidance of gradient behavior change plans because they may potentially illustrate early failures and discourage further attempts at progress (Williams & French, 2011). Mediator effects such as self-efficacy are somewhat unknown in interventional research because the assumption is made the intervention changed self-efficacy levels as measured through exercise adherence levels (Sirur, Richardson, Wishart & Hanna, 2007).

The study of research connections, particularly involving self-efficacy, among physical inactivity, chronic health problems and obesity could potentially reveal more efficacious approaches towards increasing physical activity in rural Hispanic adults. Successful engagement

and robust self-assurance in physical activity is often gauged through health outcomes and activity sustainment that depends upon many influences including gender, age, employment status and ethnicity. A systematic review of physical activity and exercise in older adults showed some relationships between changes in exercise self-efficacy and exercise; however, there was insufficient evidence for most associations (Koeneman, Verheijden, Chinapaw & Hopman-Rock, 2011). Surprisingly, Latina immigrants with high self-efficacy resulted in lower correlations with physical activity recommendations than Latina immigrants with low self-efficacy (Evenson, Sarmiento, Tawney, Macon & Ammerman, 2003). Complex differences in research methodology and conceptual and operational definitions have produced some clouded results.

As previously mentioned, physical activity rates are related to obesity rates and the literature shows variations in the influential strength of self-efficacy for physical activity in obese and non-obese populations. Literature review and meta-analysis of obese populations indicated self-efficacy was a less important mediator of physical activity unlike non-obese populations that showed robust ($r = 0.69$) connections between self-efficacy change and physical activity change (Olander, Fletcher, Williams, Atkinson, Turner & French, 2013). Motivational etiology can vary and the importance of understanding the contextual background prior to and during physical activity plan implementation may be the key to physical activity plan success. Even people who are successful by any standard may have difficulty setting their own compass to evaluate their perceptions of physical activity success and therefore individual self-efficacy levels in physical activity vary. For example, literature cites low levels of self efficacy for exercise in obese individuals with many habitual negative health habits combined with advancing age, retirement status and it was proposed they may have difficulty internally increasing their self efficacy for physical activity because of repeated rehearsing of barriers to physical activity (Ashford, Edmunds & French, 2010; Olander, et al., 2013). Recent research showing new ways of thinking about physical activity and the results obtained from physical activity have shown success in

developing increased satisfaction levels over time, which in turn presumably will increase long term physical activity adherence (Springer, Lamborn & Pollard, 2013). Overall research showed self-efficacy levels and outcome expectancies were key components to the initiation and adherence to physical activity behavior.

There is a very large quantity of general populations substantiating individual motivating techniques that were also influenced by group activities, telephone interventions, behavior counselling, etc. that have shown varying levels of success depending upon the targeted age group and settings (Bennett, Young, Nail, Winters-Stone, & Hanson, 2008; McAuley et al., 2011). For example, a pilot study to increase physical activity in older Hispanics living in Wichita, Kansas showed text messaging motivated 10 out of 11 study participants from the contemplation stage to the action/maintenance/termination stage (Collins, Dong, Ablah, Parra-Medina, Cupertino, Rogers & Ahlers-Schmidt, 2014). Overall results from Olander et al. (2013) review of physical activity research among obese adults revealed specific plans regarding time management and when, where and which specific situation physical activity can occur showed increased self efficacy for physical activity yet actual *physical activity* was not increased. Nearly three times as many behaviour change techniques (BCT) for physical activity increases were identified than in Williams & French's (2011) meta analysis of healthy (non-obese) adults.

While it is fairly easy to understand self-efficacy has been predominantly shown to influence physical activity throughout the literature in diverse racial/ethnic groups, the challenge is understanding what associations between self efficacy and physical activity are more impactful (Eyler, et al., 2003; Pekmezi, et al., 2009). Research in healthy (non-obese) and obese populations has shown different associations between self-efficacy and physical activity, and research focused among Hispanic or Latino populations show similar diversified results (Olander, et al., 2013; Williams & French, 2009). Multiple studies have used Pender's Health Promotion Model and Social Cognitive Theory which incorporate a component of self-efficacy and found that brief interventions have limited long term effects on physical activity change; however, tailored

interventions have had more success for participants in reaching physical activity levels (Richards, et al., 2007; Walker, Pullen, Hageman, Boeckner, Hertzog, Oberdorfer & Rutledge, 2010).

Research results regarding longitudinal studies are limited and permanent lifestyle physical activity habit changes are unclear, likely because of the variety of populations and physical activities available for review (Perry, Rosenfeld, Bennett, & Potempa, 2007).

Research targeting self-efficacy levels in low-income rural Hispanic individuals is lacking, and findings show different approaches are needed when working with different minority and weight classifications of populations. Further knowledge of successful approaches could build upon the already established premise that individually tailored interventions that enhance self-efficacy for physical activity will improve exercise levels. Obviously there is a need to better understand the influence of self-efficacy on physical activity in the Hispanic population. The identification of physical activity influences will assist with not only development of effective techniques to increase self-efficacy but post-intervention physical activity sustainment.

Obesity

Physical activity and obesity are interrelated as indicated in the formula whereby energy consumed (food) minus energy expended (physical activity) equals weight gain or loss (Church, et al., 2011). Therefore, it is important to examine obesity levels in relation to physical activity levels. Global obesity rates identify the United States as the most obese country with a 30.6 percent obesity rate and Mexico in second place with a 24.2 percent obesity rate (NationMaster, 2011). In the United States, an estimated 28.7 percent of Hispanics are obese (27.8 % male and 29.4 % female), despite spending less sedentary time than non-Hispanic whites (CDC, 2009; Matthews, Chen & Freedson, 2008; Office of Minority Health, 2012). Similarities in overweight and obesity rates are seen in Mexico with a 12 percent obesity rate increase from 2000 to 2006, and Latin American countries obesity rates exceeding underweight rates (Barquera, Campos-Nonato, Hernandex-Barrera, Flores, Durazo-Arvizu, Kanter & Rivera, 2009). Data from the 2009

Behavioral Risk Factor Surveillance System (BRFSS) show the Southern and Midwestern portions of the United States have higher obesity rates than Northeastern or Western regions (CDC, 2010).

Obesity risks have been linked to residence in the United States and potentially impacted through acculturation and unhealthy caloric dense foods, unsafe places to exercise, and sedentary activities (Ayala, Baquero, Klinger, 2008; Perez-Escamilla, 2011). Creighton, Goldman, Pebley and Chung (2012) attribute some of the American and Mexican obesity epidemic to general economic factors such as marketing tactics, lifestyle including activity levels, employment and transportation mechanisms that have evolved over time. This suggests obesity trends are not exclusively related to residence in the United States. In 2030, it is predicted that 90 percent of the Mexican American population will be obese or overweight and the rate of obesity related illness increases exponentially as United States residency tenure extends (CDC, 2013; Wang, Beydoun, Liang, Cabillero & Kumanyika, 2008).

Obesity studies focusing on American Hispanic subgroups and generational differences have shown varied obesity patterning. For example, research findings in Bates, Acevedo-Garcia Alegria & Krieger (2008) adult population data from the National Latino and Asian American Survey showed generational increases in BMI and obesity. First generation females had a mean BMI of 27.2 and 26.5 percent were obese (95% CI 23.2-29.9); second generation females had a mean BMI of 28.0 and 29.1 percent were obese (95% CI 21.7-36.5); and third generation females had a mean BMI of 28.2 and 32.3 percent were obese (95% CI 23.9-40.8) (Bates, et al., 2008). First generation males had a mean BMI of 27.9 and 24.5 percent were obese (95% CI 21.0-27.9); second generation males had a mean BMI of 28.4 and 35.3 percent were obese (95% CI 27.6-43.1); and third generation males had a mean BMI of 29.4 and 38.7 percent were obese (95% CI 32.2-45.2) (Bates, et al., 2008). Similar Hispanic obesity trends were noted in Kahn, Sobal and Martorell (1997) with increasing BMI rates for each successive generation. Mexican Americans

are the largest subgroup of Hispanics in the U.S., and a great proportion of obesity research has been conducted in this group. Florez, Dubowitz, Saito, Borjes and Breslau (2012) results were opposite the previously mentioned studies with higher obesity rates in first generation immigrant Mexican American males (OR=1.66, 95% CI 1.10-2.52) than second generation (OR=3.38, 95% CI 1.84-6.20) and third generation (OR=2.68, 95% CI 1.48-4.86) compared to males living in Mexico. Mexican American females had similar findings with higher obesity rates in first generation immigrant females (OR=2.62, 95% CI 1.72-4.00), than second generation (OR=3.08, 95% CI 1.81-5.23) and third generation (OR=3.79, 95% CI 2.19-6.57) compared to females living in Mexico (Florez, et al., 2012). As previously illustrated, the literature showed very inconsistent generational obesity rates in Hispanics. It is also important to note that the obesity studies have rarely reported corresponding physical activity levels.

Forty percent of adult Hispanic men and 44 percent of adult Hispanic women are obese (Ogden, Carroll, Kit, Flegal, 2014). A study of Latina women (N=688) revealed residence in the United States for over 20 years doubled their chance for obesity than those living in the United States for ten years (OR=2.07, 95% CI 1.25-3.42) with 65% of the studied population born in Mexico (Wolin, Colangelo, Chiu and Gapstur, 2009). Obesity research in a mostly female Mexican American population (female, n=9138; male, n=2130) showed obesity mediated the sitting time influences on hypertension and diabetes (deHeer, Wilkinson, Strong, Bondy & Koehly, 2012). Moreover, daily sitting time of more than four hours compared to sitting 1 – 2 hours per day was found to be associated with increased probabilities of diabetes (OR=1.29, 95% CI 1.09-1.52), hypertension (OR=1.17, 95% CI 1.01-1.37) and obesity (OR=1.55, CI 1.39-1.73). (deHeer, et al., 2012). Interestingly, small physical activity changes can be impactful as substantiated in research by Jakicic and Davis (2011) through a systematic physical activity literature review that showed moderate to vigorous intensity physical activity performed for 150 minutes per week resulted in a 1-3 percent body weight reduction despite no recommended

dietary decrease or modification. Clearly inactivity behaviors result in overweight and obesity, and many questions arise regarding the issues of progressive classifications or proportions and concepts of age, gender, ethnicity, employment, self-efficacy, and obesogenic features which can vary over time, place or issue and are worthy of investigation in order to maximize physical activity impacts.

Obviously, increased BMI rates result from imbalances in energy intake and expenditure, and engagement in physical activity has the potential to restore energy balance to achieve more healthy BMI levels. Obesity interventions focused on behavior changes, self-efficacy, education, and family units are prevalent, and federally funded research endorses broad-spectrum research approaches (NIH Obesity Research, 2011; Delormier et al., 2009). The applicability of previous research towards Hispanic populations is limited, because obesity literature has stemmed primarily from white populations and often contains short-term intervention results. This ecologically based research project will provide further descriptions of physical activity patterns which would be important in order to effectively address the obesity issues in this understudied minority group.

Social Support – Friends / Family and Acculturation

The strong associations between social support of family and friends and physical activity have been well established in multiple populations, although the majority of research has been completed in white populations (DiLoranzo, Stucky-Ropp, Vander Wal & Gothman, 1998; Steptoe, Wardle, Fuller, Holte, Justo, Sanderman, Wichstrom, 1997; Sternfeld, Ainsworth & Quesenberry, 1999). In white populations research shows friends are a source of support for physical activity; however, family has been shown to be particularly influential in women (Leslie, Owen, Salmon, Bauman, Sallis & Lo, 1999; Steptoe, et al., 1997). Female white college students receiving high social support from family are found to have significantly higher physical activity (63.8% sufficiently active versus 36.2% insufficiently active, $p < 0.001$) and male college students

receiving high social support from family (82.5% sufficiently active versus 17.5%, $p < 0.001$) and the same trend was seen in social support from friends (Leslie, Owen, Salmon, Bauman, Sallis & Lo, 1999). Steptoe et al. (1997) found physically active young adults in Spain are more likely to appreciate larger levels of social support ($p < 0.00001$). Mier, Medina & Ory's (2007) study of a United States' Hispanic population showed the collective support from family and friends were motivational toward physical activity.

An important cultural network strategy for physical activity, particularly among the Hispanic population, has been considered the social structure of collective support derived from friends and family (Franzini, Ribble, Keddie, 2011; Mier, Medina & Ory, 2007; Stahl, Rutten, Nutbeam et al., 2001, Trost, Owen, Bauman, Sallis, & Brown, 2002; Wilbur, Chandler, Dancy & Lee, 2003). Study of a Mexican American sample ($N=20$) revealed collective efficacy was an unanticipated link between social support and self-efficacy, thus underscoring the powerful social cohesion impacts among Hispanic adults (Ingram, Ruiz, Mayorga & Rosales, 2009). Family based Hispanic group goals and behaviors have been shown to impact individual behaviors, particularly in the study involving a Hispanic subpopulation of Mexican Americans which showed collective efficacy inspired walking behaviors (Ingram, Ruiz, Mayorga & Rosales, 2009; Triandis, 2001). Likewise, Wen, Shepherd & Parchman (2004) specifically mentioned their use of a social support instrument inclusive of friends & relatives, and found statistical correlation of exercise self-care with family support (correlation=0.415, significant at .01 level). Because personal relationships play an important influential role in Hispanic physical activity and many social contexts directly guide physical activity, overlapping acculturation constructs must also be considered in order to understand their effects on Hispanic physical activity (Eyler, Baker, Cromer et al., 1998; Treiber, Baranowski, Braden, Strong, Levy & Knox, 1991).

Hispanic culture places high value on amicable and positive social relationships, allocentrism (activity focused on others rather than themselves) and familialism (patriarchal

family unit and importance of family in many levels, extended kin and friends) and interpersonal relationships are highly valued (Marin & Marin, 1991). Hispanic cultural network strategies could explain the higher physical activity levels seen in research results when a comprehensive view of an individual's lifestyle physical activity was taken into account, which includes household/caregiving physical activity, leisure, occupational and transportation domains. One such example of a study including all lifestyle activity showed Hispanic subjects were more physically active than white subjects (unadjusted OR = 1.59, 95% CI 1.19-2.13) (Sternfield, Ainsworth & Quesenberry, 1999). Regional variations in physical activity were also noted with higher acculturation levels linked with increased physical activity (Ham, Yore, Kruger, Heath & Moeti, 2007; Slattery, Sweeney, Edwards, Herrick, Martaugh, Baumgartner, Guiliano, Byers, 2006; Wolin, Colditz, Stoddard, Emmons & Sorensen, 2006). High English language proficiency (ELP) levels were generally found to be associated with increased physical activity in women; however, employed women had less leisure time physical activity presumably due to work responsibilities (Salinas, Hilfinger Messias, Morales-Campos, Parra-Medina, 2014). Acculturation assimilation processes that result in behavior changes, such as physical activity, are intertwined with perpetual revisions of individual and group values, social networks and variable cultural exposures (Berry, 1989).

Some of the Hispanics' higher health status (higher than the population they emigrated from) is attributed to their adventurous determination to improve their life circumstances, while collective group physical activity provides contributions towards Hispanic good health (Ingram, Ruis, Mayorga & Rosales, 2009; Leclere, Jensen & Biddlecom, 1994; Shai & Rosenwaike, 1987). These physical activity influences were substantiated in Crespo, Smit, Carter-Pokras and Andersen (2001) study of 1988-1994 NHANES III data which revealed higher likelihood of physical activity in proceeding Mexican origin immigrant generations with implications that familism, social construction, and propinquity influence physical activity patterns. However,

Crespo, Smit, Carter-Pokras and Andersen (2001) acknowledged they only reviewed leisure time physical activity and it is plausible many arenas of physical activity (occupational, transportation, homemaking) activity were not included which could have increased physical activity findings. Given that social networks and relationships influence physical activity behaviors, and family ties are highly valued within Hispanic culture, it is difficult to show that more acculturated Hispanic populations have higher physical activity rates. Review of the leisure time physical activity rates found in the 2000 through 2003 National Health Interview Survey database revealed the Hispanic population was significantly less active than their non-Hispanic white counterparts as shown in reported adjusted odds ratios ranging from .52 for Dominican, .84 for Central or South American, Mexican and Mexican American had odds ratios of .77 and .80 respectively (Neighbors, Marquez & Marcus, 2008). No statistical differences were found for male Hispanic subgroups and the Cuban (OR=.43, 95% CI 0.33-0.58) and Dominican (OR=.48, 95% CI 0.33-0.69) women were less active than Puerto Rican (OR=.67, 95% CI 0.57-0.79) Mexican (OR=.72, 95% CI 0.63-0.82), Mexican American (OR=.78, 95% CI 0.70-0.87), and Central or South American (OR=.76, 95% CI 0.65-0.87) women (Neighbors, Marquez & Marcus, 2008). Neighbors, Marquez & Marcus (2008) did not find any other significant results including acculturation and physical activity rates; however, it is noted the measurements of acculturation were separated into four categories of (1) spoken Spanish and English during interview, (2) spoke Spanish only during interview, (3) born outside continental United States and (4) lived in the United States less than 10 years. Because these acculturation elements were separately measured, their statistical significance may not have been captured. Neighbors, Marquez & Marcus (2008) also mentioned their research failed to capture occupational physical activity and environmental factors.

Some acculturation instruments measure length of time in the U.S. and current spoken language, while other versions elicit more detail through questions about current television and radio language preferences, language spoken inside and outside of the home, country of origin,

etc. Justifiably, there are concerns with collectively reporting Hispanic physical activity research results which potentially combine millions of people presumably with similar linguistic heritage from geographically widespread locations because these aggregate results would not truly reflect the important Hispanic population differences (Hunt, Schneider & Comer, 2004). For example, a study of 2005 – 2007 California Health Interview Survey (CHIS) data showed higher acculturation levels are associated with increased leisure-time physical activity, particularly in their Guatemalan sample ($p = 0.0183$) (Van Wieren, Roberts, Arellano, Feller & Diaz, 2011). The acculturation measures in the aforementioned study included information pertaining to interview language, primary language used at home, English proficiency, citizenship status, birthplace and percent of life spent in the U.S. (Van Wieren, Roberts, Arellano, Feller & Diaz, 2011). Neighbors, Marquez and Marcus (2008) study of 2000 – 2003 National Health Interview Survey information revealed Mexican Americans were the most active (31.9%) and Cuban and Dominicans were the least active (19.8%) among Hispanic subgroups, with low overall levels of physical activity in the Hispanic study population. Clearly these ethnic variations, acculturation differences and geographic locales would be lost in cumulative reports.

Wallace, Pomery, Latimer, Martinez and Salovey (2010) comprehensively reviewed twenty-six acculturation measures and developed recommendations for the study of acculturation in relation to Hispanic physical activity research. If utilized, these recommendations could address some of the current research deficits with varied Hispanic populations, geographic locales, and acculturation measures. For example, it is difficult to find clear explanations if the original health behaviors, such as physical activity, were simply enhanced through American immigration or if after moving to America these habits decreased or changed. Burroughs Pena, Patel, Rodriguez Leyva, Khan & Sperling (2012) showed cardiovascular risk factors, such as lack of physical activity, were well established in populations before United States immigration and perpetuated despite any acculturation influences. Consistent low physical activity levels within

populations as they move from one country to another can be illustrated in Burroughs Pena, Patel, Rodriguez Leyva, Khan & Sperling's (2012) study of Cubans whereby an adult Havana, Cuba population showed high physical inactivity percentages (74% and 82%) and then low levels of physical activity were found at the same time in a similar population group in Cuban American men (47%) and women (51.6%) living in Dade County, Florida, reporting less than 1000 kcal physical activity per week. This research is particularly interesting when contrasted with Brown, Huang, Perrino, et al. (2011) study that was conducted in East Little Havana, an area of Miami, Florida, which showed positively perceived neighbourhood social climates influenced walking behaviors in an older adult Hispanic adults population.

In summary, many research projects examine a multitude of aspects, and it is difficult to distinguish if the researchers are evaluating the individual's social support group as a whole, the individual's perception of the social support or the actual observed social interaction, so the source of intrapersonal or interpersonal social support is unclear (Gottlieb & Bergen, 2010). Additionally, the construct of acculturation is inconsistently used in physical activity research, and the diverse Hispanic or Latino terminology and ethnicity use in literature extends the confusion (Hunt, Schneider & Comer, 2004; Mier, Ory & Medina, 2010; Zsembik & Fennell, 2005). Because of this confusion, research has attempted to decipher the links between Hispanic individual and group physical activity predictors and acculturation influences. As a result, the group, culture and ethnic questions used to represent acculturation in physical activity research vary widely across geographic, multilingual, social and contextual terrain (Marin & Marin, 1991; Ponce, Lavarreda, Yen, Brown, DiSogra & Satter; 2004; Warneke, Johnson, Chavez, Sudman, O'Rourke, Lacey & Horm, 1997).

Thus far, the literature has not comprehensively captured the linguistic, generational and social differentiation between Latino subgroups in Midwestern rural Hispanic populations and this proposed study can fill this gap (Lara, Gamboa, Kahramanian, Morales & Bautista, 2005;

Zambrana & Carter-Pokras, 2010). Criticism is seen throughout acculturation research citing absent or use of narrow acculturation measures, and lack of comprehension of social familism structures, which are keen constructs within Latino culture and can be further clarified through this project. It is important to understand how rural Hispanic adults' physical activity are initiated and sustained within group and community settings because of well established variations in region and country of origin. Because there is a rapid growth in Hispanic populations with significant sub-Hispanic group differences, and literature shows conflicting results between exercise and acculturation associations, and inconsistent acculturation constructs have been studied, this research could potentially reveal significant findings through the use of the standardized acculturation measure (Short Acculturation Scale for Hispanics). The socioecological approach selected for this research potentially could provide further insight into interventional efficacy and feasibility, to more effectively promote physical activity among and within various Hispanic social subgroups. Enhanced understanding of the extent of acculturation and further knowledge of the volume and impact of social support from friends and family (Social Support for Exercise Survey) will potentially enhance the development of socially appropriate culturally sensitive exercise interventions that would be accepted, adopted and maintained in physically inactive, high-risk rural adult Hispanic populations.

Community Physical Environment – Rural / Neighborhood Walkability

Physical activity research frequently considers the physical environment in terms of the, "... built environment – the physical form of communities – includes land-use patterns (how land is used); large-and small-scale built and natural features (e.g., architectural details, quality of landscaping); and the transportation system (the facilities and services that link one location to another)" (Brownson, Hoehner, Day, Forsyth & Sallis 2009, p.S99). Despite these broad community physical activity definitions, the bonds between the built and natural environmental factors and physical activity have been the least studied of all of the physical activity predictors,

and it is even more difficult to find research incorporating all of these elements in rural community locations, particularly those inclusive of rural Midwestern Hispanic populations (Marquez & McAuley, 2006; Sallis, 2009; Sallis, Cervero, Ascher, et al, 2006; Oldenburg, Sallis & French, 1999; Yousefian, Hennessy, Umstattd, Economos, Hallam, Hyatt & Hartley, 2009). However, considerable evidence among the general population has accumulated through observation, interview and survey assessments to show physical environmental attributes influence physical activity and the characteristics of rural locations have a particularly unique impact upon patterns of physical activity (Hartley, 2004; Sallis, 2009; Sallis, Slymen, Conway, et al., 2011).

The three sub concepts of land use mix diversity, convenient recreation facilities and pedestrian safety are inextricably intertwined within physical activity research. These three concepts were often mixed together and termed differently in research findings that showed illumination, proximity to trails and sidewalks, safety perceptions, recreational resource and population density, and public transportation accessibility have impacted physical activity participation levels (Addy et al., 2004; Brown et al., 2008; Clarke et al., 2008; Cohen, et al., 2007; Diez Roux et al., 2007; Kaczynski, Potwarka & Saelens, 2008; Nagel et al., 2008). Rural areas often do not have street lights, sidewalks, malls, parks, or large indoor or outdoor exercise facilities and there may also be financial barriers for going to exercise facilities, which was noted in low income Hispanic populations (Swenson, Marshall, Mikulich-Gilbertson, Baxter, & Morgenstern, 2005; Riley-Jacome, Gallant, Fisher, Gotesik, & Strogatz, 2010; Vadheim, Brewer, Kassner, Vanderwood, Hall, Butchner, Helgerson, & Harwell, 2010). Rural Latina populations were *less likely* to meet physical activity recommendations in fair/good street lighting than poor lighting conditions (Eyler, Matson-Koffman, Young, et al., 2003). Individual perceptions of the environment have been analyzed to identify environmental barriers that were described as, "...high speed traffic, heavy traffic, lack of crosswalks, or lack of sidewalks were a problem in

their neighborhood” (McGinn, Evenson, Herring, Huston, Rodriguez, 2007, p.172). Few sidewalks and unsafe conditions have been cited as barriers to physical activity (Eyler, Brownson, Bacak, & Houseman, 2003).

Overall research revealed Hispanic adults engaged in less than two vigorous activities per week and averaged 48 minutes of walking per week, yet study of recreational resource availability showed positive links between physical activity in Hispanic populations and nearby access to parks and recreation facilities (prevalence ratio[PR]=0.69; 95% CI 0.77, 1.06), thus illustrating the potential opportunity for positive environmental influences upon physical activity (Diez Roux, Evenson, McGinn, Brown, Moore, Brines, Jacobs, 2007; Hovell, Sallis, Hofstetter, Barrington, Hackley, Elder, Castro & Kilbourne, 1991). Intra-individual factors and built environment necessitate further study because research primarily included subjects with higher education and economic scales in closely located geographic areas and representation of Hispanic or Latino minority groups is lacking (McAlexander, Mama, Medina, O’Connor & Lee, 2011).

Studies evaluating mixed land use, residential density, street connectivity environmental components found higher walkability rates in Hispanic and low income neighborhoods than high income non-Hispanic neighborhoods, despite the poor building, road and sidewalk maintenance qualities in these low income Hispanic neighbourhoods (Zhu, Arch & Lee, 2008). A literature review of physical activity determinants cited lower leisure time physical activity levels were found in rural adult populations, but studies often failed to account for occupational activities thus results may inadvertently omit large quantities of physical activities performed during work (Trost, et al., 2002). The CDC considers environmental components are highly influential towards increasing levels of moderately intense physical activities, and brisk walking and bicycling are such activities (CDC, 2009). Hispanic populations are engaging in moderately intense physical activities as illustrated through research in California populations which revealed 23.6 percent of Latinos engage in non-leisure time walking and bicycling (NLTWB) physical activity as

compared to 12.1 percent of non-Latino whites (Berrigan, Troiano, McNeel, Disogra, Ballard-Barbash, 2006).

In some cases, people afforded more consideration to the quality and design of parks and neighborhoods than other factors when selecting these venues for physical activity in work or play (Craig, Brownson, Cragg & Dunn, 2002; Kaczynski, Potwarka & Saelens, 2008). Simply educating adults about their neighborhoods has resulted in increased physical activity (Kerr, Norman, Adams, Ryan, Frank, Sallis, Calfas, Patrick, 2010). Longitudinal environmental studies that explored the modernization and cost effective development within rural communities were not prevalently seen, nor were individual differences between neighborhoods studied (Brownson, et al., 2005; Sallis, Cervero, Ascher, Henderson, Kraft & Kerr, 2006). Research is often based on workplace health improvement (e.g. wellness programs) and although availability of facility use has been studied, the actual buildings themselves and their use have rarely been assessed. Rural Latinas identified the prohibition of use of school property such as playing fields and running tracks, and lack of public transportation as physical activity barriers (Evenson et al., 2002). Policy changes and workplace improvements or community strategies have not been well tracked nor publicized in literature, which is unfortunate because this could potentially explain how rural residents' perspectives changed as the built environment was adapted, such as with the installation of new sidewalks, trails, upgrades in exercise facilities, etc. (Brownson, et al., 2005; Wang, Macera, Scudder-Soucie, Schmid, Pratt, Buchner & Heath, 2004).

As mentioned in previous sections of this paper, diverse physical activity levels are seen in adult subgroups (age, ethnicity, gender, etc.) and these findings combined with the prevalence of physical inactivity found in rural settings warrant further review to learn about physical activity predictors in these locations (CDC, 1998; Parks, Housemann, Brownson, 2003). The use of the Neighborhood Environment Walkability Scale (NEWS) provided further information about neighbourhood residences, neighbourhood stores, facilities and businesses, access to services,

neighbourhood streets, places for walking and cycling, neighbourhood surroundings, traffic safety, and safety from crime. While physical observation can confirm environmental attributes of a rural environment, current research does not offer descriptions of how contextual environmental community attributes impact rural Hispanic adult residents' physical activity behaviors or habits. Therefore, further research is warranted to more fully understand how the community environment impacts physical activity in rural Hispanic Midwestern adults, and the NEWS will be able to provide an overall measure of neighbourhood walkability that can further explain the community physical environment features and their impact upon our focus population.

Summary

There is a limited amount of physical activity research inclusive of Hispanic populations, particularly Midwestern rural Hispanics. This review of literature has provided a summary of the salient factors that have been shown to have some relationship to physical activity in the general population, in the Hispanic population and finally in the rural Midwestern Hispanic population. As summarized in this review, findings specific to Hispanic and especially to rural Midwestern Hispanics is quite limited. In addition, the research to date primarily involves self-reported data, therefore the current project will obtain objective measurement of physical activity. Undoubtedly, descriptions of self-reported physical activity levels and objective accelerometry are important to obtain a better understanding of the influencing factors on physical activity levels in this population. This is essential in order to plan interventions to increase physical activity and influence policy and organizational changes that may be necessary in order to promote physical activity in this rapidly growing minority population.

CHAPTER 3

Methods

Research Design

An exploratory descriptive correlational design was used to describe physical activity levels and to explore socioecological influences (intrapersonal, interpersonal, and community physical environment) on physical activity in Hispanic rural community-dwelling adults. Cross sectional data was collected over a one-week time frame measuring seven days of physical activity levels.

G*Power 3.1.10 was used to determine the sample size for this study. A medium effect size of 0.30 was used for this study because it is a common finding across multiple regression studies. Therefore, for this linear multiple regression analysis an alpha with 0.05, with power of 0.80 and medium effect size of 0.30, a sample size of 81 was planned for 9 predictors. For clarification, the nine predictors considered for this study included intrapersonal (age, gender, employment, acculturation, obesity, self-efficacy for physical activity), and interpersonal (social support from friends and family) and community physical environment (neighborhood walkability).

Setting

The setting for the study was a rural community in southeast Nebraska. This community has experienced large growth in the Hispanic population with 13.5 percent (814) of the 6,028 total population in 2000 and then an increase of 35.7 percent (2,484) of the 6,960 total population 2010 (U.S. Census Bureau, 2010). The population continued to grow with an estimated 7,034 people in in 2014 (U.S. Census Bureau, 2016). RUCA (Rural Urban Commuting Area Codes) categorizes areas according to zip codes, which are assigned categories according to their population size. The rural community met the RUCA definition of rural because the city population is between the range of 2,500 to 9,999.

Sample

Recruitment. The target population for this study was Hispanic or Latino rural community-dwelling adults, with an adult defined as 19 years of age or older. The principal investigator for this study had direct contact with community dwelling Hispanic or Latino adults through the Public Schools GED classroom, the community and surrounding areas. Permission was obtained from the Public School to conduct the study, where at any given time during the school year there are normally greater than 250 students in the program. Permission was also obtained from the store manager at the local Thrift Store to conduct the study where the Principal Investigator was a current volunteer. Study recruitment and research activities were conducted in a private location in the buildings during business hours, which had safe convenient subject access or a mutually agreed upon setting such as a public building (e.g. public library) or home.

Inclusion / Exclusion Criteria. The inclusion criteria for this study were: (a) an adult defined as 19 years of age or older (19 is the age of majority in Nebraska), (b) self identified as Hispanic or Latino, (c) ability to speak and read English as evidenced by their Test of Adult Basic Education (TABE) score results on file with the school and their class placement in the Adult Basic Education (ABE) Program, local school or other high school graduate or BEST Literacy score results (d) participant was free from physical impairment and/or limitations that would prevent or limit them from their usual activities of daily living (Finamore, Kenyon, Lieberman, Ryu, Ueland & Young, 2008). The exclusion criteria for this study were: Subjects who had surgery within the last three months that would impact their physical activity abilities (e.g. hip or knee replacement).

Instruments

Dependent Variable of Physical Activity. The dependent variable of physical activity was measured by self-report (7-Day Physical Activity Recall) and objective measurement with an accelerometer (ActiGraph®) for the same seven days of time.

7-Day Physical Activity Recall. Physical activity was measured using the 7-Day Physical Activity Recall (7-Day PAR), an interviewer-administered instrument that allows study participants to self-report a wide range of their physical activity. The 7-Day PAR measures physical activity performed at different levels (moderate, hard and very hard) through a 10 – 15 minute interview format. Responses were converted into time per activity category, and tabulated with measurements of estimated metabolic equivalents (METs) that represent cardiac workload capacity. For example, one MET represents an individual's consumption of oxygen while at rest, activities recorded range from 1.5 (light), 4 (moderate), 6 (hard), and 10 (very hard). The participant's physical activity was converted into daily amounts of expended kilocalories per kilogram (kcal/kg/day).

The 7-Day Physical Activity Recall instrument contains physical activity descriptions that represent a wide array of daily activities to include leisure time physical activity. Successful use of the 7-Day Physical Activity Recall instrument has been shown in ethnically diverse adult subjects. Reliability and validity were reported by Sallis (1988) with a “combined reliability of the energy expenditure index” of .78 ($p < .001$) interviewer reliability for a mixed age group of 43. Dishman & Steinhardt (1988) reported correlation coefficients of .89 in four studies with college students. Successful use of the 7-day Physical Activity Recall instrument has been shown in a general Spanish adult population with reliability coefficients of total energy expenditure 0.68 (95% CI .58-.76); activity dose .65 (95% CI .54-.73); moderate intensity activity .61 (95% CI .50-.70); vigorous intensity activity .75 (95% CI .67-.81) (Zuazagoitia, Montoya, Grandes, Arietaleanizbeasoca, Arce, Martinez, Sanchez, Sanchez, 2014). A convergent validity value of $r = .52$ was calculated between 7-Day PAR, activity dose and RT3 accelerometer (Zuazagoitia, et al., 2014).

ActiGraph[®] accelerometer. Three days with at least 8 hours of valid wear time was used to measure time spent in sedentary, light, moderate and vigorous intensity activity (Aadland & Ylvisaker, 2015). The ActiGraph[®] is small (4.6 cm x 3.3. cm x 1.5 cm), lightweight (19 g) and

worn on an elastic belt with the device positioned over the dominant hip. Reliability and validity of the ActiGraph[®] has been reported for older and obese adults (Copeland & Esliger, 2009; Feito, Bassett, Tyo, & Thompson, 2011; Matthews, 2005; Lopes, Magalhães, Bragada, & Vasques, 2009; Miller, Strath, Swartz, & Cashin, 2010). Test-retest reliability correlations (ICC = 0.7-0.9) were reported in free-living individuals (n=143) across separate administrations (Sirard, Forsyth, Oakes, & Schmitz, 2011).

Independent Variable. Independent variables were obtained by demographic survey, height and weight measurements, the Self-efficacy for Exercise Behaviors Survey, Social Support for Exercise Survey, Short Acculturation Scale for Hispanics, and the Neighborhood Environment Walkability Scale.

Demographic and Anthropometric Measures. Gender, age and financial status were self-reported on the investigator developed demographic questionnaire. Study participants' weight was measured with a calibrated digital scale. Height was measured with a stadiometer.

Self-efficacy for Exercise Behaviors Survey (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). This instrument measured participants' confidence levels towards consistent physical activity. Their responses were recorded on a five point Likert-type scale with all responses totaled then averaged. A high score indicates the participant has a high level of self-efficacy. Two main self-efficacy factors include: resisting relapse and making time for exercise, and these two self-efficacy sub-scale factors had respective Cronbach's alpha values of .85 and .83 (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). Overall Cronbach's alpha values were .78 (Sallis, Pinski, Grossman, Patterson, & Nader, 1988).

Social Support for Exercise Survey (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). This instrument captured participants' self-reported responses pertaining to the behavior of their family and friends in response to their exercise. Again, their responses were recorded on a five point Likert-type scale with all responses totaled then averaged. A high score indicates the participant receives a high degree of support from their family and friends. The questionnaire

contained 29 items and friends were defined as “friends, acquaintances, or coworkers” and family as “members of the household” (Sallis, Grossman, Pinski, Patterson & Nader, 1987, p. 827).

Reported Cronbach’s alpha values for the individual factors were: .84 for friend support for exercise habits – exercising together; .91 for family support for exercise habits – participation and involvement; and .61 for family support for exercise habits – rewards and punishments (Sallis, Grossman, Pinski, Patterson, & Nader, 1987). Overall Cronbach’s alpha values were not reported.

Short Acculturation Scale for Hispanics (SASH) (Marin, Sabogal, Marin, Otero-Sabogal, Perez-Stable, 1987). This 12 item instrument uses behavioral factors, rather than sociodemographic variables, as proxy acculturation variables. These factors include assessments of language use and preference, media preference, social relationships, immigration age, years of education and amount of life lived in the United States. The responses are scored on a scale of 1 to 5, then scores compiled with lower total scores (1 and 2.99) indicative of lower acculturation and higher total scores (above 2.99) indicative of greater acculturation. Validity was consistent with other similar measures ($r=.65$) (Marin, Sabogal, Marin, Otero-Sabogal, Perez-Stable, 1987). Analysis of individual factors yielded Cronbach’s alpha values of .90 language use, .86 media preference, .78 ethnic and social relations. The overall Cronbach’s alpha value was .92 (Marin, Sabogal, Marin, Otero-Sabogal, Perez-Stable, 1987).

Neighborhood Environment Walkability Scale (NEWS) (Sallis, 2002) This instrument provided information pertaining to safety, indoor and outdoor settings, transportation and types of residences with participants’ self-reported responses. The NEWS contains 98 questions that appraise residential density, proximity of land use, street connectivity, cycling and walking facilities, aesthetics, traffic safety and crime safety (Brownson, Chang, Eyler, Ainsworth, Kirtland, Saelens & Sallis, 2004). NEWS items are rated on a scale from 1 to 4 with a higher numerical rating indicative of a positive environmental element, except for land use and residential density. These items were rated from 1 (none) to 5 (all) (Brownson et al., 2004). The majority of NEWS reliability values were greater than .75 and further testing showed reliability

coefficient numbers greater than or equal to a moderate level (Brownson et al., 2004; Saelens, Sallis, Black, Chen, 2003). More specifically, the reported test-retest reliability for the neighborhood environment factors were as follows: residential density .63, land use mix-diversity .78, land use mix-access .79, street connectivity .63, walking/cycling facilities .58, aesthetics .79, pedestrian/traffic safety .77, and crime safety .80 (Saelens, Sallis, Black & Chen, 2003). Overall Cronbach's alpha values were not reported and no validity information could be found pertaining to this instrument (Saelens, Sallis, Black & Chen, 2003).

Procedures

Enrollment and Consent. Study recruitment took place through the Public School classroom or at the local Thrift Store through face-to-face contact with all potential study participants during business hours. Eligibility for research participation in this project was determined based on student class placement, which was determined by the school based on their ability to read and speak English. Adults that indicated local Public School or other high school graduation status were included. This author personally visited all classroom sites at the local Public School with potential study participants, and had face-to-face contact with potential study participants, to provide them with an invitation to participate in the research project prior to class attendance and to verbally explain the research project. Study participants were recruited with study fliers distributed by the primary investigator during the invitation to participate and a brief oral description of the research study. If they consented to consider participation in the research project, further description of the research procedures and expectations were provided prior to obtaining informed consent.

The main staff at the recruitment sites were provided with an overview of the research project via email and in person on an individual basis if desired, so they would be aware of the research project. If time permitted, some staff desired to explain the project and cued study participants to contact the researcher if they were interested. They also provided this researcher

with information that the student(s) has provided consent to be approached regarding study participation.

The researcher screened potential participants, and proceeded with informed consent if inclusion criteria were met. Subjects were provided as much time as necessary to ask questions prior to providing informed consent. Private classroom areas, business rooms or private homes were utilized for all study procedures (i.e. to obtain informed consent, administer questionnaires, height and weight measurements, and provide ActiGraph® instructions).

Once written informed consent was completed, the demographic and contact information were obtained. Subjects were measured for height and weight. This took approximately 15 to 20 minutes. Study participants were then provided with a survey questionnaire packet to complete. Study participants were instructed to return the survey materials in person to the researcher. It took approximately 30 minutes to 1.5 hours to complete the survey questionnaires and the PI was available to answer questions if needed. Once study questionnaires were returned to the researcher, a visual review of the documents for completeness and missing data was performed. The study participant was assisted to complete any missing data if they were willing.

Finally, the study participants were issued an ActiGraph® and instructed on the proper placement and wear of the accelerometer. They were instructed to wear the accelerometer on their dominant hip while awake and maintain their normal physical activity routine. They were instructed to remove the device while sleeping, showering or swimming. The participants were provided with a diary to record their wear time (when they put the ActiGraph® on and when they took it off to shower or bathe) and any other irregularities (e.g. night shift work) that might occur during their seven day wear time. Appointments were set with a pre-arranged meeting place and time for a full 7 days later for the purpose of collecting the study questionnaires and ActiGraph®. All efforts were made to make follow up appointments that coincided with their class times and/or work schedules in order to facilitate minimal interruption in the study participants' personal schedules. If the ActiGraph® data was incomplete after 7 days they were asked if they

were willing to wear the ActiGraph® for another week. If they consented, they wore the ActiGraph® for another week and then the data was collected.

Once all research materials (questionnaires and ActiGraph®) were submitted and procedures are completed, study participants were provided a gift card in appreciation for their study participation. All survey instruments and ActiGraph® data were coded with a subject ID number only. Subject contact information (names and phone numbers and study IDs) were transported from the study site to the researcher's home office in a locked briefcase and maintained in a locked filing cabinet in the researcher's home office to maintain study participant confidentiality.

Data Analysis

The analysis was conducted with the assistance of a College of Nursing statistician and use of current SPSS statistical software packages. Descriptive statistics (frequencies, means, standard deviations) were performed for all variables. All variables were examined for normality using descriptive statistics (skewness and kurtosis) and visual inspection of scatterplots.

Aim One – To describe physical activity levels (Seven Day Physical Activity Questionnaire and objective accelerometry – time spent in sedentary, light, moderate and vigorous intensity activity) in rural Hispanic or Latino adults.

Descriptive statistics were utilized (frequencies, means, standard deviations) to summarize both self-report data from the Seven Day Physical Activity Questionnaire and the objective accelerometry. The accelerometer data was included if the information showed (1) at least three days' wear time and (2) eight hours minimal daily wear time (Aadland & Ylvisaker, 2015). The 7-Day Physical Activity recall questionnaire was an individual face-to-face structured interview that identified occupational, recreational, leisure time and activities of various intensity levels, strength and flexibility exercise, and hours of sleep. Strength and flexibility were recorded as moderate physical activity. Total daily kilocalories of energy were calculated by multiplying all seven days' activities by their corresponding MET values, sleep (1 MET), light (1.5 METs),

moderate (4 METs), hard (6 METs), and very hard (10 METs) and then totalled to provide the total weekly expenditure, then divided by seven to produce the total daily expenditure, and then it is multiplied by the weight of the individual in kilograms, to produce the Individual Energy Expenditure value (IEE).

It is noted that literature frequently reports percent MVPA ActiGraph® data and after reviewing the preliminary results it was appropriate to use percent MVPA as the objective dependent variable. It is important to note an analysis of the specific *percentage* of time spent in each of the categories of physical activity is crucial, rather than an analysis of the total time, because the study participants did not wear the ActiGraph® for the exact same length of time. It was noted the ActiGraph® program software calculates average MVPA by taking the total MVPA and dividing by the number of calendar days. This is problematic because the software counted one minute of a day as a whole calendar day, so the data did not accurately reflect the actual physical activity because it was divided by the number of days, regardless of length of daily wear time. Therefore, percent of MVPA and other physical activity percents (sedentary, light, moderate, vigorous, and very vigorous) were used for analysis. From the 7-Day Physical Activity Recall questionnaire it was appropriate to use the all-encompassing physical activity measure of Individual daily Energy Expenditure (IEE).

Aim Two – To examine factors that influence physical activity in rural Hispanic or Latinos: (a) intrapersonal factors (age, gender, ethnicity, employment, body mass index (BMI), and self-efficacy for physical exercise) and (b) interpersonal factors (acculturation and social support for exercise from friends and family) and (c) community physical environment (neighborhood walkability). Height was measured with a calibrated digital scale and height was measured with a stadiometer. BMI was calculated as weight in kilograms divided by height in meters squared ($\text{weight (kg)} / [\text{height m}]^2$). Four BMI categories were created based on the

Centers for Disease Control (CDC) criteria with underweight below 18.5, normal or healthy weight 18.5 – 24.9, overweight 25.0 – 29.9, and obese 30.0 and above (CDC, 2016).

Multiple linear regression was used to examine factors that influence physical activity in rural Hispanic or Latino adults: (a) intrapersonal factors (gender, age, acculturation, obesity, employment, and self-efficacy for physical activity) and (b) interpersonal factors (social support from friends and family) and (c) community physical environment (neighbourhood walkability). A two-sided test of significance at a p-value level of less than or equal to 0.05 will be used to test for significance.

Limitations

Threats to Validity

Overall internal validity was a limited concern because of the basic descriptive correlational study design. Selection bias was a concern because of the convenience sampling. The study participants' self reported data might be overestimated or biased because of the social desirability related to physical activity levels. The cross sectional nature of the data in this study does not allow for inferences related to causality. Historical influences may have influenced study participants' awareness of physical activity, particularly if the study questionnaires were received during periods of extremely publicized physical events within the community, such as the annual Relay for Life sponsored by Doane College. This threat was lessened by the short time span of the study (i.e. one week). Investigator attention to any potential influential event nationally, regionally, or locally during the time of data collection was used to identify any such threat and to avoid the threat if possible. Instrumentation was not a threat in this study because all data was collected by survey using well-established reliable and valid instruments. Retrospective self-report of physical activity is subject to study participants' recall bias. The objective measure produced by the ActiGraph[®] was compared to the self-reported physical activity levels obtained from the 7-Day Physical Activity Recall instrument.

CHAPTER 4

Results

Analysis of Data

The purpose of the study was to describe physical activity levels and factors that influence physical activity in rural Hispanic or Latino adults. The factors that influence physical activity in rural Hispanic or Latino adults will be presented. The conceptual framework for this study will be the basis for the presentation of the study results (Figure 1, Kaiser, Brown & Baumann, 2010). As previously mentioned, this study examined three of the five main areas in this model: (a) intrapersonal factors (age, gender, ethnicity, employment, body mass index (BMI) and self-efficacy for physical exercise), interpersonal factors (acculturation and social support for exercise from friends and family) and (c) community physical environment (neighborhood walkability) and their influences on physical activity behavior. A description of the physical activity time spent in sedentary, light, moderate and vigorous intensity in rural Hispanic or Latino adults will be provided. Physical activity behavior will be explained through the self-reported 7-Day Physical Activity recall questionnaire and objective accelerometry.

Sample Characteristics

Sixty-six individuals consented to participate in the study. Two study participants declined to fully complete the questionnaires, one study participant lost the ActiGraph[®] at a local store, and nine did not meet the pre-specified ActiGraph[®] valid wear time. This resulted in 54 study participants in the final sample that had complete questionnaire and ActiGraph[®] data. Statistical analysis for the study was performed using SPSS version 23.0 (IBM[®]SPSS[®] Statistics, 2016). Descriptive statistics (e.g. mean, median, mode, standard deviation) and multiple regression analysis were conducted. Data were reviewed for irregularities and missing values (Field, 2013). Descriptive statistics are provided in Table 1.

Demographic and Anthropometric Measures. All study participants self-identified as Hispanic. Their ages ranged from 20 to 61 years with a mean of 36.8 years (SD = 10.2). Forty one females (75.9%) and 13 males (24.1%) participated in the study. No pregnant females were in the study. The majority of the study participants were married (n=37, 68.5%), although some were single (n=13, 24.1%), divorced (n=3, 5.6%), and one living with partner (n=1, 1.9%). Many had children living in their household (n=37, 68.5%) and very few with only one child in the house (n=5, 13.9%). Most households had two (n=13, 36.1%) or three (n=11, 30.6%) children, and some even four (n=7, 19.4%) children living in the house. The mean age of children in the house was 9.39 years.

The overall employment status of the group was full time (n=38, 70.4%) and or homemaker (n=11, 20.4%). Three study participants were employed part-time, one volunteer and one disabled participant with no physical limitations. The study participants were employed at the Meatpacking Plant (n=22, 40.7%), home (n=12, 22.2%), other (n=10, 18.5%), Public School (n=7, 13.0%), Walmart (n=1, 1.9%), and Meat Storage Facility (n=1, 1.9%).

Financial status was more difficult than education to discern due to a wide variety of responses. The majority (n=42, 77.8%) worked outside the home and only a few (n=6, 11.1%) were self-employed. Many did not wish to provide detail regarding their financial status (n=18, 33.3%) and one indicated more than enough money to make ends meet. The majority (n=27, 50.0%) identified enough money to make ends meet. Fifteen percent (n=8, 14.8%) did not have enough money to make ends meet. Three participants indicated they were homeless within the last 12 months. Three participants indicated they had a college education, three had a 9 – 12th grade education, three had 6 – 8th grade education, and the rest (45 participants) declined to respond.

The majority of study participants had internet access in their home (n=37, 68.5%) via their phone (n=36, 83.7%). Only three used a computer and four used an i-pad to access the

internet. Forty nine owned a car and 30 owned more than one car. One indicated they did not own a car but could borrow someone else's car. Four did not own a car and could not borrow or use someone else's car.

The mean body mass index (BMI) of study participants was 29.5 (SD = 5.7). An overwhelming number of study participants had an obese (n=22, 40.7%) or overweight (n=22, 40.7%) body mass index (BMI). One had an underweight BMI and nine (16.7%) had normal or healthy weight BMI.

When participants were asked to select two days during the week most representative of their weekend days, their response was frequently Saturday and Sunday. However, even though these days were identified as weekend days and the assumption is made they were free to do as they please, they were frequently mandated to work on Saturdays and Sundays so these days were not free of employment responsibility. Study participants indicated they often worked overtime on one or both of the weekend days (Saturday and/or Sunday). Frequent cueing to their workplace duties elicited descriptions of their daily physical activity at moderate level that was not initially acknowledged as physical activity. During the interview, without prompting, many participants indicated the majority of their resources (time, physical energy, mental efforts) were spent towards their work and family responsibilities and they had little time for purposeful physical activity.

No study participants indicated night shift work. Unfortunately many of the participants (n = 33, 61%) failed to maintain the diary to record their ActiGraph[®] wear time. Due to the low number of study participants attempting to complete the diary, and even fewer providing a complete history of their ActiGraph[®] wear time, this information was not beneficial to the study and was not used in determining valid wear time.

Self-efficacy for Exercise Behaviors Survey (Sallis, Pinski, Grossman, Patterson, & Nader, 1988). The two main factors for this instrument are resisting relapse and making time for

exercise. Resisting relapse, also called sticking to it, is one of the two main self-efficacy factors in this survey that included six questions with few areas showing higher self-efficacy levels. Generally, the exercise confidence scores were evenly divided for the question related to sticking to an exercise program after a long tiring day at work. Thirty seven percent of respondents answered “maybe I can” and 25.9 % answered “I know I can” when asked if they felt they could exercise even though they were feeling depressed. When asked if they could continue to exercise with others even though they seem too fast or too slow, 31.5% felt moderately confident (“Maybe I can”) and 29.6% were very confident (“I know I can”) that they could continue with exercise. Responses were fairly split when asked if they could, “Stick to your exercise program when undergoing a stressful life change...” Only 9.3% responded, “I know I can” stick to an exercise program when family is demanding more time and when they have household chores to do and excessive demands at work. Only 7.4% indicated they could stick to their exercise program when social obligations were very time consuming.

Making time for exercise, the other main self-efficacy survey factor had four questions with more notable results. When asked if respondents felt they could, “Get up early, even on weekends, to exercise” 33.3% responded “Maybe I can” and 25.9% responded “I know I can.” Respondents felt confident (38.9% “I know I can”) and somewhat confident (31.5% “Maybe I can”) that they could set aside time for a physical activity program. Nearly forty percent (38.9%) believed they could “maybe” attend a party only after exercising. Thirty seven percent responded, “Maybe I can” when asked if they could read or study less in order to exercise more. The mean score for sticking to it was 24.2 and the mean score for making time for exercise was 12.6. The Cronbach’s alpha for the current study was .859.

Table 1

Demographic Characteristics

	Mean	SD
Age in Years	36.8	10.2
	n	%
Self Identified as Hispanic		
yes	54	100.0
no	0	0.0
Sex		
female	41	75.9
male	13	24.1
Marital Status		
married	37	68.5
single	13	24.1
living with partner	1	1.9
widowed	0	0.0
divorced	3	5.6
separated	0	0.0
Do you have children in the house?		
yes	37	68.5
no	16	29.6
declined to answer	1	1.9
If children, how many?		
1	5	13.9
2	13	36.1
3	11	30.6
4	7	19.4
If children, what age?		
Mean = 9.39		
Mode = 12		
Range = 0.5 - 23		
Have you been homeless at any time during the last 12 months?		
yes	3	5.6
no	51	94.4
Do you have internet access at home?		
yes	37	68.5
no	14	31.5
If internet, how do you access?		
computer	3	7.0
ipod	0	0.0
ipad	4	9.3
phone	36	83.7
Do you own a car?		
yes	49	90.7
no	5	9.3

Table 1

Demographic Characteristics (continued)	n	%
If you own a car, do you own more than one car?		
yes	30	61.2
no	19	38.8
If you do not own a car, are you able to borrow/use someone else's car?		
yes	1	20.0
no	4	80.0
Do you work outside the home?		
yes	42	77.8
no	12	22.2
Are you self-employed?		
yes	6	11.1
no	48	88.9
Employment status		
full-time	38	70.4
part-time	3	5.6
volunteer	1	1.9
disabled	1	1.9
retired	0	0.0
homemaker	11	20.4
other	0	0.0
Where are you employed?		
Meatpacking Plant	22	40.7
home	12	22.2
Walmart	1	1.9
Public School	7	13.0
Meat Storage Facility	1	1.9
other	10	18.5
Financial status		
not enough to make ends meet	8	14.8
enough to make ends meet	27	50.0
more than enough to make ends meet	1	1.9
do not wish to provide	18	33.3
Body Mass Index (BMI)		
mean = 29.5		
SD = 5.7		
Range = 17.0 – 47.9		
Body Mass Index (BMI) Weight Status		
underweight (below 18.5)	1	1.9
normal or healthy weight (18.5 – 24.9)	9	16.7
overweight (25.0 – 29.9)	22	40.7
obese (30.0 and above)	22	40.7

Social Support for Exercise Survey (Sallis, Grossman, Pinski, Patterson, & Nader, 1987) - Study participants reported little family support for their exercise. Only 14.8% responded family “Exercised with me” very often, 7.4% responded family “Offered to exercise with me” very often, and 13.0% responded family “Gave me helpful reminders to exercise” very often. The mode (most frequently answered) response for every question related to family is “none”, and even more so with questions related to friends support for exercise. For example, when asked if friends “Exercise with me” only 11.1% responded “very often” and 3.7% responded “often.” The mean score for family participation was 23.7. The mean score for family rewards and punishment was 5.0. The mean score for friend participation was 22.9. The Cronbach’s alpha for social support – family participation was .915 and social support – friend participation was .965. The overall Cronbach’s alpha for the current study was .939.

Short Acculturation Scale for Hispanics (SASH) (Marin, Sabogal, Marin, Otero-Sabogal, Perez-Stable, 1987) - Respondents preferred to read, speak and listen to Spanish more than English. No respondent indicate their social gatherings contained “All Americans” and only 9.3% visited or had visitors that were “All Americans” or “More Americans than Latinos.” Survey participants indicated if they could choose their children’s friends they overwhelmingly responded (77.8%) that they would want them to be “Half & Half”, meaning half Latino/Hispanic and half American. The mean score for SASH was 29.0. The Cronbach’s alpha for the current study was .917.

Neighborhood Environment Walkability Scale (NEWS) (Sallis, 2002) – Most respondents indicated that they did not have many cul-de-sacs or dead-end-streets. Generally they agreed the distances between intersections were short (100 yards or less), and that there are many four-way intersections. Study participants indicated there are many alternative routes to travel within the neighborhood. Most participants (64.8%) thought their streets were not too busy for walking in their neighborhood. They felt that the speed of the traffic was slow; however, they felt most drivers exceeded the speed limits. They felt crosswalks were limited but when present they were

helpful. They did not believe there were a lot of exhaust fumes from vehicles. The neighborhood was described as mostly single-family detached residences with a few apartments or condos with 1 – 3 stories. The nearby amenities such as stores, facilities, etc. within 10 minutes or less of their home within walking distance included small grocery stores, vegetable market, laundry, post office, library, elementary school, fast food restaurant, coffee place, bank / credit union, non-fast food restaurant, salon/barber shop, and park. They agreed they could do most of their shopping within easy walking distance (66.6%) at local stores (75.9%). There was a lack of public transit (bus, train). The neighborhoods were described as not hilly and no canyons or hillsides limited traveling routes. Although there are a lot of sidewalks on the streets in the neighborhood, many are not well maintained. There is a lack of bicycle or pedestrian trails (72.2%) and the sidewalks are not separated from the traffic (53.7%). There are many shade trees and interesting things to look at in the neighborhood and they are free from litter. However, there weren't as many attractive natural sites or attractive buildings in the neighborhood. Most people were very satisfied with how easy and pleasant it is to walk (66.7%) or bicycle (51.9%) in the neighborhood. Many agreed the neighborhoods were well lit at night, they could speak with people, and the crime rate was low. They felt safe to go on walks either during the day or at night. They were very dissatisfied with public transportation access (59.3%). They were very satisfied with the schools and the safety from threat of crime. They were strongly satisfied (57.4%) the neighborhood was a good place to raise children and strongly satisfied (64.8%) the neighborhood was a good place to live. The mean score for the NEWS subscales were as follows: residential density, 201.3; land use mix – diversity, 64.8; land use mix – access, 18.9; street connectivity, 12.9; walking / cycling facilities, 9.6; aesthetics, 16.5; pedestrian / traffic safety, 21.9; crime safety, 19.1; general neighborhood satisfaction, 60.7. The Cronbach's alpha values for the current study were as follows: residential density .092, land use mix-diversity .897, land use mix-access .708, street connectivity .472, walking/cycling facilities .787, aesthetics .645,

pedestrian/traffic safety .538, and crime safety .611 and neighborhood satisfaction .841. The overall NEWS Cronbach's alpha for the current study was .849.

Aim 1

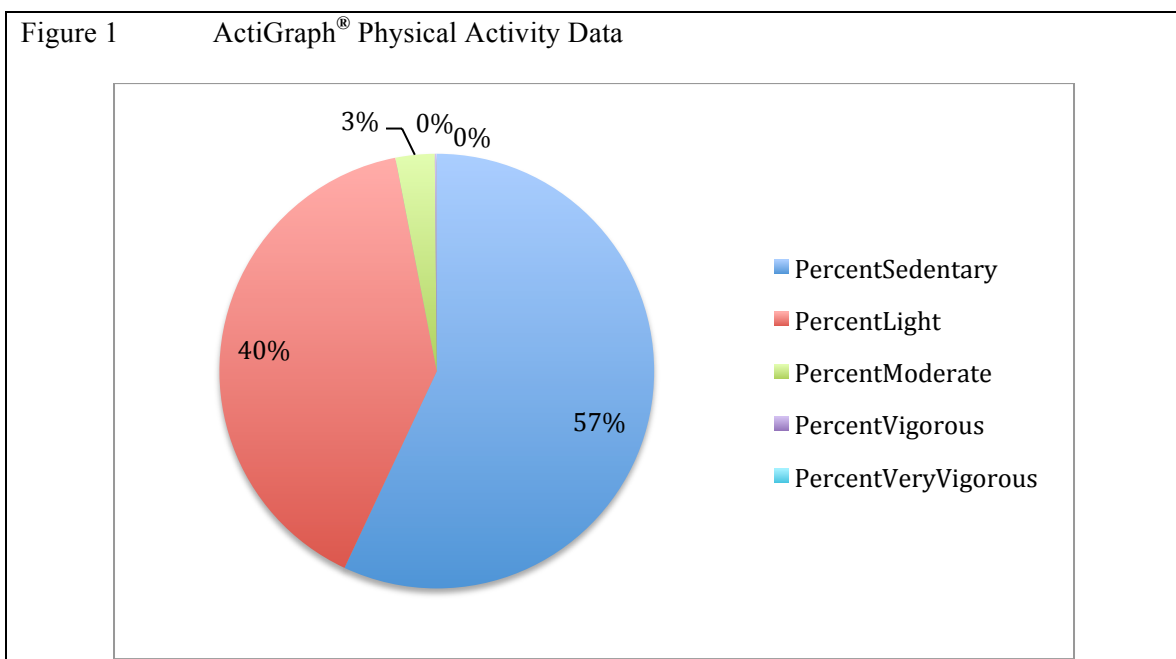
Aim 1 was to describe the physical activity levels (7-Day Physical Activity Recall and Accelerometry). Table 2 shows the results of the objective ActiGraph[®] physical activity measurements and the subjective IEE from the 7-Day Physical Activity Recall questionnaire. The % MVPA represents the percentage of time spent in moderate, vigorous and very vigorous physical activity. Because % MVPA is frequently cited in physical activity literature, this measurement, along with the other individual measurements have been reported.

Table 2

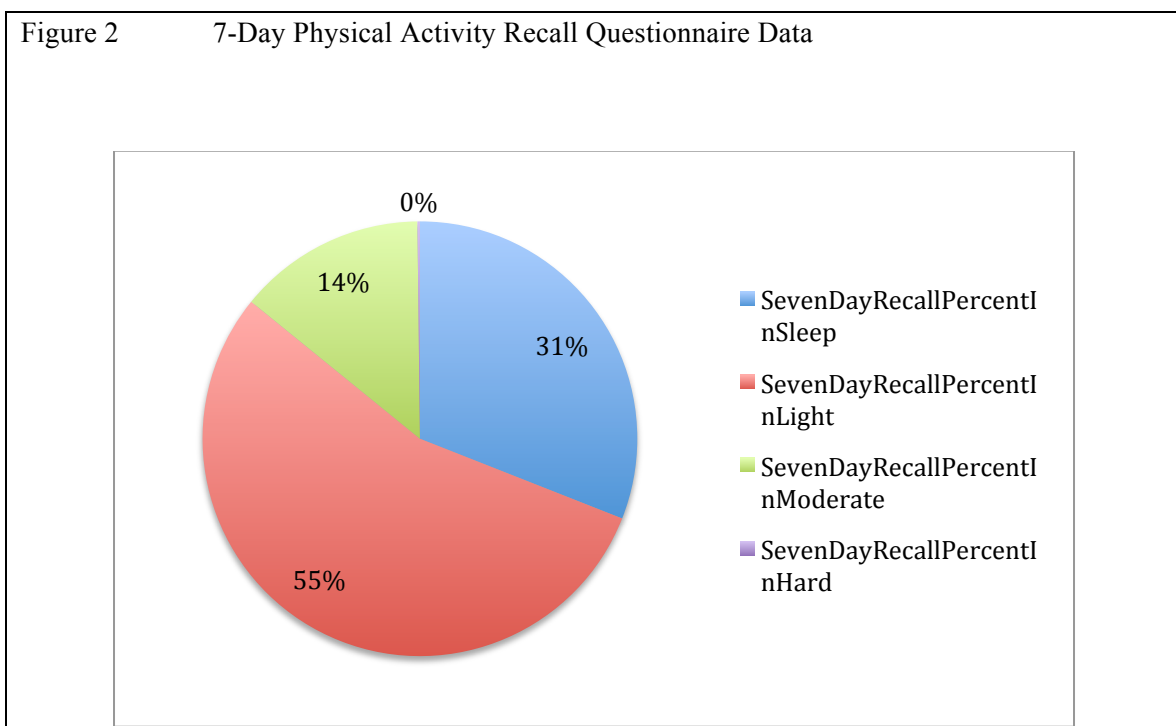
Descriptive Statistics of Physical Activity Levels

	N	Minimum	Maximum	Mean	Std. Error	Std. Deviation	Skewness	Kurtosis
% MVPA	54	.23	9.69	3.06	.28	2.09	1.231	1.848
% Sedentary	54	35.63	76.97	56.98	1.44	10.55	-.323	-.637
% Light	54	22.80	59.53	39.96	1.32	9.73	.208	-.730
% Moderate	54	.23	9.69	2.91	.27	1.99	1.361	2.387
% Vigorous	54	.00	1.63	.13	.04	.30	3.491	13.528
% Very Vigorous	54	.00	.63	.02	.01	.09	6.513	44.880
IEE	54	1501.9	5048.6	3056.4	105.1	772.1	.272	-.344
% Sleep	54	12.50	50.00	30.98	.62	4.52	.172	9.847
% Light	54	27.98	87.50	54.87	1.85	13.56	.047	-1.155
% Moderate	54	.00	36.31	13.96	1.85	13.56	.139	-1.838
% Hard	54	.00	3.27	.19	.08	.56	4.087	18.912

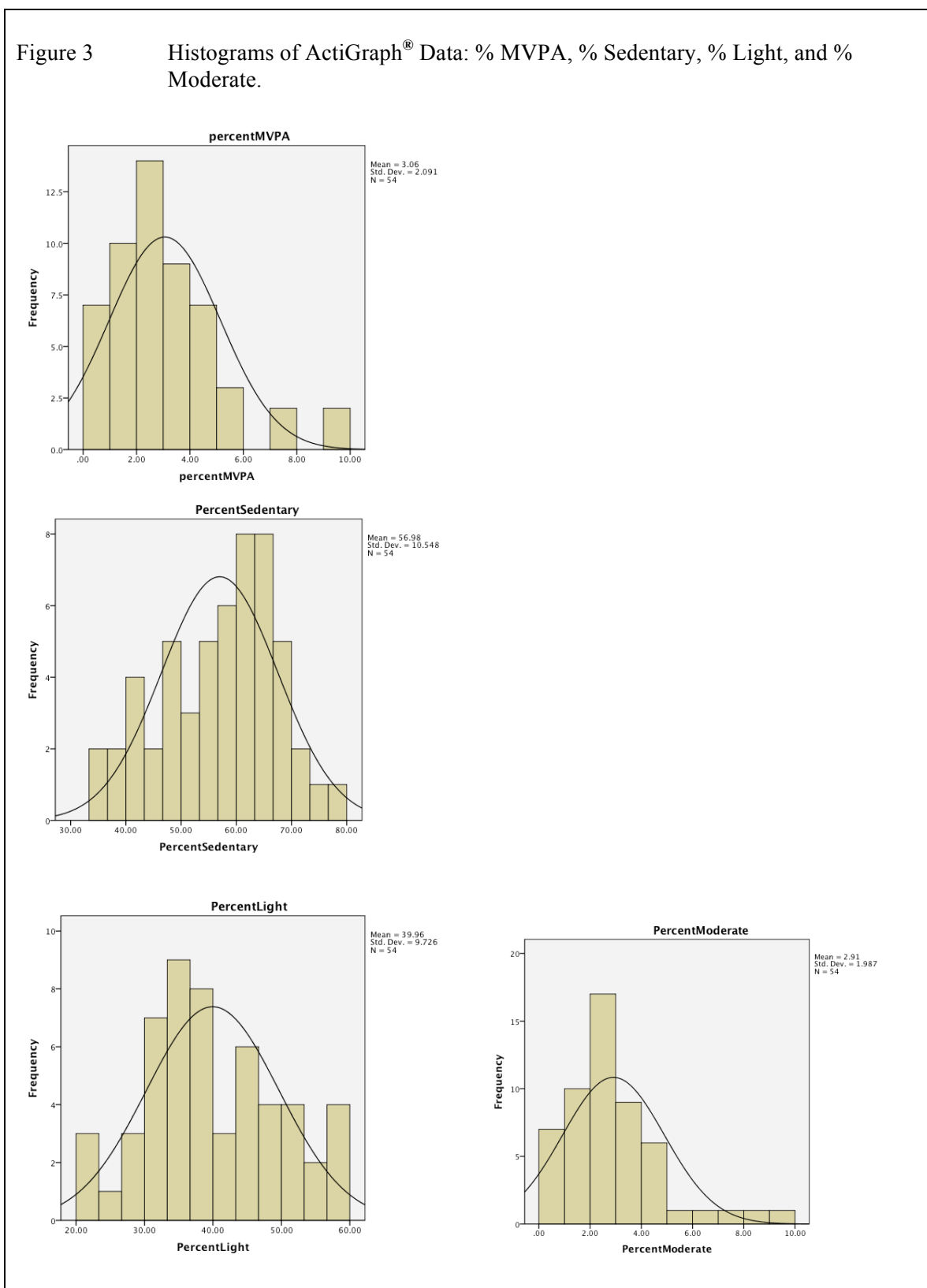
The majority of the physical activity time was spent in sedentary or light physical activity for the ActiGraph[®] data.



The 7-Day Physical Activity Recall questionnaire data shows the majority of time was spent in in sleep or light physical activity.



The following histograms show the normal bell curve overlaid with the bar chart.



The positive skewness and the asymmetry of the Percent Vigorous and Very Vigorous categories can be easily seen.

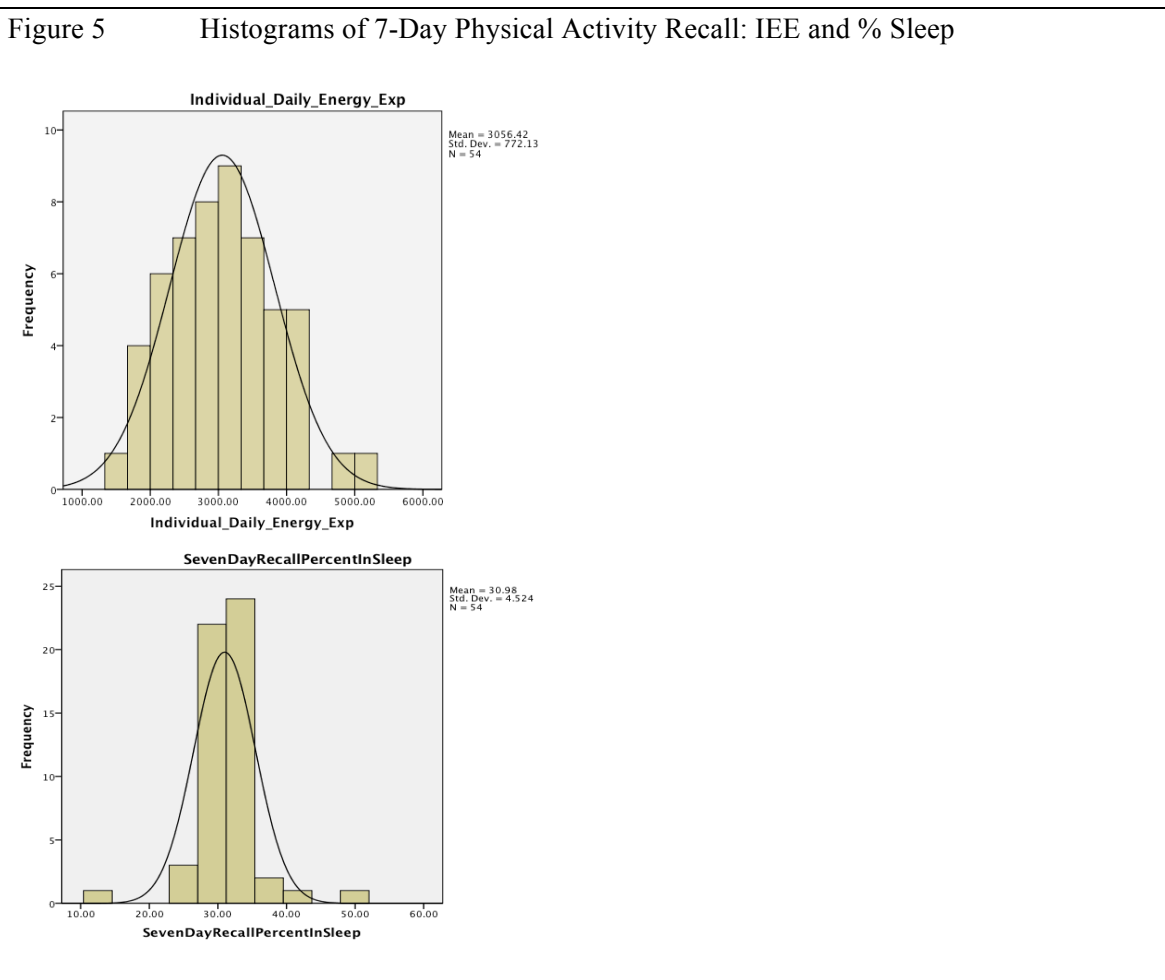
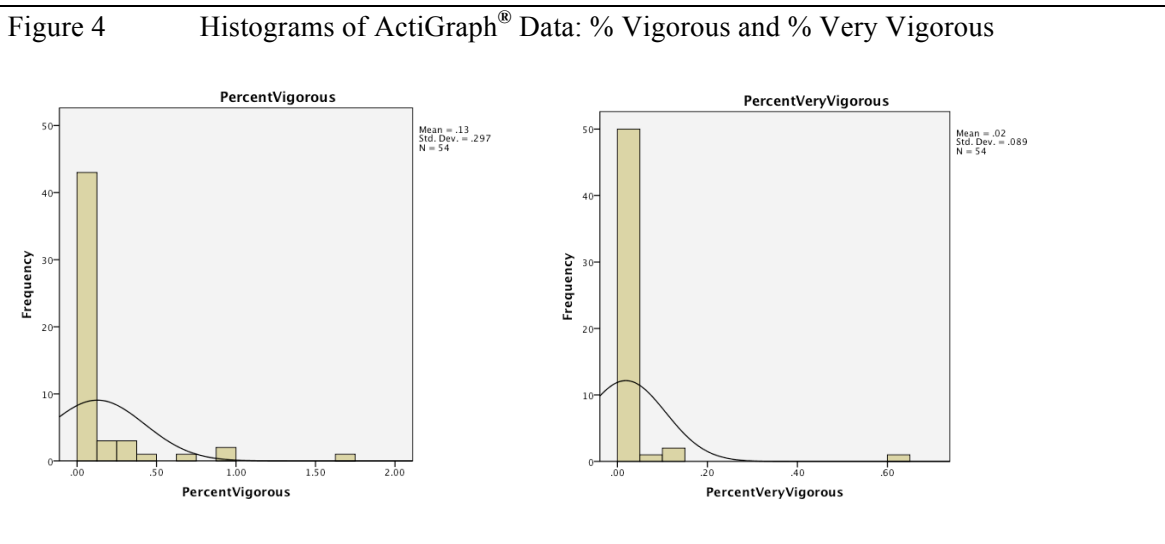
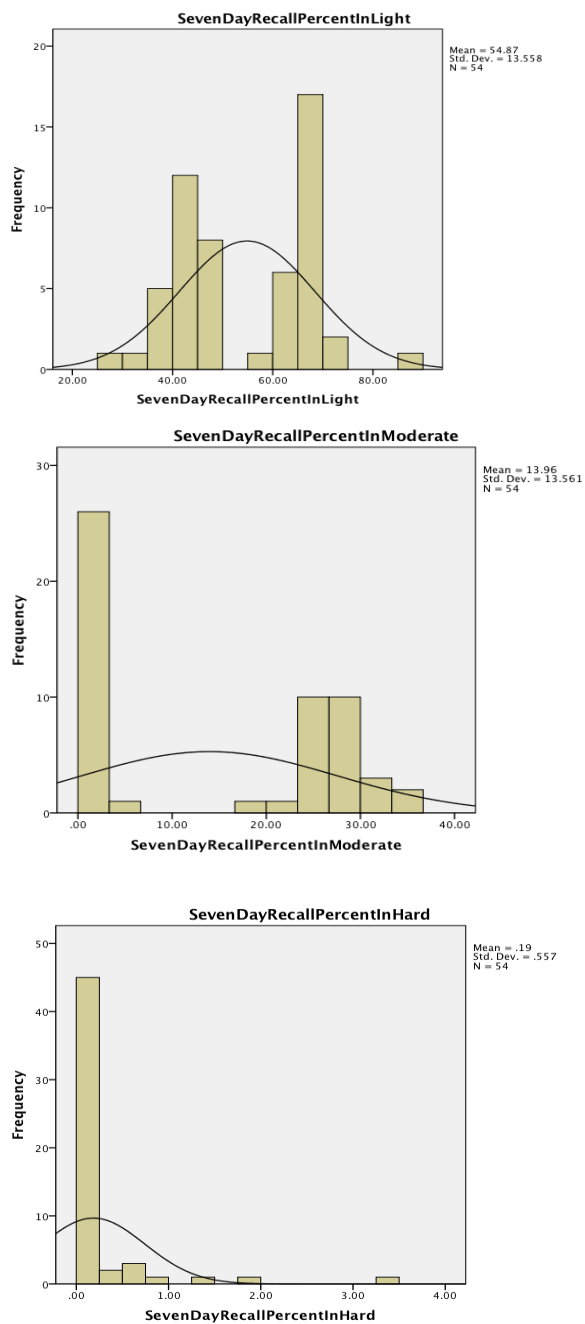


Figure 6 Histograms of 7-Day Physical Activity Recall: % Light, % Moderate, and % Hard



Aim 2

The second aim of this study was to examine factors that influence physical activity in rural Hispanic or Latinos (a) intrapersonal factors (age, gender, ethnicity, employment, body mass

index (BMI) and self-efficacy for physical exercise) and (b) interpersonal factors (acculturation and social support for exercise from friends and family) and (c) community physical environment (neighbourhood walkability).

Age

The following table shows the Pearson correlations of age with the various physical activity measures. There were three significant correlations: (ActiGraph®) % Sedentary, % Light, and (7-Day Physical Activity Recall) % Sleep.

Table 3

Pearson Correlations of Age and Physical Activity Measures

	Pearson Correlation	Age Correlations Sig. (2-tailed)
% MVPA	.009	.949
% Sedentary	-.291	.033*
% Light	.314	.021*
% Moderate	.049	.723
% Vigorous	-.198	.151
% Very Vigorous	-.236	.086
IEE	.177	.200
% Sleep	-.275	.044*
% Light	-.033	.813
% Moderate	.132	.343
% Hard	-.166	.230

* significant at the .05 level

In summary, older participants spent less of their time in sleep and sedentary physical activity and more time in light physical activity. There were no significant relationships between age and %MVPA or IEE so this variable was not added to the regression model.

Gender

The following tables summarize the independent samples t-tests for gender and the various physical activity categories. These findings show those who are male spend a significantly higher time in moderate physical activity. The t-tests showed a significant difference in gender and percent in Moderate Physical Activity ($p = 0.013$), and a significant

difference in gender and percent MVPA ($p = 0.020$). There was also a significant difference in gender and IEE ($p = 0.002$). These findings indicated gender was an important variable to include in the regression model.

Table 4

Independent Sample t-Tests for Gender and Physical Activity Measures

	Gender	N	Mean	Std. Deviation	Std. Error Mean	t	Sig. (2-tailed)
% Sedentary	Female	41	57.27	9.53	1.49	.354 ^a	.725
	Male	13	56.07	13.70	3.80		
% Light	Female	41	40.04	8.84	1.38	.104 ^a	.918
	Male	13	39.71	12.53	3.47		
% Moderate	Female	41	2.54	1.73	.27	-2.576 ^a	.013*
	Male	13	4.09	2.35	.65		
% Vigorous	Female	41	.143	.335	.052	.659 ^a	.513
	Male	13	.080	.114	.032		
% Very Vigorous	Female	41	.009	.029	.0046	-0.805 ^b	.436
	Male	13	.049	.175	.0485		
% MVPA	Female	41	2.69	1.87	.29	-2.393 ^a	.020*
	Male	13	4.22	2.38	.66		

a. The result of Levene's test was that equal variances were assumed.

b. The result of Levene's test was that equal variances were not assumed.

* significant at the .05 level

	Gender	N	Mean	Std. Deviation	Std. Error Mean	t	Sig. (2-tailed)
IEE	Female	41	2878.6	713.7	111.5	-3.268 ^a	.002**
	Male	13	3617.2	697.4	193.4		
% Sleep	Female	41	31.45	4.16	.65	1.377 ^a	.175
	Male	13	29.49	5.43	1.51		
% Light	Female	41	55.73	13.27	2.07	.818 ^a	.417
	Male	13	52.19	14.65	4.06		
% Moderate	Female	41	12.65	13.64	2.13	-1.273 ^a	.209
	Male	13	18.11	12.94	3.59		
% Hard	Female	41	.174	.576	.090	-.246 ^a	.806
	Male	13	.219	.512	.142		

a. The result of Levene's test was that equal variances were assumed.

** significant at the .01 level

Employment

The following table separates the type of physical activity as measured by the ActiGraph[®] data by the employment categories.

Table 5

ActiGraph[®] Physical Activity and Employment Data

Where Employed	Total	% in Sedentary Mean	% in Light Mean	% in Moderate Mean	% in Vigorous Mean	% in Very Vigorous Mean	% in MVPA Mean
Meatpacking Plant	22	54.5	41.6	3.8	0.06	0.03	3.9
Home	12	60.7	36.8	2.2	0.29	0.02	2.5
Public School	7	57.3	40.5	2.2	0.03	0.00	2.2
Meat Storage Facility	1	37.4	58.2	4.5	0.00	0.00	4.5
Walmart	1	42.5	57.1	0.4	0.00	0.00	0.4
Other	10	59.2	36.8	2.6	0.18	0.01	2.8
Unemployed	1	76.6	23.2	0.3	0.00	0.00	0.3
TOTAL	54	57.0	40.0	2.9	0.13	0.02	3.1

The following table shows the results of the 7-Day Physical Activity recall questionnaire of Individual daily Energy Expenditure (IEE) in the different employment categories. Total daily kilocalories of energy were calculated by multiplying all seven days' activities by their corresponding MET values, sleep (1 MET), light (1.5 METs), moderate (4 METs), hard (6 METs), and very hard (10 METs) and then totaled to provide the total weekly expenditure, then divided by seven to produce the total daily expenditure, and then it is multiplied by the weight of the individual in kilograms, to produce the IEE value.

Table 6
7-Day Physical Activity Recall Questionnaire Data

Where Employed	Total	IEE	
		Mean	Standard Deviation
Meatpacking Plant	22	3534	594
Home	12	2487	596
Public School	7	3139	812
Meat Storage Facility	1	1990	
Walmart	1	3271	
Other	10	2721	751
Unemployed	1	3005	
TOTAL	54	3057	772

To simplify, the analysis of the employment categories and to provide clarity in terms of employment types that would involve physical activity and those that do not, this variable was recoded into a dichotomous grouping by the type of labor – manual labor and non-manual labor. For example, those performing activity such as lifting and moving heavy items, stocking parts, packing boxes, custodial work, and bakery work were included in the manual labor category.

A one-way ANOVA was performed for IEE and %MVPA for the new labor status. The result of this test showed a highly significant difference between the groups for IEE ($p = .000$) and a significant difference between the groups for %MVPA ($p = .036$).

The following tables summarize the independent samples t-tests for labor status and the various physical activity categories. These results were consistent with the concept that individuals involved in manual labor expended more energy. Both the objective ActiGraph[®] and subjective 7-Day Physical Activity Recall showed that the manual labor group expended more energy.

Table 7

Independent Samples t-Tests for Labor Status and Physical Activity Measures

	Labor	N	Mean	Std. Deviation	Std. Error Mean	t	Sig. (2-tailed)
% Sedentary	Manual	25	53.49	10.94	2.19	-2.357 ^a	.022*
	Non-Manual	29	60.00	9.37	1.74		
% Light	Manual	25	42.82	10.18	2.04	2.066 ^a	.044*
	Non-Manual	29	37.50	8.75	1.62		
% Moderate	Manual	25	3.60	2.12	.42	2.489 ^a	.016*
	Non-Manual	29	2.32	1.68	.31		
% Vigorous	Manual	25	.063	.144	.029	-1.583 ^b	.122
	Non-Manual	29	.183	.378	.070		
% Very Vigorous	Manual	25	.030	.127	.025	.868 ^a	.389
	Non-Manual	29	.009	.030	.006		
% MVPA	Manual	25	3.70	2.16	.43	2.155 ^a	.036*
	Non-Manual	29	2.51	1.90	.35		

a. The result of Levene's test was that equal variances were assumed.

b. The result of Levene's test was that equal variances were not assumed.

* significant at the .05 level

	Labor	N	Mean	Std. Deviation	Std. Error Mean	t	Sig. (2-tailed)
IEE	Manual	25	3567.2	567.7	113.5	5.699 ^a	.000**
	Non-Manual	29	2616.1	646.9	120.1		
% Sleep	Manual	25	29.92	2.16	.43	-1.627 ^a	.110
	Non-Manual	29	31.90	5.73	1.06		
% Light	Manual	25	42.87	3.86	.77	-10.726 ^a	.000**
	Non-Manual	29	65.22	9.77	1.81		
% Moderate	Manual	25	27.17	3.80	.76	16.149 ^a	.000**
	Non-Manual	29	2.57	6.75	1.25		
% Hard	Manual	25	.042	.147	.029	-1.917 ^b	.065
	Non-Manual	29	.308	.731	.136		

a. The result of Levene's test was that equal variances were assumed.

b. The result of Levene's test was that equal variances were not assumed.

** significant at the .01 level

In the ActiGraph[®] data, a significant difference was observed between the manual and non-manual labor groups with percent sedentary physical activity ($p = .022$), percent light physical activity ($p = .044$), percent moderate physical activity ($p = .016$), and percent MVPA ($p = .036$). Since employment status showed a significant difference by percent MVPA this variable will be added to the overall regression model for percent MVPA. Histograms are also shown illustrating the different populations of these two labor groups with % sedentary, % light, and % MVPA.

Figure 7 Histograms of Labor Groups with % Sedentary, % Light, and % MVPA.

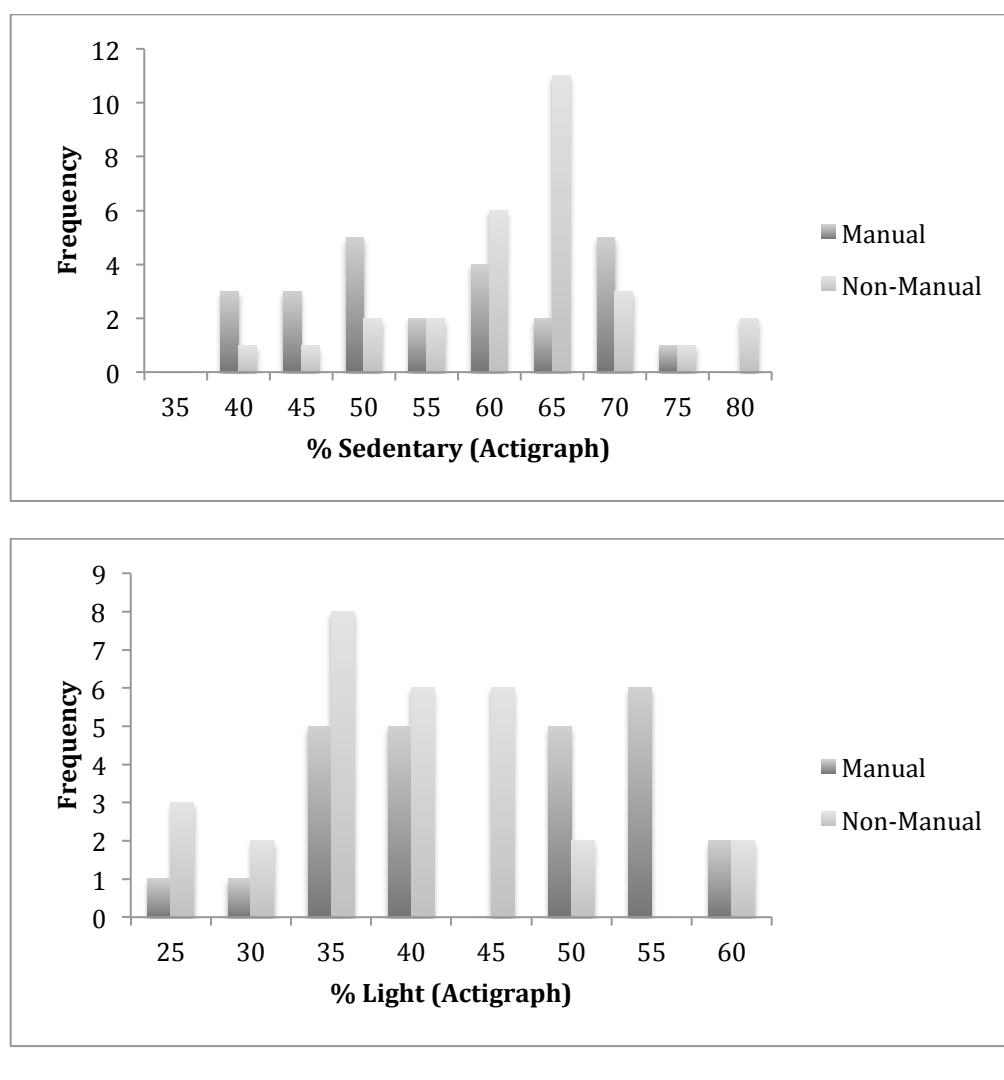
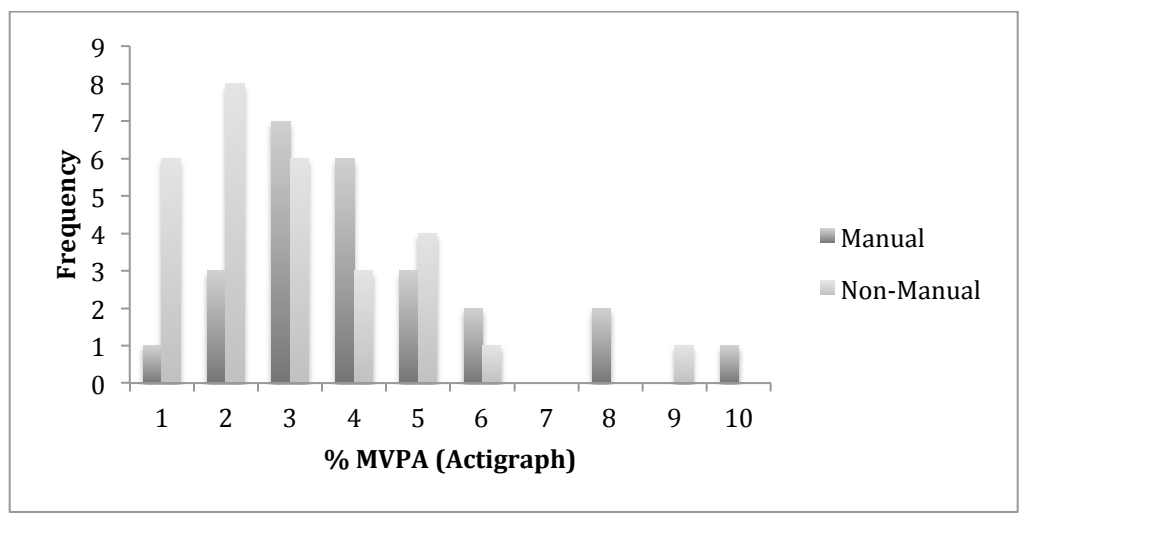
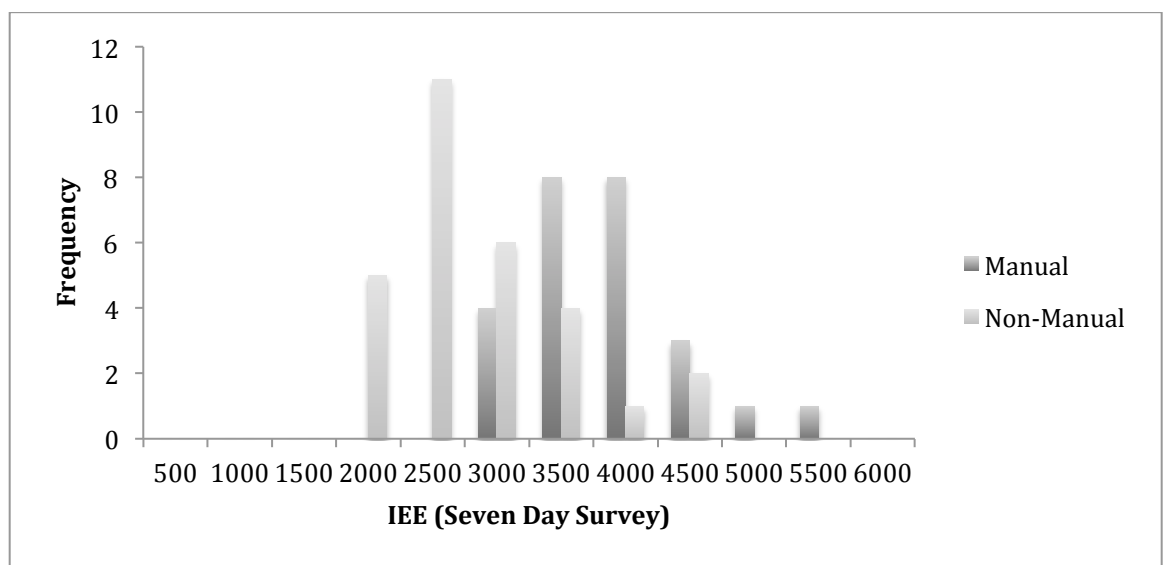


Figure 7 (continued) Histograms of Labor Groups with % Sedentary, % Light, and % MVPA.



In the 7-Day Physical Activity Recall questionnaire data, a significant difference was observed between the manual and non-manual labor groups with percent light physical activity ($p = .000$), percent moderate physical activity ($p = .000$), and IEE ($p = .000$). This highly significant difference between groups indicates that this variable should be included in the regression model for IEE.

Figure 8 Histogram of Labor Groups with IEE



BMI

BMI status and percent MVPA was explored with an ANOVA test and no significant difference was found between the groups ($p = .704$). Both BMI and IEE use a common factor, the mass of the individual in kg, therefore any possible correlation between BMI and IEE was not explored due to concern for multicollinearity. Therefore, BMI was not included in the regression model for either percent MVPA nor IEE.

Self-efficacy, interpersonal factors, social support, and community physical environment

In order to examine the predictors of self-efficacy for physical exercise, interpersonal factors (acculturation and social support for exercise from friends and family) and community physical environment (neighborhood walkability), a correlation study was done after choosing two dependent variables for the study - percent MVPA and IEE.

The following tables list the Pearson correlations of percent MVPA and IEE with the different instruments used in this study.

Table 8

Pearson Correlations of % MVPA and IEE with the Different Instruments

Subscales	Self-Efficacy Correlations % MVPA		IEE	
	Pearson correlation	Sig. (2-tailed)	Pearson correlation	Sig. (2-tailed)
Sticking to it	-.086	.619	.028	.872
Making time for exercise	-.131	.392	.019	.901
Acculturation Correlations % MVPA				
	Pearson correlation	Sig. (2-tailed)	Pearson correlation	Sig. (2-tailed)
Short Acculturation Scale for Hispanics (SASH)	-.202	.144	.062	.656
Level of SASH	-.167	.226	-.023	.869
Social Support Correlations % MVPA				
Subscales	Pearson correlation	Sig. (2-tailed)	Pearson correlation	Sig. (2-tailed)
Family participation	-.217	.115	-.133	.339
Family rewards and punishment	-.184	.183	.034	.810
Friend participation	-.013	.927	.110	.431
NEWS Correlations % MVPA				
Subscales	Pearson correlation	Sig. (2-tailed)	Pearson correlation	Sig. (2-tailed)
Residential density	.168	.225	-.004	.975
Land use mix - diversity	.041	.770	.152	.278
Land use mix – access	.244	.076	.084	.545
Street connectivity	-.246	.072	-.070	.615
Walking/cycling facilities	-.048	.732	-.092	.509
Aesthetics	-.016	.911	-.116	.404
Pedestrian traffic safety	.130	.349	.301*	.027
Crime safety	.112	.421	.119	.390
General neighborhood satisfaction	-.017	.901	.013	.926

* significant at the .05 level

As seen in the above table, the only significant correlation was the NEWS pedestrian traffic safety subscale with IEE ($p = .027$). It should be pointed out the best correlations with

percent MVPA was with the NEWS subscales of land use mix – access ($p = .076$) and street connectivity ($p = .072$). Although the p values were larger than $.05$, these were added to the regression model for percent MVPA because there was a trend toward significance.

The correlational relationship between homemaker / employed at home and Short Acculturation Scale for Hispanics (SASH) had a Pearson correlation of -0.333 ($p = 0.014$). A higher value indicates a higher acculturation rate, with 2.99 identified as the differentiating value (Marin et al., 1987). This finding shows that those who are employed at home (primarily homemakers) have a significantly lower acculturation value.

Linear Regression Model

After reviewing the correlational study results and the independent samples t -tests, two independent linear regression models were developed for the dependent variables IEE and percent MVPA.

For the percent MVPA measure, the best model used the predictors of gender, land use mix – access (NEWS), and street connectivity (NEWS). Although attempts were made to improve the model with other predictors (e.g. labor, self-efficacy or social support), none of these gave a significant improvement to the model. The results of the percent MVPA regression model are shown below. Note the constant was not a significant value. The R value for the overall model was $.529$, and the three predictors were significant at the $.01$ level.

Table 9

Results of the % MVPA Regression Model

R = .529	B	t	Sig.	Collinearity statistics	
				Tolerance	VIF
(Constant)	.265	.151	.880		
Gender	1.580	2.715	.009	.999	1.001
Land use mix – access	.222	2.854	.006	.905	1.105
Street connectivity	-.261	-2.866	.006	.905	1.105

For the IEE measure, the best model used the predictors of gender, labor, and pedestrian traffic safety (NEWS). The results of the IEE regression model are shown below. Note that one

predictor (labor) and the constant were significant at the .01 level, the other two predictors were significant at the .05 level. The R value for the overall model was .714.

Table 10

Results of the IEE Regression Model

R = .714	B	t	Sig.	Collinearity statistics	
				Tolerance	VIF
(Constant)	2794.018	4.696	.000		
Gender	424.252	2.259	.028	.912	1.096
Labor	-828.634	-5.199	.000	.931	1.074
Pedestrian traffic safety	46.161	2.114	.040	.970	1.031

In order to test these regression models, the percent MVPA and IEE were calculated and then compared to the measured values. (Gender was coded as 1 = female and 2 = male. Labor was coded as 1 = manual and 2 = non-manual.) The figures shown below plot the calculated values *versus* the measured values.

Figure 9 % MVPA Regression: Calculated versus Measured Values

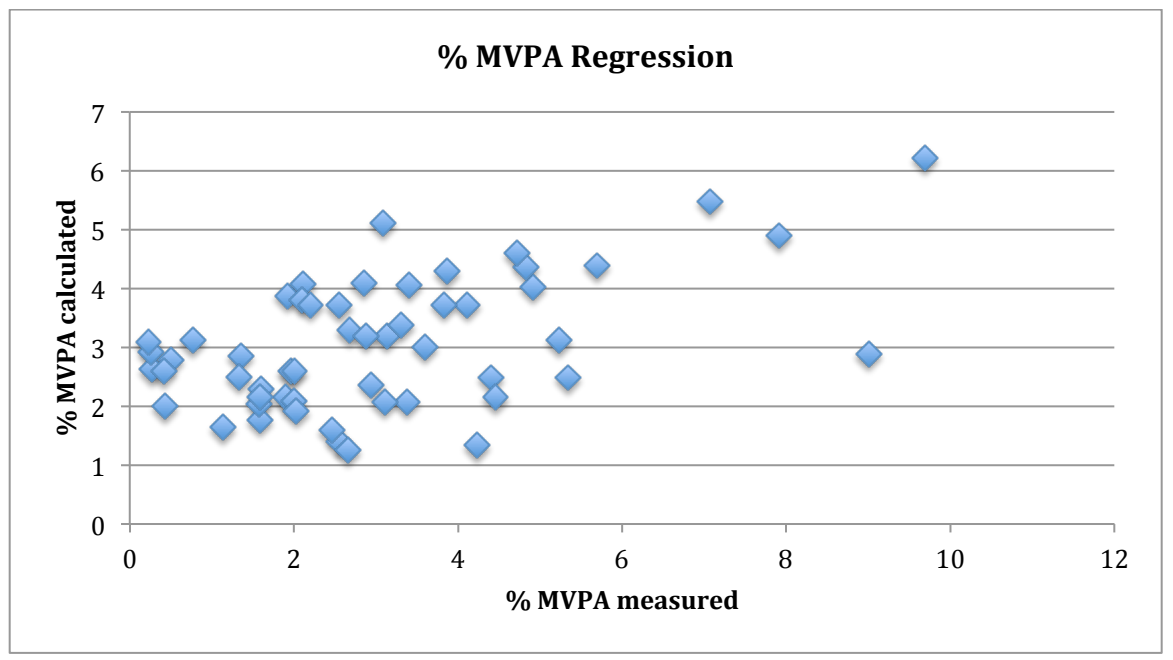
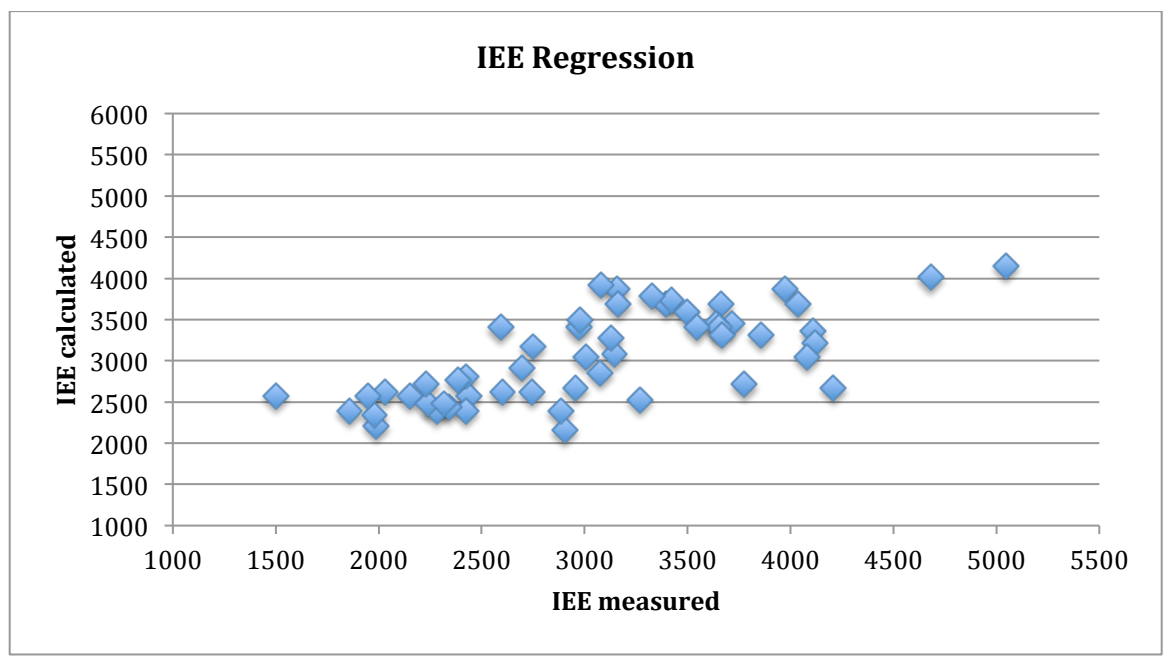


Figure 10 IEE Regression: Calculated versus Measured Values



The residuals (calculated minus measured) plotted against the measured IEE or percent MVPA show that an unidentified predictor is present as evidenced by the trend. At low measured physical activity values, the calculated model gave too large of a value and for high measured physical activity values, the calculated model gave too small of a value. No other predictor is available from the identified variables in the model for this study that could improve upon this regression model.

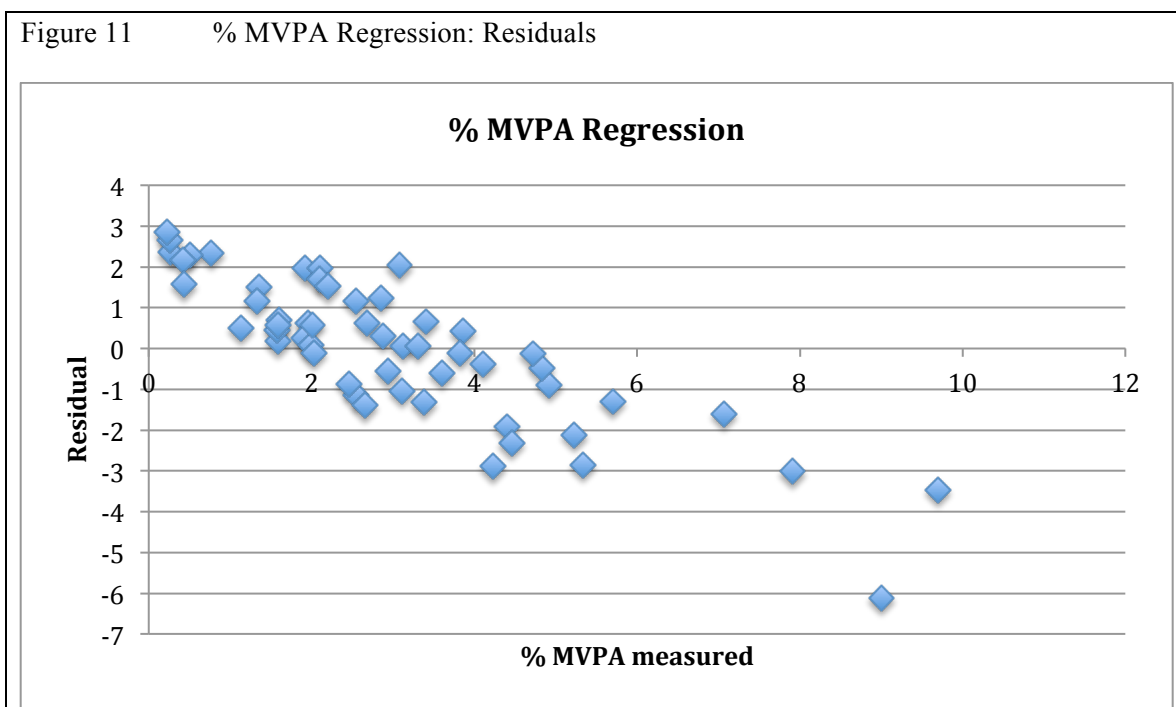
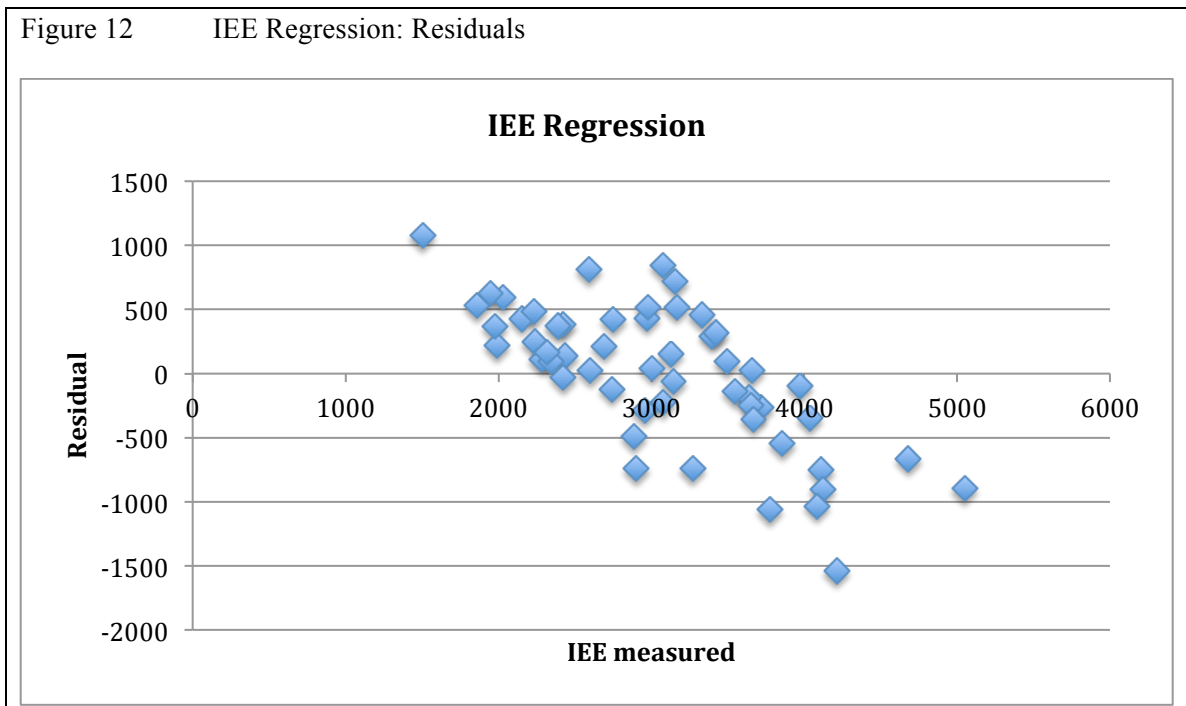


Figure 12 IEE Regression: Residuals



CHAPTER 5

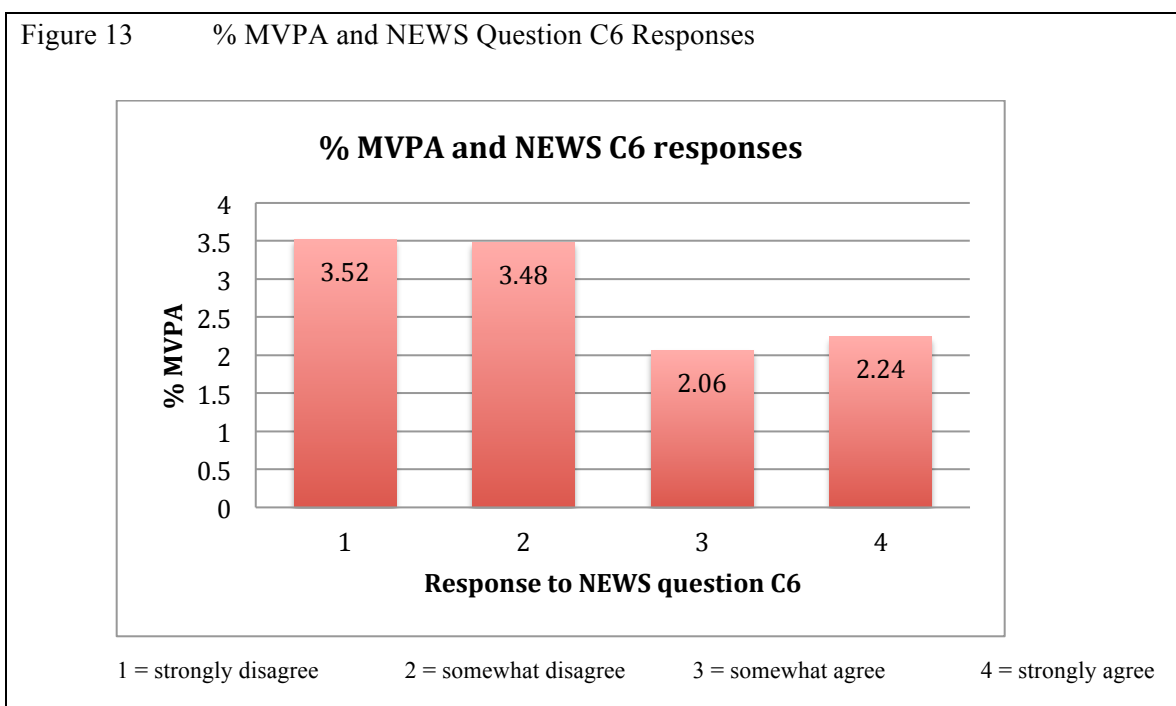
Discussion

Overall there were consistencies between the objective ActiGraph[®] measurements (% MVPA) and the subjective 7-Day Physical Activity Recall questionnaire measurements (IEE) of physical activity. Generally, in this study, it was found that there was a very low level of physical activity in most participants, consistent with literature reports of low physical activity levels in rural adults (Patterson, Moore, Probst & Shinogle, 2004). For example, 97% of the time was spent in either sedentary or light physical activity according to the ActiGraph[®] data. Arredondo et al. (2016) explained objective MVPA measurements were half of what was reported. These findings were similar to the findings in this study whereby ActiGraph measurements showed only 3% of the participants' time was spent in moderate or vigorous physical activity (% MVPA) whereas the self-reported amount by the 7-Day Physical Activity Recall questionnaire showed 14% of the time in moderate or vigorous physical activity. What cannot be determined from these results is whether the ActiGraph[®] underestimated activity levels or whether the 7-Day Physical Activity Recall questionnaire overestimated activity levels.

Examination of the study variables in preparation for the regression showed some interesting findings. The independent samples t-tests showed significant differences between gender groups and between labor groups for both percent MVPA and IEE. Study participants involved in manual labor work showed they performed more physical activity. Consistent with previous literature findings, this research showed men were more active than women (Crespo et al., 2001; Marquez & McAuley, 2006). Surprisingly, the regression results did not show self-efficacy for physical activity, acculturation, and social support for exercise from friends and family as being impactful for physical exercise. However some subscales of the NEWS community physical environment were significant in the regression models.

Another point to consider with low physical activity levels in this population comes from the research performed by Martinez, Powell, Agne, Scarinci & Cherrington (2012) whereby Mexican immigrants felt their strenuous physical activity performed at work was sufficient, and they had little time and were too tired to engage in physical activity outside of their employment.

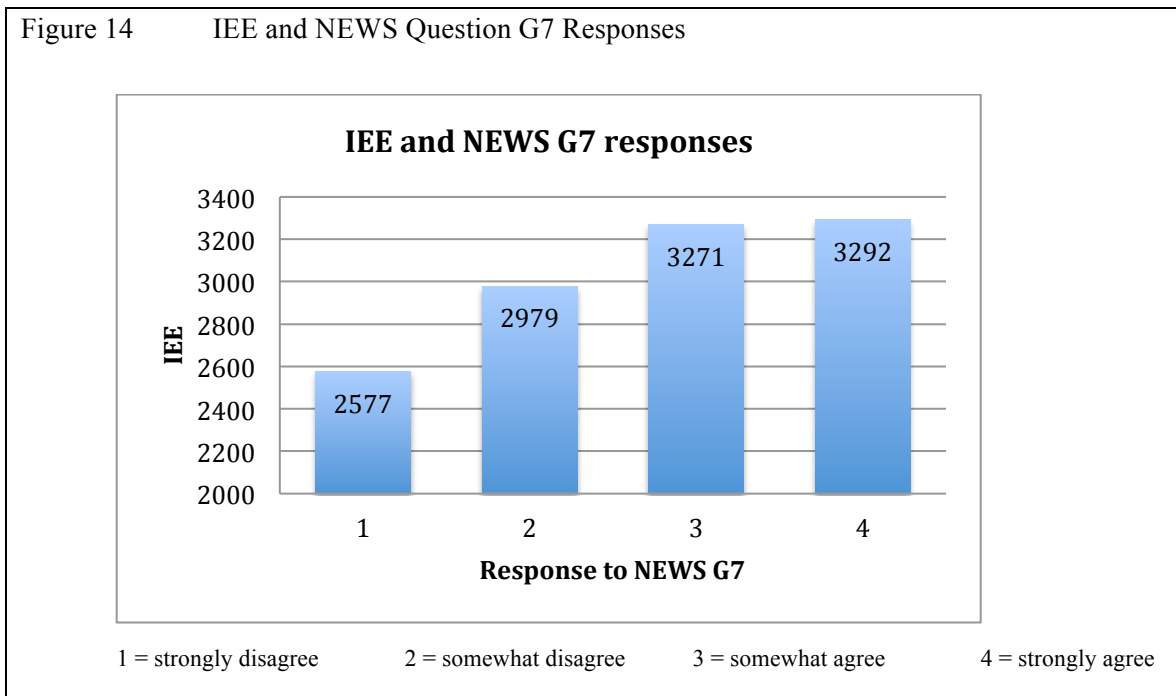
The regression models resulted in different predictors for the objective ActiGraph[®] measurements (percent MVPA) and the subjective 7-Day Physical Activity Recall questionnaire measurements (IEE) of physical activity. For percent MVPA the predictors were gender and two subscales of the NEWS community physical environment survey (namely street connectivity and land use mix – access). Subsequent investigation into the individual questions that made up these two subscales of NEWS showed significant correlations with only two questions – C6 (The streets in my neighbourhood are hilly, making my neighbourhood difficult to walk in) ($p = .016$) and D2 (There are walkways in my neighbourhood that connect cul-de-sacs to streets, trails, or other cul-de-sacs) ($p = .044$). Participants who answered strongly agree to question D2 had less physical activity, which does not make sense. As pointed out in the NEWS scoring procedure, this question was eliminated in the pilot study due to low test-retest reliability. Many participants had difficulty answering this question because they did not understand the definition of a cul-de-sac. Participants who answered strongly agree (response 4) to question C6 (which was reverse coded according to the directions) also had less physical activity. This one question seems to be the main factor in the regression inclusion of NEWS in the regression model. Indeed, running the regression model with only gender and question C6 turned out to be significant ($R = .427$, $p = .006$). Participants who perceived that the streets are hilly had less physical activity. The topography of the city is hilly and this could be a barrier to walking or bicycling as a recreational form of physical activity.



Interestingly the regression model showed that labor (manual *versus* non-manual) was not a significant predictor in the regression model for percent MVPA. For the IEE regression model, however, both gender and labor were significant predictors along with the NEWS subscale of pedestrian traffic safety. A possible explanation for this difference in the regression models for MVPA and IEE may be related to the fact that the ActiGraph[®] data very likely did not capture all of the physical activity levels for study participants working at the Meatpacking Plant. Because the device is worn on the hip, it cannot detect upper body movement. Subjects employed at a Meatpacking Plant reported performing work that used many arm movements and upper body strength, such as repetitive movement of the shoulders and waist when lifting heavy objects, and reaching above the shoulders and behind the back when processing meat products. In the 7-Day Physical Activity Recall questionnaire, the Meatpacking Plant workers were subjectively classified as doing moderate levels of physical activity during work. This moderate level of manual labor at work may not have been captured in the objective measurement of %

MVPA accurately. This may also explain the noted differences in the descriptive data for %MVPA from the ActiGraph[®] as compared to the IEE from the 7-Day Physical Activity Recall questionnaire.

Subsequent investigation into the individual questions that made up this subscale of NEWS that was a significant predictor in the IEE regression model showed only a single question – G7 (The crosswalks in my neighbourhood help walkers feel safe crossing busy streets) that had a significant correlation with IEE ($p = .010$). Participants who answered strongly agree to question G7 had more physical activity.



Socio-demographic variables are important physical activity predictors, although the return on health investment is perceived to decline with age resulting in decreasing physical activity levels with age. The overall sample had a moderately wide range of adult ages (mean 36.8, SD = 10.2). It was found in this study that older participants spent less of their time in sleep and sedentary physical activity and more time in light physical activity. There were no

significant relationships between age and %MVPA or IEE. Study findings are consistent with literature reports as Merchant et al. (2015) studied urban Hispanics physical activity behavior and found they spent 74% of their time in sedentary behaviors with older adult and women more sedentary than younger adults and males. Older Hispanic adults spent less time in moderate or vigorous physical activity (MVPA) than younger Hispanic adults, and males had double the amount of time in occupational activity than women (Arredondo et al., 2016).

Physical activity self-efficacy was not found to be influential in this research project. Dominick, Dunsiger, Pekmezi & Marcus (2013) explained self-efficacy levels depend upon social support from friends and family, and proposed exploring a moderator effect between health literacy, self-efficacy and social support. It is possible the study participants failed to complete the questionnaires to the best of their ability due to the volume of questions asked, or perhaps they did not completely understand the questionnaire content due to a lack of cultural or health literacy (Dominick, Dunsiger, Pekmezi & Marcus, 2013). Some study participants took 1.5 hours to complete the study questionnaires, asking multiple clarification questions that illustrates a lack of understanding despite their having met the academic requirements for the study inclusion.

An unexpected finding in this research was that family and friends did not influence physical activity. Although the Social Support for Exercise Survey was available in Spanish, not all of the instruments were available in Spanish, so only the English versions were used. It was possible that some of the study participants may have felt more comfortable answering the questionnaires in their primary language of Spanish. This could have been a factor in the instrument not being found to be significant in this study. Again, perhaps the questionnaire responses were not given adequate attention due to the volume of questions asked, or perhaps they did not completely understand the importance of the request. D'Alonzo (2011) indicated lower literacy immigrant Latinos have difficulty completing less quantifiable questionnaires, and proposed asking questions that ask subjects to select more specifically defined answers (e.g. 0, 1-

2, etc.) to elicit more meaningful responses. Another potential explanation lies in the fact that migrant farmworkers have impermanent residence and may have less social connections than others due to their transient lifestyle and low-income limits community activity participation (USDOL, 2014; USDOL, 2008).

Study Limitations

Recruitment for this study was challenging and through informal conversations with study participants it was revealed they perceived the ActiGraph[®] was tracking their physical location and they were concerned about the impact to their immigration status. The Fair Labor Standards Act does not require small farms to pay Federal minimum wages or overtime, and many workers fail to obtain U.S. immigration documentation (USDA, 2013, USDOL, 2008). The National Agricultural Workers Survey (NAWS) of crop farmworkers during 2007 – 2009 showed only 48 percent of workers had been approved to work in the United States (USDA, 2013). Research showed many Hispanic or Latino populations avoided public intermingling within community populations and places, and they avoided walking outside due to fear of law enforcement immigration status verification, thus decreasing their prospects for social support for physical activity and actual physical activity (Agne, Scarinci & Cherrington, 2012; Keller et al., 2014). It is possible that decreased study participation rates were related to immigration status issues, and thus immigration issues influence physical activity rates.

As previously mentioned, research showed acculturation stress and lack of exercise has been linked to chronic disease in the Hispanic or Latino population (Bassett, Fitzhugh, Crespo, King & McLaughlin, 2002). While the objective findings of this research did not produce evidence of friends, family or acculturation influence upon physical activity, the difficulties in study participant recruitment, the reasoning for lack of study participation, and their questionnaire survey response patterns imply these influences have an effect on Hispanic or Latino lifestyle. Research findings in this study are culturally consistent with *marianismo* influence in Latinas,

whereby others' needs are a priority over their own and they feel physical activity is a waste of time (Eun-Ok, et al., 2010; D'Alonzo, 2012).

Similarly, Zauszniewski (2010) emphasized the importance of understanding the target population perspective, and to consider the level of commitment and technological skill set of the target population and if they are willing to complete study activities or if they will drop out. For example, it is noted the study participants failed to maintain their physical activity log. Their lack of adherence to this portion of the research protocol illustrates an intervention involving this type of activity would need to be approached differently to increase adherence as it might potentially be an ineffective strategy.

The study recruitment process posed challenges which warrant further discussion regarding the overall sample size for the study. Unfortunately, an optimal number of study participants were not recruited. The convenience sample obtained through the school and community venues captured English – language proficient individuals. However, Spanish speaking individuals were excluded from the study because some instruments were not available in Spanish. These research findings therefore are limited in their generalizability to Hispanic or Latino populations who match the sample demographics. Past research has shown the use of *promotora* and Spanish questionnaires helped to recruit a higher percentage of Hispanic or Latino population (Hilfinger Messias, Parra-Medina, Sharpe, Trevino, Koskan, Morales-Campos, 2013).

The ActiGraph® valid wear time parameters could be a possible study limitation because some of the subjects did not have adequate data for analysis. As a result, the sample size was small and thus the activity may not be representative of the population as a whole. In addition, the ActiGraph® may not have been sensitive to detect upper body activity that many of the subjects in this study were involved in as a part of their work or employment.

The data processing methods allowed for comparison between the 7-Day Physical Activity Recall Interview Questionnaire results and ActiGraph® results, and similar physical

activity levels were noted. The questionnaire provided a good estimate of daily physical activity, including leisure time physical activity and occupational physical activity. However, it may be study participants were potentially providing answers based upon perceived response desirability (Klesges, Eck, Mellon, Fulliton, Somes & Hanson, 1990). This may result in overestimation of physical activity levels on the 7-Day Physical Activity Recall questionnaire.

In summary, this study had several limitations that may have influenced results. In addition, the sample size was small and from only one rural community and the surrounding areas so the results are not generalizable beyond this sample.

Implications

There are several notable strengths to this study. This is an important research study of physical activity predictors in rural Midwestern Hispanic or Latino adults, it uses objective ActiGraph[®] physical activity measure and it includes male and female participants. This research showed overall physical activity levels were low, men were more active than women and those performing manual labor work were highly active. Continued research based on an ecological model is necessary to determine more specifically what persuades or affixes physical activity behavior in rural Hispanic or Latino adults. These findings contribute to physical activity research because there is a scant amount of research focused on rural Midwestern Hispanic or Latino adult physical activity behavior and this knowledge can help build behavioral strategies for effective physical activity interventions. For example, in this study overall physical activity levels are low and females are more inactive than males, and self-efficacy, social influence and acculturation are not influencing physical activity levels in rural Hispanic or Latino women, so research needs to continue to clarify what elements can be impactful towards increasing physical activity levels.

The recruitment strategies of a Community Health Promoter or *promotora* with future research projects could generate larger sample sizes and produce research results that could more

closely determine whether or not the ActiGraph[®] underestimated activity levels or whether the 7-Day Physical Activity Recall questionnaire overestimated activity levels. In particular, the ecological model may provide the best opportunity to understand the parameters required for realistic and feasible long-term physical activity changes. Perhaps with extended research time over multiple seasons, it may be possible to more closely determine group dynamics, demands from work and family responsibilities, and discover why the current study did not capture the influential social cohesion so frequently seen in Hispanic or Latino populations. Because such low physical activity levels were found in this group, it is important to continue to identify influences and measures to help increase physical activity in this vulnerable rural Hispanic or Latino population.

Future studies should further examine the heterogeneous mix within the Hispanic or Latino population because social norms and physical activity levels vary. For example, urban Hispanic or Latino populations were studied by Troiano et al. (2008) and Mexican American adults were the most active and had the highest MVPA levels; however, Arredondo et al. (2016) found Puerto Ricans had the highest levels of MVPA levels. These studies proposed the physical activity differences could be attributed to methods of transportation and occupational activity found in these urban areas. Continued subpopulation research to determine the physical activity differences in Mexican, Puerto Rican, Cuban, Central American, Dominican, and South American are needed because rural geographic terrain, economic and social resources are vastly different from urban settings.

The occupational, gender and low physical activity findings from this study can enhance knowledge to develop strategies to increase physical activity in rural Hispanic or Latino adults. Further research in these populations will help to decipher the complex sociocultural backgrounds within subpopulations in order to further understand how environmental components impact overall physical activity in Hispanic or Latino populations. This will enable more targeted,

relevant physical activity interventions to be developed for the increasingly diverse, growing vulnerable rural Hispanic or Latino population.

References

- Aadland, E. & Ylvisaker, E. (2015). Reliability of the ActiGraph® GT3X+Accelerometer in Adults under Free-Living Conditions. *PLoS One*, *10*(8) :e0134606. doi: 10.1371/journal.pone.0134606. eCollection 2015.
- Addy, C. L., Wilson, D. K., Kirtland, K. A., Ainsworth, B. E., Sharpe, P., & Kimsey, D. (2004). Associations of perceived social and physical environmental supports with physical activity and walking behavior. *American Journal of Public Health*, *94*(3), 440-443. doi:10.2105/AJPH.94.3.440
- Afable-Munsuz, A., Ponce, N., Ridriguez, M., Perez-Stable, E., (2010). Immigrant –generation and physical activity among Mexican, Chinese and Filipino adults in the U.S. *Social Science Medicine*, *70*(12), 1997-2005.
- Agency for Healthcare Research and Quality (2011). Centers for Disease Control and Prevention. Physical activity and older Americans. Benefits and strategies. Retrieved on February 14, 2011 from <http://www.ahrq.gov/ppip/activity.htm>
- Amaro, H. & de la Torre, A. (2002). Public health needs and scientific opportunities in research on Latinas. *American Journal of Public Health*, *92*(4), 525-529.
- American Heart Association. Heart disease and stroke statistics – 2004 update. Washington, D.C.: American Heart Association, 2005.
- Anderson, G., & Horvath, J. (2004). The growing burden of chronic disease in america. *Public Health Reports* (Washington, D.C.: 1974), *119*(3), 263-270. doi:10.1016/j.phr.2004.04.005
- Apovian, C. M. (2010). The causes, prevalence, and treatment of obesity revisited in 2009: What have we learned so far? *The American Journal of Clinical Nutrition*, *91*(1), 277S-279S. doi:10.3945/ajcn.2009.28473A

- Arredondo, E.M., Sotres-Alvarez, D., Stoutenberg, M., Davis, S.M., Crespo, N.C., Mercedes, R.C....Evenson, K. (2016). Physical Activity Levels in U.S. Latino/Hispanic Adults. *Am J Prev Med* 50(4), 500-508.
- Ashford, S., Edmunds, J., French, D.P. (2010). What is the best way to change self-efficacy to promote lifestyle and recreational physical activity? A systematic review with meta-analysis. *Br J Health Psychol.* May;15(Pt 2):265-88. doi: 10.1348/135910709X461752.
- Averill, J. (2003). Keys to the puzzle: Recognizing strengths in a rural community. *Public Health Nursing (Boston, Mass.)*, 20(6), 449-455.
- Ayala, G.X., Baquero, B., Klinger, S. (2008). A systematic review of the relationship between acculturation and diet among Latinos in the United States: Implications for future research. *J Am Diet Assoc.*, 108(8), 1330-1344.
- Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior.* (Vol 4, pp. 71-81), New York: Academic Press. Retrieved November 11, 2011 from <http://des.emory.edu/mfp/BanEncy.html>
- Bandura, A. (1997). *Self-efficacy : The exercise of control.* New York: W.H. Freeman.
- Bandura, A. (2004). Health promotion by social cognitive means. *Health Education Behavior*, 31(2), 143-164.
- Banna, J., Kaiser, L., Drake, C. & Townsend, M. (2012). Acculturation, physical activity and television viewing in Hispanic women: Findings from the 2005 California women's health survey. *Public Health Nutrition*, 15(2), 198-207.
- Barquera, S., Campos-Nonato, I., Hernandez-Berrera, L., Flores M., Durazo-Arvizu, R., Kanter, R., Rivera, J. (2009). Obesity and central adiposity in Mexican adults: Results from the Mexican National Health and Nutrition Survey 2006. *Salud publica de mexico*, 51(4), S595-S603.

- Bassett, D., Fitzhugh, E., Crespo, C., King, G. McLaughlin, J. (2002). Physical activity and ethnic differences in hypertension prevalence in the United States. *Prev Med.* 34(2), 179-186.
- Bates LM, Acevedo-Garcia D, Alegría M, Krieger N. (2008). Immigration and generational trends in body mass index and obesity in the United States: results of the National Latino and Asian American Survey, 2002-2003. *Am J Public Health.* Jan;98(1):70-7. Epub 2007 Nov 29.
- Bautista, L, Reininger, B., Gay, J.L., Barroso, C.S., McCormick, J.B. (2011). Perceived barriers to exercise in Hispanic adults by level of activity. *J Phys Act Health.* Sep;8(7):916-25
- Bennett, J. A., Young, H. M., Nail, L. M., Winters-Stone, K., & Hanson, G. (2008). A telephone-only motivational intervention to increase physical activity in rural adults: A randomized controlled trial. *Nursing Research*, 57(1), 24-32.
doi:10.1097/01.NNR.0000280661.34502.c1
- Bernstein, R., Edwards, T. (2008). An older and more diverse nation by midcentury. Washington, D.C. U.S. Census Bureau
- Berrigan D, Troiano RP, McNeel T, Disogra C, Ballard-Barbash R. (2006). Active transportation increases adherence to activity recommendations. *Am J Prev Med.* Sep;31(3):210-6.
- Berry, J. (1989). The psychology of acculturation. Nebraska Symposium on Motivation, Cross-cultural perspectives. Current theory and research in motivation, Vol. 37., (pp. 201-234). Lincoln, NE, US: University of Nebraska Press, xii, 363 pp.
- Berrigan, D., Dodd, K., Troiano, R., Reeve B., Ballard-Barbash, R. (2006). Physical activity and acculturation among adult Hispanics in the United States. *Res Q Exerc Sport*, 77(2), 147-157.
- Bilek, L.D., Venema, D.M., Camp, K.L., Lyden, E.R., Meza, J.L. (2005). Evaluation of the human activity profile for use with persons with arthritis. *Arthritis & Rheumatism*, 53(5), 756-763.

- Blewett, L.A., Casey, M., Thiede, C.K. (2004). Improving access to primary care for growing Latino population: the role of safety net providers in the rural Midwest. *Journal of Rural Health, 20*(3), 237-245.
- Boeckner, L. S., Pullen, C. H., Walker, S. N., & Hageman, P. A. (2006). Differences in eating and activity behaviors, health history, and biomarkers among normal-weight, overweight, and obese rural midwestern hispanic women. *Journal of the American Dietetic Association, 106*(11), 1870-1874. doi:10.1016/j.jada.2006.08.001
- Boehmer, T. K., Lovegreen, S. L., Haire-Joshu, D., & Brownson, R. C. (2006). What constitutes an obesogenic environment in rural communities? *American Journal of Health Promotion : AJHP, 20*(6), 411-421.
- Brown SC, Huang S, Perrino T, Surio P, Borges-Garcia R, Flavin K, Brown CH, Pantin H, Szapocznik J. (2011). The relationship of perceived neighborhood social climate to walking in Hispanic older adults: a longitudinal, cross-lagged panel analysis. *J Aging Health. Dec;23*(8):1325-51. doi: 10.1177/0898264311418502. Epub 2011 Sep 1.
- Brown, S. C., Mason, C. A., Perrino, T., Lombard, J. L., Martinez, F., Plater-Zyberk, E., . . . Szapocznik, J. (2008). Built environment and physical functioning in hispanic elders: The role of "eyes on the street". *Environmental Health Perspectives, 116*(10), 1300-1307. doi:10.1289/ehp.11160
- Brownson, R.C., Chang, J.J., Eyster, A.A., Ainsworth, B.E., Kirtland, K.A., Saelens, B.E., Sallis, J.F. (2004). Measuring the environment for friendliness toward physical activity: A comparison of the reliability of 3 questionnaires. *American Journal of Public Health, 94*(3), 473-483.
- Brownson RC, Eyster AA, King AC, Brown DR, Shyu YL, Sallis JF. (2000). Patterns and correlates of physical activity among US women 40 years and older. *Am J Public Health. Feb;90*(2):264-70.

- Brownson, R. C., Hagood, L., Lovegreen, S. L., Britton, B., Caito, N. M., Elliott, M. B., . . . Tune, D. (2005). A multilevel ecological approach to promoting walking in rural communities. *Preventive Medicine, 41*(5-6), 837-842. doi:10.1016/j.ypmed.2005.09.004
- Brownson, R.C., Hoehner, C.M., Day, K., Forsyth, A., Sallis, J.F. (2009). Measuring the built environment for physical activity: state of the science. *American Journal of Preventative Medicine, 36*(4 Suppl), S99-123e12.
- Burke, N. M., Chomitz, V. R., Riales, N. A., Winslow, S. P., Brukilacchio, L. B., & Baker, J. C. (2009). The path to active living: Physical activity through community design in somerville, massachusetts. *American Journal of Preventive Medicine, 37*(6 Suppl 2), S386-94. doi:10.1016/j.amepre.2009.09.010
- Burke, J. Williams, K., Gaskill, S., Hazuda, H., Haffner, S., Stern, M. (1999). Rapid rise in the incidence of type 2 diabetes from 1987 to 1996: Results from the San Antonio Heart Study. *Arch Intern Med. July 12:159*(13), 1450-1456.
- Burroughs Peña MS, Patel D, Rodríguez Leyva D, Khan BV, Sperling L. (2012). Lifestyle risk factors and cardiovascular disease in cubans and cuban americans. *Cardiol Res Pract.* ;2012:470705. doi: 10.1155/2012/470705. Epub 2011 Nov 23.
- Buscemi, C., Williams, C., Tappen, R., & Blais, K. (2012). Acculturation and health status among Hispanic American elders. *Journal of Transcultural Nursing, 23*(3), 229-36.
- Caban-Martinez, A.J., Lee, D.J., Fleming, L.E., LeBlanc, W.G., Dristopher, L.A., Chung-Bridgers, K., Christ, S.L., McCollister, K.E., Pitman, T. (2007). Leisure-time physical activity levels of the U.S. workforce. *Preventive Medicine, 44*(5), 432-436.
- Centers for Disease Control and Prevention. National Center or Health Statistics. National Health Interview Survey. Retrieved on July 5, 2013 from cdc.gov/nchs/nhis.htm.
- Centers for Disease Control and Prevention. Division of Nutrition, Physical Activity, and Obesity. About Adult BMI. Retrieved on March 4, 2016 from http://www.cdc.gov/healthyweight/assessing/bmi/adult_bmi/

- Centers for Disease Control and Prevention. (2009). Differences in Prevalence of obesity among black, white and Hispanic adults – United States 2006-2008. *Morbidity and Mortality Weekly Report*, 5(27), 740-744.
- Centers for Disease Control and Prevention. (2008). Prevalence of Self-Reported Physically Active Adults – United States - 2007. *Morbidity and Mortality Weekly Report*, 57(48), 1297-1300.
- Centers for Disease Control and Prevention. (2008). Facts about physical activity center for disease control. 2008. Retrieved on February 28, 2016 from <http://www.cdc.gov/physicalactivity/data/facts.html>.
- Centers for Disease Control and Prevention. (2004). “Health disparities experienced by Hispanics – United States”. *Morbidity and Mortality Weekly Report*, 53, 935-937.
- Centers for Disease Control and Prevention. (1990). Prevalence of leisure-time and occupational physical activity among employed adults – *United States. Morbidity and Mortality Weekly Report*, 49(19), 420-424.
- Centers for Medicare and Medicaid Services (2011). National Health Expenditure Data. Retrieved on November 11, 2011 from https://www.cms.gov/NationalHealthExpendData/25_NHE_Fact_Sheet.asp
- Church, T. S., Thomas, D. M., Tudor-Locke, C., Katzmarzyk, P. T., Earnest, C. P., Rodarte, R. Q., . . . Bouchard, C. (2011). Trends over 5 decades in U.S. occupation-related physical activity and their associations with obesity. *PloS One*, 6(5), e19657. doi:10.1371/journal.pone.0019657
- Christensen, D.L., Alcalá-Sánchez, I., Leal-Berumen, I., Conchas-Ramírez, M., Brage, S. (2012) Physical Activity, cardio-respiratory fitness, and metabolic traits in rural Mexican Tarahumara. *Am J Hum Biol* 24(4), 558-561.
- Clevette, A. (2012). [A study of factors associated with physical activity]. Unpublished raw data.
- Clark, D.O. (1995). Racial and educational differences in physical activity among older adults.

Gerontologist, 35, 472-480.

- Clarke, P., Ailshire, J. A., Bader, M., Morenoff, J. D., & House, J. S. (2008). Mobility disability and the urban built environment. *American Journal of Epidemiology*, 168(5), 506-513. doi:10.1093/aje/kwn185
- Cohen, D. A., Inagami, S., & Finch, B. (2008). The built environment and collective efficacy. *Health & Place*, 14(2), 198-208. doi:10.1016/j.healthplace.2007.06.001
- Cohen, D. A., McKenzie, T. L., Sehgal, A., Williamson, S., Golinelli, D., & Lurie, N. (2007). Contribution of public parks to physical activity. *American Journal of Public Health*, 97(3), 509-514. doi:10.2105/AJPH.2005.072447
- Collins, T.C., Dong, F., Ablah, E., Parra-Medina, D., Cupertino, P., Rogers, N., Ahlers-Schmidt, C.R. (2014). Text messaging to motivate exercise among Latino adults at risk for vascular disease: a pilot study, 2013. *Prev Chronic Dis*, Oct 30:E192. doi:10.5888/pcd11.140219.
- Collins, R., Lee, R., Albright, C. & King, A. (2004). Ready to be physically active? The effects of a course preparing low-income multiethnic women to be more physically active. *Health Education Behaviors*, 31(1), 47-64.
- Committee on Physical Activity, Health, Transportation, and Land Use (2005). Does the Built Environment Influence Physical Activity? Transportation Research Board Special Report: Washington, D.C.
- Cortez, D.E. & Rogler, L.H. (1996). Health status and acculturation among Puerto Ricans in New York City, *Journal of Gender, Culture and Health*, 1, 267-276.
- Costanzo, C., Walker, S. N., Yates, B. C., McCabe, B., & Berg, K. (2006). Physical activity counseling for older women. *Western Journal of Nursing Research*, 28(7), 786-801; discussion 802-10. doi:10.1177/0193945906289495

- Craig, C. L., Brownson, R. C., Cragg, S. E., & Dunn, A. L. (2002). Exploring the effect of the environment on physical activity: A study examining walking to work. *American Journal of Preventive Medicine, 23*(2 Suppl), 36-43.
- Crain, A. L., Martinson, B. C., Sherwood, N. E., & O'Connor, P. J. (2010). The long and winding road to physical activity maintenance. *American Journal of Health Behavior, 34*(6), 764-775
- Creighton, M.J., Goldman, N., Pebley, A.R., Chung, C.Y. (2012). Durational and generational differences in Mexican immigrant obesity: is acculturation the explanation? *Soc Sci Med. Jul;75*(2):300-10. doi: 10.1016/j.socscimed.2012.03.013. Epub 2012 Apr 10.
- Crespo, C.J., Smit, E., Carter-Pokras, O., & Anderson, R. (2001). Acculturation and leisure-time physical activity in Mexican American adults: Results from the NHANES 111, 1988-1994. *American Journal of Public Health, 91*, 1254-1257.
- D'Alonzo, K.T. (2012). The influence of marianismo beliefs on physical activity of immigrant Latinas. *Journal of Transcultural Nursing, 23*(2), 124-133.
- D'Alonzo, K.T. (2011). Evaluation and revision of questionnaires for use among low-literacy immigrant Latinos. *Rev Lat Am Enfermagem, 19*(5), 1255-1264.
- De Heer, H.D., Wilkinson, A.V., Strong, L.L., Bondy, M.L., Koehly, L.M. (2012). Sitting time and health outcomes among Mexican origin adults: obesity as a mediator. *BMC Public Health. Oct 23;12*:896. doi: 10.1186/1471-2458-12-896.
- Degeance, J., Mouton, C., Lichtenstein, M., & Hazuda, H. (2005). Potential mediators of ethnic differences in physical activity in older Mexican Americans and European Americans: Results from the San Antonio longitudinal study of aging. *Journal of American Geriatric Society, 53*(7), 1240-1247.
- Delormier, T., Frohlich, K., Potvin, L. (2009). Food and eating as a social practice: an approach to understanding eating patterns as social phenomena. *Soc. Health Illness 31*, 215-228.
- Department of Health and Human Services. (2012). Obesity and Hispanic Americans. Retrieved

- on August 5, 2012 from <http://minorityhealth.hhs.gov/templates/content.aspx?ID=6459>
- DiLorenzo TM, Stucky-Ropp RC, Vander Wal JS, Gotham HJ. (1998). Determinants of exercise among children. II. A longitudinal analysis. *Prev Med. May-Jun;27(3):470-7.*
- Diez Roux, A. V., Evenson, K. R., McGinn, A. P., Brown, D. G., Moore, L., Brines, S., & Jacobs, D. R., Jr. (2007). Availability of recreational resources and physical activity in adults. *American Journal of Public Health, 97(3), 493-499.* doi:10.2105/AJPH.2006.087734
- Dishman, R. & Steinhardt, M. (1988). Reliability and concurrent validity of a 7-day recall of physical activity in college students. *Medicine & Science in Sports and Exercise, 20(1), 14-25.*
- Dominick, G.M., Dunsiger, S.I., Pekmezi, D.W., Marcus, B.H. (2013). Health literacy predicts change in physical activity self-efficacy among sedentary Latinas. *J Immigrant Minority Health, 15:533-539*
- Eamranond, P.P., Wee, C.C., Legedza, A.T., Maraantonio, E.R. & Leveille, S.G. (2009). Acculturation and cardiovascular risk factor control among Hispanic adults in the United States. *Public Health Reports, 124(818-823).*
- Eberhardt, M., Ingraham, D. Makuc, D. Health. (2001) United States 2001 Urban and Rural Health Chartbook, National Center for Health Statistics
- Eun-Ok, I., Lee, B., Hwang, H., Yoo, K.H., Chee, W., Stuijbergen, A. (2010). "A waste of time": Hispanic women's attitudes toward physical activity. *Women Health. 50(6), 563-579.*
- Evenson, K., Sarmiento, O., Tawney, K., Macon, M., & Ammerman, A. (2003). Personal, social and environmental correlates of physical activity in North Carolina Latina immigrants. *American Journal of Preventative Medicine. Oct 25, (3 suppl 1), 77-85.*
- Evenson, K., Sarmiento, O., Tawney, K., Macon, M., & Ammerman, A. (2002). Environmental, policy and cultural factors related to physical activity among Latina immigrants. *Women and Health, 36(2), 43-57.*

- Evenson KR, Wen F. (2010). Measuring physical activity among pregnant women using a structured one-week recall questionnaire: evidence for validity and reliability. *Int J Behav Nutr Phys Act.* Mar 21;7:21. doi: 10.1186/1479-5868-7-21.
- Ewing, B., Thompson, M., Wachtel, M., & Freeza, E. (2011). A cost-benefit analysis of bariatric surgery on the South Plains region of Texas. *Obes Surg.* 2011 May;21(5):644-9. doi: 10.1007/s11695-010-0266-0.
- Eyler, A. (2003). Personal, social, and environmental correlates of physical activity in rural midwestern white women. *American Journal of Preventive Medicine*, 25(3si), 86-92.
- Eyler, A., Baker, E., Cromer, L., King, A., Brownson R., & Donatelle, R. (1998). Physical activity and minority women: A qualitative study. *Health Education Behavior*, 25(5), 640-652.
- Eyler, A.A., Brownson, R.C., Bacak, S.J. & Housemann, R.A. (2003). The epidemiology of walking for physical activity in the United States. *Medicine and Science in Sports and Exercise* 35(9), 1529-1536.
- Eyler, A., Matson-Koffman, D., Young, D., Wilcox,S., Wilbur,J., Thompson, J., Sanderson, B., & Evenson, K. (2003). Quantitative study of correlates of physical activity in women from diverse racial/ethnic groups: The women's cardiovascular health network project – summary and conclusions. *American Journal of Preventative Medicine.* 25(3 Suppl 1), 93-103.
- Fahlman, M.M., Topp, R., McNevin, N., Morgan, A.L. & Boardley, D.J. (2007). Structured exercise in older adults with limited functional ability: assessing the benefits of an aerobic plus resistance training program. *Journal of Gerontological Nursing*, 33, 32-39.
- Feito, Y., Bassett, D. R., Tyo, B., & Thompson, D. L. (2011). Effects of body mass index and tilt angle on output of two wearable activity monitors. *Medicine and Science in Sports and Exercise*, 43(5), 861-866.

- Field, A. (2013). *Discovering Statistics using IBM SPSS Statistics*. Los Angeles: SAGE Publications Ltd.
- Finamore, F., Kenyon, D., Lieberson, D., Ryu, W., Ueland, M., & Young, S. (2008). *BEST Literacy Test Manual*. United States of America: Center for Applied Linguistics.
- Flegal, K. M., Carroll, M. D., Ogden, C. L., & Curtin, L. R. (2010). Prevalence and trends in obesity among US adults, 1999-2008. *JAMA : The Journal of the American Medical Association*, *303*(3), 235-241. doi:10.1001/jama.2009.2014
- Fleming LE, Lee DJ, Martinez AJ, Leblanc WG, McCollister KE, Bridges KC, Christ SL, Arheart KL, Pitman T. (2007). The health behaviors of the older US worker. *Am J Ind Med. Jun;50*(6):427-37.
- Florez, K., Dubowitz, T., Saito, N., Borjes, G., Breslau, J. (2012). United States – Mexico migration and the prevalence of obesity: A transnational perspective. *Arch Intern Med*, *172*(22), 1760-1762.
- Ford, E.S., Li, C., Zhao, G. (2010). Prevalence and correlates of metabolic syndrome based on a harmonious definition among adults in the U.S. *Journal of Diabetes*, *2*(3), 180-193.
- Franzini, L., Ribble, J.C., Keddie, A.M., (2001). Understanding the Hispanic Paradox, Ethnicity and Disease, *Ethn Dis. 11*(3) 496-518.
- Frezza, E. & Wachtel, M. (2009). Is the health care system the next victim of the financial crisis? *Surg Laparosc Endosc Percutan Tech. Jun 19*(3):276. doi: 10.1097/SLE.0b013e3181a7c6f7
- Friedenreich, C. M. (2001). Physical activity and cancer prevention: From observational to intervention research. *Cancer Epidemiology, Biomarkers & Prevention : A Publication of the American Association for Cancer Research, Cosponsored by the American Society of Preventive Oncology*, *10*(4), 287-301.
- Giardinia, E.G., Laudano, M. Hurstak, E., Saroff, A., Fleck, E., Sciacca, R., Boden-Albala, B., Cassetta, J. (2009). Physical Activity Participation among Caribbean Hispanic Women

- Living in New York: Relation to Education, Income and Age. *Journal of Women's Health, 18*(2), 187-193.
- Gidlow, C., Cochrane, T., Davey, R.C., Smith, G., Fairburn, J. (2010). Relative importance of physical and social aspects of perceived neighbourhood environment for self-reported health. *Preventative Medicine, 51*(2), 157-163.
- Gottlieb, B. H., & Bergen, A. E. (2010). Social support concepts and measures. *Journal of Psychosomatic Research, 69*(5), 511-520. doi:10.1016/j.jpsychores.2009.10.001
- Gracey, M., & King, M. (2009). Indigenous health part 1: Determinants and disease patterns. *Lancet, 374*(9683), 65-75. doi:10.1016/S0140-6736(09)60914-4
- Grassi, Gonzalez, Tello & He (1999). La Vida Caminando: A community based physical activity program designed for rural Latino Families, *Journal of Health Education, 30* (2, Suppl, 1), 13-17.
- Ham SA, Ainsworth BE. (2010). Disparities in data on Healthy People 2010 physical activity objectives collected by accelerometry and self-report. *Am J Public Health. Apr 1*;100 Suppl 1:S263-8. doi: 10.2105/AJPH.2009.180075.
- Ham SA, Yore MM, Kruger J, Heath GW, Moeti R. (2007). Physical activity patterns among Latinos in the United States: putting the pieces together. *Prev Chronic Dis. Oct*;4(4):A92. Epub 2007 Sep 15.
- Hamer, M., & Chida, Y. (2008). Walking and primary prevention: A meta-analysis of prospective cohort studies. *British Journal of Sports Medicine, 42*(4), 238-243. doi:10.1136/bjism.2007.039974
- Hartley, D. (2004). Rural health disparities, population health and rural culture. *Am J Public Health, 94*(10), 1675-1678.
- Hartman, S., Dunsiger, S., Pekmezi, D., Barbera, B., Neighbors, C., Marquez, B., & Marcus, B., (2011). Impact of baseline BMI upon the success of Latina Participants Enrolled in a 6-month physical activity intervention. *Journal of Obesity, 921916* Epub Nov 24.

- Hayashi, T., Farrell, M., Chaput, L., Rocha, D., & Hernandez, M. (2010). Lifestyle intervention, behavioral changes, and improvement in cardiovascular risk profiles in the California WISEWOMAN project. *Journal of Women's Health, 19*(6), 1129-1138.
- He, S. & Baker, D. (2005). Differences in leisure-time, household, and work-related physical activity by race, ethnicity, and education. *J Gen Intern Med., 20*, 259-265.
- Hilfingier Messias, D.K., Parra-Medina, D., Sharpe, P.A., Trevino, L., Koskan, A.M., Morales-Campos, D. (2013). Promotoras de Salud: Roles, responsibilities, and contributions in a multi-site community-based randomized controlled trial. *Hisp Health care Int. 11*(2), 62-71.
- Hovell, M., Mulvihill, M., Buono, M., Liles, S., Schade, D., Washington, T., Manzano, R., Sallis, J. (2008). Culturally tailored aerobic exercise intervention for low-income Latinas. *American Journal of Health Promotion. 22*(3), 155-163.
- Hovell, M., Sallis, J., Hofstetter, R. Barrington, Hackley, Elder, Castro & Kilbourne, (1991). Identification of correlates of physical activity among Latino adults. *J Community Health, 16*, 23-36.
- Hunt, K., Resendez, R. Williams, K., Haffner, S., Stern, M., Hazuda, H. (2003). All-cause and cardiovascular mortality among Mexican American and non-Hispanic white older participants in the San Antonio Heart Study – evidence against the “Hispanic paradox”, *American Journal of Epidemiology, Dec 1:158*(11), 1048-57
- Hunt, L., Schneider, S., & Comer, B. (2004). Should “acculturation” be a variable in health research? A critical review of research on US Hispanics. *Social Science Medicine, 59*(5), 973-986.
- Ickes, M. & Sharma, M. (2012). A systematic review of physical activity interventions in Hispanic adults. *Journal of Environmental Public Health, 156435* E Pub Feb 8.

- Im, E.O., Lee, B., Chee, W., Stuifbergen, A., eMAPA ResearchTeam. (2011). Attitudes toward physical activity of white midlife women. *Journal of Obstetric, Gynecologic & Neonatal Nursing*, 40(3), 312-321. doi: 10.1111/j.1552-6909.2011.01249.x.
- Im EO, Lee B, Hwang H, Yoo KH, Chee W, Stuifbergen A, Walker L, Brown A, McPeck C, Miro M, Chee E. (2010). "A waste of time": Hispanic women's attitudes toward physical activity. *Women Health*. Sep;50(6):563-79. doi: 10.1080/03630242.2010.510387.
- Ingram M, Ruiz M, Mayorga MT, Rosales C. (2009). The Animadora Project: identifying factors related to the promotion of physical activity among Mexican Americans with diabetes. *Am J Health Promot*. Jul-Aug;23(6):396-402. doi: 10.4278/ajhp.08021915.
- Jakicic, J., Davis, K. (2011). Obesity and physical activity. *Psychiatr Clin N Am* 34, 829-840.
- Juarbe, T., Turok, X.P., Perex-Stable, E.J. (2002). Perceived benefits and barriers to physical activity among older Latina women. *Western Journal of Nursing Research*, 24(8), 868-886.
- Kaczynski, A. T., Potwarka, L. R., & Saelens, B. E. (2008). Association of park size, distance, and features with physical activity in neighborhood parks. *American Journal of Public Health*, 98(8), 1451-1456. doi:10.2105/AJPH.2007.129064
- Kahn, L.K., Sobal, J., Martorell, R. (1997). Acculturation, socioeconomic status, and obesity in Mexican Americans, Cuban Americans, and Puerto Ricans. *Int J Obes Relat Metab Disord*, 21(2), 91-96.
- Kaiser, B.L. & Baumann, L.C. (2010). Perspectives on healthy behaviors among low-income Latino and non-Latino adults in two rural counties. *Public Health Nursing*, 27(6), 528-536. doi: 10.1111/j.1525-1446.2010.00893.x.
- Kaiser, B.L., Brown, R.L., & Baumann, L.C. (2010). Perceived influences on physical activity and diet in low-income adults from two rural counties. *Nursing Research*, 59(1), 67-75
- Keele-Smith, R. & Leon, T. (2003). Evaluation of individually tailored interventions on exercise adherence. *Western Journal of Nursing Research*. 25(6), 641-651.

- Keller, C., Ainsworth, B., Records, K., Todd, M., Belyea, M., Vega-Lopez, S., Permana, P., Coonrod, & Nagle-Williams, A. (2014). A comparison of a social support physical activity intervention in weight management among post-partum Latinas. *BMC Public Health, 14*(971)
- Kerr, J., Norman, G.J., Adams, M.A., Ryan, S., Frank, L., Sallis, J.F., Calfas, K.J., Patrick, K. (2010). Do neighborhood environments moderate the effect of physical activity lifestyle interventions in adults? *Health Place, 16*(5), 903-908.
- Kim, J., Sillah, A. Boucher, J., Sidebottom, A., & Knickelbine, T. (2013). Prevalence of the American Heart Association's "ideal cardiovascular health" metrics in a rural, cross-sectional, community-based study: the Heart of New Ulm Project. *J Am Heart Assoc. Apr 25;2*(3):e000058. doi: 10.1161/JAHA.113.000058.
- Kirk MA, Rhodes RE. (2011). Occupation correlates of adults' participation in leisure-time physical activity: a systematic review. *Am J Prev Med. Apr;40*(4):476-85. doi: 10.1016/j.amepre.2010.12.015
- Klesges, R., Eck, L., Mellon, M. Fulliton, W., Somes, G., Hanson, C. (1990). The accuracy of self-reports of physical activity. *Medicine and Science in Sports and Exercise, 22*(5), 690-697.
- Koeneman, M.A., Verheijden, M.W., Chinapaw, M.J., Hopman-Rock, M. (2011). Determinants of physical activity and exercise in healthy older adults: a systematic review. *Int J Behav Nutr Phys Act. Dec 28;8*:142. doi: 10.1186/1479-5868-8-142.
- Kruger J, Yore MM, Ainsworth BE, Macera CA. (2006). Is participation in occupational physical activity associated with lifestyle physical activity levels? *J Occup Environ Med. Nov;48*(11):1143-8.
- Laffrey, S.C. (2000). Physical activity among older Mexican American women. *Research in Nursing and Health. 23*(5), 383-392. 10.1002/1098-240X(200010)23:5<383::AID-NUR5>3.0.CO;2-S

- Lara M, Gamboa C, Kahramanian MI, Morales LS, Bautista DE. (2005). Acculturation and Latino health in the United States: a review of the literature and its sociopolitical context. *Annu Rev Public Health.*;26:367-97.
- Larkey, L. (2006). Las mujeres saludables: reaching Latinas for breast, cervical and colorectal cancer prevention and screening. *Journal of Community Health*, 31(1), 69-77.
- Leclere FB, Jensen L, Biddlecom AE.(1994). Health care utilization, family context, and adaptation among immigrants to the United States. *J Health Soc Behav. Dec*;35(4):370-84
- Lee, D. & Markides, K.S. (1990). Activity and mortality among aged persons over an eight-year period. *J Gerontol B Psychol Sci Soc Sci.*, 45,S39-S42.
- Leslie, E., Owen, N., Salmon, J., Bauman, A., Sallis, J.F., Lo, S.K. (1999). Insufficiently active Australian college students: perceived personal, social, and environmental influences. *Prev Med. Jan*;28(1):20-7.
- Lopes, V. P., Magalhães, P., Bragada, J., & Vasques, C. (2009). ActiGraph[®] calibration in obese/overweight and type 2 diabetes mellitus middle-aged to old adult patients. *Journal of Physical Activity & Health*, 6 Suppl 1, S133-S140.
- Lynch KE, Landsbaugh JR, Whitcomb BW, Pekow P, Markenson G, Chasan-Taber L (2012). Physical activity of pregnant Hispanic women. *Am J Prev Med. Oct*;43(4):434-9.
- Marin, G. & Marin, B. (1991). Research with Hispanic populations. Applied Social Research Methods Series. Newbury Park, CA: Sage Publications, (Vol 23).
- Martin, S.L., Kirkner, G.J., Mayo, K., Matthews, C.E., Durstine, J.L., & Herbert, J.R. (2005). Urban, rural and regional variations in physical activity. *Journal of Rural Health*, 21(3), 239/-244.
- Marin, G., Sabogal, F., Marin, B.V., Otero-Sabogal, R., Perez-Stable, E.J. (1987). Development of a short acculturation scale for Hispanics. *Hispanic Journal of Behavioral Sciences*, 9(183), doi: 10.1177/07399863870092005.

- Martinez, J. Powell, J., Agne, A., Scarinci, I. & Cherrington, A. (2012). Exploring weight and lifestyle: Mexican immigrant Men's Perspectives. *Public Health Nursing, 29*(6), 490-498, doi:10.1111/j.1525-1446.2012.01026.x.
- Martyn-Nemeth, P., Vitale, G., & Cowger, D. (2010). A culturally focused exercise program in Hispanic adults with type 2 diabetes: A pilot study. *Diabetes Educator, 36*(2), 258-267.
- Marquez, D.X. & McAuley, E. (2006). Gender and acculturation influences on physical activity in Latino adults. *Annals of Behavioral Medicine, 31*(2), 138-144.
- Marquez, D.X. & McAuley, E. (2006). Social cognitive correlates of leisure time physical activity among Latinos. *Journal of Behavioral Medicine, 29*(3), 281-289.
- Marquez, D.X., Neighbors, C.J., & Bustamante, E.E. (2010). Leisure time and occupational physical activity among racial or ethnic minorities. *Med Sci Sports Exerc 42*(6), 1086-1093.
- Matthews, C. E. (2005). Calibration of accelerometer output for adults. *Medicine & Science in Sports & Exercise, 37*(11), S512-S522.
- Matthews, C., Chen, K., Freedson, P. et al. (2008). Amount of time spent in sedentary behaviors in the United States. *American Journal epidemiol 167*(7), 875-881.
- McAlexander, K., Mama, S., Medina, A., O'Connor, D., Lee, R. (2011). The concordance of directly and indirectly measured built environment attributes and physical activity adoption. *International Journal of Behavioral Nutrition and Physical Activity, 8*(71), 1-7.
- McAuley, E., Mullen, S.P., Szabo, A.N., White, S.M., Wojcicki, T.R., Mailey, E.L., Gothe, N.P., Olson, E.A., Voss, M., Erickson, K., Prakash, R., & Kramer, A.F., (2011). Self-regulatory processes and exercise adherence in older adults: executive function and self-efficacy effects. *American Journal of Preventive Medicine, 41*(3), 284-290.
[doi:10.1016/j.amepre.2011.04.014](https://doi.org/10.1016/j.amepre.2011.04.014)
- McBean, A., Huang, Z., Virnig, B.A., Lurie, N., Musgrave, D. (2003). Racial variation in the control of diabetes among elderly Medicare managed care beneficiaries. *Diabetes Care,*

26, 3250-3256.

McDowell, I. Newell, C. (1996). *Measuring health: A guide to rating scales and questionnaires.*

New York: Oxford University Press

McGinn, A. P., Evenson, K. R., Herring, A. H., Huston, S. L., & Rodriguez, D. A. (2007).

Exploring associations between physical activity and perceived and objective measures of the built environment. *Journal of Urban Health : Bulletin of the New York Academy of Medicine*, 84(2), 162-184. doi:10.1007/s11524-006-9136-4

McGruder, H.F., Malarcher, A.M., Antoine, T.L., Greenlund, K.J. & Croft, J.B. (2004). Racial and ethnic disparities in cardiovascular risk factors among stroke survivors: United States 1999 to 2001. *Stroke*, 35(7), 1557-61.

McLeroy, K. R., Bibeau, D., Steckler, A., & Glanz, K. (1988). An ecological perspective on health promotion programs. *Health Education Quarterly*, 15(4), 351-377

Merchant, G., Buelna, C., Castaneda, S.F., Arrendondo, E.M., Marchall, S.J., Strizich,

G....Talavera, G. (2015). Accelerometer-measured sedentary time among Hispanic adults: Results from the hispanic community health study/study of Latinos (HCHS/SOL). *Preventive Medicine Reports*, Oct 22;2:845-53. doi: 10.1016/j.pmedr.2015.09.019. eCollection 2015.

Mier N, Ory MG, Medina AA. (2010). Anatomy of culturally sensitive interventions promoting nutrition and exercise in hispanics: a critical examination of existing literature. *Health Promot Pract. Jul;11(4):541-54.* doi: 10.1177/1524839908328991. Epub 2009 Feb 4.

Mier, N., Medina, A.A. , Ory MG. (2007). Mexican Americans with type 2 diabetes: perspectives on definitions, motivators, and programs of physical activity. *Prev Chronic Dis. Apr 4(2):A24.*

Miller, N. E., Strath, S. J., Swartz, A. M., & Cashin, S. E. (2010). Estimating absolute and relative physical activity intensity across age via accelerometry in adults. *Journal of Aging and Physical Activity*, 18(2), 158-170.

- Montgomery-Downs, H.E., Insana, S.P., & Bond, J.A. (2012). Movement toward a novel activity monitoring device. *Sleep Breath, 16*:913-917.
- Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, Das SR, de Ferranti S, Després JP, Fullerton HJ, Howard VJ, Huffman MD, Isasi CR, Jiménez MC, Judd SE, Kissela BM, Lichtman JH, Lisabeth LD, Liu S, Mackey RH, Magid DJ, McGuire DK, Mohler ER 3rd, Moy CS, Muntner P, Mussolino ME, Nasir K, Neumar RW, Nichol G, Palaniappan L, Pandey DK, Reeves MJ, Rodriguez CJ, Rosamond W, Sorlie PD, Stein J, Towfighi A, Turan TN, Virani SS, Woo D, Yeh RW, Turner MB; American Heart Association Statistics Committee and Stroke Statistics Subcommittee. (2016) Executive Summary: Heart Disease and Stroke Statistics – 2016 Update: A report from the American Heart Association. *Circulation, Jan 26; 133*(4), 447-54. doi: 10.1161/CIR.0000000000000366.
- Nagel, C. L., Carlson, N. E., Bosworth, M., & Michael, Y. L. (2008). The relation between neighborhood built environment and walking activity among older adults. *American Journal of Epidemiology, 168*(4), 461-468. doi:10.1093/aje/kwn158
- National Center for Health Statistics. (2007). Health, United States with chartbook on trends in the health of Americans. Retrieved from <http://www.cdc.gov/nchs/data/hus/hus07.pdf>
- National Heart Lung and Blood Institute. (2008). The heart truth for Latinas: An action plan. Retrieved from http://www.nhlbi.nih.gov/health/hearttruth/material/factsheet_latina.pdf
- NationMaster. (2011) Health statistics, obesity rates by country. Retrieved on October 20, 2013 from www.nationmaster.com/graph/hca_obe-health-obesity.
- Nebraska Department of Health and Human Services (2011). Nutrition and activity for health: Prevention works. Healthy Communities Grant. Retrieved on February 26, 2011 from <http://www.dhhs.ne.gov/NAFH/publichealthsolutionshealthdepthcg.htm>
- Neighbors C., Marquez D., Marcus B. (2008) Leisure-time physical activity disparities among Hispanic subgroups in the United States. *Am J Public Health. 98*(8):1460–1464.

[PubMed:18048795]

NIH Obesity Research (2011) Retrieved on October 30, 2012 from <http://obesityresearch.nih.gov/>

Nijamkin, M., Campa, A., Sosa, J., Baum, M., Himburg, S., Johnson, P. (2012). Comprehensive nutrition and lifestyle education improves weight loss and physical activity in Hispanic Americans following gastric bypass surgery: a randomized controlled trial. *J Acad Nutr Diet*. Mar;112(3):382-90. doi: 10.1016/j.jada.2011.10.023. Epub 2012 Mar 1.

Northridge, M.E., Sclar, E.D. & Biswas, P. (2003). Sorting out the connections between the built environment and health: a conceptual framework for navigating pathways and planning healthy cities. *Journal of Urban Health*, 80(4), 556-568.

Office of Minority Health. Diabetes and Hispanic Americans. Retrieved on August 22, 2012 from <http://minorityhealth.hhs.gov/templates/content.aspx?lvl=3&lvlID=5&IS=3324>

Ogden, C.L., Carroll, M.D., Kit, B.K., Flegal, K.M. (2014). Prevalence of childhood and adult obesity in the United States, 2011 – 2012. *JAMA Feb 26 311*(8), 806-814

Olander EK, Fletcher H, Williams S, Atkinson L, Turner A, French DP. (2013). What are the most effective techniques in changing obese individuals' physical activity self-efficacy and behaviour: a systematic review and meta-analysis. *Int J Behav Nutr Phys Act*. Mar 3;10:29. doi: 10.1186/1479-5868-10-29.

Oldenburg BF, Sallis JF, French ML, Owen N. (1999). Identification of correlates of physical activity among Latino adults. *Health Educ Res*. Feb;14(1):121-30.

Orozco, L. J., Buchleitner, A. M., Gimenez-Perez, G., Roque, I., Figuls, M., Richter, B., & Mauricio, D. (2008). Exercise or exercise and diet for preventing type 2 diabetes mellitus. *Cochrane Database of Systematic Reviews (Online)*, (3)(3), CD003054. doi:10.1002/14651858.CD003054.pub3

Ory, M. G., Lee Smith, M., Mier, N., & Wernicke, M. M. (2010). The science of sustaining health behavior change: The health maintenance consortium. *American Journal of Health Behavior*, 34(6), 647-659.

- Ostchega Y, Dillon CF, Hughes JP, Carroll M, Yoon S. (2007). Trends in hypertension prevalence, awareness, treatment, and control in older U.S. adults: data from the National Health and Nutrition Examination Survey 1988 to 2004. *J Am Geriatr Soc. Jul;55(7):1056-65.*
- Ottenbacher, A.J., Snih, S.A., Karmarkar, A., Lee, J., Samper-Ternent, R., Kumar, A., Bindawas, S., Markides, K.S., & Ottenbacher, K.J. (2012). Routine physical activity and mortality in Mexican Americans aged 75 and older. *J Am Geriatr June 60(6).* 1085-91.
- Pandy, D., Labarthe, D., Goff, W., Chan, W & Nichaman, M. (2001). Community-wide coronary heart disease mortality in Mexican American equals or exceeds that in non-Hispanic whites: the Corpus Christi heart project. *American Journal of Medicine, 110(2)*, 81-87.
- Parks SE, Housemann RA, Brownson RC. (2003). Differential correlates of physical activity in urban and rural adults of various socioeconomic backgrounds in the United States. *J Epidemiol Community Health. Jan;57(1):29-35.*
- Parra-Medina, D. & Hilfinger Messias, D.K. (2011). Promotion of physical activity among Mexican-origin women in Texas and South Carolina: An examination of social, cultural, economic and environmental factors. *Quest, 63(1)*, 100-117.
- Patterson, P. D., Moore, C. G., Probst, J. C., & Shinogle, J. A. (2004). Obesity and physical inactivity in rural america. *The Journal of Rural Health : Official Journal of the American Rural Health Association and the National Rural Health Care Association, 20(2)*, 151-159.
- Pekmezi, D.W., Neighbors, C.J., Lee, C.S., Gans, K.M., Bock, B.C., Morrow, K.M., Marquez, B., Dunsiger, S., Marcus, B.H. (2009). A culturally adapted physical intervention for Latinas: a randomized controlled trial. *American Journal of Preventative Medicine, 37(6)*, 495-500. [doi:10.1016/j.amepre.2009.08.023](https://doi.org/10.1016/j.amepre.2009.08.023)
- Peragallo, N., Fox, P., Alba, M. (2000). Acculturation and breast self-examination among immigrant Latina women in the U.S.A., *International Nursing Review, 47(1)*, 38-45.

- Perez A, Fleury J, Keller C. (2010). Review of intervention studies promoting physical activity in Hispanic women. *West J Nurs Res. Apr*;32(3):341-62. doi: 10.1177/0193945909351300. Epub 2009 Dec 29.
- Perez-Escamilla, R. (2011). Acculturation, nutrition, and health disparities in Latinos. *Am J Clin Nutr. 93*(5), 1163S-1167S.
- Perry, C. K., Rosenfeld, A. G., Bennett, J. A., & Potempa, K. (2007). Heart-to-heart: Promoting walking in rural women through motivational interviewing and group support. *The Journal of Cardiovascular Nursing, 22*(4), 304-312.
doi:10.1097/01.JCN.0000278953.67630.e3
- Pescatello, L., Alonso, M., Schaffino, R. & Leavitt, R. (2008) Determinants of physical activity among a convenience sample of Puerto Rican women residing in the Northeastern United States. *Journal of Strength and Conditioning Research, 22*(5), 1515-1521.
- Petersen, A., Leet, R., Brownson, R. (2005). Correlates of physical activity among pregnant women in the United States. *Journal of Med. Sci., Sports Exerc. 37* 1748-1753.
- Plonczynski, D.J. (2000). Measurement of motivation for exercise. *Health Education Research, 15*(6), 695-705.
- Ponce NA, Lavarreda SA, Yen W, Brown ER, DiSogra C, Satter DE.(2004). The California Health Interview Survey 2001: translation of a major survey for California's multiethnic population. *Public Health Rep. Jul-Aug*;119(4):388-95.
- Portillo, C., White, M., Baisden, K., & Dawson, C. (1995). Angina, functional impairment and physical inactivity among Mexican-American women with depressive symptoms. *Progressive Cardiovascular Nursing, 10*(3), 18-25
- Ramirez, A., Perez, M., Munoz, O., Garcia, P., Trevino, L., Lara, P. (2011). Family based health needs along the Texas-Mexico border, *Journal of Public Health, 33*(4), 579-86.
- Resnick, B., Luisi, D., Vogel, A., Junaleepa, R. (2004) Reliability and validity of the self efficacy for exercise and outcome expectations for exercise scales with minority older adults .

Journal of Nursing Measurement, 12(3), 235-247.

Reis, J.P., Bowles, H.R., Ainsworth, B.E., Dubose, K.D., Smith, S., Laditka, J.N. (2004).

Nonoccupational physical activity by degree of urbanization and U.S. geographic region.

Medicine & Science in Sports & Exercise, 36(12), 2093-2098.

Reyes NR, Oliver TL, Klotz AA, Lagrotte CA, Vander Veur SS, Virus A, Bailer BA, Foster GD.

(2012). Similarities and differences between weight loss maintainers and regainers: a

qualitative analysis. *J Acad Nutr Diet*. Apr;112(4):499-505. doi:

10.1016/j.jand.2011.11.014.

Richards, K. C., Enderlin, C. A., Beck, C., McSweeney, J. C., Jones, T. C., & Roberson, P. K.

(2007). Tailored biobehavioral interventions: A literature review and synthesis. *Research and Theory for Nursing Practice*, 21(4), 271-285.

Riley-Jacome, M., Gallant, M.P., Fischer, B.D., Gotcsik, F.S., Strogatz, D.S. (2010). Enhancing

community capacity to support physical activity: The development of a community-based indoor-outdoor walking program. *The Journal of Primary Prevention*, 31(1-2), 85-95,

10.1007/s10935-010-0204-x.

Robbins, L. B., Pender, N. J., Conn, V. S., Frenn, M. D., Neuberger, G. B., Nies, M. A., . . .

Wilbur, J. (2001). Physical activity research in nursing. *Journal of Nursing Scholarship* :

An Official Publication of Sigma Theta Tau International Honor Society of Nursing /

Sigma Theta Tau, 33(4), 315-321.

Roumen, C., Blaak, E. E., & Corpeleijn, E. (2009). Lifestyle intervention for prevention of

diabetes: Determinants of success for future implementation. *Nutrition Reviews*, 67(3),

132-146. doi:10.1111/j.1753-4887.2009.00181.x

Ruzic L, Heimer S, Misigoj-Durakovic M, Matkovic BR. (2003). Increased occupational

physical activity does not improve physical fitness. *Occup Environ Med*.

Dec;60(12):983-5.

Saelens, B.E. & Handy, S.L. (2008). Built environment correlates of walking: A review. *Med Sci*

Sports Exerc., 40(7 Suppl), S550-S566).

- Saelens, B.E., Sallis, J.F., Black, J.B., Chen, D. (2003). Neighborhood based differences in physical activity: an environment scale evaluation. *American Journal of Public Health*, 93(9), 1552-1558.
- Salinas, J., Hilfinger Messias, D., Morales-Campos, D., Parra-Medina, D. (2014). English language proficiency and physical activity among Mexican-origin women in South Texas and South Carolina. *J Health Care Poor Underserved*, 25(1), 357-375.
- Sallis, J. (2009). Measuring physical activity environments: A brief history, *American Journal of Preventive Medicine*, 36(4S), S86-S92.
- Sallis, J. (2002, December). Neighborhood Environment Walkability Scale (NEWS). Retrieved from <http://drjamessallis.sdsu.edu/Documents/NEWS.pdf>
- Sallis, J., Cervero, R., Ascher, W., Henderson, K., Kraft, M., Kerr, J. (2006). An ecological approach to creating more physically active communities. *Annual Review of Public Health*, 27, 297-322.
- Sallis, J., Grossman, R.M., Pinski, R.B., Patterson, T.L., Nader, P.R. (1987). The development of scales to measure social support for diet and exercise behaviors. *Preventive Medicine*, 16, 825-836.
- Sallis, J., Patterson, T., Buono, M. & Nader, P. (1988). Relation of cardiovascular fitness and physical activity to cardiovascular disease risk factors in children and adults. *American Journal of Epidemiology*, 127(5), 933-941.
- Sallis, J., Pinski, R.B., Grossman, R.M., Paterson, T.L., Nader, P.R. (1988). The development of self-efficacy scales for health related diet and exercise behaviors. *Health Education Research*, 3(3), 283-292.
- Sallis, J.F. & Saelens, B.E. (2000). Assessment of physical activity by self-report: status, limitations, and future directions. *Research Quarterly for Exercise and Sport*, 71(S1-14).

- Sallis, J. F., Slymen, D. J., Conway, T. L., Frank, L. D., Saelens, B. E., Cain, K., & Chapman, J. E. (2011). Income disparities in perceived neighborhood built and social environment attributes. *Health & Place, 17*(6), 1274-1283. doi:10.1016/j.healthplace.2011.02.006
- Scott, A.J. & Wilson, R.F. (2011). Social determinants of health among African Americans in a rural community in the deep south: An ecological exploration. *Rural Remote Health, 11*, 1634
- Shai D, Rosenwaike I. (1987). Mortality among Hispanics in metropolitan Chicago: an examination based on vital statistics data. *J Chronic Dis. 40*(5):445-51.
- Sirard, J. R., Forsyth, A., Oakes, J. M., & Schmitz, K. H. (2011). Accelerometer test-retest reliability by data processing algorithms: Results from the twin cities walking study. *Journal of Physical Activity & Health, 8*(5), 668-674.
- Sirur, R., Richardson, J., Wishart, L., Hanna, S. (2009). The role of theory in increasing adherence to prescribed practice. *Physiotherapy Canada, 61*(2), 68-77
- Slattery ML, Sweeney C, Edwards S, Herrick J, Murtaugh M, Baumgartner K, Guiliano A, Byers T. (2006). Physical activity patterns and obesity in Hispanic and non-Hispanic white women. *Med Sci Sports Exerc. Jan;38*(1):33-41
- Springer, J.B., Lamborn, S.D., Pollard, D.M. (2013). Maintaining physical activity over time: the importance of basic psychological need satisfaction in developing the physically active self. *Am J Health Promot. May-Jun;27*(5):284-93. doi: 10.4278/ajhp.110211-QUAL-62.
- Ståhl T, Rütten A, Nutbeam, D., Bauman A, Kannas L, Abel T, Lüschen G, Rodriguez DJ, Vinck J, van der Zee J. (2001). The importance of the social environment for physically active lifestyle--results from an international study. *Soc Sci Med. Jan;52*(1):1-10.
- Stephoe A, Wardle J, Fuller R, Holte A, Justo J, Sanderman R, Wichstrøm L. (1997) Leisure-time physical exercise: prevalence, attitudinal correlates, and behavioral correlates among young Europeans from 21 countries. *Prev Med. Nov-Dec;26*(6):845-54.

- Sternfeld B, Ainsworth BE, Quesenberry CP.(1999). Physical activity patterns in a diverse population of women. *Prev Med. Mar*;28(3):313-23
- Swenson, C.J., Marshall, J.A., Mikulich-Gilbertson, S.K., Baxter, J. & Morgenstern, N. (2005). Physical activity in older, rural, Hispanic and non-hispanic white adults. *Medicine & Science in Sports & Exercise*, 37(6), 995-1002.
- Swider, S. (2002). Outcome effectiveness of community health workers: An integrative literature review. *Public Health Nursing*, 19(1), 11-20.
- The National Physical Activity Plan (2010). Make the Move: National Physical Activity Plan. Retrieved on June 1, 2012 from <http://www.physicalactivityplan.org/>
- Treiber FA, Baranowski T, Braden DS, Strong WB, Levy M, Knox W. (1991). Social support for exercise: relationship to physical activity in young adults. *Prev Med. Nov*;20(6):737-50.
- Triandis, H.C. (2001). Individualism-collectivism and personality. *J Pers. Dec*;69(6):907-24.
- Troiano, R.P., Berrigan, D., Dodd, K.W., Masse, L.C., Tilert, T., McDowell, M. (2008). Physical activity in the United States measured by accelerometer. *Med Sci Sports Exerc.* 40(1), 181-188.
- Trost, S., Owen, N., Bauman, A., Sallis, J., Brown, W. (2002). Correlates of adults' participation in physical activity: review and update. *Med Sci. Sport Exerc.* 34(12): 1996-2001.
- Trost, S.G., McIver, K. L., Pate, R.R. (2005). Conducting accelerometer-based activity assessments in field-based research. *Med Sci Sports Exerc* 37(11), S531-43.
- U.S. Bureau of the Census, Current Population Reports. Population Projections of the United States by age, race, and Hispanic Origin: 1995-2050. Washington DC: U.S. Department of Commerce. Bureau of the Census. 1998.
- U.S. Census Bureau. (2010). American FactFinder, 2000 and 2010 Decennial Census (NCLR calculation) Retrieved from <http://factfinder2census.gov>
- U.S. Census Bureau (2010). State & County Quickfacts. Retrieved on February 26, 2011 from <http://quickfacts.census.gov/qfd/states/31/31151.html>

- U.S. Census Bureau (2016). State & County Quickfacts. Retrieved on February 26, 2011 from <http://quickfacts.census.gov/qfd/states/31/31151.html>
- U.S. Census Bureau (2016). Hispanic Americans by the numbers. Retrieved on March 3, 2016 from http://factfinder.census.gov/faces/nav/jsf/pages/community_facts.xhtml#
- U.S. Department of Agriculture. (2013). Immigration and the rural workforce. Retrieved on March 21, 2016 from <http://www.ers.usda.gov/topics/in-the-news/immigration-and-the-rural-workforce.aspx>
- U.S. Department of Labor. (2014). Who are migrant and seasonal farmworkers. Retrieved on March 21, 2016 from http://www.doleta.gov/programs/who_msfw.cfm
- U.S. Department of Labor. (2008). Wage and Hour Division (WHD) Handy reference guide to the fair labor standards act. Retrieved on March 21, 2016 from <http://www.dol.gov/whd/regs/compliance/hrg.htm>
- United States Census Bureau. (2012). Profile America Facts for Features. Retrieved on June 1, 2012 from http://www.census.gov/newsroom/releases/archives/facts_for_features_special_editions/cb12-ff10.html
- United States Census Bureau (2012). The 2012 Statistical Abstract. Retrieved on June 1, 2012 from <http://www.census.gov/compendia/statab/cats/population.html>
- U.S. Department of Health and Human Services, Office of Minority Health. (2012). Obesity
- U.S. Department of Health and Human Services. Healthy People 2020. Retrieved on October 30, 2011 from <http://www.healthypeople.gov/2020/topicsobjectives2020/default.aspx>
- Umstattd Meyer MR, Sharkey JR, Patterson MS, Dean WR. (2013) Understanding contextual barriers, supports, and opportunities for physical activity among Mexican-origin children in Texas border colonias: a descriptive study. (2013) *BMC Public Health*. Jan 8,13(14). doi: 10.1186/1471-2458-13-14.
- United States Department of Agriculture. (2007). U.S. statistics on women and minorities on

farms and in rural areas. Retrieved on August 5, 20120 from

<http://www.nal.usda.gov/afsic/pubs/agriwomen.shtml>

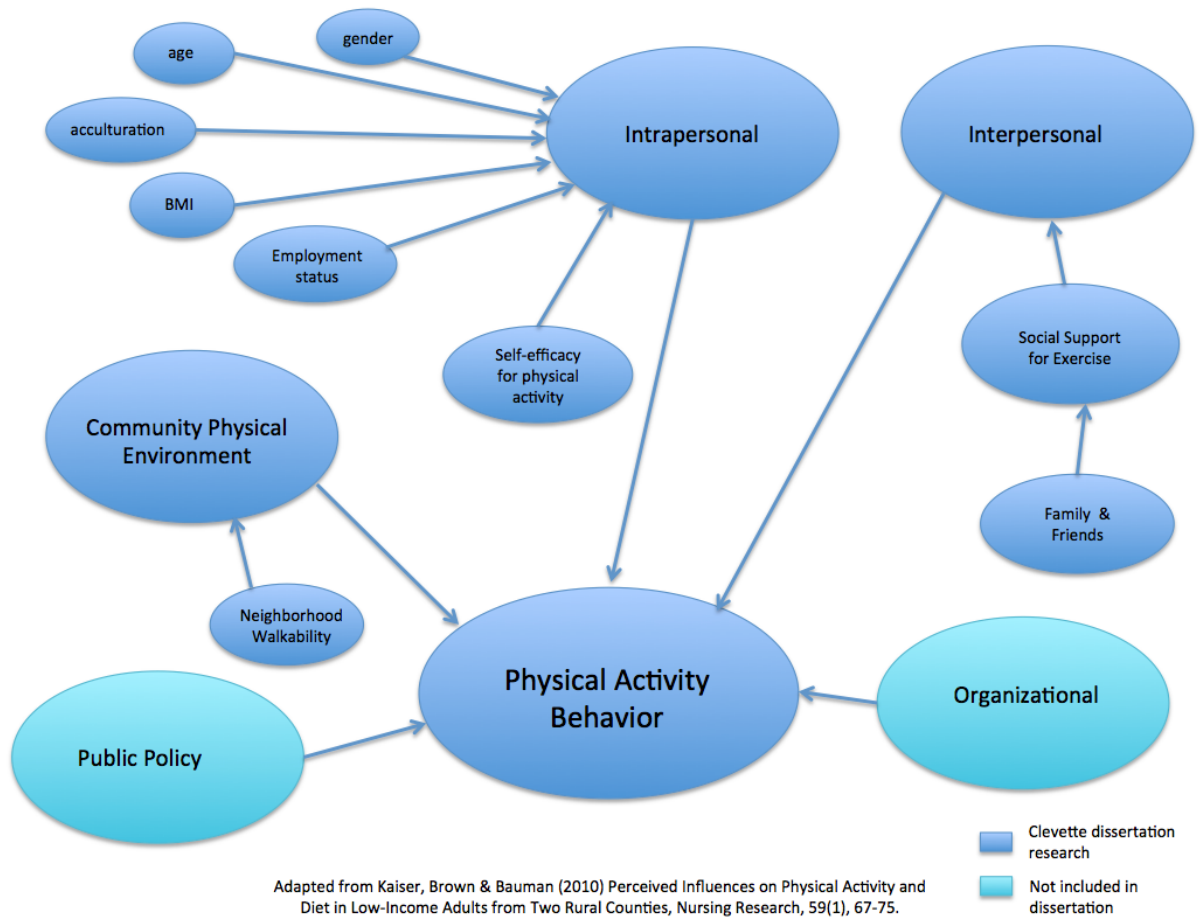
- Vadheim, Brewer, Kassner, Vanderwood, Hall, Butchner, Helgerson, & Harwell, Walker, S. N., Pullen, C. H., Hageman, P. A., Boeckner, L. S., Hertzog, M., Oberdorfer, M. K., & Rutledge, M. J. (2010). Maintenance of activity and eating change after a clinical trial of tailored newsletters with older rural women. *Nursing Research*, 59(5), 311-321. doi:10.1097/NNR.0b013e3181ed6695
- Van Wieren AJ, Roberts MB, Arellano N, Feller ER, Diaz JA. (2011). Acculturation and cardiovascular behaviors among Latinos in California by country/region of origin. *J Immigr Minor Health*. Dec;13(6):975-81. doi: 10.1007/s10903-011-9483-4.
- Voorhees, C. & Rohm Young, D. (2003). Personal, social, and physical environmental correlates of physical activity levels in urban Latinas. *Amercian Journal of Preventive Medicine*, 25(3Si), 61-68.
- Walker, S.N., Pullen, C.H., Hageman, P.A., Boeckner, L.S., Hertzog, M., Oberdorfer, M.K. & Rutledge, M.J. (2010). Maintenance of activity and eating change following a clinical trial of tailored newsletters with older rural women. *Nursing Research*, 59(5), 311-321.
- Wallace, P., Pomery, E., Latimer, A., Martinez, J. & Salovey, P. (2010). A review of acculturation measures and their utility in studies promoting latino health. *Hispanic Journal of Behavioral Science*, 32(1), 37-54.
- Wang, Y., Beydoun, M., Liang, L., Caballero, B., Kumanyika, S. (2008). Will all Americans become overweight or obese? Estimating the progression and cost of the U.S. obesity epidemic. *Obesity* 16, 2323-2330.
- Wang, G., Macera, C. A., Scudder-Soucie, B., Schmid, T., Pratt, M., Buchner, D., & Heath, G. (2004). Cost analysis of the built environment: The case of bike and pedestrian trails in lincoln, neb. *American Journal of Public Health*, 94(4), 549-553. doi:10.2105/AJPH.94.4.549

- Warnecke RB, Johnson TP, Chávez N, Sudman S, O'Rourke DP, Lacey L, Horm J. (1997).
Improving question wording in surveys of culturally diverse populations. *Ann Epidemiol.*
Jul;7(5):334-42.
- Wen LK, Shepherd MD, Parchman ML. (2004). Family support, diet, and exercise among older
Mexican Americans with type 2 diabetes. *Diabetes Educ.* Nov-Dec;30(6):980-93.
- Wilbur, J., Chandler, P., Dancy, B. & Lee, H. (2003). *Correlates of physical activity in urban
Midwestern Latinas. American Journal of Preventative Medicine, 25(3), 69-76.*
- Williams SL, French DP. (2011) What are the most effective intervention techniques for
changing physical activity self-efficacy and physical activity behaviour--and are they the
same? *Health Educ Res. Apr;26(2):308-22.* doi: 10.1093/her/cyr005. Epub 2011 Feb 14.
- Wolin, K. & Bennett, G. (2008). Interrelations of socioeconomic position and occupational and
leisure-time physical activity in the National Health and Nutrition Examination Survey.
Journal of Phys Act Health, 5(2), 229-241.
- Wolin, K., Colangelo, L., Chiu, B., Gapstur, S. (2009). Obesity and immigration among Latina
women. *J Immigr Minor Health 11(5), 428-431.*
- Wolin KY, Colditz G, Stoddard AM, Emmons KM, Sorensen G. (2006). Acculturation and
physical activity in a working class multiethnic population. *Prev Med Apr;42(4):266-72.*
Epub 2006 Feb 14.
- Yousefian A., Hennessy E., Umstattd M. R., Economos C., Hallam J., Hyatt R. , Hartley D.
(2009). Development of the rural active living assessment tools: Measuring rural
environments. *Preventive Medicine, 50, S86-S92.*
- Zambrana RE, Carter-Pokras O. (2010). Role of acculturation research in advancing science and
practice in reducing health care disparities among Latinos. *Am J Public Health.*
Jan;100(1):18-23. doi: 10.2105/AJPH.2008.138826. Epub .

- Zauszniewski JA. (2012). Intervention development: assessing critical parameters from the intervention recipient's perspective. *Appl Nurs Res. Feb;25(1):31-9*. doi: 10.1016/j.apnr.2010.06.002. Epub 2010 Aug 4.
- Zhu X, Arch B, Lee C. (2008). Personal, social, and environmental correlates of walking to school behaviors: case study in Austin, Texas. *ScientificWorldJournal. Sep 21;8:859-72*. doi: 10.1100/tsw..63.
- Zsembik BA, Fennell D. (2005). Ethnic variation in health and the determinants of health among Latinos. *Soc Sci Med. Jul;61(1):53-63*.
- Zuazagoitia, A., Montoya, I., Grandes, G., Arietaleanizbeasoca, M., Arce, V., Martinez, V., Sanchez, M., Sanchez, A. (2014). Reliability and validity of the 7-day Physical Activity Recall interview in a Spanish population. *Eur J. Sport Sci. Suppl 1:S361-8*.

Appendix A

Clevette Ecological Model for Physical Activity



Appendix BCOLLEGE OF NURSING
Lincoln Division

Study Participant Demographic Information Form (page 1 of 4)

Name	
Address	
e-mail address	
Phone Number	
Alternate Number	
Age	
Study Participant ID #	

Study Participant Demographic Information Form (page 2 of 4)

+	
Study Participant ID #	
Sex	<input type="checkbox"/> male <input type="checkbox"/> female
Self Identifies as Hispanic or Latino?	<input type="checkbox"/> yes <input type="checkbox"/> no
If self-identification of more than one ethnic group -- mark all areas the study participant identifies	<input type="checkbox"/> Caucasian <input type="checkbox"/> Black <input type="checkbox"/> Hispanic <input type="checkbox"/> Native American <input type="checkbox"/> Asian <input type="checkbox"/> Other
Marital Status	<input type="checkbox"/> married <input type="checkbox"/> single <input type="checkbox"/> living with partner <input type="checkbox"/> widowed <input type="checkbox"/> divorced <input type="checkbox"/> separated
Do you have children in your house?	<input type="checkbox"/> yes <input type="checkbox"/> no
If children in the house, how many and what are their ages?	
If female, are you pregnant? If yes and willing to provide due date, note due date	<input type="checkbox"/> yes <input type="checkbox"/> no
Have you been homeless at any time during the last 12 months?	<input type="checkbox"/> yes <input type="checkbox"/> no
Do you have internet service at home? If yes, do you access this via a computer, ipad, ipod, phone (list all applicable options)?	<input type="checkbox"/> yes <input type="checkbox"/> no
Do you own a car?	<input type="checkbox"/> yes <input type="checkbox"/> no
If you own a car, do you own more than one car?	<input type="checkbox"/> yes <input type="checkbox"/> no
If you do not own a car, are you able to borrow / use someone else's car (neighbor's car, mother's car, etc.)	<input type="checkbox"/> yes <input type="checkbox"/> no
Do you work outside the home?	<input type="checkbox"/> yes <input type="checkbox"/> no
Are you self-employed?	<input type="checkbox"/> yes <input type="checkbox"/> no



COLLEGE OF NURSING
Lincoln Division

Study Participant Demographic Information Form (page 3 of 4)

Study Participant ID #	
Employment Status	<input type="checkbox"/> Full-time <input type="checkbox"/> Part-time <input type="checkbox"/> Volunteer <input type="checkbox"/> Disabled <input type="checkbox"/> Retired <input type="checkbox"/> Homemaker <input type="checkbox"/> Other
Financial Status	<input type="checkbox"/> Not enough to make ends meet <input type="checkbox"/> Enough to make ends meet <input type="checkbox"/> More than enough to make ends meet **Gross Income Before Taxes/Deductions _____ per wk _____ per month _____ per yr. <input type="checkbox"/> Do not wish to provide Gross Income information
When do you plan to graduate / get your GED?	



COLLEGE OF NURSING
Lincoln Division

Study Participant Demographic Information Form (page 4 of 4)

Study Participant ID #	
ActiGraph® Number **again verbally remind study participant to place the ActiGraph® on their dominant hip (right vs left handed), emphasize the ActiGraph® is not waterproof, and the ActiGraph® is valuable / expensive	
Study Participant questionnaires completed	<input type="checkbox"/> yes <input type="checkbox"/> no
Study Participant provided gift cards and gift card tracking number(s)	<input type="checkbox"/> yes <input type="checkbox"/> no Gift Card Tracking # Gift Card Tracking #

Appendix C

ID# _____

Version 12/2002

Date _____

Neighborhood Environment Walkability Scale (NEWS)

We would like to find out more information about the way that you perceive or think about your neighborhood. Please answer the following questions about your neighborhood and yourself. Please answer as honestly and completely as possible and provide only one answer for each item. There are no right or wrong answers and your information is kept confidential.

A. Types of residences in your neighborhood

Among the residences in your neighborhood...

- How common are detached single-family residences in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All
- How common are townhouses or row houses of 1-3 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All
- How common are apartments or condos 1-3 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All
- How common are apartments or condos 4-6 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All
- How common are apartments or condos 7-12 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All
- How common are apartments or condos more than 13 stories in your immediate neighborhood?

1	2	3	4	5
None	A few	Some	Most	All

B. Stores, facilities, and other things in your neighborhood

About how long would it take to get from your home to the nearest businesses or facilities listed below if you walked to them? Please put only one check mark (✓) for each business or facility.

	1-5 min	6-10 min	11-20 min	21-30 min	31+ min	don't know
example: gas station	1. _____	2. _____	3. <input checked="" type="checkbox"/>	4. _____	5. _____	8. _____
1. convenience/small grocery store	1. _____	2. _____	3. _____	4. _____	5. _____	8. _____
2. supermarket	1. _____	2. _____	3. _____	4. _____	5. _____	8. _____
3. hardware store	1. _____	2. _____	3. _____	4. _____	5. _____	8. _____
4. fruit/vegetable market	1. _____	2. _____	3. _____	4. _____	5. _____	8. _____

2

	1-5 min	6-10 min	11-20 min	21-30 min	31+ min	don't know
5. laundry/dry cleaners	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
6. clothing store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
7. post office	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
8. library	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
9. elementary school	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
10. other schools	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
11. book store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
12. fast food restaurant	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
13. coffee place	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
14. bank/credit union	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
15. non-fast food restaurant	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
16. video store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
17. pharmacy/drug store	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
18. salon/barber shop	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
19. your job or school [check here ____ if do not have work away from home or do not attend school]	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
20. bus or trolley stop	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
21. park	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
22. recreation center	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____
23. gym or fitness facility	1. ____	2. ____	3. ____	4. ____	5. ____	8. ____

C. Access to services

Please circle the answer that best applies to you and your neighborhood. Both local and within walking distance mean within a 10-15 minute walk from your home.

1. I can do most of my shopping at local stores.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. Stores are within easy walking distance of my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. Parking is difficult in local shopping areas.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. There are many places to go within easy walking distance of my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

5. It is easy to walk to a transit stop (bus, train) from my home.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

6. The streets in my neighborhood are hilly, making my neighborhood difficult to walk in.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

7. There are many canyons/hillsides in my neighborhood that limit the number of routes for getting from place to place.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

D. Streets in my neighborhood

Please circle the answer that best applies to you and your neighborhood.

1. The streets in my neighborhood do not have many, or any, cul-de-sacs (dead-end streets).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. There are walkways in my neighborhood that connect cul-de-sacs to streets, trails, or other cul-de-sacs.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. The distance between intersections in my neighborhood is usually short (100 yards or less; the length of a football field or less).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. There are many four-way intersections in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4
5. There are many alternative routes for getting from place to place in my neighborhood. (I don't have to go the same way every time.)

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

E. Places for walking and cycling

Please circle the answer that best applies to you and your neighborhood.

1. There are sidewalks on most of the streets in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. The sidewalks in my neighborhood are well maintained (paved, even, and not a lot of cracks).

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. Sidewalks are separated from the road/traffic in my neighborhood by parked cars.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

5. There is a grass/dirt strip that separates the streets from the sidewalks in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

F. Neighborhood surroundings

Please circle the answer that best applies to you and your neighborhood

1. There are trees along the streets in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

2. Trees give shade for the sidewalks in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

3. There are many interesting things to look at while walking in my neighborhood.

1	2	3	4
strongly disagree	somewhat disagree	somewhat agree	strongly agree

4. My neighborhood is generally free from litter.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
5. There are many attractive natural sights in my neighborhood (such as landscaping, views).
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
6. There are attractive buildings/homes in my neighborhood.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |

G. Safety from traffic

Please circle the answer that best applies to you and your neighborhood.

1. There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk in my neighborhood.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
2. There is so much traffic along nearby streets that it makes it difficult or unpleasant to walk in my neighborhood.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
3. The speed of traffic on the street I live on is usually slow (30 mph or less).
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
4. The speed of traffic on most nearby streets is usually slow (30 mph or less).
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
5. Most drivers exceed the posted speed limits while driving in my neighborhood.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
6. There are crosswalks and pedestrian signals to help walkers cross busy streets in my neighborhood.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |

7. The crosswalks in my neighborhood help walkers feel safe crossing busy streets.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
8. When walking in my neighborhood, there are a lot of exhaust fumes (such as from cars, buses).
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |

H. Safety from crime

Please circle the answer that best applies to you and your neighborhood.

1. My neighborhood streets are well lit at night.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
2. Walkers and bikers on the streets in my neighborhood can be easily seen by people in their homes.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
3. I see and speak to other people when I am walking in my neighborhood.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
4. There is a high crime rate in my neighborhood.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
5. The crime rate in my neighborhood makes it unsafe to go on walks during the day.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |
6. The crime rate in my neighborhood makes it unsafe to go on walks at night.
- | | | | |
|----------------------|----------------------|-------------------|-------------------|
| 1 | 2 | 3 | 4 |
| strongly
disagree | somewhat
disagree | somewhat
agree | strongly
agree |

I. Neighborhood satisfaction

Below are things about your neighborhood with which you may or may not be satisfied. Using the 1-5 scale below, indicate your satisfaction with each item by placing the appropriate number on the line preceding that item. Please be open and honest in your responding. The 5-point scale is as follows:

- 1 = strongly dissatisfied
- 2 = somewhat dissatisfied
- 3 = neither satisfied nor dissatisfied
- 4 = somewhat satisfied
- 5 = strongly satisfied

How satisfied are you with...

- (example) 3 the number of pedestrian cross-walks in your neighborhood ?
- a. the highway access from your home?
 - b. the access to public transportation in your neighborhood?
 - c. your commuting time to work/school?
 - d. the access to shopping in your neighborhood?
 - e. how many friends you have in your neighborhood?
 - f. the number of people you know in your neighborhood?
 - g. how easy and pleasant it is to walk in your neighborhood?
 - h. how easy and pleasant it is to bicycle in your neighborhood?
 - i. the quality of schools in your neighborhood?
 - j. access to entertainment in your neighborhood (restaurants, movies, clubs, etc.)?
 - k. the safety from threat of crime in your neighborhood?
 - l. the amount and speed of traffic in your neighborhood?
 - m. the noise from traffic in my neighborhood?
 - n. the number and quality of food stores in your neighborhood?
 - o. the number and quality of restaurants in your neighborhood?
 - p. your neighborhood as a good place to raise children?
 - q. your neighborhood as a good place to live?

Appendix D

SOCIAL SUPPORT AND EXERCISE SURVEY

Below is a list of things people might do or say to someone who is trying to exercise regularly. If you are not trying to exercise, then some of the questions may not apply to you, but please read and give an answer to every question.

Please rate each question *twice*. Under *family*, rate how often anyone living in your household has said or done what is described during the last three months. Under *friends*, rate how often your friends, acquaintances, or coworkers have said or done what is described during the last three months.

Please write *one* number from the following rating scale in each space:

	none	rarely	a few times	often	very often	does not apply
	1	2	3	4	5	8

During the past three months, my family (or members of my household) or friends:

	Family	Friends
11. Exercised with me.	11. _____	11. _____
12. Offered to exercise with me.	12. _____	12. _____
13. Gave me helpful reminders to exercise ("Are you going to exercise tonight?").	13. _____	13. _____
14. Gave me encouragement to stick with my exercise program.	14. _____	14. _____
15. Changed their schedule so we could exercise together.	15. _____	15. _____
16. Discussed exercise with me.	16. _____	16. _____
17. Complained about the time I spend exercising.	17. _____	17. _____
18. Criticized me or made fun of me for exercising.	18. _____	18. _____
19. Gave me rewards for exercising (bought me something or gave me something I like).	19. _____	19. _____
20. Planned for exercise on recreational outings.	20. _____	20. _____
21. Helped plan activities around my exercise.	21. _____	21. _____
22. Asked me for ideas on how <i>they</i> can get more exercise.	22. _____	22. _____
23. Talked about how much they like to exercise.	23. _____	23. _____

	Office Use Only	
<input type="checkbox"/> 1. English <input type="checkbox"/> 2. Spanish Date: Entered <input type="checkbox"/> <input type="checkbox"/> / <input type="checkbox"/> <input type="checkbox"/> / <input type="checkbox"/> <input type="checkbox"/>		Coder: <input type="checkbox"/> <input type="checkbox"/>

EXERCISE CONFIDENCE SURVEY

Below is a list of things people might do while trying to increase or continue regular exercise. We are interested in exercises like running, swimming, brisk walking, bicycle riding, or aerobics classes.

Whether you exercise or not, please rate how confident you are that you could really motivate yourself to do things like these consistently, *for at least six months*.

Please circle one number for each question.
How sure are you that you can do these things?

	I know I cannot		Maybe I can		I know I can	Does not apply
21. Get up early, even on weekends, to exercise.	1	2	3	4	5	(8)
22. Stick to your exercise program after a long, tiring day at work.	1	2	3	4	5	(8)
23. Exercise even though you are feeling depressed.	1	2	3	4	5	(8)
24. Set aside time for a physical activity program; that is, walking, jogging, swimming, biking, or other continuous activities for at least 30 minutes, 3 times per week.	1	2	3	4	5	(8)
25. Continue to exercise with others even though they seem too fast or too slow for you.	1	2	3	4	5	(8)
26. Stick to your exercise program when undergoing a stressful life change (e.g., divorce, death in the family, moving).	1	2	3	4	5	(8)
27. Attend a party only after exercising.	1	2	3	4	5	(8)
28. Stick to your exercise program when your family is demanding more time from you.	1	2	3	4	5	(8)
29. Stick to your exercise program when you have household chores to attend to.	1	2	3	4	5	(8)
30. Stick to your exercise program even when you have excessive demands at work.	1	2	3	4	5	(8)
31. Stick to your exercise program when social obligations are very time consuming.	1	2	3	4	5	(8)
32. Read or study less in order to exercise more.	1	2	3	4	5	(8)

Office use only

1. English 2. Spanish Date: Entered / / Coder:

October 7, 1988

Appendix E

SHORT ACCULTURATION SCALE

201

Appendix A Wording of Items in Acculturation Scale

A. English

- * 1. In general, what language(s) do you read and speak?

1	2	3	4	5
Only Spanish	Spanish better than English	Both Equally	English better than Spanish	Only English

- * 2. What was the language(s) you used as a child?

1	2	3	4	5
Only Spanish	More Spanish than English	Both Equally	More English than Spanish	Only English

- * 3. What language(s) do you usually speak at home?

1	2	3	4	5
Only Spanish	More Spanish than English	Both Equally	More English than Spanish	Only English

- * 4. In which language(s) do you usually think?

1	2	3	4	5
Only Spanish	More Spanish than English	Both Equally	More English than Spanish	Only English

- * 5. What language(s) do you usually speak with your friends?

1	2	3	4	5
Only Spanish	More Spanish than English	Both Equally	More English than Spanish	Only English

Appendix A (continued)
Wording of Items In Acculturation Scale

6. In what language(s) are the T.V. programs you usually watch?

1	2	3	4	5
Only Spanish	More Spanish than English	Both Equally	More English than Spanish	Only English

7. In what language(s) are the radio program you usually listen to?

1	2	3	4	5
Only Spanish	More Spanish than English	Both Equally	More English than Spanish	Only English

8. In general, in what language(s) are the movies, T.V. and radio programs you *prefer* to watch and listen to?

1	2	3	4	5
Only Spanish	More Spanish than English	Both Equally	More English than Spanish	Only English

9. Your close friends are:

1	2	3	4	5
All Latinos/Hispanics	More Latinos than Americans	About Half & Half	More Americans than Latinos	All Americans

10. You prefer going to social gatherings/parties at which the people are:

1	2	3	4	5
All Latinos/Hispanics	More Latinos than Americans	About Half & Half	More Americans than Latinos	All Americans

Appendix A (continued)
Wording of Items in Acculturation Scale

11. The persons you visit or who visit you are:

1	2	3	4	5
All Latinos/ Hispanics	More Latinos than Americans	About Half & Half	More Americans than Latinos	All Americans

12. If you could choose your children's friends, you would want them to be:

1	2	3	4	5
All Latinos/ Hispanics	More Latinos than Americans	About Half & Half	More Americans than Latinos	All Americans

Appendix F

7-Day Physical Activity Recall

PAR#: 1 2 3 4 5 6 7 Participant _____

Interviewer _____ Today is _____ Today's Date _____

1. Were you employed in the last seven days? 0. No (Skip to Q#4) 1. Yes
2. How many days of the last seven did you work? _____ days
3. How many total hours did you work in the last seven days? _____ hours last week
4. What two days do you consider your weekend days? _____

(mark days below with a squiggle)

		DAYS						
		1	2	3	4	5	6	7
	SLEEP	1	2	3	4	5	6	7
MORNING	Moderate							
	Hard							
	Very Hard							
AFTERNOON	Moderate							
	Hard							
	Very Hard							
EVENING	Moderate							
	Hard							
	Very Hard							
Total Min Per Day	Strength:	_____	_____	_____	_____	_____	_____	_____
	Flexibility:	_____	_____	_____	_____	_____	_____	_____

4a. Compared to your physical activity over the past 3 months, was last week's physical activity more, less, or about the same? 1. More 2. Less 3. About the same	6. Do you think this was a valid PAR Interview? 1. Yes 0. No If NO, go to the back and explain.
5. Were there any problems with the PAR interview? 0. No 1. Yes If YES, go to the back and explain.	7. Were there any special circumstances concerning this PAR ? 0. No 1. Yes, if YES, what were they?(circle) 1. Injury all week 2. Illness all week 3. Illness part week 4. Injury part week 5. Pregnancy 6. Other:

7-Day Physical Activity Recall

Worksheet Key:

An asterisk (*) denotes a work-related activity.

A squiggly line through a column (day) denotes a weekend day.

Rounding: 10-22 min.=.25

23-37 min.=.50

38-52 min.=.75

53-1:07 hr/min. =1.0

1:08-1:22 hr/min.=1.25

5. Explain why there were problems with this PAR interview:

6. If PAR interview was not valid, why was it not valid?

7. Please list below any activities reported by the subject which you do not know how to classify.

8. Please provide any other comments you may have.

Appendix G



UNIVERSITY OF NEBRASKA MEDICAL CENTER unmc.edu

Physical Activity Research Study

UNMC College of Nursing

Approximately
one week study
for Midwestern
rural Hispanic or
Latino Adults

Answer
questionnaires,
height & weight
measurements,
wear activity
monitor

Follow-up after
one week with
research nurse

What is it about?

- To study areas of physical activity influence and physical activity levels

Who can participate?

People who are:

- self-identified as Hispanic or Latino
- participate in the Crete Public Schools Adult Education Program
- an adult (19 years of age or older)
- able to speak and read English
- free from physical impairment and /or limitations from usual activity

How does it work?

- First, a brief orientation, questionnaires, height and weight measurements are completed. This usually takes 45 to 60 minutes and will be done at the school.
- Next, you are asked to wear a physical activity monitor and maintain a short written diary for one week
- Instructions are given for the physical activity monitor
- An appointment is planned for follow-up after one week to return the physical activity monitor and activity diary

Is there anything else?

- People wear an activity monitor on a belt around their waist for 7 days
- Follow-up appointment is completed with research nurse. This only takes a few minutes.

Are there any costs involved?

- There are no costs to people who participate in the study
- You will be compensated for your time

Does this change my normal physical activity behavior?

- You should not change your normal physical activity behaviors.
- All health information is kept strictly confidential.

Please call 402.826-7490 or
email aclegett@unmc.edu with any questions
Principal Investigator: Alison Clevette, PhD(c), RN
PhD Nursing Student

IRB# 375-14-EP

UNIVERSITY OF
Nebraska
Medical Center



Physical Activity Research Study

UNMC College of Nursing

What is it about?

- To study areas of physical activity influence and physical activity levels

Who can participate?

People who are:

- self-identified as Hispanic or Latino
- an adult (19 years of age or older)
- able to speak and read English
- free from physical impairment and /or limitations from usual activity

How does it work?

- First, a brief orientation, questionnaires, height and weight measurements are completed. This usually takes 45 to 60 minutes and will be done in a private business, school or mutually agreeable location
- Next, you are asked to wear a physical activity monitor and maintain a short written diary for one week
- Instructions are given for the physical activity monitor
- An appointment is planned for follow-up after one week to return the physical activity monitor and activity diary

Is there anything else?

- People wear an activity monitor on a belt around their waist for 7 days
- Follow-up appointment is completed with research nurse. This only takes a few minutes.

Are there any costs involved?

- There are no costs to people who participate in the study
- You will be compensated for your time

Does this change my normal physical activity behavior?

- You should not change your normal physical activity behaviors.
- All health information is kept strictly confidential.

Follow-up after
one week with
research nurse

Please call 402.826-7490 or
email acleve@unmc.edu with any questions
Principal Investigator: Alison Clevette, PhD(c), RN
PhD Nursing Student

IRB# 375-14-EP

Appendix H



Crete Public Schools

920 Linden Avenue

Crete, Nebraska 68333

www.creteschools.com

March 21, 2014

To whom it may concern:

The purpose of this letter is to confirm Alison Clevette, University of Nebraska Medical Center, PhD Nursing Student, has the permission of the Crete Public Schools to conduct research at our campus for her study, "Influences and Physical Activity Patterns of Midwestern Rural Hispanic or Latino Adults."

Ms. Clevette will contact current and past adult students enrolled in the Crete Public Schools Special Programs classes to recruit them for the study. Ms. Clevette will approach them prior to class attendance face-to-face contact or telephone contact. An invitation to participate in the research will be handed out and a verbal explanation of the research project will be provided. If students consent to be approached further about the research project, added description and project expectations will be provided. Her plan is to contact the majority of the students from March 2014 through October 2014, although some student recruitment may extend into November and December 2014 depending upon recruitment and participation rates. Ms. Clevette's on-site research activities will be finished by December 31, 2014.

General demographic data, height and weight measurements, surveys related to physical activity and objective physical activity data will be gathered using the ActiGraph® accelerometer. Data collection for each subject will involve one week. The data will remain entirely confidential and will not be provided to anyone outside the research team without permission from the University of Nebraska Medical Center IRB.

Ms. Clevette's research will not interfere with the classroom learning activities. Ms. Clevette has agreed to provide to my office a copy of the University of Nebraska Medical Center IRB approval notification before recruiting students. She has also agreed to provide a copy of any aggregate results.

Sincerely,

Jan E. Sears
Director, Special Programs
Crete Public Schools

Administration
826-5855 ~ 474-1005

Elementary School
826-5822 ~ 474-1007

Middle School
826-5844 ~ 474-1008

High School
826-5811 ~ 474-1011



January 5, 2015

To whom it May Concern:

The purpose of this letter is to confirm Alison Clevette, University of Nebraska Medical Center, PhD Nursing Student, has the permission of the Crete Public Schools to conduct research on our campus for her study, "Influences and Physical Activity Patterns of Midwestern Rural Hispanic or Latino Adults."

Alison Clevette will contact **adults only** for the purpose of study recruitment from the following groups: current students enrolled in the Crete Public Schools Special Programs classes, former students, adult friends and family of students, current Crete Public School employees and friends and family of employees. Ms. Clevette will approach them prior to class attendance, face-to-face contact, email, or telephone contact. An invitation to participate in the research will be handed out and a verbal explanation of the research project will be provided. If students consent to be approached further about the research project, added description and project expectations will be provided. Her plan is to continue recruiting adults through May 2015, although some recruitment may extend until August 2015 depending upon recruitment and participation rates. Ms. Clevette's on-site research activities will be finished by August 31, 2015.

General demographic data, height and weight measurements, literacy tests, surveys related to physical activity and objective physical activity data will be gathered using the Actigraph® accelerometer. Data collection for each subject will generally last one week. The data will remain entirely confidential and will not be provided to anyone outside the research team without permission from the University of Nebraska Medical Center IRB.

Ms. Clevette's research will not interfere with employee duties or classroom learning activities. Ms. Clevette has agreed to provide my office a copy of the University of Nebraska Medical Center IRB approval notification before recruiting students. She has also agreed to provide a copy of any aggregate results.

Sincerely,

Diane M. Bruha, Ed.S.
Director of Special Programs

Administration
826-5855 ~ 474-1005

Elementary School
826-5822 ~ 474-1007

Middle School
826-5844 ~ 474-1008

High School
826-5811 ~ 474-1011



1211 Main St. Crete, NE 68333
Phone: 402-826-2332

January 5, 2015

To whom it May Concern:

The purpose of this letter is to confirm Alison Clevette, University of Nebraska Medical Center, PhD Nursing Student, has the permission of the New Beginnings Non-profit Thrift Store to conduct research at our place of business for her study, "Influences and Physical Activity Patterns of Midwestern Rural Hispanic or Latino Adults."

Alison Clevette will contact **adults only** while they are at the store for the purpose of study recruitment. Ms. Clevette will approach them initially via face-to-face contact, and subsequent email or telephone contact may occur if requested. An invitation to participate in the research will be handed out and a verbal explanation of the research project will be provided. If adults consent to be approached further about the research project, added description and project expectations would be provided. Her plan is to continue recruiting adults through May 2015, although some recruitment may extend until August 2015 depending upon recruitment and participation rates. Ms. Clevette's on-site research activities will be finished by August 31, 2015.

General demographic data, height and weight measurements, literacy tests, surveys related to physical activity and objective physical activity data will be gathered using the Actigraph® accelerometer. Data collection for each subject will generally last one week. The data will remain entirely confidential and will not be provided to anyone outside the research team without permission from the University of Nebraska Medical Center IRB.

Ms. Clevette's research will not interfere with employee duties or classroom learning activities. Ms. Clevette has agreed to provide my office a copy of the University of Nebraska Medical Center IRB approval notification before recruiting students. She has also agreed to provide a copy of any aggregate results.

Sincerely,

Amy Schwisow
New Beginnings, Non-Profit Thrift Store Manager

Appendix I



NEBRASKA'S HEALTH SCIENCE CENTER

Office of Regulatory Affairs (ORA)
Institutional Review Board (IRB)

July 23, 2014

Alison Clevette, RN MSN
CON
UNL VIA COURIER

IRB # 375-14-EP

TITLE OF PROPOSAL: Physical Activity Levels and Related Factors in Midwestern Rural Hispanic or Latino Adults

DATE OF REVIEW: 07/23/2014

Dear Ms. Clevette:

Thank you for submitting your research proposal for IRB review. After careful consideration of your application and all other submitted documents, the IRB has **conditionally approved** this research proposal. The IRB has held final approval and release of this study. Initiation of this research is not authorized until receipt of an acceptable written response to the IRB's review.

By conditionally approving this research, the IRB determined that all of the criteria for IRB approval specified at 45 CFR 46.111 and 21 CFR 56.111 (as applicable) are satisfied. The following are requirements determined by the IRB which must be satisfied in order for the IRB to issue a final approval and release letter:

IRB Requirements

IRB Application

1. According to the IRB's records the required CITI training for you and Leeza Struwe has expired. Please be advised that the IRB will not issue final approval and release of this study until you both have completed the biomedical refresher course. For questions regarding CITI training please contact Jenny Kucera at 559-6119 or jkucera@unmc.edu. Please notify the IRB when the training has been completed.
2. The IRB understands that subjects under the age of 19 years (minors) will not be enrolled in this research. Therefore, the second paragraph under Section II.6B,
3. Section II.8A states that pregnant women will be included in the research and Section II.11B states that they will not. Please revise the appropriate section accordingly.
4. The IRB understands that students of the PI may be subjects of the research, as indicated in Section II.8B(1). However, additional safeguards for the protection of these subjects are not outlined in Section II.8B(2). Please revise accordingly.
5. The IRB assumes that TABE score results will be reviewed for eligibility after a subject has consented to participate in the study. Please revise the 2nd paragraph in Section II.9.
6. The IRB assumes, based on the PI's professional role in the Crete Public Schools, that the PI has ethical access to the TABE score results. Please confirm for the record.
7. Please revise Section II.12B to reflect how, when and by whom the explanation of the research study will be provided to potential subjects.
8. Please include the anticipated duration of each study visit in Section II.12B.
9. In numerous sections of the IRB application, the "Exercise Confidence Survey" and "Self-Efficacy for Exercise Behaviors survey" are referenced. The Exercise Confidence Survey has been attached to the IRB application, but the Self-Efficacy Survey has not. If they are the same survey, please revise the application using the same survey title throughout the application according to how it is titled within the attachment. If they are not the same survey, please attach the Self-Efficacy Survey.
10. According to HRRP Policy #3.8, payments to subjects must be prorated based upon the duration of participation of the subject in the research. Any credit for payment should accrue as the study progresses and not be contingent upon the subject completing the entire study. Therefore, please revise the last



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Institutional Review Board (IRB)

- bullet point in the first paragraph of Section II.12B.
11. The IRB requires that paper documents containing research data must be transported in a locked briefcase. Please revise Section II.15A(6)(i) accordingly.
 12. Please revise Section II.16 to include loss of confidentiality as a potential risk.
 13. In consideration of #10 above, please revise Section II.23.
 14. Section II.29 states that the PI will personally visit all classroom sites to provide potential subjects with information regarding the study. Later in the paragraph, it states that main staff at the recruitment sites will be providing potential subjects with information, then providing their contact information to the PI. Please revise this section to clearly describe the different ways in which potential subjects will be invited to participate. The IRB recommends that if staff at a recruitment site are not listed on the IRB application, then a document (i.e., flier) be provided to them to hand out to potential subjects with the PI's contact information provided for the subject to contact the PI.

Adult Consent Form

1. Please revise the last sentence in the "What will be done during this research study?" section to include the questionnaire that will be given and how long the visit is expected to last.
2. Please include loss of confidentiality as a potential risk to the subjects.
3. Please revise the "Will you be paid for being in this research study?" section in consideration of #10 above.
4. Please provide an address or other source for subjects to get results of the study in the "How will results of the research..." section.

Additional Documentation

1. **Risk Level Documentation:** Based upon the information in the IRB application, any associated detailed protocol, and other submitted documents which describe procedures to be carried out on human subjects for research purposes and the associated potential risks, the IRB determined that the research is classified as: Minimal Risk.
2. **Expedited Review Category:** 45 CFR 46.110/21 CFR 56.110, category 4, 7,

Additional Comments

1. The on-line submission system (<http://net.unmc.edu/rss>) has now been reset to edit. You may return to the system to make the necessary corrections/clarifications in all documents. Upload your response to the IRBs initial review as a document. Once this is all complete, hit save and resubmit to initiate the re-review process. It is no longer required that you also submit hard copies of your response.
2. Please be advised that during the initial IRB review, the Board did not thoroughly proofread the consent document in order to identify any typographical errors and spacing problems. Therefore, during revision of the consent form you are encouraged to proof this document carefully and correct any errors.
3. Please be advised that as a consequence of the IRB's second review of this protocol there may be a need for additional clarifications with regard to the IRB Application and/or revision of the consent form.
4. Your response must be received by the IRB within 45 days from the date of this letter, or the IRB will assume you no longer wish to pursue this research.

In accordance with Federal Regulations and Organizational requirements, this research cannot be initiated until the IRB has reviewed and approved your revised submission. You will be officially notified when you can implement the research.

If you have any questions regarding the IRB's review, please contact the IRB administrative office.

Respectfully Submitted on Behalf of the IRB,

Signed on: 2014-07-23 17:39:00.000

Jenny Kucera, MS, CIP



NEBRASKA'S HEALTH SCIENCE CENTER

Office of Regulatory Affairs (ORA)
Institutional Review Board (IRB)

IRB Administrator
Office of Regulatory Affairs



NEBRASKA'S HEALTH SCIENCE CENTER

Office of Regulatory Affairs (ORA)
Institutional Review Board (IRB)

August 15, 2014

Alison Clevette, RN MSN
College of Nursing
UNL VIA COURIER**IRB # 375-14-EP****TITLE OF PROPOSAL:** Physical Activity Levels and Related Factors in Midwestern Rural Hispanic or Latino Adults**DATE OF EXPEDITED REVIEW:** 07/23/2014**DATE OF FINAL APPROVAL AND RELEASE:** 08/15/2014 **VALID UNTIL:** 07/23/2015**CLASSIFICATION OF RISK:** Minimal**EXPEDITED CATEGORY OF REVIEW:** 45 CFR 46.110; 21 CFR 56.110, Category 4, 7

The IRB has completed its review of the above-titled protocol. The IRB has determined you are in compliance with HHS Regulations (45 CFR 46), applicable FDA Regulations (21 CFR 50, 56) and the Organization's HRPP policies. Furthermore, the IRB is satisfied you have provided adequate safeguards for protecting the rights and welfare of the subjects to be involved in this study. This letter constitutes official notification of final approval and release of your project by the IRB. You are authorized to implement this study as of the above date of final approval.

Please be advised that only the IRB approved and stamped consent forms can be used to make copies to enroll subjects. Also, at the time of consent all subjects must be given a copy of *The Rights of Research Subjects* and "What Do I Need to Know" forms.

The IRB wishes to remind you that the PI is ultimately responsible for ensuring that this research is conducted in full compliance with the protocol, applicable Federal Regulations, and Organizational policies.

Finally, under the provisions of this institution's Federal Wide Assurance (FWA00002939), the PI is directly responsible for submitting to the IRB any proposed change in the research or the consent form(s)/information sheet(s). In addition, any adverse events, unanticipated problems involving risk to the subject or others, noncompliance, and complaints must be promptly reported to the IRB in accordance with HRPP policies.

This project is subject to periodic review and surveillance by the IRB and, as part of the Board's surveillance, the IRB may request periodic progress reports. For projects which continue beyond one year, it is the responsibility of the PI to initiate a request to the IRB for continuing review and update of the research project.

On behalf of the IRB,

Signed on: 2014-08-15 11:48:00.000

Jenny Kucera, MS, CIP
IRB Administrator
Office of Regulatory Affairs



NEBRASKA'S HEALTH SCIENCE CENTER

Office of Regulatory Affairs (ORA)
Institutional Review Board (IRB)

January 23, 2015

Alison Clevette, RN MSN
CON
UNL VIA COURIER

IRB # 375-14-EP

TITLE OF PROPOSAL: Physical Activity Levels and Related Factors in Midwestern Rural Hispanic or Latino Adults

RE: Request for Change, dated 01/12/2015

DATE OF EXPEDITED REVIEW: 01/22/2015

Dear Ms. Clevette:

The UNMC IRB has completed its review of the above mentioned Request for Change involving the addition of new study sites, email as a form of recruitment and the use of the BEST Literacy Test. The Request for Change also includes revision to age range, inclusion/exclusion criteria, safeguards to vulnerable populations, methods and procedures, the recruitment flier, where informed consent will be obtained and the reference section.

This letter constitutes official notification of IRB approval of the revised IRB application and recruitment flier.

The IRB has not required re-consent of currently enrolled subjects.

You are authorized to implement this change accordingly.

Respectfully Submitted on Behalf of the IRB,

Signed on: 2015-01-23 09:29:00.000

Jenny Kucera, MS, CIP
IRB Administrator
Office of Regulatory Affairs



NEBRASKA'S HEALTH SCIENCE CENTER

Office of Regulatory Affairs (ORA)
Institutional Review Board (IRB)

July 24, 2015

Alison Clevette, RN MSN
CON
UNL VIA COURIER**IRB # 375-14-EP****TITLE OF PROPOSAL:** Physical Activity Levels and Related Factors in Midwestern Rural Hispanic or Latino Adults**DATE OF EXPEDITED REVIEW:** 07/23/2015**VALID UNTIL:** 07/23/2016**EXPEDITED CATEGORY OF REVIEW:** 45 CFR 46.110; 21 CFR 56.110, Category 4, 7

The UNMC IRB has completed its review of the Application for Continuing Review for the above titled research project including the complete protocol file and has expressed it as their opinion that you have provided adequate safeguards for the rights and welfare of the subjects involved in this study and are in compliance with HHS regulations (45 CFR 46) and FDA regulations (21 CFR 50.56) as applicable.

This letter constitutes official notification of the re-approval of your research project by the IRB for the IRB approval period indicated above. You are therefore authorized to continue this study.

We wish to remind you that, under the provisions of the Federal Wide Assurance (FWA 00002939) from the Institution to HHS, the Principal Investigator is directly responsible for keeping the IRB informed of any proposed changes involved in the procedures or methodology in the protocol and for promptly reporting to the Board any unanticipated problems involving risks to the subjects or others.

In accordance with HRPP policies, this project is subject to periodic review and monitoring by the IRB and, as part of their monitoring, the IRB may request periodic reports of progress and results. For projects which continue, it is also the responsibility of the Principal Investigator to initiate a request to the IRB for Continuing Review of the research project in consideration of the IRB approval period.

On Behalf of the IRB,

Signed on: 2015-07-24 08:30:00.000

Jenny Kucera, MS, CIP
IRB Administrator
Office of Regulatory Affairs

Appendix J

Neighborhood Environment Walkability Scale (NEWS)

A. Types of residences in your neighborhood	N	%
1. How common are <u>detached single-family residences</u> in your immediate neighborhood?		
1. None	4	7.4
2. A Few	15	27.8
3. Some	8	14.8
4. Most	21	38.9
5. All	6	11.1
TOTAL	54	100
2. How common are <u>townhouses or row houses of 1-3 stories</u> in your immediate neighborhood?		
1. None	25	46.3
2. A Few	12	22.2
3. Some	12	22.2
4. Most	4	7.4
5. All	1	1.9
TOTAL	54	100
3. How common are <u>apartments or condos 1-3 stories</u> in your immediate neighborhood?		
1. None	18	33.3
2. A Few	21	38.9
3. Some	11	20.4
4. Most	3	5.6
5. All	1	1.9
TOTAL	54	100
4. How common are <u>apartments or condos 4-6 stories</u> in your immediate neighborhood?		
1. None	48	88.9
2. A Few	4	7.4
3. Some	1	1.9
4. Most	1	1.9
5. All	0	0.0
TOTAL	54	100
5. How common are <u>apartments or condos 7-12 stories</u> in your immediate neighborhood?		
1. None	54	100
6. How common are <u>apartments or condos more than 13 stories</u> in your immediate neighborhood?		
1. None	54	100

Neighborhood Environment Walkability Scale (NEWS)

B. Stores, facilities, and other things in your neighborhood		
	N	%
1. convenience/small grocery store		
1. 1-5 min	13	24.1
2. 6-10 min	12	22.2
3. 11-20 min	15	27.8
4. 21-30 min	10	18.5
5. 31+ min	4	7.4
8. don't know	0	0.0
TOTAL	54	100
2. supermarket		
1. 1-5 min	10	18.5
2. 6-10 min	9	16.7
3. 11-20 min	11	20.4
4. 21-30 min	15	27.8
5. 31+ min	8	14.8
8. don't know	1	1.9
TOTAL	54	100
3. hardware store		
1. 1-5 min	11	20.4
2. 6-10 min	5	9.3
3. 11-20 min	19	35.2
4. 21-30 min	10	18.5
5. 31+ min	6	11.1
8. don't know	3	5.6
TOTAL	54	100
4. fruit/vegetable market		
1. 1-5 min	12	22.2
2. 6-10 min	7	13.0
3. 11-20 min	19	35.2
4. 21-30 min	6	11.1
5. 31+ min	7	13.0
8. don't know	3	5.6
TOTAL	54	100
5. laundry/dry cleaners		
1. 1-5 min	13	24.1
2. 6-10 min	14	25.9
3. 11-20 min	15	27.8
4. 21-30 min	5	9.3
5. 31+ min	4	7.4
8. don't know	3	5.6
TOTAL	54	100
6. clothing store		
1. 1-5 min	5	9.3
2. 6-10 min	8	14.8
3. 11-20 min	20	37.0
4. 21-30 min	10	18.5
5. 31+ min	8	14.8
8. don't know	3	5.6
TOTAL	54	100

7. post office		
1. 1-5 min	11	20.4
2. 6-10 min	10	18.5
3. 11-20 min	20	37.0
4. 21-30 min	9	16.7
5. 31+ min	3	5.6
8. don't know	1	1.9
TOTAL	54	100
8. library		
1. 1-5 min	11	20.4
2. 6-10 min	8	14.8
3. 11-20 min	21	38.9
4. 21-30 min	11	20.4
5. 31+ min	3	5.6
8. don't know	0	0.0
TOTAL	54	100
9. elementary school		
1. 1-5 min	14	25.9
2. 6-10 min	7	13.0
3. 11-20 min	16	29.6
4. 21-30 min	13	24.1
5. 31+ min	4	7.4
8. don't know	0	0.0
TOTAL	54	100
10. other schools		
1. 1-5 min	7	13.0
2. 6-10 min	7	13.0
3. 11-20 min	10	18.5
4. 21-30 min	12	22.2
5. 31+ min	12	22.2
8. don't know	6	11.1
TOTAL	54	100
11. book store		
1. 1-5 min	6	11.1
2. 6-10 min	3	5.6
3. 11-20 min	11	20.4
4. 21-30 min	11	20.4
5. 31+ min	9	16.7
8. don't know	14	25.9
TOTAL	54	100
12. fast food restaurant		
1. 1-5 min	11	20.4
2. 6-10 min	11	20.4
3. 11-20 min	19	35.2
4. 21-30 min	9	16.7
5. 31+ min	3	5.6
8. don't know	1	1.9
TOTAL	54	100
13. coffee place		
1. 1-5 min	9	16.7

2. 6-10 min	8	14.8
3. 11-20 min	13	24.1
4. 21-30 min	9	16.7
5. 31+ min	3	5.6
8. don't know	12	22.2
TOTAL	54	100
14. bank/credit union		
1. 1-5 min	10	18.5
2. 6-10 min	10	18.5
3. 11-20 min	19	35.2
4. 21-30 min	12	22.2
5. 31+ min	3	5.6
8. don't know	0	0.0
TOTAL	54	100
15. non-fast food restaurant		
1. 1-5 min	11	20.4
2. 6-10 min	9	16.7
3. 11-20 min	11	20.4
4. 21-30 min	14	25.9
5. 31+ min	4	7.4
8. don't know	5	9.3
TOTAL	54	100
16. video store		
1. 1-5 min	4	7.4
2. 6-10 min	10	18.5
3. 11-20 min	16	29.6
4. 21-30 min	8	14.8
5. 31+ min	5	9.3
8. don't know	11	20.4
TOTAL	54	100
17. pharmacy/drug store		
1. 1-5 min	9	16.7
2. 6-10 min	9	16.7
3. 11-20 min	18	33.3
4. 21-30 min	13	24.1
5. 31+ min	5	9.3
8. don't know	0	0.0
TOTAL	54	100
18. salon/barber shop		
1. 1-5 min	7	13.0
2. 6-10 min	15	27.8
3. 11-20 min	18	33.3
4. 21-30 min	10	18.5
5. 31+ min	3	5.6
8. don't know	1	1.9
TOTAL	54	100
19. your job or school		
1. 1-5 min	5	9.3
2. 6-10 min	9	16.7
3. 11-20 min	18	33.3

4. 21-30 min	5	9.3
5. 31+ min	9	16.7
8. don't know	8	14.8
TOTAL	54	100
20. bus or trolley stop		
1. 1-5 min	4	7.4
2. 6-10 min	6	11.1
3. 11-20 min	3	5.6
4. 21-30 min	3	5.6
5. 31+ min	5	9.3
8. don't know	32	59.3
TOTAL	53	98.1
21. park		
1. 1-5 min	14	25.9
2. 6-10 min	15	27.8
3. 11-20 min	15	27.8
4. 21-30 min	7	13.0
5. 31+ min	3	5.6
8. don't know	0	0.0
TOTAL	54	100
22. recreation center		
1. 1-5 min	4	7.4
2. 6-10 min	8	14.8
3. 11-20 min	11	20.4
4. 21-30 min	8	14.8
5. 31+ min	7	13.0
8. don't know	16	29.6
TOTAL	54	100
23. gym or fitness facility		
1. 1-5 min	6	11.1
2. 6-10 min	7	13.0
3. 11-20 min	15	27.8
4. 21-30 min	8	14.8
5. 31+ min	9	16.7
8. don't know	8	14.8
TOTAL	53	98.1

Neighborhood Environment Walkability Scale (NEWS)

C. Access to services	N	%
1. I can do most of my shopping at local stores.		
1. strongly disagree	5	9.3
2. somewhat disagree	8	14.8
3. somewhat agree	29	53.7
4. strongly agree	12	22.2
TOTAL	54	100
2. Stores are within easy walking distance of my home.		
1. strongly disagree	10	18.5
2. somewhat disagree	8	14.8
3. somewhat agree	24	44.4
4. strongly agree	12	22.2
TOTAL	54	100
3. Parking is difficult in local shopping areas.		
1. strongly disagree	18	33.3
2. somewhat disagree	10	18.5
3. somewhat agree	22	40.7
4. strongly agree	4	7.4
TOTAL	54	100
4. There are many places to go within easy walking distance of my home.		
1. strongly disagree	11	20.4
2. somewhat disagree	4	7.4
3. somewhat agree	23	42.6
4. strongly agree	16	29.6
TOTAL	54	100
5. It is easy to walk to a transit stop (bus, train) from my home.		
1. strongly disagree	31	57.4
2. somewhat disagree	8	14.8
3. somewhat agree	9	16.7
4. strongly agree	5	9.3
TOTAL	53	98.1
6. The streets in my neighborhood are hilly, making my neighborhood difficult to walk in.		
1. strongly disagree	24	44.4
2. somewhat disagree	12	22.2
3. somewhat agree	8	14.8
4. strongly agree	10	18.5
TOTAL	54	100
7. There are many canyons/hillsides in my neighborhood that limit the number of routes for getting from place to place.		
1. strongly disagree	39	72.2
2. somewhat disagree	4	7.4
3. somewhat agree	9	16.7
4. strongly agree	2	3.7
TOTAL	54	100

Neighborhood Environment Walkability Scale (NEWS)

D. Streets in my neighborhood	N	%
1. The streets in my neighborhood <u>do not</u> have many, or any, cul-de-sacs (dead-end streets).		
1. strongly disagree	12	22.2
2. somewhat disagree	7	13.0
3. somewhat agree	18	33.3
4. strongly agree	17	31.5
TOTAL	54	100
2. There are walkways in my neighborhood that connect cul-de-sacs to streets, trails, or other cul-de-sacs.		
1. strongly disagree	27	50.0
2. somewhat disagree	10	18.5
3. somewhat agree	15	27.8
4. strongly agree	2	3.7
TOTAL	54	100
3. The distance between intersections in my neighborhood is usually short (100 yards or less; the length of a football field or less).		
1. strongly disagree	8	14.8
2. somewhat disagree	12	22.2
3. somewhat agree	20	37.0
4. strongly agree	14	25.9
TOTAL	54	100
4. There are many four-way intersections in my neighborhood.		
1. strongly disagree	12	22.2
2. somewhat disagree	11	20.4
3. somewhat agree	20	37.0
4. strongly agree	11	20.4
TOTAL	54	100
5. There are many alternative routes for getting from place to place in my neighborhood. (I don't have to go the same way every time.)		
1. strongly disagree	6	11.1
2. somewhat disagree	6	11.1
3. somewhat agree	26	48.1
4. strongly agree	16	29.6
TOTAL	54	100

Neighborhood Environment Walkability Scale (NEWS)

E. Places for walking and cycling	N	%
1. There are sidewalks on most of the streets in my neighborhood.		
1. strongly disagree	13	24.1
2. somewhat disagree	8	14.8
3. somewhat agree	21	38.9
4. strongly agree	12	22.2
TOTAL	54	100
2. The sidewalks in my neighborhood are well maintained (paved, even, and not a lot of cracks).		
1. strongly disagree	13	24.1
2. somewhat disagree	16	29.6
3. somewhat agree	18	33.3
4. strongly agree	7	13.0
TOTAL	54	100
3. There are bicycle or pedestrian trails in or near my neighborhood that are easy to get to.		
1. strongly disagree	21	38.9
2. somewhat disagree	18	33.3
3. somewhat agree	7	13.0
4. strongly agree	8	14.8
TOTAL	54	100
4. Sidewalks are separated from the road/traffic in my neighborhood by parked cars.		
1. strongly disagree	17	31.5
2. somewhat disagree	12	22.2
3. somewhat agree	14	25.9
4. strongly agree	11	20.4
TOTAL	54	100
5. There is a grass/dirt strip that separates the streets from the sidewalks in my neighborhood.		
1. strongly disagree	12	22.2
2. somewhat disagree	13	24.1
3. somewhat agree	15	27.8
4. strongly agree	14	25.9
TOTAL	54	100

Neighborhood Environment Walkability Scale (NEWS)

F. Neighborhood surroundings	N	%
1. There are trees along the streets in my neighborhood.		
1. strongly disagree	3	5.6
2. somewhat disagree	5	9.3
3. somewhat agree	19	35.2
4. strongly agree	27	50.0
TOTAL	54	100
2. Trees give shade for the sidewalks in my neighborhood.		
1. strongly disagree	5	9.3
2. somewhat disagree	8	14.8
3. somewhat agree	20	37.0
4. strongly agree	21	38.9
TOTAL	54	100
3. There are many interesting things to look at while walking in my neighborhood.		
1. strongly disagree	10	18.5
2. somewhat disagree	12	22.2
3. somewhat agree	27	50.0
4. strongly agree	5	9.3
TOTAL	54	100
4. My neighborhood is generally free from litter.		
1. strongly disagree	4	7.4
2. somewhat disagree	10	18.5
3. somewhat agree	22	40.7
4. strongly agree	18	33.3
TOTAL	54	100
5. There are many attractive natural sights in my neighborhood (such as landscaping, views).		
1. strongly disagree	9	16.7
2. somewhat disagree	21	38.9
3. somewhat agree	20	37.0
4. strongly agree	4	7.4
TOTAL	54	100
6. There are attractive buildings/homes in my neighborhood.		
1. strongly disagree	13	24.1
2. somewhat disagree	17	31.5
3. somewhat agree	18	33.3
4. strongly agree	6	11.1
TOTAL	54	100

Neighborhood Environment Walkability Scale (NEWS)

G. Safety from traffic		N	%
1. There is so much traffic along the street I live on that it makes it difficult or unpleasant to walk in my neighborhood.			
1. strongly disagree		19	35.2
2. somewhat disagree		16	29.6
3. somewhat agree		14	25.9
4. strongly agree		5	9.3
TOTAL		54	100
2. There is so much traffic along <u>nearby</u> streets that it makes it difficult or unpleasant to walk in my neighborhood.			
1. strongly disagree		15	27.8
2. somewhat disagree		20	37.0
3. somewhat agree		11	20.4
4. strongly agree		8	14.8
TOTAL		54	100
3. The speed of traffic on the street I live on is usually slow (30 mph or less).			
1. strongly disagree		5	9.3
2. somewhat disagree		5	9.3
3. somewhat agree		13	24.1
4. strongly agree		31	57.4
TOTAL		54	100
4. The speed of traffic on most <u>nearby</u> streets is usually slow (30 mph or less).			
1. strongly disagree		6	11.1
2. somewhat disagree		7	13.0
3. somewhat agree		19	35.2
4. strongly agree		22	40.7
TOTAL		54	100
5. Most drivers exceed the posted speed limits while driving in my neighborhood.			
1. strongly disagree		2	3.7
2. somewhat disagree		9	16.7
3. somewhat agree		29	53.7
4. strongly agree		14	25.9
TOTAL		54	100
6. There are crosswalks and pedestrian signals to help walkers cross busy streets in my neighborhood.			
1. strongly disagree		17	31.5
2. somewhat disagree		14	25.9
3. somewhat agree		15	27.8
4. strongly agree		8	14.8
TOTAL		54	100
7. The crosswalks in my neighborhood help walkers feel safe crossing busy streets.			
1. strongly disagree		12	22.2
2. somewhat disagree		12	22.2
3. somewhat agree		19	35.2
4. strongly agree		11	20.4
TOTAL		54	100
8. When walking in my neighborhood, there are a lot of exhaust fumes (such as from cars, buses).			
1. strongly disagree		23	42.6

2. somewhat disagree	15	27.8
3. somewhat agree	12	22.2
4. strongly agree	4	7.4
TOTAL	54	100

Neighborhood Environment Walkability Scale (NEWS)

H. Safety from crime	N	%
1. My neighborhood streets are well lit at night.		
1. strongly disagree	8	14.8
2. somewhat disagree	12	22.2
3. somewhat agree	24	44.4
4. strongly agree	10	18.5
TOTAL	54	100
2. Walkers and bikers on the streets in my neighborhood can be easily seen by people in their homes.		
1. strongly disagree	7	13.0
2. somewhat disagree	7	13.0
3. somewhat agree	25	46.3
4. strongly agree	15	27.8
TOTAL	54	100
3. I see and speak to other people when I am walking in my neighborhood.		
1. strongly disagree	2	3.7
2. somewhat disagree	8	14.8
3. somewhat agree	26	48.1
4. strongly agree	18	33.3
TOTAL	54	100
4. There is a high crime rate in my neighborhood.		
1. strongly disagree	40	74.1
2. somewhat disagree	6	11.1
3. somewhat agree	6	11.1
4. strongly agree	2	3.7
TOTAL	54	100
5. The crime rate in my neighborhood makes it unsafe to go on walks <u>during the day</u> .		
1. strongly disagree	41	75.9
2. somewhat disagree	6	11.1
3. somewhat agree	5	9.3
4. strongly agree	2	3.7
TOTAL	54	100
6. The crime rate in my neighborhood makes it unsafe to go on walks <u>at night</u> .		
1. strongly disagree	30	55.6
2. somewhat disagree	14	25.9
3. somewhat agree	7	13.0
4. strongly agree	3	5.6
TOTAL	54	100

Neighborhood Environment Walkability Scale (NEWS)

I. Neighborhood satisfaction	N	%
a. How satisfied are you with the highway access from your home?		
1. strongly dissatisfied	5	9.3
2. somewhat dissatisfied	7	13.0
3. neither satisfied nor dissatisfied	12	22.2
4. somewhat satisfied	16	29.6
5. strongly satisfied	14	25.9
TOTAL	54	100
b. How satisfied are you with the access to public transportation in your neighborhood?		
1. strongly dissatisfied	32	59.3
2. somewhat dissatisfied	5	9.3
3. neither satisfied nor dissatisfied	9	16.7
4. somewhat satisfied	3	5.6
5. strongly satisfied	5	9.3
TOTAL	54	100
c. How satisfied are you with your commuting time to work/school?		
1. strongly dissatisfied	1	1.9
2. somewhat dissatisfied	7	13.0
3. neither satisfied nor dissatisfied	12	22.2
4. somewhat satisfied	15	27.8
5. strongly satisfied	18	33.3
TOTAL	53	98.1
d. How satisfied are you with the access to shopping in your neighborhood?		
1. strongly dissatisfied	5	9.3
2. somewhat dissatisfied	9	16.7
3. neither satisfied nor dissatisfied	11	20.4
4. somewhat satisfied	15	27.8
5. strongly satisfied	14	25.9
TOTAL	54	100
e. How satisfied are you with how many friends you have in your neighborhood?		
1. strongly dissatisfied	4	7.4
2. somewhat dissatisfied	8	14.8
3. neither satisfied nor dissatisfied	12	22.2
4. somewhat satisfied	15	27.8
5. strongly satisfied	15	27.8
TOTAL	54	100
f. How satisfied are you with the number of people you know in your neighborhood?		
1. strongly dissatisfied	6	11.1
2. somewhat dissatisfied	7	13.0
3. neither satisfied nor dissatisfied	11	20.4
4. somewhat satisfied	16	29.6
5. strongly satisfied	14	25.9
TOTAL	54	100
g. How satisfied are you with how easy and pleasant it is to walk in your neighborhood?		
1. strongly dissatisfied	1	1.9
2. somewhat dissatisfied	5	9.3
3. neither satisfied nor dissatisfied	12	22.2

4. somewhat satisfied	11	20.4
5. strongly satisfied	25	46.3
TOTAL	54	100
h. How satisfied are you with how easy and pleasant it is to bicycle in your neighborhood?		
1. strongly dissatisfied	2	3.7
2. somewhat dissatisfied	10	18.5
3. neither satisfied nor dissatisfied	14	25.9
4. somewhat satisfied	11	20.4
5. strongly satisfied	17	31.5
TOTAL	54	100
i. How satisfied are you with the quality of schools in your neighborhood?		
1. strongly dissatisfied	1	1.9
2. somewhat dissatisfied	5	9.3
3. neither satisfied nor dissatisfied	9	16.7
4. somewhat satisfied	15	27.8
5. strongly satisfied	24	44.4
TOTAL	54	100
j. How satisfied are you with access to entertainment in your neighborhood (restaurants, movies, clubs, etc.)?		
1. strongly dissatisfied	9	16.7
2. somewhat dissatisfied	15	27.8
3. neither satisfied nor dissatisfied	10	18.5
4. somewhat satisfied	12	22.2
5. strongly satisfied	8	14.8
TOTAL	54	100
k. How satisfied are you with the safety from threat of crime in your neighborhood?		
1. strongly dissatisfied	4	7.4
2. somewhat dissatisfied	4	7.4
3. neither satisfied nor dissatisfied	5	9.3
4. somewhat satisfied	20	37.0
5. strongly satisfied	21	38.9
TOTAL	54	100
l. How satisfied are you with the amount and speed of traffic in your neighborhood?		
1. strongly dissatisfied	1	1.9
2. somewhat dissatisfied	10	18.5
3. neither satisfied nor dissatisfied	10	18.5
4. somewhat satisfied	24	44.4
5. strongly satisfied	9	16.7
TOTAL	54	100
m. How satisfied are you with the noise from traffic in my neighborhood?		
1. strongly dissatisfied	3	5.6
2. somewhat dissatisfied	5	9.3
3. neither satisfied nor dissatisfied	13	24.1
4. somewhat satisfied	16	29.6
5. strongly satisfied	17	31.5
TOTAL	54	100
n. How satisfied are you with the number and quality of food stores in your neighborhood?		
1. strongly dissatisfied	5	9.3

2. somewhat dissatisfied	13	24.1
3. neither satisfied nor dissatisfied	11	20.4
4. somewhat satisfied	15	27.8
5. strongly satisfied	10	18.5
TOTAL	54	100
o. How satisfied are you with the number and quality of restaurants in your neighborhood?		
1. strongly dissatisfied	6	11.1
2. somewhat dissatisfied	14	25.9
3. neither satisfied nor dissatisfied	11	20.4
4. somewhat satisfied	15	27.8
5. strongly satisfied	8	14.8
TOTAL	54	100
p. How satisfied are you with your neighborhood as a good place to raise children?		
1. strongly dissatisfied	1	1.9
2. somewhat dissatisfied	1	1.9
3. neither satisfied nor dissatisfied	4	7.4
4. somewhat satisfied	17	31.5
5. strongly satisfied	31	57.4
TOTAL	54	100
q. How satisfied are you with your neighborhood as a good place to live?		
1. strongly dissatisfied	2	3.7
2. somewhat dissatisfied	0	0.0
3. neither satisfied nor dissatisfied	3	5.6
4. somewhat satisfied	14	25.9
5. strongly satisfied	35	64.8
TOTAL	54	100

Social Support and Exercise Survey

During the past three months, my family (or members of my household)...	N	%
11. Exercised with me.		
1. none	18	33.3
2. rarely	5	9.3
3. a few times	16	29.6
4. often	7	13.0
5. very often	8	14.8
TOTAL	54	100
12. Offered to exercise with me.		
1. none	17	31.5
2. rarely	10	18.5
3. a few times	13	24.1
4. often	10	18.5
5. very often	4	7.4
TOTAL	54	100
13. Gave me helpful reminders to exercise (“Are you going to exercise tonight?”).		
1. none	14	25.9
2. rarely	11	20.4
3. a few times	13	24.1
4. often	9	16.7
5. very often	7	13.0
TOTAL	54	100
14. Gave me encouragement to stick with my exercise program.		
1. none	19	35.2
2. rarely	4	7.4
3. a few times	14	25.9
4. often	9	16.7
5. very often	8	14.8
TOTAL	54	100
15. Changed their schedule so we could exercise together.		
1. none	25	46.3
2. rarely	11	20.4
3. a few times	13	24.1
4. often	2	3.7
5. very often	3	5.6
TOTAL	54	100
16. Discussed exercise with me.		
1. none	27	50.0
2. rarely	3	5.6
3. a few times	10	18.5
4. often	9	16.7
5. very often	5	9.3
TOTAL	54	100
17. Complained about the time I spend exercising.		
1. none	36	66.7
2. rarely	4	7.4
3. a few times	8	14.8
4. often	3	5.6
5. very often	3	5.6

TOTAL	54	100
18. Criticized me for or made fun of me for exercising.		
1. none	34	63.0
2. rarely	9	16.7
3. a few times	7	13.0
4. often	2	3.7
5. very often	2	3.7
TOTAL	54	100
19. Gave me rewards for exercising (bought me something or gave me something I like).		
1. none	38	70.4
2. rarely	5	9.3
3. a few times	8	14.8
4. often	1	1.9
5. very often	2	3.7
TOTAL	54	100
20. Planned for exercise on recreational outings.		
1. none	26	48.1
2. rarely	6	11.1
3. a few times	14	25.9
4. often	4	7.4
5. very often	4	7.4
TOTAL	54	100
21. Helped plan activities around my exercise.		
1. none	27	50.0
2. rarely	9	16.7
3. a few times	10	18.5
4. often	2	3.7
5. very often	6	11.1
TOTAL	54	100
22. Asked me for ideas on how <i>they</i> can get more exercise.		
1. none	26	48.1
2. rarely	6	11.1
3. a few times	17	31.5
4. often	3	5.6
5. very often	2	3.7
TOTAL	54	100
23. Talked about how much they like to exercise.		
1. none	22	40.7
2. rarely	7	13.0
3. a few times	7	13.0
4. often	12	22.2
5. very often	6	11.1
TOTAL	54	100

Social Support and Exercise Survey

During the past three months, my friends...	N	%
11. Exercised with me.		
1. none	29	53.7
2. rarely	6	11.1
3. a few times	9	16.7
4. often	2	3.7
5. very often	6	11.1
8. does not apply	2	3.7
TOTAL	54	100
12. Offered to exercise with me.		
1. none	27	50.0
2. rarely	6	11.1
3. a few times	11	20.4
4. often	2	3.7
5. very often	6	11.1
8. does not apply	2	3.7
TOTAL	54	100
13. Gave me helpful reminders to exercise (“Are you going to exercise tonight?”).		
1. none	26	48.1
2. rarely	10	18.5
3. a few times	9	16.7
4. often	1	1.9
5. very often	6	11.1
8. does not apply	2	3.7
TOTAL	54	100
14. Gave me encouragement to stick with my exercise program.		
1. none	27	50.0
2. rarely	6	11.1
3. a few times	7	13.0
4. often	3	5.6
5. very often	8	14.8
8. does not apply	3	5.6
TOTAL	54	100
15. Changed their schedule so we could exercise together.		
1. none	31	57.4
2. rarely	1	1.9
3. a few times	11	20.4
4. often	3	5.6
5. very often	5	9.3
8. does not apply	3	5.6
TOTAL	54	100
16. Discussed exercise with me.		
1. none	32	59.3
2. rarely	1	1.9
3. a few times	8	14.8
4. often	3	5.6
5. very often	7	13.0
8. does not apply	3	5.6
TOTAL	54	100

17. Complained about the time I spend exercising.		
1. none	43	79.6
2. rarely	2	3.7
3. a few times	4	7.4
4. often	1	1.9
5. very often	1	1.9
8. does not apply	3	5.6
TOTAL	54	100
18. Criticized me for or made fun of me for exercising.		
1. none	41	75.9
2. rarely	4	7.4
3. a few times	4	7.4
4. often	1	1.9
5. very often	1	1.9
8. does not apply	3	5.6
TOTAL	54	100
19. Gave me rewards for exercising (bought me something or gave me something I like).		
1. none	43	79.6
2. rarely	2	3.7
3. a few times	3	5.6
4. often	2	3.7
5. very often	1	1.9
8. does not apply	3	5.6
TOTAL	54	100
20. Planned for exercise on recreational outings.		
1. none	34	63.0
2. rarely	4	7.4
3. a few times	7	13.0
4. often	2	3.7
5. very often	5	9.3
8. does not apply	2	3.7
TOTAL	54	100
21. Helped plan activities around my exercise.		
1. none	32	59.3
2. rarely	3	5.6
3. a few times	9	16.7
4. often	2	3.7
5. very often	5	9.3
8. does not apply	3	5.6
TOTAL	54	100
22. Asked me for ideas on how <i>they</i> can get more exercise.		
1. none	32	59.3
2. rarely	5	9.3
3. a few times	8	14.8
4. often	4	7.4
5. very often	2	3.7
8. does not apply	3	5.6
TOTAL	54	100
23. Talked about how much they like to exercise.		

1. none	27	50.0
2. rarely	7	13.0
3. a few times	10	18.5
4. often	4	7.4
5. very often	3	5.6
8. does not apply	3	5.6
TOTAL	54	100

Exercise Confidence Survey

Whether you exercise or not, please rate how confident you are that you could really motivate yourself to do things like these consistently, <i>for at least six months.</i>	N	%
21. Get up early, even on weekends, to exercise.		
1. I know I cannot	11	20.4
2.	3	5.6
3. Maybe I can	18	33.3
4.	6	11.1
5. I know I can	14	25.9
8. does not apply	2	3.7
TOTAL	54	100
22. Stick to your exercise program after a long, tiring day at work.		
1. I know I cannot	13	24.1
2.	9	16.7
3. Maybe I can	14	25.9
4.	4	7.4
5. I know I can	12	22.2
8. does not apply	2	3.7
TOTAL	54	100
23. Exercise even though you are feeling depressed.		
1. I know I cannot	8	14.8
2.	8	14.8
3. Maybe I can	20	37.0
4.	1	1.9
5. I know I can	14	25.9
8. does not apply	3	5.6
TOTAL	54	100
24. Set aside time for a physical activity program; that is, walking, jogging, swimming, biking, or other continuous activities for at least 30 minutes, 3 times per week.		
1. I know I cannot	6	11.1
2.	2	3.7
3. Maybe I can	17	31.5
4.	7	13.0
5. I know I can	21	38.9
8. does not apply	1	1.9
TOTAL	54	100
25. Continue to exercise with others even though they seem too fast or too slow for you.		
1. I know I cannot	6	11.1
2.	3	5.6

3. Maybe I can	17	31.5
4.	10	18.5
5. I know I can	16	29.6
8. does not apply	2	3.7
TOTAL	54	100
26. Stick to your exercise program when undergoing a stressful life change (e.g. divorce, death in the family, moving).		
1. I know I cannot	8	14.8
2.	11	20.4
3. Maybe I can	10	18.5
4.	8	14.8
5. I know I can	11	20.4
8. does not apply	6	11.1
TOTAL	54	100
27. Attend a party only after exercising.		
1. I know I cannot	11	20.4
2.	4	7.4
3. Maybe I can	21	38.9
4.	8	14.8
5. I know I can	5	9.3
8. does not apply	5	9.3
TOTAL	54	100
28. Stick to your exercise program when your family is demanding more time from you.		
1. I know I cannot	9	16.7
2.	6	11.1
3. Maybe I can	18	33.3
4.	10	18.5
5. I know I can	5	9.3
8. does not apply	6	11.1
TOTAL	54	100
29. Stick to your exercise program when you have household chores to do.		
1. I know I cannot	9	16.7
2.	6	11.1
3. Maybe I can	21	38.9
4.	9	16.7
5. I know I can	5	9.3
8. does not apply	4	7.4
TOTAL	54	100
30. Stick to your exercise program even when you have excessive demands at work.		
1. I know I cannot	8	14.8
2.	9	16.7
3. Maybe I can	18	33.3
4.	7	13.0
5. I know I can	5	9.3
8. does not apply	7	13.0
TOTAL	54	100
31. Stick to your exercise program when social obligations are very time consuming.		
1. I know I cannot	6	11.1
2.	16	29.6

3. Maybe I can	13	24.1
4.	9	16.7
5. I know I can	4	7.4
8. does not apply	6	11.1
<hr/>		
TOTAL	54	100
<hr/>		
32. Read or study less in order to exercise more.		
1. I know I cannot	7	13.0
2.	6	11.1
3. Maybe I can	20	37.0
4.	12	22.2
5. I know I can	5	9.3
8. does not apply	4	7.4
<hr/>		
TOTAL	54	100
<hr/>		

Short Acculturation Scale

A. English	N	%
1. In general, what language(s) do you read and speak?		
1. Only Spanish	8	14.8
2. Spanish better than English	30	55.6
3. Both equally	11	20.4
4. English better than Spanish	2	3.7
5. Only English	3	5.6
TOTAL	54	100
2. What was the language(s) you used as a child?		
1. Only Spanish	29	53.7
2. Spanish better than English	18	33.3
3. Both equally	2	3.7
4. English better than Spanish	1	1.9
5. Only English	4	7.4
TOTAL	54	100
3. What language(s) do you usually speak at home?		
1. Only Spanish	19	35.2
2. Spanish better than English	22	40.7
3. Both equally	7	13.0
4. English better than Spanish	3	5.6
5. Only English	3	5.6
TOTAL	54	100
4. In which language(s) do you usually think?		
1. Only Spanish	19	35.2
2. Spanish better than English	14	25.9
3. Both equally	16	29.6
4. English better than Spanish	2	3.7
5. Only English	3	5.6
TOTAL	54	100
5. What language(s) do you usually speak with your friends?		
1. Only Spanish	13	24.1
2. Spanish better than English	20	37.0
3. Both equally	12	22.2
4. English better than Spanish	5	9.3
5. Only English	4	7.4
TOTAL	54	100
6. In what language(s) are the T.V. programs you usually watch?		
1. Only Spanish	6	11.1
2. Spanish better than English	18	33.3
3. Both equally	15	27.8
4. English better than Spanish	11	20.4
5. Only English	4	7.4
TOTAL	54	100
7. In what language(s) are the radio program you usually listen to?		
1. Only Spanish	10	18.5
2. Spanish better than English	13	24.1
3. Both equally	13	24.1
4. English better than Spanish	8	14.8

5. Only English	10	18.5
TOTAL	54	100
8. In general, in what language(s) are the movies, T.V. and radio programs you prefer to watch and listen to?		
1. Only Spanish	8	14.8
2. Spanish better than English	15	27.8
3. Both equally	17	31.5
4. English better than Spanish	6	11.1
5. Only English	8	14.8
TOTAL	54	100
9. Your close friends are:		
1. All Latinos/Hispanics	7	13.0
2. More Latinos than Americans	23	42.6
3. About Half & Half	21	38.9
4. More Americans than Latinos	1	1.9
5. All Americans	2	3.7
TOTAL	54	100
10. You prefer going to social gatherings/parties at which the people are:		
1. All Latinos/Hispanics	10	18.5
2. More Latinos than Americans	14	25.9
3. About Half & Half	28	51.9
4. More Americans than Latinos	2	3.7
5. All Americans	0	0.0
TOTAL	54	100
11. The persons you visit or who visit you are:		
1. All Latinos/Hispanics	21	38.9
2. More Latinos than Americans	17	31.5
3. About Half & Half	11	20.4
4. More Americans than Latinos	2	3.7
5. All Americans	3	5.6
TOTAL	54	100
12. If you could choose your children's friends, you would want them to be:		
1. All Latinos/Hispanics	4	7.4
2. More Latinos than Americans	4	7.4
3. About Half & Half	42	77.8
4. More Americans than Latinos	1	1.9
5. All Americans	3	5.6
TOTAL	54	100