

**PARENTAL LIMIT SETTING, ACCULTURATION, AND SCREEN TIME IN LATINO
CHILDREN**

by

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Childhood obesity is a becoming growing epidemic in the United States, and screen time has been noted as a correlate. Obesity disproportionately affects Latino children, and Latino children may be more susceptible to engaging in greater screen time. Screen time behaviors established in youth are likely to carry over and have been shown to track into adulthood,¹ predisposing them to life-long unhealthy lifestyle habits. Furthermore, sedentary behavior, which is primarily comprised of screen-based activities,² has been linked to overweight and obesity, type 2 diabetes, cardiovascular disease, cancer, and all-cause mortality.³⁻⁵ With the growing Latino population in the United States, the overall purpose of this study is to identify the effect of acculturation proxies (generational status and language use) on screen time in 6-11 year old Latino children mediated by parental limit setting of screen time. Data was extracted from the 2011-2012 National Survey of Children's Health (NSCH), providing a final sample of 3127 children. The relationships between generational status and language use with screen time mediated by parental limit setting were investigated using a mediation analysis as proposed by Baron and Kenny's steps for mediation. We did not find support that parental limit setting mediated the relationship between generational status and screen time. However, parental limit setting was responsible for an average of 1.6 minutes/day less screen time accounting for 11% of the relationship between language use and screen time. Although the mediation effect of parental limit setting contributed minimally to this association, parental limit setting had a significant

effect on reducing child screen time by approximately an hour. Future research should further explore the protective role of parent limit setting in reducing excessive screen time in Latino children, and how this relationship may vary by generational status or language use.

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1.0 INTRODUCTION

1.1 BACKGROUND

Childhood obesity is a major public health challenge in the United States, and it disproportionately affects Latino children. Based on the most recent national estimates, approximately 17.0% of US children and adolescents aged 2 to 19 years were categorized as obese.⁶ Among US school-aged children (aged 6-11), the incidence of overweight and obesity is 34.2% and 17.5% respectively.⁶ This is deeply concerning considering obesity can carry into adulthood, putting both children and adults at risk for comorbidities.⁷⁻⁹ Furthermore, Latino children's prevalence of obesity (95th percentile of BMI-for-age) and extreme obesity (above or at 120% of BMI-for-age) were 25% and 9.3% respectively, which was higher than that of any other racial/ethnic group.⁶ With the rapidly growing Latino population in the United States, there is a need for more research to identify key determinants of obesity in order to better understand how to best curb this epidemic.

Obesity itself is the result of many factors, particularly, caloric imbalance, genetics, and health status; however, it can be directly impacted by improving one's diet, increasing physical activity, and reducing sedentary behavior. A specific sedentary behavior hypothesized to contribute to obesity among children is engaging in excessive screen time. Screen time can be defined as sedentary behavior involving watching of television, video gaming and any other time

spent on screens.¹⁰ Among school-aged children, previous research observes a clear dose-response relationship between TV viewing and the prevalence of childhood obesity.¹¹⁻¹⁴ Latino children may be more susceptible to engaging in greater screen time, as previous studies have shown that Latino children watched an average of 2.35 hours per day compared to 2.02 hours per day for white children.¹⁵

Parental limit setting is one possible avenue in preventing children from engaging in excessive screen time. Parents applying positive parenting practices lower their child's risk for overweight and obesity. According to De Lepeleere et al. (2017), setting screen time limits for children and ensuring they adhere to the limit is a positive parenting practice that can increase time for physical activity, and thus lower a child's risk of becoming obese.¹⁶ Although more research on parental limit setting of screen time is needed, in a sample of 160 parent-adolescent dyads from Boston, Cincinnati, and San Diego, setting limits on screen time was significantly associated with fewer hours of screen time for adolescents.¹⁷ There is little research examining the effect of parental limit setting in Latino children's screen time behaviors. In one study, most Latino parents with preschool-aged children strongly or somewhat agreed that they set limits on their children's screen time behaviors; however, children watched 98.7 ± 74.2 minutes of screen time per day and only 54% met screen time recommendations of 2 hours per day or less of recreational screen time.¹⁸

Acculturation defined as the cultural, psychological, and behavioral changes that occur in both adults and children when they come into incessant contact with two or more cultures.¹⁹ Generational status and language use have been used in many previous studies with Latinos as proxy measures of acculturation,²⁰⁻²⁸ and are highly correlated with each other.²⁹ Previous studies have documented that BMI and obesity increase with subsequent generations in the US for

Latino children.^{22,25,30-32} However, the relationship between generational status and language use with screen time is less clear. There is evidence that non-English speakers are likely to engage in fewer hours of screen time than those who are English speakers regardless of generation status.^{26,28} To our knowledge, there is no research evaluating the relationship between generational status and language with parental limit setting of screen time.

1.2 SPECIFIC AIMS

The overall purpose of this study is to identify the effect of generational status and language use on screen time in Latino children (aged 6-11 years) and evaluate whether the effect is mediated by parental limit setting of screen time.

Aim 1. To investigate the association between generational status and language use with screen time;

Hypothesis 1: Children with higher generational status and those who primarily speak English will engage in more screen time minutes/day compared with children with lower generational status and those who primarily speak a language other than English in the home.

Aim 2. To investigate the association between generational status and language use with parental limit setting of screen time;

Hypothesis 2: Children with higher generational status and those who primarily speak English will have fewer parents who set limits on screen time compared with lower generational status and those who primarily speak a language other than English in the home.

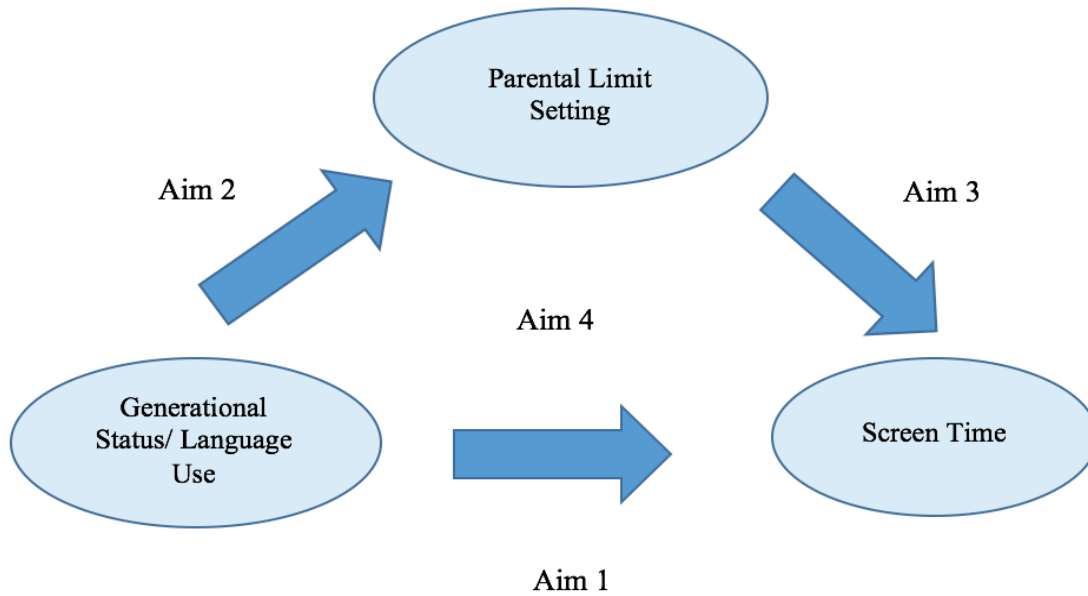
Aim 3. To investigate the association between parental limit setting with child daily screen time;

Hypothesis 3: Parents who responded positively to setting limits on their child's screen time would decrease their average daily minutes of screen time.

Aim 4. To investigate the mediating effect of parental limit setting in the association between generational status and language use with screen time;

Hypothesis 4: Parental limit setting will have a mediating effect on the associations between generational status and language use with screen time.

Figure 1: Mediation Analysis with Specific Aims



1.3 SIGNIFICANCE

Immigrants and their US born children comprise an increasing proportion of the total U.S. population, the majority of which are of Hispanic or Asian origin.^{33,29} It is estimated that by the year 2020 almost 30 percent of all children in the United States will have one or more foreign-born parents.^{34,35} Many of these children of immigrants are likely to live in families with low incomes, have parents with low education and limited English proficiency, and have less interactions with their parents.³⁴ Despite this growing population, little is known about the correlates of obesity among children of immigrants and how those compare with subsequent

generations of children in the US.

Among immigrant populations, 6-11 year old Latino children are disproportionately affected by obesity compared to their racial ethnic counterparts.⁶ This is deeply concerning considering obesity can carry into adulthood, putting both children and adults at risk for comorbidities such as elevated blood pressure, abnormal fasting glucose and potentially increased morbidity and mortality.⁶⁻⁹ Additionally, overweight and obese children are observed to be at greater risk for lower self-esteem and poor emotional wellbeing, poorer social skills and social difficulties, depression, anxiety and disordered eating behaviors compared to normal weight children.³⁶

Screen time is a correlate of childhood obesity, and the American Academy of Pediatrics recommends less than or equal 2 hours of recreational screen time per day for children to reduce the risk of obesity.³⁷ What is troubling is that Latino children engage in more screen time than their peers, and most Latino children do not meet these AAP recommendations.^{15,37}

The purpose of this study is to examine the effect of generational status and language use on screen time in a nationally representative sample of 6-11 year old Latino children mediated by parental limit setting of screen time. To our knowledge, there is no previous research examining the relationships between generational status and language use with screen time in Latino children. Furthermore, there is no research observing whether parental limit setting has a mediating effect in these relationships. With the information provided from this study, researchers will be able to better understand whether parental limit setting can play a role in Latino children's screen time and how that varies by acculturation status. Such information

would be useful for future child obesity prevention programs and interventions with Latino families.

2.0 REVIEW OF THE LITERATURE

2.1 CHILD OBESITY IN LATINO CHILDREN

Childhood obesity is a significant public health challenge in the U.S. Based on the 2011-2014 NHANES report, U.S. children and adolescents aged 2 to 19 years prevalence of obesity (95th percentile of BMI-for-age) in 2011-2014 was 17.0% and extreme obesity (above or at 120% of BMI-for-age) was 5.8%.⁶ Among preschool children (aged 2-5), the prevalence of obesity and extreme obesity was 8.9% and 1.7%, for school aged children (aged 6-11), the prevalence was 17.5% and 5.6%, and for adolescents (aged 12-19), the prevalence was 20.5% and 7.8%.⁶ There is variation in the trends of child obesity according to age. In their 25-year period report (1988-1994 through 2013-2014), Ogden et al.⁶ noted an increase in those aged 6 to 11 years, the prevalence rose until 2007-2008 before leveling off. Based on the 2011-2014 NHANES report, it seems as if school age is when childhood obesity prevalence really begins to take off and can be an age group worth investigating more diligently.

From this NHANES report, Latinos had the highest prevalence of childhood obesity compared to their racial/ethnic counterparts.⁶ According to the 2011-2014 NHANES report, about half of Latino children of between 6 to 11 years were found to be overweight. Even more concerning, Latino children's prevalence of obesity and extreme obesity were 25% and 9.3% respectively, which was higher than that of any other racial/ethnic group.⁶

This is deeply concerning considering obesity can carry into adulthood, putting both children and adults at risk for comorbidities.⁷⁻⁹ Obesity is responsible for the development of many of the non-communicable diseases among them being diabetes and cardiovascular diseases.³⁸ It impairs the physical health and self-esteem of a child. They tend to have declined quality of life in addition to poor academic performance. Other comorbid conditions of obesity include metabolic, hepatic, orthopedic, and pulmonary and renal disorders.²⁶

Obesity itself is the result of many factors, mainly caloric imbalance, genetics, and health status; however, it can be directly modified by improving diet, decreasing sedentary behavior and getting involved in physical activities. According to Kornides et al.,³⁹ obesity is a preventable cause of morbidity and risk factors among Latino children include TV viewing, being physically inactive, dietary intake, infant birth weight, parental obesity, food insecurity, country of origin and acculturation. Liu et al.⁴⁰ examined the obesity incidence in children using a 12-year collection of both weight and height in over 40,000 US children. The predictors of the earlier onset of overweight among children were race, sex, and lack of insurance.⁴⁰ They also noted that Latino boys had the earliest onset of overweight compared to those that are black or white, and their prevalence of being overweight is 20% by the age of 4.3 years.⁴⁰

2.2 THE RELATIONSHIP BETWEEN SCREEN TIME AND OBESITY

Screen time is among the factors hypothesized to contribute to obesity among children. Screen time can be defined as sedentary behavior involving watching of television, video gaming and any other time spent on screens.¹⁰ The 2015 Common Sense Census reported that 62% of children aged 8-12 spent an average of 2.21 hours per day watching TV.⁴¹ Among school-aged

children, previous research observes a clear dose-response relationship between amount of time viewing television and/or frequency of viewing TV with the prevalence of childhood obesity.¹¹⁻¹⁴

Researchers hypothesize three possible mechanisms by which television viewing may be associated with obesity: 1) TV viewing displaces physical activity; (2) increased dietary energy intake from eating while viewing or from the effects of food advertising; and (3) decreased resting metabolic rate during viewing.¹⁴ Based on a systematic review of 232 studies, youth (aged 5-17) who watched television for more than 2 hours per day had unfavorable body composition and decreasing this time led to a decrease in BMI.⁴²

Overall, there is limited research specifically examining Latino children and their screen time prevalence. However, some researchers have explored how particular behaviors such as lack of physical activity and television viewing are related to becoming overweight and obesity. Doherty et al.⁴³ noted a positive association between screen time and increased BMI among Latino children. What makes this population even more at risk for childhood obesity is the fact that Latino children watched 2.35 hours compared to 2.02 hours for white children.¹⁵ Marttinen et al.⁴⁴ conducted a statistical inquiry into Latino children concerning physical activity, screen time and obesity. After completing a cross-sectional analysis of the connection between viewing TV and BMI, they noted that time spent viewing television increases chances of being overweight among the Latino children.⁴⁴

2.3 RELATIONSHIP BETWEEN SCREEN TIME AND PARENTAL LIMIT SETTING

The American Academy of Pediatrics (AAP) recommends that parents limit their children's viewing of television to a maximum of two hours per day.³⁷ However, given the amount of screen time in which the average U.S. child engages, it is clear that few children are meeting this recommendation. Parental limit setting is one possible avenue in preventing children to engage in excessive exposure to screen time. According to De Lepeleere et al. (2017), setting screen time limits for children and ensuring they adhere to the limit is a positive parenting practice that can increase the time for physical activity, and thus lower the child's risk of becoming obese.¹⁶

However, prior research has shown differences in parental behaviors and its effect on media use.⁴⁵ While there are insufficient reasons to conclude on the discrepancy, barriers such as social support may be affecting the parental media limit setting. While examining the parental influences on adolescent video gaming, Smith et al.⁴⁵, noted that parents who discussed cyber safety had children who engaged in fewer hours of screen time on both weekdays and weekends. Limit setting of screen time along with monitoring of screen time, however, showed no significant effects on children's total screen time. This study suggests that describing the consequences associated with screen time could allow children to understand the effects and in turn may reduce their screen time rather than just limit sitting alone.^{16,45,46}

In contrast, the Kaiser Family Foundation observed setting limits on TV time was significantly associated with less media use for children aged 8-18; however, only 28% of the participants indicated that they had rules set for the time they have view their televisions while in the house.^{15,45} According to Carlson et al., 9-15 year old children who agreed that their parents had rules about the time they should spend watching television and video gaming are less likely

to exceed the AAP recommendations of 2 hours or less of screen time.⁴⁶ Children who disagreed that their parents had restrictions were more likely to exceed those recommendations. Carlson et al.⁴⁶ further noted that the children with the lowest prevalence of exceeding AAP recommendations were those with parents who had consistent rules about limiting screen time. Additionally, in a sample of 160 parent-adolescent dyads from Boston, Cincinnati, and San Diego, setting limits on screen time was also significantly associated with fewer hours of screen time for adolescents.¹⁷

Given the lack of research in parental limit setting of screen time with the general population, there is much to be understood with parental limit setting of screen time specifically in Latinos. However, baseline data extracted from ANDALE Pittsburgh, a family-based, promotora-mediated child obesity intervention, provided some interesting observation regarding limit setting.¹⁸ In this sample (n=49), 96% of parents agreed to limiting their preschool-aged children's screen time, yet only 54% of the children met the AAP recommendations of limiting children's screen-viewing time to no more 2 hours per day (Sharma et al., 2018). This is consistent with previous research that although adults acknowledge the importance of limiting screen time, they tend to fail in imposing screen time restrictions for children.⁴⁷ However, it is unclear whether these limits carry over with older children (aged 6-11) as this sample was taken from Latino preschool children.

2.4 ACCULTURATION

Acculturation has been defined as the process by which immigrants adopt the attitudes, values, customs, beliefs and behaviors of a new culture.³¹ John Berry developed a framework to further

explain the process involving the maintenance of the original culture and development of relationships with the new culture. These processes involve four different acculturation strategies that designate differences in individual attitudes and behaviors: integration, assimilation, separation, and marginalization.³¹ Integration involves individuals who have maintained previous attitudes and behaviors from their original culture, but have also adopted new attitudes and behaviors from their new culture. Assimilation involves individuals who have completely adopted attitudes and behaviors from their new culture. Separation involves individuals who have maintained their original cultures attitudes and behaviors and have entirely rejected their new culture. Marginalization occurs when individuals do not identify with their original culture nor their new culture.³¹

There are multiple ways to measure acculturation. The three most widely used types of acculturation measurement instruments are unidimensional, bidimensional, multidimensional.⁴⁸ Unidimensional instruments explain changes in terms of losses occurring in one cultural orientation and the accompanied gains in another, and present acculturation as a linear process from unacculturated to acculturated. Bidimensional instruments measures acculturation based on each culture individually; measuring both the level or maintenance of the original culture and the adoption of the new culture. Multidimensional instruments examine multiple dimensions by using separate scales to describe many elements of acculturation such as attitudes, values, and ethnic interaction.⁴⁸ However, another way of studying acculturation at the population-level is through proxy measures. Proxy measures are commonly used as indicators of acculturation and include variables such as generational status, length of residence in the U.S., and language.⁴⁸ Proxy measures are unidimensional and do not directly measure elements of acculturative change (such as attitudes and behaviors) but are useful because they are quick and convenient to use and

often correlate with measurement scales.⁴⁸

Generational status and language use are proxy measures that are highly correlated to each other,²⁹ and have been used in many previous studies with Latinos as proxy measures of acculturation.²⁰⁻²⁸ Generational status as a proxy assumes that acculturation can be explained by the amount of exposure individuals have to the dominant culture.^{49,50} Most acculturation scales use language in some way and although it is very complex as it involves reading, speaking, thinking, as well as levels of use based on the environment and opportunity for use.^{49,51} For this reason, language is considered one of the easiest acculturation indicators to measure.⁴⁹

2.4.1 Generational Status/ Language Use and Obesity

For generational status in Latino children, there is an observed trend with BMI and obesity to increase with subsequent generations in the U.S.^{22,25,30-32} According to Gordon-Larsen et al.,²² acculturation differences exist between immigrants born abroad and born in the U.S. Specifically, an extended stay in the U.S. was linked with the overweight prevalence in Cubans and Puerto Ricans adolescents. Additionally, the diverse lifestyles of U.S.-born Latinos underlie the heightened overweight prevalence in the 1st and consequent generations residing in the U.S.²² Popkin & Udry²⁵ also found that Asian-Americans and Hispanic adolescents born in the U.S. have a double chance of becoming obese as compared to 1st generation residing in the U.S.

There is limited research evaluating both generational status and language use, and its relationship with obesity, in Latino children. One study by Taverno et al.²⁸ specifically looked at the relationship between the proxy measures and BMI among 6-11 year old Hispanic children using data from the 2003 National Survey of Children's Health. It was observed that the 1st and

2nd generation non-English speakers were more likely to be obese in comparison to the 3rd generation English speakers. These findings were intriguing because this is the opposite of what is observed in typical Latino adult and adolescent populations, where obesity and overweight seems to increase steadily over generations.²⁸

2.4.2 Generational Status/ Language Use and Screen Time

There is limited research observing the relationship of both generational status and language use with screen time. Singh et al. (n=68,288) reported that immigrant children (aged 6-17) are less likely to watch television for 3 hours or more per day than native US children, but this gap narrowed with increasing acculturation levels.²⁶ Additionally, the odds of watching television were 1.5 and 2.3 times higher in native Hispanic and black children, respectively.²⁶ In contrast, Williams et al. looked at both generational status and language use in (n=2475) immigrant and non-immigrant adolescents in the US and found that neither measure was significantly associated with screen time (specifically screen viewing and social media).⁵²

Specifically in Latino children, Taverno Ross et al.²⁸ examined these relationships in a sample of 6-11 year olds from the 2007 National Survey of Children's Health. This study observed that youth who spoke a language other than English in their household were less likely to engage in 2 or more hours of daily screen time. Furthermore, the odds of having 2 or more hours of screen time was significantly lower for all non-English speaking groups regardless of generational status, compared to the 3rd generation, English speakers. These results would suggest that speaking a language other than English in the home could possibly be a protective factor for accumulating screen time on a typical school day.²⁸

2.4.3 Generational Status/ Language Use and Parental Limit Setting of Screen Time

To our knowledge, there is no research studying the relationship between generational status and language use with parental limit setting of screen time. Although, Olvera et al.⁵³ did examine the effect of language use and limit setting on unhealthy weight control behaviors (UWCBs) such as regular dieting, vomiting, laxative or diet pill use, fasting, and excessive exercise in Hispanic daughters. In this sample, mothers who used more limit setting strategies were less likely to have daughters engaging in UWCBs, and this negative association was stronger among low acculturated girls compared to their highly acculturated counterparts. Given the lack of research on parental limit setting in general, a greater understanding of generational status and language use as it relates to screen time could help improve obesity rates or even child health.

3.0 METHODS

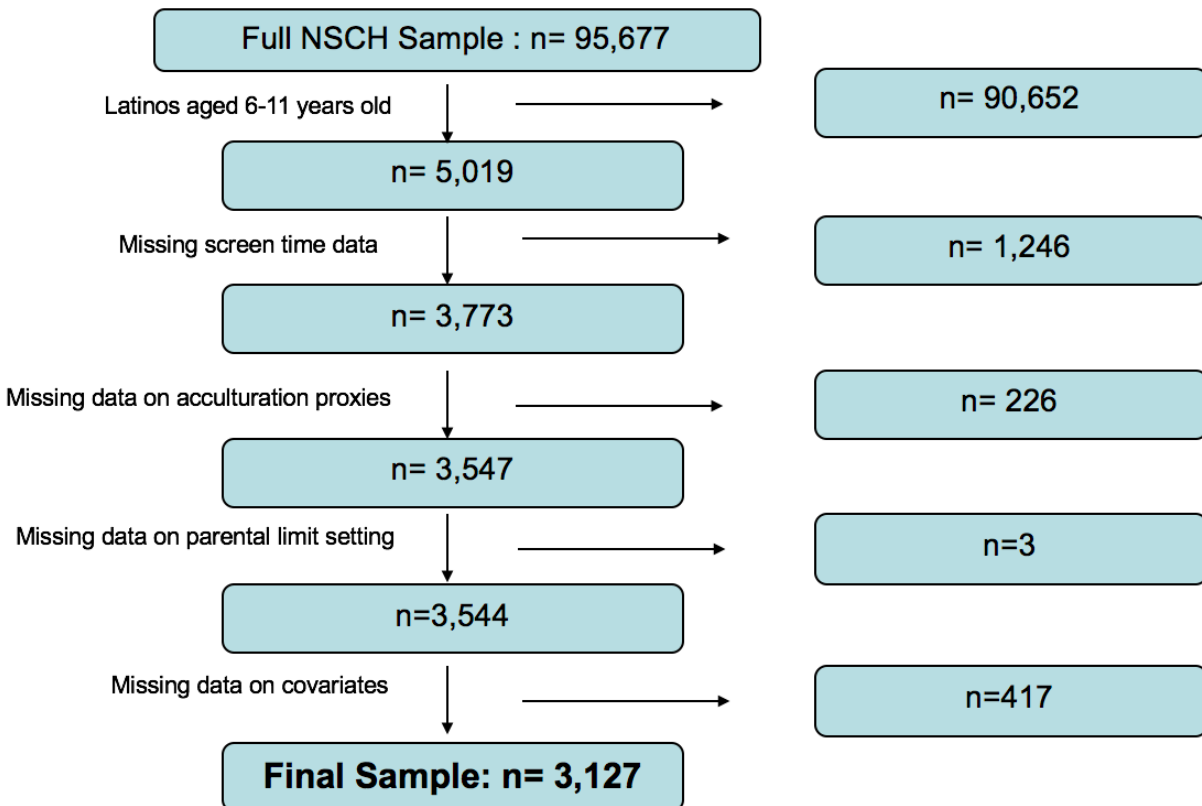
3.1 DATA COLLECTION

Data was extracted from the 2011-2012 National Survey of Children's Health (NSCH),⁵⁴ a nationally representative sample of youth aged 0-17 years in the United States. This random-digit dialed survey was conducted through the Health Resources and Services Administration's Maternal and Child Health Bureau and the Centers for Disease Control and National Center for Health Statistics. This data set involved physical, emotional, and behavioral health indicators for youth ranging from 2-17 years of age. More details on the survey are described elsewhere (www.nschdata.org).⁵⁵ A Spanish-language version of the NSCH questionnaire was developed after thorough review and evaluation to accurately accommodate for cultural appropriateness by a team of experienced Spanish-language telephone interviewers and supervisors. In households primarily speaking Spanish, a trained bilingual interviewer implemented the NSCH survey in Spanish; families were given the option to respond in the language of their preference (English or Spanish). The sample of interviews was performed through landline telephone numbers but was supplemented with an independent random-digit-dial sample of cell phone numbers. Households interviews performed by cell phone were eligible if the respondent indicated they did not have access to a landline or were unlikely to be contacted through their landline.⁵⁴

3.2 PARTICIPANTS

For this study, the full NSCH sample (n=95,677) was limited to Latino children aged from 6-11 years old (n=5,019). Furthermore, the participants were excluded if they had missing data on the following: screen time (n=1,246), parental limit setting (n=3), immigrant generation (n=223), and language (n=6), and gender/ household education level/ household poverty line (n=417). This resulted in a final sample of 3127 children.

Figure 2: Final Sample of Participants from 2011-2012 National Survey of Children’s Health



3.2.1 Generational Status

Child's generational status was based on whether the child and his or her parents were born in the United States. Immigrant generation categorization was coded based on the recommendations of the Institute of Medicine's report on immigrant children: 1st generation (children as those born outside of the U.S.), 2nd generation (children born in the U.S. of at least 1 immigrant parent), and 3rd or higher generation (children born in the U.S. of U.S.-born parents).⁵⁷

3.3 MEASURES

3.3.1 Screen Time

Screen time was assessed by asking parents "On an average weekday, about how much time does [your child] usually spend in front of a TV watching TV programs, videos, or playing video games?" and "On an average weekday, about how much time does [your child] usually spend with computers, cell phones, handheld video games, and other electronic devices, doing things other than schoolwork?". For this study, the variable analyzed continuously in average minutes per day of screen time and was also recoded to 0 (less than 2 hours/day), or 1 (2 hours or more/day) based on the AAP recommendations for children and adolescents.⁵⁶

3.3.2 Limit Setting of Screen Time

Limit setting of screen time was assessed by asking parents “Do you limit the amount of time [CHILD’S NAME] spends watching TV, playing on the computer, or using electronic devices?” Parent reported their responses as either “yes’ or “no and were coded as 0 (no) and 1 (yes).

3.3.3 Language Use

Child’s language use was assessed by asking parents “What is the primary language spoken in your home?”. The responses were recoded to 0 (English), and 1 (Non-English).

3.3.4 Sociodemographics

Parents responded to other questions surrounding their family’s sociodemographic information. Specifically, parents reported child age in years, child’s gender (recoded as 0-male or 1-female). Household education was assessed by asking parents “What is the highest grade or year of school ([MOTHER TYPE/FATHER TYPE/OTHER]) has completed?” Education of the parent was taken from the parent with the highest in the household, and was recoded as 0 (< 12 years), 1 (12 years), or 2 (>12 years). Income was assessed by asking parents “How many children live in households with incomes above/below the federal poverty level?” This response was recoded as poor (< 133% poverty), near poor (\geq 133% poverty and < 185% poverty), or not poor (\geq 185% poverty) based on 2011 and 2012 USDHHS Federal Poverty Guidelines for households.

3.4 STATISTICAL ANALYSES

All data analyses were completed in Stata SE, version 15.1, to account for complex sample design. All proportions and means provided estimates for the population of Latino children living in the U.S. Descriptive statistics were analyzed for all variables for the total sample and by generational status and language use. Statistical significance level was set to $p < 0.05$.

The relationships between generational status and language use with screen time mediated by parental limit setting were investigated using a mediation analysis as proposed by Baron and Kenny's steps for mediation.⁵⁸ The first step observes the relationship between the predictor variable and the outcome variable (PATH C). The second step observes the relationship between the predictor variable and the mediator variable (PATH A). The third step observes the relationship between the mediator variable and the outcome variable (PATH B). To complete the mediation analysis, step 4 analyzes the relationship between the predictor variable and the outcome variable with correction for the mediator variable (PATH C'). If all the prior steps are significant, the overall mediation of this effect can be calculated with the following equation: $[1 - (C'/C)] * 100\%$. This will determine the percentage to which the mediator plays a role in this relationship. These models include multiple linear and logistic regressions with both categorical (e.g., parental limit setting) and continuous (e.g., generational status, language use, screen time) predictors. Each model was adjusted for the following covariates: household income and education, and child age and gender. We hypothesized that these covariates would have an influence on Latino children's screen time as well as parental limit setting of screen time.

4.0 RESULTS

4.1 SAMPLE DESCRIPTIVES

Characteristics of the total sample and by child generational status and language use are presented in **Table 1**. The average age of the children was 9.2 (± 2) years, and 54% were male. More than one half of the children lived in households which had education levels exceeding 12 years (58%), and 53% resided in ‘poor or near poor’ households. Most of the children were either 2nd generation (49%) or 3rd or higher generation (43%), while only 7% were 1st generation immigrants. For language use, 40% spoke a language other than English in the household and 60% spoke English. The majority of 1st generation children were non-English speakers (93%), 64% of 2nd generation children were non-English speakers, while the majority of 3rd or higher generation children were English speakers (97%).

In general, children of higher generational status and those who spoke primarily English had higher household education and less poverty. The majority of 3rd or higher generation children had household education levels exceeding 12 years (78%) and were categorized as ‘not poor’ (65%), while the majority of 1st generation children had household education levels equal

to or less than 12 years (61%), and were 'poor or near poor' (79%). The majority of English speakers had household education levels exceeding 12 years (77%) and were 'not poor' (67%), while non-English speakers had household education levels equal to less than 12 years (72%) and were 'poor or near poor' (80%).

On average, parents reported their children accumulated 197 (± 152) minutes of screen time per day. Descriptively, average daily screen time was highest among 1st generation and non-English speaking children, and lowest amongst 3rd or higher generation and English-speaking children. For the total sample, 60% of children engaged in 2 or more hours of screen time per day. In regard to parental limit setting of screen time, 91% of parents agreed that they set limits on their child's screen time. Descriptively, parental limit setting did not vary by generational status nor language use; between 90-92% of parents regardless of acculturation level agreed to setting limits on their child's screen time.

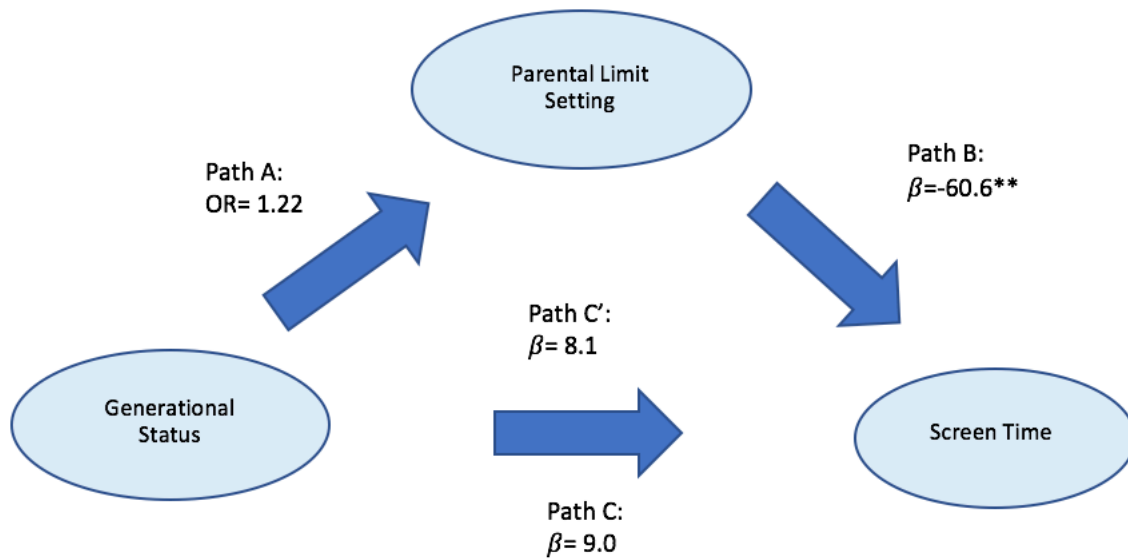
Table 1: Descriptive Statistics of 3,127 children participating in the 2011-2012 National Survey of Children's Health by generation and language use

Characteristic	All n=3127	First Generation n=225	Second Generation n=1546	Third Generation n=1356	Non- English n=1240	English n=1887
Age (year) M (SD)	9.18 (1.99)	9.74 (1.91)	9.13 (1.99)	9.14 (1.99)	9.18 (1.99)	9.17 (1.99)
Sex of child						
Male	1694 (54%)	128 (57%)	834 (54%)	732 (54%)	676 (55%)	1018 (54%)
Female	1433 (46%)	97 (43%)	712 (46%)	624 (46%)	564 (45%)	869 (46%)
Education						
<12 years	636 (20%)	78 (34%)	485 (31%)	73 (5%)	520 (42%)	116 (6%)
12 years	687 (22%)	62 (27%)	397 (25%)	228 (17%)	369 (30%)	318 (17%)
>12 years	1804 (58%)	85 (37%)	664 (43%)	1055 (78%)	351 (28%)	1453 (77%)
Household Poverty Line						
Poor	1257 (41%)	152 (68%)	783 (51%)	322 (24%)	808 (65%)	449 (24%)
Near Poor	362 (12%)	25 (11%)	215 (14%)	122 (9%)	189 (15%)	173 (9%)
Not Poor	1508 (48%)	48 (21%)	548 (35%)	878 (65%)	243 (20%)	1265 (67%)
Generational Status						
First Generation	225 (7%)	225 (100%)	--	--	210 (17%)	15 (1%)
Second Generation	1546 (49%)	--	1546 (100%)	--	992 (80%)	545 (29%)
Third Generation	1356 (43%)	--	--	1356 (100%)	38 (3%)	1318 (70%)
Primary Language						
Non- English	1240 (40%)	210 (93%)	992 (64%)	38 (3%)	1240 (100%)	--
English	1887 (60%)	15 (7%)	545 (36%)	1318 (97%)	--	1887 (100%)
Screen time, minutes/day, M (SD)	197.39 (152.17)	207.44 (139.23)	197.68 (139.33)	195.38 (167.74)	200.35 (134.63)	195.44 (162.86)
<= 2 hours	1237 (40%)	75 (33%)	583 (38%)	579 (43%)	444 (36%)	793 (42%)
>2 hours	1890 (60%)	150 (67%)	963 (62%)	777 (57%)	796 (64%)	1094 (58%)
Limit Setting of Screen Time						
Agree	2846 (91%)	204 (91%)	1421 (92%)	1221 (90%)	1146 (92%)	1700 (90%)
Disagree	281 (9%)	21 (9%)	125 (8%)	135 (10%)	94 (8%)	187 (10%)

4.2 SPECIFIC AIM 1

Our first aim was to investigate the association of generational status and language use with screen time. We hypothesized that children with higher generational status and those with English as their primary household language would engage in more screen time. **Figure 3, Path C** represents the association between generational status and average screen time minutes/day. Path C demonstrated a non-significant association between generation and screen time after correction for covariates (child age, child gender, parent education, and household income). Therefore, our hypothesis was not supported for the association of generational status with screen time.

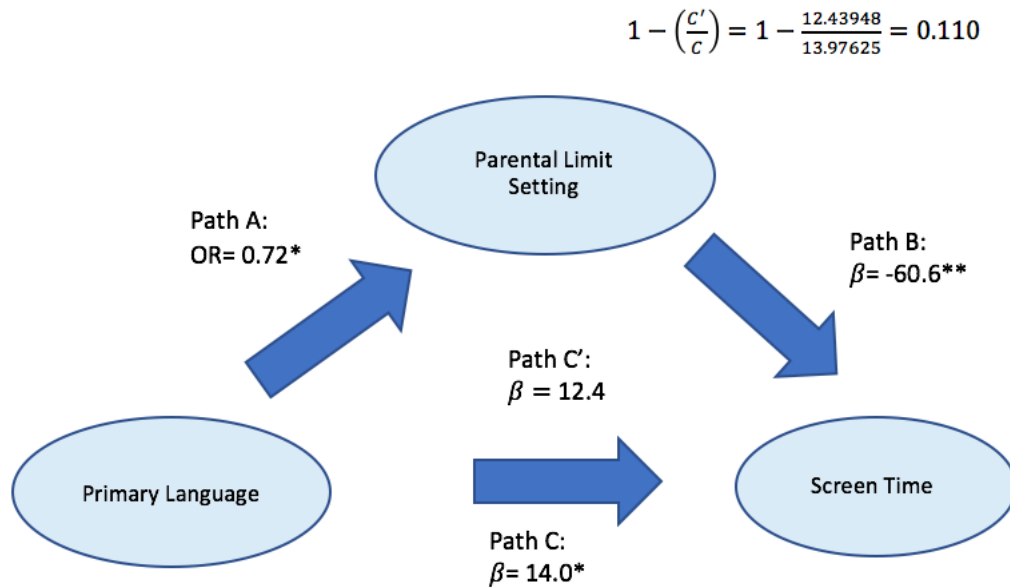
Figure 3: Mediation Analysis of Generational Status and Screen time with Parental limit setting of 3,127 children participating in the 2012 National Survey of Children’s Health



NOTE: *Denotes p-value less than .05. ** Denotes p-value less than .001.

Figure 4, Path C represents the association between language use and average screen time minutes/day. After correction for covariates, there was a significant association between primary language and screen time ($p = 0.038$). That is, when the primary language was English, parents reported children engaged in an additional 14.0 minutes per day of screen time, compared with children whose primary language was non-English. Therefore, we found support for our hypothesis that English speakers would engage in more screen time than Non-English speakers.

Figure 4: Mediation Analysis of Primary Language Spoken in Household and Screen time with Parental Limit Setting of 3,127 children participating in the 2012 National Survey of Children’s Health



NOTE: *Denotes p-value less than .05. ** Denotes p-value less than .001.

4.3 SPECIFIC AIM 2

Our second aim was to investigate the association between generational status and language use with parental limit setting of screen time. We hypothesized that children with higher generational status and primarily English-speakers would have fewer parents who set limits on screen time. **Figure 3, Path A** represents the association of generational status and parental limit setting. Path A displayed a non-significant association between generational status and parental limit setting

after correction for covariates. Therefore, our hypothesis was not supported for the association between generational status with parental limit setting.

Figure 4, Path A represents the association between language use and parental limit setting. There was a significant association in Path A between language use and screen time after correction for covariates ($p = 0.042$). That is, when the primary language was English, the odds of a parental limit setting on screen time was 0.719 times more likely compared to when the primary language was non-English. Therefore, our hypothesis was supported that primarily English-speaking children have fewer parents who set limits on screen time.

4.4 SPECIFIC AIM 3

Our third aim was to investigate the association between parental limit setting of screen time and child screen time minutes per day. We hypothesized that parents who responded positively to setting limits on their child's screen time would decrease their average daily minutes of screen time. In both **Figure 3** and **4, Path B** represents the association of parental limit setting with screen time. Path B demonstrated a significant relationship between parental limit setting and screen time after correction for covariates ($p < 0.001$); specifically, when parents agree to set limits on their child's screen time, the average daily screen time decreased by 60.6 minutes. Therefore, Hypothesis 3 was supported in both models.

4.5 SPECIFIC AIM 4

Our fourth aim was to investigate the mediating effect of parental limit setting in the association between generational status and language use with child screen time. We hypothesized that parental limit setting would have a mediating effect on the associations between generational status and language use with screen time. **Figure 3, Path C'** represents the mediating effect of parental limit setting in the association between generational status with child screen time. Path C' observed a non-significant association between generational status and screen time after correction for covariates. Since there were no significant associations displayed in Path A nor Path C, this violates the steps of a Baron & Kenny mediation analysis, which removed the possibility of parental limit setting mediating the relationship between generational status and screen time. Therefore, our Hypothesis 4 for generational status was not supported.

Figure 4, Path C' represents the mediating effect of parental limit setting in the association between language use with child screen time. After correction for covariates in Path C', those children whose primary language was English had parents who reported their child engaging in an additional 12.4 minutes/day of screen time, on average. Parental limit setting in this case accounted for 1.6 minutes of 14 minutes per day of screen time in the relationship between language use and screen time. Therefore, our Hypothesis 4 for language use was supported. Additionally, it is important to note that this relationship was no longer significant when controlling for parental limit setting as the p-value changed from Path C ($p = 0.038$) to Path C' ($p = 0.063$). Additionally, the overall mediation of these models determined by taking C and C' directly from their respective models is 11%. Therefore, only 11% of the association between language use and average hours of screen time per day is mediated by parental limit setting.

5.0 DISCUSSION

5.1 DESCRIPTIVES

Parents from this sample reported that on an average weekday, their child engaged in 197 ± 152 minutes of screen time, almost a full hour above the AAP recommendation for parents to limit their children's viewing of television to a maximum of two hours per day.³⁷ This is highly concerning considering the literature observes a clear dose-response relationship between TV viewing and the prevalence of childhood obesity.¹¹⁻¹⁴ Screen time behaviors established in youth are likely to carry over and have been shown to track into adulthood,¹ predisposing them to life-long unhealthy lifestyle habits. Furthermore, sedentary behavior, which is primarily comprised of screen-based activities,² has been linked to overweight and obesity, type 2 diabetes, cardiovascular disease, cancer, and all-cause mortality.³⁻⁵

The majority of parents agreed that they set limits on their child's screen time (90%), yet only 40% of the children were meeting the AAP screen time recommendation. This is consistent with what was observed in a separate pilot study with Latino preschool children where 96% of parents agreed to limiting their children's screen time, yet only 54% of the children met the AAP recommendations.¹⁸ Previous research suggests that although parents acknowledge the importance of limiting screen time, they tend to fail in imposing screen time restrictions for children.⁴⁷ Because the response options given to parents were 'yes' or 'no,' we do not know how parents defined setting limits in this sample, or whether limit setting was in-line with AAP

recommendations. Therefore, future research to understand what parents qualify as setting limits is warranted along with effective strategies to help parents set limits for their children's screen time, particularly for Latino parents.

5.2 SPECIFIC AIM 1

We did not find support for our Hypothesis 1 that children with higher generational status would engage in more screen time. Previous research reported by Singh et al displayed that immigrant children aged 6-17 are less likely to watch television for 3 hours or more per day when compared to native U.S. born children (n=68,2888). In our study, the same trend was not observed with generational status. However, there is previous literature to support our null finding. For example, Williams et al. looked at generational status in 2,475 immigrant and non-immigrant adolescents in the US and found that this measure was not significantly associated with screen time.⁵² Additionally, Taverno et al. observed that generational status did not play a major role in accumulating less than 2 hours per day of screen time for Latino children aged 6-11 year olds.²⁸ The null finding of the present study could also be due to the low sample size of 1st generation children (n=225) compared to both 2nd (n=1546) and 3rd or higher generation (n=1356) children.

For language use, our hypothesis was supported that primarily speaking English children engaged in more screen time. This study found that English speakers accumulated an average of 14 extra minutes per day of screen time compared to non-English speakers. This is consistent with previous literature as Taverno et al. observed 6-11 aged Latino children who spoke a language other than English in their household were less likely to engage in 2 or more hours of daily screen time.²⁸ Furthermore, this same study found that the odds of having 2 or more hours

of screen time was significantly lower for all non-English speaking children. Our results support our hypothesis and suggest that speaking a language other than English in the home could possibly be a protective factor for accumulating screen time on a typical weekday. Future research should explore after school weekday activities in Latino children by generational status to determine whether specific activities may contribute to or decrease overall screen time levels in children. Future interventions could also target Latino immigrant families in maintaining these healthy habits, which would include low levels of TV viewing and screen time.

5.3 SPECIFIC AIM 2

For Aim 2, we hypothesized that children with higher generational status and primarily English speakers would have fewer parents who set limits on screen time. For generational status, our hypothesis was not supported. This would make sense as there were no differences in parental limit setting between 1st, 2nd or 3rd or higher generation children, descriptively. . This is both important and revealing, as it may imply that all parents perceive that they set limits, regardless of generational status. It could also point to a lack of sensitivity in the measure to achieve adequate variability due to the simple yes/no response options. To our knowledge, there is no research examining the relationship between generational status and parental limit setting. Future research is needed to better understand the relationship between generational status and other more comprehensive measures of acculturation with parental limit setting, particularly surrounding screen time.

For language use, our hypothesis was supported that English-speaking children were less likely to have parent who set limits on screen time. To our knowledge, there is no prior research

examining language use and parental limit setting of screen time. However, with the limited research available on limit setting in Latinos, we did find some consistencies. For example, Olvera et al.⁵³ examined the effect of language use and parental limit setting on unhealthy weight control behaviors in their daughters, and found that mothers set more limits if they were of lower acculturation (i.e., primarily non-English speakers) compared to higher acculturated parents (i.e., primarily English-speakers). Therefore, lower acculturation (through the proxy measure of language use) may be associated with increased limit setting for some behaviors. Further, Calzada et al.⁵⁹ observed that lower acculturated parents display more authoritarian behaviors towards their children compared to higher acculturated parents. This could partly explain the differences in parental limit setting between primarily English speaking and non-English speaking children in our sample.

5.4 SPECIFIC AIM 3

For Aim 3, we hypothesized that parental limit setting would be associated with lower screen time in children. This hypothesis was supported by the fact that parents who reported setting limits on screen time had children who engaged in 60 fewer minutes of screen time per day. This is one of the first studies reporting a significant effect of parental limit setting of screen time in Latino children. In a sample of 160 parent-adolescent dyads from Boston, Cincinnati, and San Diego, setting limits on screen time was also significantly associated with fewer hours of screen time for adolescents.¹⁷ These findings highlights the potential parental limit setting has in reducing school aged children's screen time. Future research should investigate the role of

parental limit setting as a protective factor for engaging in excessive screen time in Latino youth, and how to target this behavior in an intervention.

5.5 SPECIFIC AIM 4

We did not receive support for our hypothesis that parental limit setting mediated the relationship between generational status and screen time. However, parental limit setting was responsible for an average of 1.6 minutes/day less screen time accounting for 11% of the relationship between language use and screen time, supporting our hypothesis. While this relationship may not carry high clinical significance, it does begin to help us understand these relationships a bit more, given the little research that exists on this topic. Family and home factors (e.g., parental and sibling behavior and screen time habits), number of TVs in the household, TV in the bedroom, neighborhood factors, and psychosocial factors (e.g., depression, lack of friends) have all been associated with screen time in youth.^{47,60,61} It is possible that these other factors could provide more context and partly mediate the relationship between limit setting and excessive screen time in Latino children.

5.6 STRENGTHS

To our knowledge, this is one of the first studies examining the effect of parental limit setting on screen time in Latino children aged 6-11. Most of the research that has been previously conducted on parental limit setting has either included non-Latino samples or has focused on

parental limit setting of behaviors other than screen time.^{16,17,45,46,53} Additionally, this study used the 2011-2012 NSCH data that are representative of children ages 0-17 nationally and from each state to provide a large diverse sample size.

5.7 LIMITATIONS

This study does not come without limitations. First, this data are cross-sectional, limiting the exploration of parental limit setting, generational status, and language use solely to associations. Longitudinal data is needed to assess causality of these relationships. Due to the fact that the measures were based on parent report, the limit setting and screen time variables do not assess actual observed behaviors of either parents or children. Specifically, for the parental limit setting variable, there was very little variation observed in the responses. Since this is survey data, there is also the potential for parents to overreport healthy behaviors (e.g. limit setting) and underreport unhealthy behaviors (e.g. screen time).⁶²

Acculturation is a very complex construct and measurement can be difficult. In this study, acculturation was assessed through proxy measures of generational status and language;⁴⁹ it is possible that other measures of acculturation could have elicited different relationships with key variables.⁴⁸ Proxy measures are limited in scope and sensitivity primarily because acculturation is not measured in terms of changing values, cultural norms, attitudes, behaviors and language preferences.⁴⁸ Acculturation instruments that highlight multidimensional and multidirectional views that measure these various dimensions could provide more context on the relationships explored in the study.^{31,63}

5.8 IMPLICATIONS FOR FUTURE RESEARCH

It is estimated that by the year 2020 almost 30 percent of all children in the United States will have one or more foreign-born parents.^{34,35} This demographic trend demands the need for future research focusing on improving immigrant health and behaviors particularly in the growing U.S. Latino population. Latino children are disproportionately affected by obesity and have been noted to engage in more screen time than their peers. Several studies, including the present study, have found that many Latino children do not meet the AAP screen time recommendations.^{6,15,37} With the overwhelming evidence of the negative side effects of excessive screen time,¹¹⁻¹⁴ researchers should pursue avenues to reduce this risky behavior in this specific subpopulation.

Additionally, this NSCH data was collected between 2011-2012 when 2001 AAP recommendations were relevant.³⁷ New AAP recommendations for children ages 6 and older are to “place consistent limits on the time spent using media, and the types of media, and make sure media does not take the place of adequate sleep, physical activity and other behaviors essential to health.”⁶⁴ With the increased availability of screen-based media, parental limit setting should have greater emphasis in reducing average daily screen time in children. Future interventions that target Latino children and their parents should take into account parental limit setting as a positive practice to adopt as it appears to play a role in reducing their child’s average daily screen time. Furthermore, the variable of parental limit setting should be explored more intricately. In this study, the variable was observed as an agree/disagree option but future research should be more specific and ask more questions regarding parental limit setting to get a better perspective of parent’s practices towards their child’s screen time.

5.9 CONCLUSION

In conclusion, on average the Latino children in this sample were engaging in high levels of screen time, despite many parents reporting they set limits. Parental limit setting mediated the association between language use and screen time in this sample of 6-11 year old Latino children. Although the mediation effect of parental limit setting contributed minimally to this association, parental limit setting had a significant effect on reducing child screen time by approximately an hour a day. The present results highlight the promising role of parental limit setting in reducing screen time in Latino children. Future research should further explore the protective role of parent limit setting in reducing excessive screen time in Latino children, and how this relationship may vary by generational status or language use.

APPENDIX A: NATIONAL SURVEY OF CHILDREN'S HEALTH 2011-2012

SECTION 1: INITIAL DEMOGRAPHICS

K1Q01: Is [SC] male or female?

- (1) MALE
- (2) FEMALE
- (3) DON'T KNOW
- (4) REFUSED

K1Q03: What is the primary language spoken in your home?

- (1) ENGLISH
- (10) RUSSIAN
- (11) TAGALOG
- (12) VIETNAMESE
- (13) ANY OTHER LANGUAGE
- (2) SPANISH
- (3) ARABIC
- (4) CHINESE

- (5) FRENCH
- (6) ITALIAN
- (7) JAPANESE
- (77) DON'T KNOW
- (8) KOREAN
- (9) POLISH
- (99) REFUSED

SECTION 7: MIDDLE CHILDHOOD AND ADOLSCENCE (6-17 YEARS)

K7Q60A: On an average weekday, about how much time does [SC] usually spend in front of a TV watching TV programs, videos, or playing video games?

- (1) DON'T OWN
- (2) DON'T KNOW
- (3) REFUSED

___ ___ ___ NUMBER OF HOURS/MINUTES

K7Q60B: On an average weekday, about how much time does [SC] usually spend with computers, cell phones, handheld video games, and other electronic devices, doing things other than schoolwork?

- (1) DON'T OWN
- (2) DON'T KNOW
- (3) REFUSED

___ ___ ___ NUMBER OF HOURS/MINUTES

K7Q62: Does [he/she] have a TV, computer, or access to electronic devices in [his/her] bedroom?

- (1) YES
- (2) NO
- (3) DON'T KNOW
- (4) REFUSED

SECTION 11: ADDITIONAL DEMOGRAPHICS

K11Q01: Is [SC] of Hispanic, Latino or Spanish origin?

- (1) YES
- (2) NO
- (3) DON'T KNOW
- (4) REFUSED

Hispanic or Latino includes Mexican, Mexican-American, Central American, South American or Puerto Rican, Cuban, or Other Spanish-Caribbean

K11Q20: What is the highest grade or year of school [you have / [SC]'s [MOTHER TYPE] has] completed?

- (1) 8th GRADE OR LESS
- (2) 9th-12th GRADE NO DIPLOMA

(3) HIGH SCHOOL GRADUATE OR GED COMPLETED

(4) COMPLETED A VOCATIONAL, TRADE, OR BUSINESS SCHOOL PROGRAM

(5) SOME COLLEGE CREDIT BUT NO DEGREE

(6) ASSOCIATE DEGREE (AA, AS)

(7) BACHELOR'S DEGREE (BA, BS, AB)

(8) MASTER'S DEGREE (MA, MS, MSW, MBA)

(9) DOCTORATE (PhD, EdD) or PROFESSIONAL DEGREE (MD, DDS, DVM, JD)

(96) DON'T KNOW

(97) REFUSED

K11Q30: [Were you / Was [SC]'s [MOTHER TYPE]] born in the United States?

(1) YES

(2) NO

(3) DON'T KNOW

(4) REFUSED

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