ABSTRACT

Title of Dissertation: INFLUENCE OF LATINX FATHERS' BEHAVIORS, COGNITIONS, AFFECT, AND FAMILY CONGRUENCE ON YOUTH ENERGY BALANCE-RELATED HEALTH OUTCOMES

Matthew Rene Rodriguez, Doctor of Philosophy, 2022

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For decades, researchers have studied and theorized about the ways fathers interact with children and other members of the family. While this research provides important evidence, few father involvement studies have included Latinx fathers. Numerous father involvement conceptual frameworks have helped us understand the ways fathers interact with their families. Much of this research has focused on fathers' behaviors, but research suggests other domains need more investigation, such as fathers' cognitions and affect. Understanding these additional domains of father involvement can provide important evidence for understanding the ways fathers influence the health of children. Fathers influence the health of their children within different cultural and socio-political contexts. When considering Latinx father involvement within a social determinants of health approach, research has encouraged focusing on upstream factors that can contribute to the health of Latinx families. Addressing these upstream factors can shape the health and wellbeing of children. Currently, Latinx youth suffer disproportionately from obesity compared to all other racial and ethnic groups in the U.S. Through investigating Latinx father involvement, I fill an important gap by researching the extent to which Latinx fathers' affect,

behaviors, and cognitions shape youth health outcomes. I also investigate theorized moderators that may influence the relationship between fathers' involvement and youth health outcomes. Using a cross sectional study design with a community-based sample of Latinx fathers and youth (ages 10-14) (n=193), I use latent moderation structural analyses to test the theorized causal mechanisms.

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by

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This dissertation is dedicated to my loving wife Malia.

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Table of Contents

List of Tables

List of Figures

CHAPTER I. INTRODUCTION

Statement of the Problem

Public Health Concern of Child Overweight and Obesity

Obesity is a critical public health issue in the United States and abroad. Healthy People 2030 has identified reducing child obesity as a top priority given the linkage to high blood pressure, high cholesterol, diabetes, asthma, anxiety, and depression (Healthy People 2030, 2021). Obesity can also lead to long-term adverse health consequences, such as diabetes and hypertension (Burke et al., 2008). Over the last 30 years, the worldwide prevalence of child obesity has increased greatly (Han et al., 2010). Prevention of overweight and obesity, as oppose to treatment, is universally understood as the optimal strategy for addressing the global prevalence of obesity (Han et al., 2010). When seeking to address child adiposity, prevention efforts can help parents in providing healthy food portions and opportunities for physical activity (Han et al., 2010). These preventive efforts can have long lasting effects on child development over time.

Helping address child adiposity early on can have long-term impact as children develop into adults over their life course. Child overweight or obesity can be associated with later increased risk of diabetes, hypertension, heart disease, stroke, and premature mortality (Reilly & Kelly, 2011). Child obesity can also be associated with comorbidities, such as metabolic risk factors, asthma, and dental health problems (Pulgarón, 2013). Overweight children can be more likely to experience lower self-esteem and experience psychosocial problems compared to their healthy-weight peers (Rankin et al.). Families of children with obesity, diabetes, and epilepsy can be at risk of having family difficulties and decline of children's health-related quality of life compared to families with children having asthma (Mendes et al., 2016).

Despite the health risks of child obesity, U.S. population trends do not provide encouraging news. From the period between 1976 to 1980 and 2003 to 2004, the U.S. prevalence of overweight children aged 6 to 11 has almost tripled and youth aged 12 to 19 years has more than tripled (Wang & Beydoun, 2007). Also, child and adolescent obesity in the U.S. has significantly increased from 2001 to 2016 (Ogden et al., 2018). Between 2013-2016, 17.8% of youth aged 2 to 19 in the U.S. were obese of whom 5.8% were severely obese (Ogden et al., 2018). Latinx youth aged 2-19 had higher percentages of obesity (21.9%) compared to all other racial and ethnic groups, such as Blacks (19.5%), Whites (14.7%), and Asian (8.6%) (Ogden et al., 2015).

To understand the disproportionate rates of Latinx child obesity, we need to consider macro- and micro-level contexts that may shape child health outcomes. For example, greater understanding of socio-political contexts can lead to identification of upstream factors that shape the health of Latinx families. Also, by accounting for Latinx cultural contexts, researchers can increase understanding of Latinx family values and priorities, which can influence youth health outcomes.

Understanding Latinx Cultural and Socio-Political Contexts

Latinx families are estimated to comprise 29% of the U.S. population by 2060 (U.S. Census Bureau, 2018). Latinx families, like all other families, live within certain cultural contexts. Understanding these contexts proves helpful when seeking to positively influence the health of Latinx children and their families. For example, Latinx families often emphasize *familismo* as a prioritization of the family above the individual members (Calzada et al., 2013). Fathers and mothers play a prominent role in facilitating relationships among the family members and ensuring their health and wellbeing. While research has focused on the role Latinx

mothers play in the health of children, researchers have called for more obesity studies to include fathers (Davison et al., 2016). In particular, Latinx fathers can shape the health and wellbeing trajectories of their youth.

But while fathers influence their children over the life course, Latinx families can face sociocultural contexts and upstream factors that influence their daily lives. Employment conditions, housing and neighborhood quality, food and social services accessibility, and legal documentation access can contribute to the health of Latinx families (Castañeda et al., 2015). Immigration itself can be viewed as a social determinant of health as immigration involves a complex process of negotiation with socio-political and economic factors (Castañeda et al., 2015). And while Latinx families navigate these sociopolitical contexts in the U.S., researchers can consider structural forces that influence father-child involvement. When assessing Latinx father involvement within a social determinants of health approach, research has encouraged focusing on the intersections of immigration and social determinants of health (Castañeda et al., 2015). Through understanding of cultural and socio-political context, father involvement researchers can examine exogenous factors that can shape family health outcomes.

More research is also needed to understand Latinx father involvement with *cultural sensitivity*. Despite stereotypical myths about Latinx fathers exhibiting "machismo" (i.e. excessively macho) (Saracho & Spodek, 2008), fathers' engaged in more physical play with children when mothers attained more than a high school education, if fathers were not married to their partner, and when fathers were younger (Cabrera et al., 2006). For example, Latinx fathers may motivate their children to be physically active, such as through dancing and snowboarding (Zhang et al., 2018).

While Latinx fathers play an important role in the wellbeing of their children, there is an opportunity to increase knowledge about Latinx father involvement with children (Campos, 2008). Latinx fathers are becoming more involved in their children's lives, such as caring for children while the mother of the child is working (Laughlin, 2013). Since obesity disproportionately impacts Latinx children (ages 2-19) at higher percentages in the U.S. than all other ethnic/racial groups (Ogden et al., 2015), Latinx fathers should be targeted for intervention given their prominent role within the family.

For example, one important role of Latinx fathers is that of a caretaker. In addition to spending time playing with children, Latinx fathers also perform household caretaking duties, such as supervision of children and more engagement in stereotypical "feminine" activities with children (i.e. shopping, reading, cooking, and indoor activities) (Coltrane et al., 2004). Latinx fathers have been found to be significantly more likely to perform housework when the family encountered economic stress (Coltrane et al., 2004). A national survey of U.S. households revealed 73% of Latinx fathers live with all of their children, 85% have children with only one partner, and 89% work full- or part-time (Karberg et al., 2017). Also, research has found that higher levels of Latinx family rituals were predictive of fathers having more monitoring of children compared to fathers having lower levels of family rituals (Coltrane et al., 2004).

Most Latinx fathers in the U.S. are immigrants (64%) (Karberg et al., 2017). Given that the majority of Latinx fathers in the U.S. are immigrants, researchers have an opportunity to better understand Latinx fathers from a variety of cultural experiences, such as immigration. Immigration can be an important aspect of the lived experiences of Latinx fathers and their families. Latinx immigrant parents have expectations for their children to respect others and be close to the family (Aldoney & Cabrera, 2016). Parents understand the importance of endorsing

cultural values from their country of origin as well as values from the United States, such as employment and educational opportunities (Aldoney & Cabrera, 2016). When comparing within-group differences between immigrants versus non-immigrants, 73% of Latinx immigrant fathers live at or below 200% of the federal poverty line compared to 27% of U.S.-born Latinx fathers (Karberg et al., 2017). Limited resources could prove challenging for Latinx families seeking to provide nutritious food for their children. While Latinx fathers navigate cultural differences between their country of origin and the United States, their youth also face cultural challenges.

Acculturation in the U.S. can be a risk factor for overweight-related behaviors among Latinx youth (Gordon-Larsen et al., 2003). First generation Mexican and Puerto Rican youth can consume more fruits per day compared to second generation youth and Mexican and Cuban youth can consume more vegetables per day compared to second generation Mexican and Cuban youth (Gordon-Larsen et al., 2003). Also, overweight prevalence may pose a greater concern among U.S.-born youth compared to foreign-born immigrants, except for Mexican youth who can have similar percentages of overweight across generations (Gordon-Larsen et al., 2003). Regarding physical activity, Mexican first generation youth had significantly lower TV and video viewing per week compared to Mexican second generation youth and Cuban first generation youth had significantly lower computer/video game usage compared to Cuban second generation youth (Gordon-Larsen et al., 2003). These findings suggest that navigating cultures between one's country of origin and the U.S. can prove challenging for youth in the context of energy balance-related behaviors (EBRBs). See Table 1 for a definition of EBRB and other terms.

Given the disproportionately high rates of Latinx child obesity in the U.S., researchers have an opportunity to understand factors that contribute to this public health problem. Research

has looked at upstream social determinants of health, such as poverty, immigration, and stereotypes. Also, Latinx father involvement plays a prominent role in shaping the health of children.

In light of prior Latinx family science research, however, more research is looking at the specific ways fathers contribute to the health of children (Zhang et al., 2021). Evidence shows that fathers participating in fatherhood programs self-report increased nurturing and engagement behaviors with children (Avellar et al., 2018). Because of the different ways fathers influence children, researchers have provided numerous conceptual frameworks to explain father involvement.

Father Involvement and Youth Health Outcomes

Fathers prove to be critical contributors to the health and wellbeing of children. While researchers have examined the ways fathers engage their youth (Lamb et al., 1987; Palkovitz, 1997; Pleck, 1996), many have focused on direct care activities and affection in comparison to fathers' indirect interactions, such as cognitions (Diniz et al., 2021). Lamb conceptualizes *degrees* of father involvement as including three components: 1) interaction, 2) availability, and 3) responsibility (Lamb et al., 1987). Lamb's description of interaction involves fathers' direct contact with his youth, availability refers to fathers' presence or accessibility, and responsibility refers to fathers' role in planning for his youth's wellbeing (Lamb et al., 1987). Pleck describes father involvement as including three *levels*: 1) engagement, 2) availability, and 3) responsibility (Pleck, 1996). Many father-involvement studies have focused on father's engagement (Cabrera et al., 2017), availability (Gold et al., 2020), and responsibility (Mincy & Sorensen, 1998; Shafer et al., 2020).

While these father involvement conceptualizations have proved helpful to researchers over the years, the U.S. government has utilized this research when establishing national responsible fatherhood initiatives. Father involvement has also been explained in terms of *responsibility* (Doherty et al., 1998). The concept of responsibility has provided evidence to guide the father involvement community-based programs. In 2005, the U.S. federal government enacted the Deficit Reduction Act, which provides funding to support numerous Responsible Fatherhood programs nationwide (Rodriguez & Hurtado, 2022). Responsible fatherhood programs in large urban areas can help fathers with providing emotional support (Anderson et al., 2002). In these programs, fathers can experience love and support along with help and advice (Anderson et al., 2002). Much Responsible Fatherhood programming has focused on fathers' employment and economic stability.

Researchers have also looked at father involvement in terms of providing *resources* to the family. While many fathers fulfill a "good provider" role (Bernard, 1981), fathers' play more than just a "provide and reside" role in the lives of their children (Roy & Cabrera, 2010). Understanding the multi-dimensional domains of father involvement beyond just earning income becomes especially important for lower-income fathers struggling with food security but wanting to contribute to the health and wellbeing of their children.

Some fathers move in and out of poverty and sometimes the public can stereotype fathers' involvement. The U.S. public has struggled to understand the complexity of men's roles, and how their roles change over time in their children's lives. Some have called irresponsible fathers "deadbeats" for not fulfilling their role of providing resources to their families (Mincy & Sorensen, 1998). But stereotypes of fathers fail to account for structural upstream factors that may inhibit fathers' involvement. For example, fathers' low-income barriers of providing

resources to the family system can exacerbate the public's understanding of the myriad of ways fathers contribute to child health outcomes. Some child welfare agencies have tried to squeeze money out of these "turnip" fathers, but with limited success (Mincy & Sorensen, 1998). Father involvement transcends the mere provision of resources to children and their families and can include other mechanisms of influence.

Fathers qualitatively influence their families in numerous ways, that sometimes go unnoticed. Recent developments in fathering research have moved beyond quantifying engagement to investigating quality of engagement. Palkovitz describes father involvement as including three *domains*: 1) cognitive, 2) affective, and 3) behavioral (Palkovitz, 1997, 2019). Examples of the cognitive domain include fathers' planning, praying, and hoping for the child's wellbeing. The affective domain can include fathers' loving, smiling, hugging, and friendship with his child. The behavioral domain can include role modeling, teaching responsibility, and encouraging hobbies, such as playing soccer or ballet. Palkovitz's conceptualization of father involvement domains helps move the conversation toward quality of father-child engagement as oppose to quantifying the amount of dollars or hours fathers contribute to the family over time.

Another underexplored dimension is the bidirectional influence of father involvement and child development. While much research has investigated fathers' direct effects on children, Palkovitz's recent article reminds us that children also reciprocally influence fathers (Palkovitz, 2019). Domains of child-father involvement can include affect, behaviors, and cognitions. As children interact with their fathers, children can influence their fathers' behaviors, such as fathers' food consumption behaviors or shopping patterns. In this child-father subsystem, children can exert their own will and act as agents of influence on their fathers.

Father-child involvement also occurs in the context of the *coparenting* subsystem. Coparenting encompasses the ways that parents or parental figures interact with each other in the context of caretaking of children (Feinberg, 2003). Coparents' beliefs, values, and expectations are shaped by the dominant culture and also ethnic cultural norms (Feinberg, 2003). A fathers' coparenting relationship is the center of where family processes evolve (Weissman & Cohen, 1985) and may be an important moderator of family stress and supports for members of the family system (Feinberg, 2003). Father involvement is thereby a complex process that interacts with multiple members of the family system, including children and coparents.

Marsiglio and Roy describe fathering as a social arrangement that includes the interactions of fathers with four types of partnerships: 1) coparents, 2) family and extended kin, 3) friends and coworkers, and 4) youth workers (Marsiglio & Roy, 2012). In their conceptual model, fathers receive (and extend) social capital from these four partnerships, which helps them with fathering. Further, they explain that how fathers' actions can reciprocally influence the affect, behaviors, and cognitions of others within their networks. They define fatherhood in terms of *nurturance* as oppose to a legal or biological status, which they borrow from Nancy Dowd (Dowd, 2000). As a nurturer, fathers care for the emotional wellbeing of their children—not just the financial wellbeing (Dowd, 2011). Through conceptualizing fathering as a social arrangement comprising of the nurturance of children, researchers can appreciate additional domains of involvement including affection for children.

Father involvement can also include providing *warmth* to children. In addition to providing resources, fathers also provide love to their children (Roy, 2004). Fathers recognize the important role that affection plays in the nurturance of children. Because fathers provide

affection to their children, which some may argue is more important than cash, researchers can re-conceptualize father involvement in terms of their role as "provider" of love and warmth.

Prior research has also called for renewed efforts to investigate the underexplored domains in family science that are often overlooked in daily life, such as: 1) the domains of *beliefs and emotions*, 2) the behaviors of *consumption*, and 3) the spheres of time and space (Daly, 2003). These underexplored areas in family science intersect within a variety of cultural contexts as well (Cabrera et al., 2014). In addition to these domains, we might further consider health behaviors in families with particular focus on how father involvement behaviors can shape children's health and well-being.

Grounding Father Involvement in EBRBs

Despite the wealth of literature outlining the ways fathers directly and indirectly engage their children, failure to include fathers in pediatric obesity studies is cause for concern given the current child obesogenic problem in the United States. When asked why fathers have not been included in pediatric research, 80% of fathers reported they had not been invited to participate (Davison et al., 2017). In particular, few studies have looked at the specific ways fathers uniquely influence their child's energy balance-related behaviors (EBRBs) (Davison et al., 2016; Morgan et al., 2017).

When addressing youth overweight and obesity, researchers have an opportunity to increase understanding of fathers' cognitions (i.e. expectations), affect (i.e. emotions), behaviors of consumption (i.e. role modeling) and the ways these domains of involvement contribute to children's energy balance-related behaviors. By grounding father involvement research in the context of dietary intake and physical activity, community-based initiatives can provide more precision with how Latinx fathers influence child health outcomes within the family system.

While researchers understand the need for more obesity prevention studies among minoritized communities, barriers of recruiting Latinx fathers and their families can prove challenging. One qualitative study of a tobacco and other substance cessation program called Padres Informados, Jóvenes Preparados (Informed Parents, Healthy Youth) discovered barriers of program engagement: 1) lack of time due to difficult socioeconomic conditions, 2) lack of reliable transportation, 3) unfamiliarity with parental programs, 4) cultural gender role beliefs about mothers being the primary caretakers of children, and 5) cultural dislike of being told how to father their children (Garcia-Huidobro et al., 2016). Despite these barriers of program attendance, there were important facilitators of program engagement: 1) motivation to become better parents, 2) a desire to communicate better with their child, 3) parents' desire to support their child's education, 4) having a fun program experience through sharing with others, 5) practicing skills with their youth, and 6) facilitators that were warm and had effective communication skills (Garcia-Huidobro et al., 2016). While some research has included Latinx fathers, there are potentially unique ways Latinx fathers shape their children's fruit and vegetable intake and moderate-to-vigorous physical activity.

One program called Padres Preparados, Jóvenes Saludables (Prepared Parents, Healthy Youth), addressed this need for more culturally informed Latinx father involvement research. The Padres parenting skills and youth obesity prevention program originated from feedback gained from the Latinx community in the Saint Paul Minnesota region through a father advisory group (Zhang et al., 2018). With time, the team of community agencies and researchers co-developed a family skills and youth obesity prevention program that included both Latinx fathers and their adolescent children (aged 10-14) in an interactive session format that met consecutively for 8 weeks (Zhang et al., 2019). The program sessions included topics covering parenting

habits, navigating cultures, healthy eating, reducing sedentary behaviors, healthy drinks, conflict management, physical activity, and family connection (Zhang et al., 2019).

The Padres program collected data from Latinx fathers (*n*=193) and their families about energy balance-related behaviors, such as fruit and vegetable intake and moderate-to-vigorous physical activity. By collecting multiple perspectives from fathers, mothers, and adolescents, the data triangulated observations from multiple vantage points within the family system. Given the lack of research focusing on Latinx families, this Padres data offers critical information that we can leverage to test Palkovitz's domains of father involvement within the context of Latinx fathers and their children.

Purpose of Study and Research Questions

The purpose of the present study is to understand the ways that Latinx fathers' affect, behaviors, and cognitions shape youth health outcomes. Toward this objective, I ground father involvement in the context of Latinx youth fruit and vegetable intake and moderate-to-vigorous physical activity. The Latinx participants in this study participated in the Padres Preparados, Jóvenes Saludables program. By investigating the relation between Latinx father involvement and youth EBRBs, I provide critical evidence for researchers, health care practitioners, and policy makers seeking to understand the domains of Latinx father involvement and their influence on youth health outcomes. While recognizing that Latinx fathers influence their child in many positive ways, I provide important insight to help researchers and practitioners understand the unique pathways that fathers influence their youth's fruit and vegetable intake and moderate-to-vigorous physical activity. Given the problem of Latinx youth adiposity in the U.S., this study provides timely public health evidence for those seeking to reduce health disparities among Latinx children.

The primary overarching research question for this study, therefore, is to understand: To what extent is fathers' healthy parenting involvement related to youth energy-balance related behaviors? This overarching research question has two specific components: 1) To what extent is fathers' EBRB role modeling related to youth EBRBs? and 2) To what extent is fathers' EBRB expectation for their youth's EBRBs related to youth EBRBs? The study's secondary research questions seek to understand: To what extent does fathers' warmth, coparenting EBRB congruence, and father-child EBRB congruence moderate the associations between fathers' EBRB role modeling/expectations and youth fruit/vegetable intake and moderate-to-vigorous physical activity?

Table 1. *Definition of Terms*

Terms	**Definition**
Energy balance-related behaviors	The balance of energy (Hill et al., 2012) through fruit and vegetable intake (Mytton et al., 2014) and expenditure of energy via physical activity (Perdew et al., 2020).
Healthy expectation	The belief that eating fruits and vegetables and participating in moderate-to-vigorous physical activity can provide health benefits (Yordy & Lent, 1993).
Warmth	The internal feeling of love, affection, and intimacy that manifests in external responses, such as showing interest, acceptance, concern, and comfort to their youth (Barrett & Bliss-Moreau, 2009; Rohner, 1998; Rohner & Britner, 2002).
Father-child EBRB congruence	The perceived agreement between fathers and their children regarding youth fruit and vegetable intake and physical activity behaviors.
Coparenting EBRB congruence	The perceived agreement between fathers and their partners regarding youth fruit and vegetable intake and physical activity behaviors.
Father involvement	The warmth (Rohner & Britner, 2002), intimacy, and concern fathers have for their child coupled with external representation of actions (Bandura, 1986b) and internal self-reflective thinking (Pajares, 1996) about healthy dietary intake and physical activity (See also Palkovitz, 1997).

Review of Literature

Foundations of Father Involvement

Like mothers, fathers can play a prominent role in the wellbeing of children across the life course. Fathers contribute to the procreation of children, which Lamb argues is "one of the most basic elements of fatherhood" (Lamb et al., 1987). Fathers' engagement with children has been found to be protective against low birth weight (Lee et al., 2018), predict child educational attainment (Fagan & Iglesias, 1999; Flouri & Buchanan, 2004), be associated with child happiness, life satisfaction, and lower distress (Amato, 1994), be protective against child aggression (Flanders et al., 2009), and be associated with youths' psychological adjustment (Veneziano, 2000). As mentioned previously, father involvement has been described in terms of engagement, responsibility, and accessibility (Pleck, 1996). While the ways fathers interact with children can be conceptualized quantitatively, current research is looking at how fathers *qualitatively* influence their children through nurturance and other domains of involvement.

Children need environments that are predictable, nurturing, have boundaries, have economic security, and exhibit cooperation between mothers and fathers (Doherty et al., 1996). Furstenberg describes the concept of "doing for your children" as the process where fathers decide to engage their paternal responsibilities by providing for the needs of their child (Furstenberg, 1992). One important component of "doing for your children," is the concept of generativity whereby fathers nurture and guide their children (Marsiglio, 1995). Sometimes fathers find "second chances" by improving themselves by guarding against past mistakes so they can better nurture and care for their children and grandchildren (Roy & Lucas, 2006). In other contexts, mothers gatekeep their children against fathers who are perceived to be an

unhealthy or unproductive influence on themselves or their children (Fagan & Cherson, 2017; Roy & Dyson, 2005; Schoppe-Sullivan et al., 2008). In contexts involving nurturance, fathers can also provide warm relationships with their children.

Fathers can influence their children through having warm and affectionate relationships. Having a combination of warmth, monitoring, and involvement, while allowing child autonomy are characteristics of authoritative parenting style (Baumrind, 1966). Authoritative parents are also not overly restrictive and hostile (Baumrind, 1966). Baumrind asserts that parental warmth tends to covary differently with parental directiveness or restrictiveness for girls and boys (Baumrind, 1966). Researchers have also proposed parenting style is best conceptualized as a moderator of parental influences on child development (Darling & Steinberg, 1993). The reason is that parenting style is understood as a *context* where parenting practices occur, as oppose to parenting style being a parenting practice itself. Bronfenbrenner suggests that in family contexts not involving extreme rejection and neglect, parental affection and authority have different effects on developing responsibility in sons and daughters whereby a lack of warmth and discipline can impair dependability and an overdose of warmth or discipline has deleterious effects for girls (Bronfenbrenner, 1961). Birch found that providing food without contingency paired with adult attention (i.e. affect) resulted in significant increases in food preference among youth, which produced effects that lasted for at least 6 weeks after the presentation of food (Birch et al., 1980).

Parental warmth has also been described as having different dimensions, such as affection, support, care, nurturance, concern, and love (Rohner & Britner, 2002). Child Trends developed a measure of parental warmth, which included questions about physical affection, loving, spending time, playing and joking, talking, and appreciating the child (Hofferth, 2003).

When youth reported a warm relationship with their father, parental monitoring predicted lower trouble in school, which had greater effects for boys compared to girls (Lowe & Dotterer, 2013). Paternal permissive parenting style can also play a protective role for daughters' intake of higher fruits and vegetables but not for authoritative parenting style, which may indicate that fathers' warmth and caring may be a key variable (Berge, Wall, Loth, et al., 2010).

Fathers can be involved in meaningful ways even when not co-residing with their children. Nonresident fathers' can also play an important role in a child's life through establishing feelings of closeness, which has been found to be positively associated with child well-being (Amato & Gilbreth, 1999). Even fathers who have been separated from their children have opportunities to re-engage with their children (Roy & Lucas, 2006). In cases of family separation due to seasonal migratory work patterns, deportation, or other contexts, fathers can still engage their youth and maintain emotional ties (Dreby, 2010).

Expanding Foundations of Father Involvement

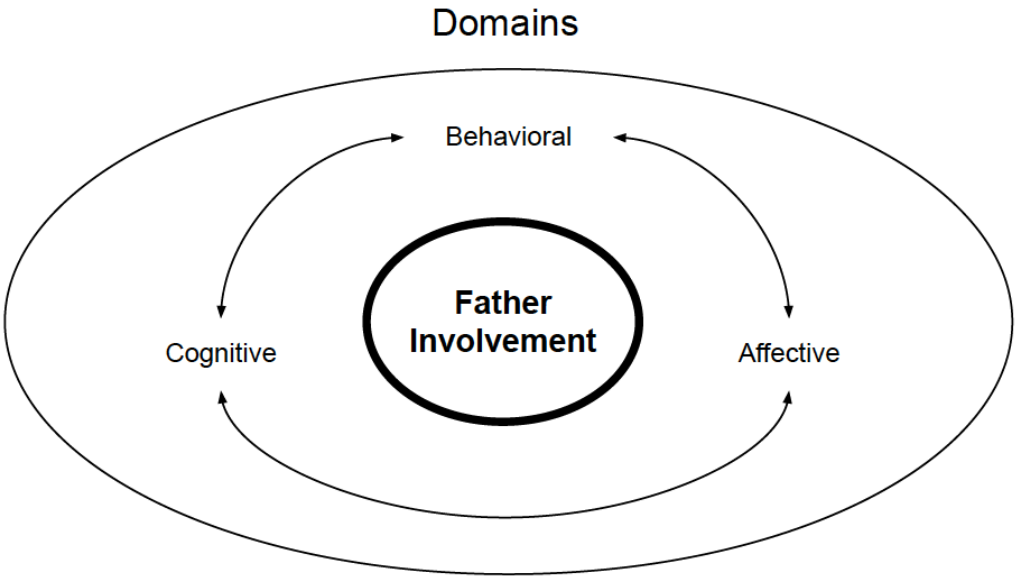
While it has been established that mothers are critical to the wellbeing of children (Kotch, 2013), fathers have direct and indirect effects on child development (Cabrera et al., 2018; Lamb, 1997). U.S. society has traditionally expected fathers to fulfill their "breadwinning" role by providing for the financial security of children. Researchers, however, recognize fathers do much more to shape the healthy development of their children (Bernard, 1981).

While researchers have discovered much about father involvement over the years, foundational research often focused exclusively on fathers' behaviors. More recent studies have expanded how father involvement can be conceptualized across multiple new domains. Palkovitz reminds researchers that fathers do much more than putting bread on the table—fathers engage children with their affect, behaviors, and cognition (Palkovitz, 1997). For example, low-income

noncustodial fathers in Chicago and incarcerated fathers in Indiana emphasized the importance of nurturing their children (Roy, 2004).

Palkovitz's research includes affect, behaviors, and cognitions (Palkovitz, 1997). For example, father involvement can describe the ways fathers use their emotions, thinking, and behaviors to connect with their child (Palkovitz, 1997, 2019). Palkovitz's conceptual model of father involvement has been found to be theoretically functional and statistically acceptable (Toth & Xu, 1999). See Figure 1.

Figure 1. *Domains of Father Involvement*



While Palkovitz's conceptual expansion of father involvement helps researchers differentiate between different domains of engagement, the model is limited in illustrating how members of the family relate to one another. One theoretical framework that explains the interconnections between family members is family systems theory. Family systems theory provides important concepts that help researchers frame the interactions between fathers,

mothers, and their children. First, families are comprised of individual members who are also part of subsystems. For example, fathers and children comprise one subsystem that are interconnected through regular engagement. Another subsystem is the coparenting subsystem where parents engage each other. All components within a family system including individual members and subsystems are interrelated (White & Klein, 2015). For example, when fathers make changes in how they engage their child within the father-child subsystem, the changes can influence other members in the subsystem—the child. Or when the coparenting subsystem modifies how each coparent interrelates, these modifications in the coparenting subsystem can influence the father-child subsystem. Family systems theory assumes that a change in one family member or subsystem can influence other components in the family system (Baptist, 2022).

While family systems theory helps researchers understand the interconnections between family members, the theory is limited in understanding contextual factors that can shape family processes. However, we can better understand how individual fathers function within a family system if we carefully consider the cultural and sociopolitical contexts in which families live. In particular, for a study of father involvement and children's health, diverse cultural contexts shape these interactions.

Latinx Fathering Within Socio-Political and Cultural Contexts

Latinx fathers function within cultural and socio-political contexts, which help researchers understand exogenous factors that can shape father involvement. While Latinx families share many cultural similarities, they are also very diverse. Regarding similarities, a report using nationally representative data of Latinx fathers in the U.S. found that the majority of fathers live with their partner and all of their children (Karberg et al., 2017). Specifically, 82% of Latinx fathers are married or cohabitating and 73% live with all of their children (Karberg et al.,

2017). Also, Latinx fathers have on average 2.3 children and 64% are immigrants (Karberg et al., 2017). These national findings can suggest that Latinx fathers in the U.S. appear to be providers of resources to their families through participation in the labor force and appear to value living together with their family. Despite similarities, Latinx families have great cultural heterogeneity. For example, Latinx families can trace their lineages from the Americas, Africa, and Europe (Gallegos & Ferdman, 2007). In the U.S., Latinx families come from 40 countries spanning from the southern U.S. border to the Tierra del Fuego region in Argentina (Perez & Luquis, 2012). Each geographic region can provide variety in Latinx families' cultural experiences, such as recreational activities and food preferences.

Latinx fathers shape their children's health (O'Connor et al., 2020). Latinx families have also been shown to support warm parenting practices by talking to their children with lots of affection (Delgado-Gaitan, 1994). Latinx fathers are engaged with their children's healthy development, such as showing more interaction and involvement (Toth & Xu, 1999), child rearing responsibility (Hofferth, 2003), and caregiving for toddlers compared to White fathers (Cabrera & Bradley, 2012). This understanding differs from the stereotypical "machismo" (i.e. patriarchy and male chauvinism) deficit-based perspectives of Latinx fathers (Saracho & Spodek, 2008). Latinx fathers are less controlling of their children, have stronger beliefs in partner gender equity (Hofferth, 2003), and are more likely to monitor and interact with their children compared to Whites (Toth & Xu, 1999). Cultural values can shape Latinx father involvement with their children (Cabrera & Bradley, 2012).

Latinx fathers' warmth to be positively associated with youth fruit and vegetable intake and physical activity (Zhang et al., 2021). While Latinx immigrant fathers may have less warmth compared to U.S.-born Latinx fathers (Guendelman et al., 2018), Latinx father and mother

parental warmth can reduce adolescent alcohol use and have positive effects on the parent-child relationship (Mogro-Wilson, 2008). Mexican American fathers' warmth can have moderation effects for middle-school daughters, but not sons, regarding greater optimism about the future and moderation effects for sons, but not daughters, regarding language arts self-efficacy (Suizzo et al., 2017). Authoritative fathers can influence youth academic GPA and youth can achieve better grades when parented by permissive fathers compared to authoritarian fathers (Kim & Rohner, 2002). While fathers seek to engage their children in warm and affectionate relationships, they do so while managing often demanding work schedules.

While father involvement can prove important to the wellbeing of children, researchers have observed that the role of fathers can be ambiguous in Western cultures (Cabrera et al., 2007). In Latinx cultures, fathers play a central role in the immediate and extended family system (Villarruel, 1998). Latinx fathers are integral in promoting "*familismo*," which is an important Latinx cultural value that prioritizes the family over the individual (Calzada et al., 2013). The concept of *familismo* has been researched extensively and offers the perspective that Latinx fathers have a strong sense of loyalty to one another and beliefs in caretaking the family (Calzada et al., 2013). Fathers' attitudinal *familismo* places value on family support, interconnectedness, honor, and subjugation of self for the family (Steidel & Contreras, 2003) and behavioral familismo places value on family help with raising children (Calzada et al., 2013). *Familismo* may be a cultural value that can also buffer against structural determinants of health, such as food insecurity.

Latinx fathers can sometimes face insurmountable inequities, such as food insecurity. Mexican-heritage fathers near the Texas-Mexico border reported feeling monetary responsibilities to their families (McClendon et al., 2021). This finding proves important when

considering challenges, such as food insecurity, which low-income families may navigate while seeking to attain adequate resources for survival. Access to expensive fresh fruits and vegetables along with exercise equipment and expensive youth sports camps can prove challenging for low-income Latinx families facing resource insecurity barriers. Policies that impose further financial barriers on immigrant communities, such as Public Charge, could further endanger Latinx immigrant families ability to access healthy nutrition (Parrott et al., 2018). In addition, social inequities can challenge Latinx fathers' and children's biological systems to respond to these demands, which may result in obesity (McEwen, 2004; Sanders-Phillips et al., 2009). Given the complexities of U.S. social interactions, Latinx fathers and their families can face a myriad of challenges in maintaining a healthy family system for child development, such as underemployment and access to economic resources.

Many fathers provide financial resources to their biological and nonbiological children through participation in the labor force. According to the U.S. Bureau of Labor Statistics, in 2017, 92.8 % of all fathers with children below age 18 worked (U.S. Bureau of Labor Statistics, 2018). A report using nationally representative data of Latinx fathers in the U.S. found that 89% worked full-time or part-time in the last week (Karberg et al., 2017). Cabrera's expanded model of fathers' behavior and influence on children illustrates that workplace rules may influence the parent-child subsystem (Cabrera et al., 2014). As fathers spend more time away from the family through demanding work schedules, fathers may find spending time connecting with their children challenging.

The U.S. Census Bureau reports that from 2007-2011, Latinos had the third highest rate of poverty compared to all other racial groups (Macartney et al., 2013). Bajaras-Gonzales and colleagues (2014) found that for a large proportion of Mexican American families, lower

income-to-needs ratio was related to greater family conflict, which can then lead to harsher parenting (Barajas-Gonzalez & Brooks-Gunn, 2014). As underemployed families struggle to provide resources for their families, they can face additional challenges such as increased greater family conflict, which can then lead to harsher parenting within the parent-child subsystem.

Some Latinx families can also face challenges with educational attainment. One ethnographic study conducted in the 1990s provides insights that may be relevant for understanding Latinx families in today's modern context. The study found that in La Barriada, a primarily Puerto Rican neighborhood in Brooklyn, young fathers were more likely to stay in school for shorter durations so they could enter the workforce (Sullivan, 1993). These young fathers found it more difficult to use education as a means of obtaining a better job that other men from a primarily African American low-income neighborhood in New York City were able to find (Sullivan, 1993). Latinx immigrant fathers can struggle with lower educational attainment and higher poverty compared to U.S.-born Latinx fathers (Guendelman et al., 2018). Children with engaged fathers achieved better academically and were more likely to get A's and enjoy school (Allen & Daly, 2007).

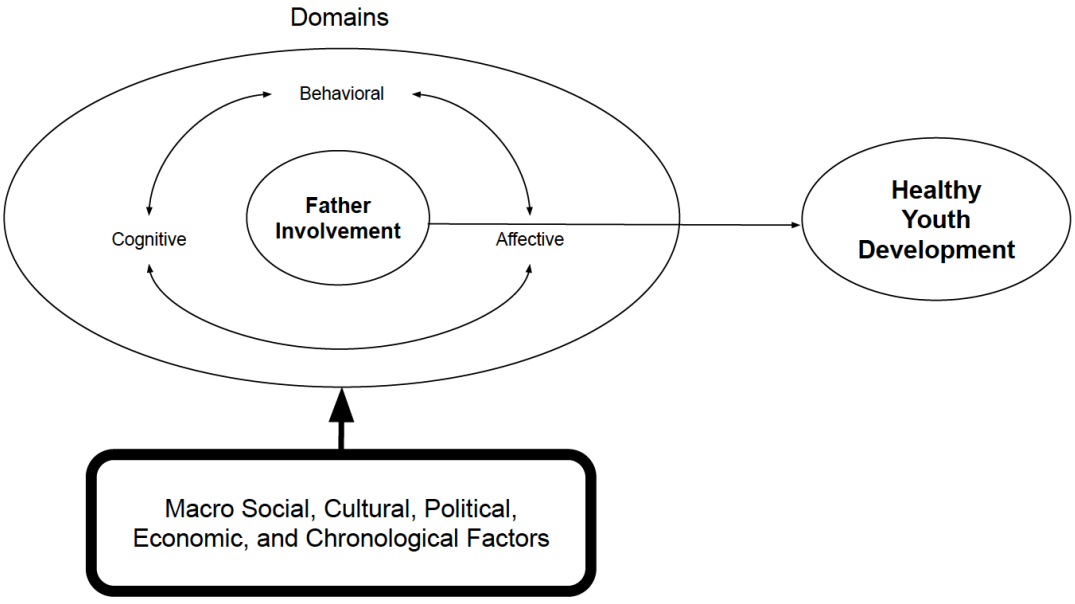
While demanding schedules can influence father involvement, residential contexts can also shape how fathers influence their children. Given that Latinx fathers and their families come from diverse backgrounds and experiences, fathers can coparent their children despite sometimes living apart from the family system due to migratory work schedules or even deportation. Transnational Latinx fathers can maintain connection with their families through negotiation of illegality, providing resources, maintaining transnational family networks, and communicating via technology (Roy & Yumiseva, 2021). Transnational fathering runs counter to the

stereotypical standard north American family where the father co-resides with the mother and children in the same household (Smith, 1993).

Building upon her previous model, Cabrera's expanded model captures some of the sociopolitical and economic contexts, such as immigration and non-residence, from which fathers are situated (Cabrera et al., 2014). Cabrera has written extensively in the area of Latinx fathers and has provided a heuristic model illustrating the reciprocal nature of father-child involvement (Cabrera et al., 2014). Also included are the different types of family relationships, such as the coparenting subsystem.

As fathers engage their children with healthy behaviors, affect, and cognition, socio-political, cultural, economic, and chronological factors can inhibit or facilitate optimal conditions for men to interact with their children. As access to resources becomes available, fathers can provide healthy fruit and vegetables for their children to consume along with opportunities for physical activity. See Figure 2.

Figure 2. *Influence of Father Involvement on Youth Development*



Cabrera's work has also emphasized the positive effects fathers have on their children, such as through playing with their children (Cabrera et al., 2017). Others have also looked at the importance of fathers' role in playing with their children as an important part of their generativity (Dienhart & Daly, 1997). Lamb has argued that fathers do more than caretake because they also create pleasure-filled activities and are the "primary medium through which the child is introduced to the world" (Lamb, 1975). In a subsequent article, Lamb explains that fathers tend to engage in playful and stimulating interactions while mothers tend to interact in more conventional playtime and also are the primary caretakers (Lamb, 1981). One study found that infants of fathers who had a high amount of interaction, play, and caregiving activities were more cognitively competent at 6 months and scored higher on the Bayley Scales of Infant Development and by age three, children had higher IQ's (Allen & Daly, 2007). Helping children remain physically active has public health implications for prevention of child obesity and overweight.

Latinx fathers can contribute to healthy EBRBs. First-generation Latinx U.S. residents may eat more fruit and vegetables than later generations, which may suggest food acculturation effects (Batis et al., 2011; Gordon-Larsen et al., 2003). Fruit and vegetable availability at home may be associated with child fruit, juice, and vegetable intake (Cullen et al., 2001). A randomized controlled trial called Activo, sought to increase moderate-to-vigorous physical activity among Latinx men in 2015-2017 and discovered the intervention proved efficacious in increasing moderate-to-vigorous physical activity over a 6-month period (Larsen et al., 2020). In this study, the intervention group received baseline counseling along with printed materials and text messages over six months and the control group received printed materials and text messages over six months (Larsen et al., 2020). Findings from this study suggest that

technology-supported interventions show potential for addressing Latinx men's moderate-to-vigorous physical activity needs (Larsen et al., 2020).

Through supporting the needs of Latinx fathers, researchers have the opportunity to indirectly influence child obesogenic health outcomes. To address pediatric obesity, targeting fathers allows researchers to influence their engagement, sense of responsibility, and accessibility toward their children. By targeting multiple domains of fathers' involvement, interventions have greater capacity to influence the multi-dimensional interactions that fathers have with their child within the family system. Given that family systems operate within macro-system environments, such as communities and municipalities, Cabrera's heuristic model helps researchers account for exogenous factors, such as social determinants of health, that may influence minoritized populations, such as Latinx families. Through framing pediatric obesity prevention within the context of father-child involvement and family systems theory, researchers have the potential to uncover hidden causal pathways that influence child obesity and overweight.

Public Health Concern Over Child Obesity and Overweight

Child obesity and overweight is a public health issue. According to the World Health Organization, overweight and obesity are defined as "abnormal or excessive fat accumulation that presents a risk to health" (World Health Organization, 2020). As mentioned previously, Latinx youth aged 2-19 had a higher prevalence of obesity (21.9%) compared to all other racial and ethnic groups, such as Blacks (19.5%), Whites (14.7%), and Asian (8.6%) (Ogden et al., 2015). When looking at Latinx within group differences, among youth aged 2-19, males had a higher prevalence of obesity (18.1%) compared to females (17.5%) (Ogden et al., 2018). When comparing the prevalence of obesity among younger children aged 2-5 (11.6%), youth aged 6-11

had statistically significant higher obesity (17.9%), $p < .001$ (Ogden et al., 2018). When looking at the prevalence of severe obesity, children aged 6-11 had statistically significantly higher rates (4.8%) compared to children aged 2-5 (1.8%), $p < .001$ (Ogden et al., 2018).

The U.S. Centers for Disease Control and Prevention outline growth charts based on population-level BMI estimations to describe thresholds for child weight status categories (Centers for Disease Control and Prevention, 2022). Healthy weight includes child BMIs between the 5th to 85th percentiles. When defining child overweight and obesity, a common approach includes calculating BMI ≥ 85th percentile (Han et al., 2010). Children with a BMI ≥ 85th percentile are overweight and ≥ 95th percentile are obese (Centers for Disease Control and Prevention, 2022). While body mass intake can help researchers understand whether a child is at risk of overweight or obesity, energy balance can help with understanding *why*.

Energy Balance, Child Overweight, and Obesity

Energy balance involves two specific behaviors: 1) the intake of energy, such as carbohydrates, proteins, fats, and alcohol (Hill et al., 2012), and 2) the expenditure of energy through physical activity (Kremers et al., 2005). Weight gain occurs when the body consumes more energy than is expended through: 1) physical activity, 2) resting metabolic rate (60-70%), and processing of consumed energy (10-15%) (Kremers et al., 2005). Energy storage (e.g. adiposity) increases only when consumption of food exceeds expenditure of energy (Hill et al., 2004). A person's total daily energy expenditure (TEE) occurs through resting energy expenditure (REE), diet-induced energy expenditure (DEE) and activity-induced energy expenditure (AEE) (Van Baak, 1999). REE occurs as the body performs normal functions. DEE happens when the body absorbs food and changes the food into energy for storage. AEE happens when the body performs voluntary and involuntary physical activities. Between 70-85% of TEE

occurs through REE and DEE and the rest of the energy expends through AEE during a 24-hour period (Van Baak, 1999). Accumulation of energy occurs within environmental contexts.

Researchers have identified six environmental factors that influence positive energy balance: 1) intake of high-fat, energy-dense foods, 2) intake of low-cost easily available fast foods, 3) large portion sizes, 4) decline of work-related physical activity, 5) decline of daily living activity, and 6) sedentary behaviors (Hill et al., 2000; Kremers et al., 2005). Positive weight gain results from the interaction of these numerous behaviors (Hill et al., 2000; Kremers et al., 2005). The human body shows stronger opposition to losing rather than gaining weight (Hill et al., 2012). Excessive weight gain prevention efforts are more likely to succeed compared to treatments for obesity (Hill et al., 2012). Thus, targeting energy balance in youth is a public health preventive approach that has the potential to show greater promise than efforts to lower overweight and obesity among adults. Efforts to prevent or reduce overweight and obesity should consider the complexity of these interactions when designing their programs.

When studying EBRBs, researchers may also distinguish between four elements of behavior: 1) single actions, 2) targets, 3) context, and 4) time (Fishbein & Ajzen, 2010; Kremers et al., 2005). Single acts are observed behaviors, such as eating a banana at the dinner table on Friday. Eating is the action and the banana is the target. The context is the dinner table, which is where the eating occurred. Friday is the time point at which the action occurred. Researchers are concerned mostly about behavioral categories, however, as opposed to single actions. Behavioral categories, such as fruit intake, can include different variations of single actions, such as intake of bananas, apples, and oranges. Outcomes, such as reducing obesity, should be conceptualized as a result from behavioral categories (Kremers et al., 2005), such as low physical activity and low intake of fruits and vegetables. As researchers seek to address child overweight and obesity,

they measure single actions as a way to understand behavioral categories, which are theorized to predict EBRB health outcomes. It's important to note that behaviors are not the only factors related to the balance of energy. Genetic susceptibility to overweight or obesity is also a key factor when considering how to address child adiposity (Rennie et al., 2005). Genetic metabolic pathways may explain susceptibility to excessive weight gain (Rennie et al., 2005). In addition to genetics, intake of fruits and vegetables have been targets of investigation.

Fruit and Vegetable Intake, Energy Density, and Adiposity

Intake of fruits and vegetable along with reducing energy dense food intake can contribute to healthy child development. Dietary guidelines typically include food recommendations that include fruits, vegetables, whole grains, lower-fat dairy products, lean protein, and vegetable oils, seeds, and nuts (Bowen et al., 2018). A systematic review of energy density, which is the amount of energy per unit weight of food or drink, found strong evidence to suggest a positive association between dietary energy density and increased fatty tissue in the body (Pérez-Escamilla et al., 2012). Foods with high water and/or fiber are usually lower in energy density, such as fruits and vegetables. The USDA recommends youth aged 9-13 consume between 1.5 to 2 cups of fruit and 1.5 to 3 cups of vegetables every day, dependent upon biological sex (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). Eating fruits and vegetables can increase potassium levels and eating dark-green vegetables can increase iron levels to rates that the USDA recommends (U.S. Department of Health and Human Services and U.S. Department of Agriculture, 2015). In addition to fruits and vegetables, research has investigated intake of high energy dense foods.

In contrast, dietary fat has the highest amount of energy per gram, and fatty foods are usually considered to have high energy density (Pérez-Escamilla et al., 2012). The 2010 Dietary

Guidelines Advisory Committee (DGAC) found strong and consistent evidence for adults that revealed diets relatively low in energy density improve weight maintenance and weight loss (Pérez-Escamilla et al., 2012). The 2010 DGAC also discovered moderately strong evidence for children and adolescents of a positive relationship between dietary energy density and increased adiposity (Pérez-Escamilla et al., 2012). A systematic review and meta-analysis of dietary energy density (DED) studies uncovered that participants with the highest DED had significant weight gain, risk of excess adiposity, and greater adjusted mean body mass index (BMI) (Rouhani et al., 2016). These results are consistent with another systematic review that collected evidence that diets high in energy-dense, high-fat, and low-fiber foods incline young people to future overweight and obesity (Ambrosini, 2014).

A meta-analysis of intake and health outcomes, unearthed significant evidence of an inverse association between vegetable intake and risk of stroke, heart failure, and coronary heart disease (Bechthold et al., 2019). This study also discovered significant evidence of an inverse association between fruit intake and risk of stroke and coronary heart disease (Bechthold et al., 2019). Another literature review revealed convincing evidence that increasing the intake of fruit and vegetables reduces the risk of hypertension, coronary heart disease and stroke (Boeing et al., 2012). The review also found probably evidence that intake of fruit and vegetables are inversely related to the risk of cancer in general (Boeing et al., 2012). Another systematic review and meta-analysis captured evidence that increasing consumption of fruits was significantly associated with a decrease risk of type 2 diabetes (Schwingshackl et al., 2017). This study also learned that increasing consumption of red meat was significantly associated with an increase in type 2 diabetes risk (Schwingshackl et al., 2017).

Physical Activity, Energy Expenditure, and Health Related Quality of Life

While obesity researchers have investigated food intake, they have also looked at physical activity. Physical activity can also help youth struggling with overweight and obesity. Physical fitness includes a variety of characteristics, including cardiorespiratory endurance, skeletal muscle endurance, skeletal muscle strength, flexibility, balance, skeletal muscle power, speed, reaction time, and body composition (Physical Activity Guidelines Advisory Committee, 2008). Youth aged 6 to 11 years old are recommended to have at least one hour of moderate to vigorous physical activity (MVPA) per day (Physical Activity Guidelines Advisory Committee, 2008). A population-based cohort study (Hispanic Community Health Study/Study of Latinos) (HCHS/SOL) collected data from 2008-2011 of Latinx families (*n*=16,415) and discovered that youth aged 8 to 16 years old (*n*=1,466) spent 25 minutes per day in moderate physical activity and 10 minutes per day in vigorous physical activity, which was well below the national recommendations for 60 minutes per day (Evenson et al., 2019). Another study analyzed the HCHS/SOL data and learned that 65% of Latinx adults met the 2008 Physical Activity Guidelines for Americans of having at least 150 minutes per week of moderate PA, at least 75 minutes per week of vigorous PA, or at least 150 minutes per week for a combination of the two (Arredondo et al., 2016). This study also unearthed that Mexican and Central American adults had the most minutes per day of work-related MVPA (Arredondo et al., 2016). One study of Latinx adults showed that males who engaged in walking activities were significantly more likely to engage in both moderate and vigorous PA and that acculturation and self-efficacy were significant predictors of PA (Mikell et al., 2020). Physical activity can lead to greater quality of life.

A systematic review revealed a dose-response relationship whereby higher frequency of physical activity was related to better health-related quality of life (Wu et al., 2017). One longitudinal study of fifth to seventh graders illumined a significant negative association between moderate-to-vigorous physical activity and fat mass index, percent body fat, and body mass index for both boys and girls (Dowda et al., 2017). One systematic review obtained evidence that children and adolescents with higher levels of physical activity had significantly higher health-related quality of life (i.e. physical, psychological, and social health) compared to children and adolescents with lower levels of physical activity (Wu et al., 2017). Another systematic review discovered that physical activity can protect against adolescent's body fat gain and higher intensity physical activity can provide greater protective effects of body fat gain for both sexes of adolescents (Ramires et al., 2015).

A meta-analysis of studies that included youth who were overweight or obese with a BMI greater or equal to the 85th percentile gathered evidence to support that exercise intervention can reduce BMI, body weight, body fat percentage, and waist circumference (Stoner et al., 2016). Exercise intervention can also improve insulin and glucose levels in overweight and obese youth (Stoner et al., 2016). A literature review collected evidence to support the association between low physical activity and excessive fatness in adolescents (Pate et al., 2013). One study of fifth- to seventh-graders revealed that eating breakfast, knowledge of food, and speaking with family about eating healthier foods are positively associated to physical activity (Garcia et al., 2019).

Obesity Prevention, Role Modeling, and Social Cognitive Theory

Given the prominent role of Latinx fathers in the family system, researchers have looked at the ways fathers shape youth's energy balance-related behaviors. Fathers can influence their children's EBRBs through role modeling. The most widely used strategy to conceptualize dietary

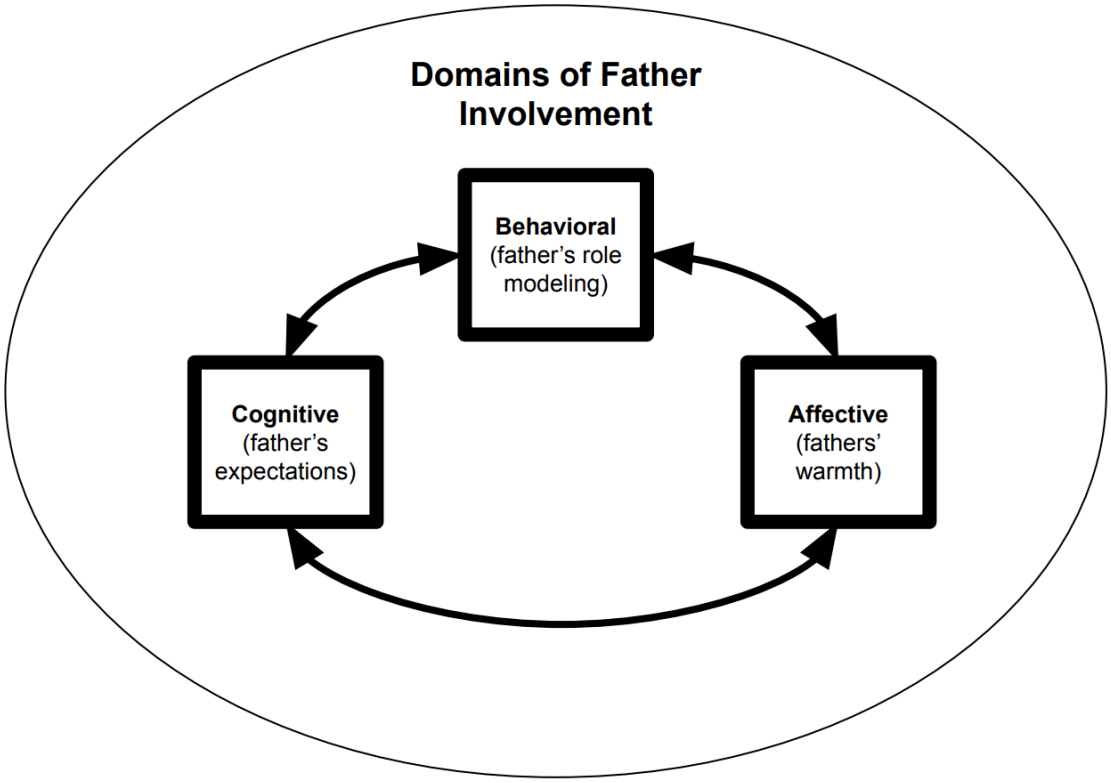
habits through a reduction of caloric intake is based on Bandura's social cognitive model (Han et al., 2010). According to social cognitive theory, modeling is a powerful mechanism of transmitting values and behaviors (Bandura, 1986b). Modeling can be referred to as "imitation," which conveys how humans mimic the actions of others. Modeling can also be referred to as "identification," which differs from imitation in that identification conveys a sense of intrinsic reward from the similarity (Kohlberg, 1963). Modeling operates when a behavior is represented to the learner and the learner then retains the modeler's behavior as a reference for the learner's future behavior (Bandura, 1986b).

In the context of energy balance-related behaviors, as fathers represent their fruit and vegetable intake and physical activity in front of their children, the children retain this information to help guide their future food intake and physical activity behaviors. For example, Latinx mothers have reported that fathers support healthy child dietary intake and physical activity through role modeling and playing sports (Lora et al., 2017). As Latinx fathers role model healthy eating and physical activity, their children retain this information and use it as a guide for their own healthy eating and physical activity behaviors.

Within social cognitive theory, a person's behaviors, cognitions and personal factors (e.g. affect), and environments continually interact with each other in triadic reciprocality (Bandura, 1986b). While reciprocal determinism suggests that families and peers influence fruit, juice, and vegetable consumption (Baranowski, 1997), more research is needed to understand these family influences on children. For example, research has found fathers are less likely to monitor youth food intake compared to mothers (Scaglioni et al., 2018), but why? Within a reciprocal determinism framework, fathers' parenting behaviors can influence his own expectations about his child's energy balance-related behaviors, such as child fruit and vegetable intake and child

physical activity level. In return, a child's behavior at home (e.g. complaining about eating too many fruits and vegetables) can influence their fathers' cognitions about what foods to put on the grocery list. Reciprocal determinism thereby explains how father's and children's cognitions, behaviors, personal factors, and environments determine each other and are determined by each other (Cabrera et al., 2014). While fathers and children can reciprocally influence each other, this study focuses on fathers' influence of children through affect, behaviors, and cognitions. See Figure 3.

Figure 3. *Fathers' Role Modeling, Warmth, and Expectations*



Several social cognitive theory reciprocal determinism models have illustrated numerous interactions between family, environment, and child behaviors (Cullen et al., 2001; Zhang et al., 2019). In these models, children's individual eating behaviors of fruit and vegetables influence

their (and their father's) individual self-efficacy, knowledge and skills, and acculturation. Children's eating behaviors also influence social environmental factors, such as parenting-child connection, cultural values, and the family food environment. For example, a child may ask their parent to purchase their favorite type of fruit while at the grocery store. In reciprocal fashion, these individual, social, and physical environmental factors can shape fruit and vegetable intake and physical activity behaviors.

While families can be complex systems, fathers can influence children directly through role modeling and having healthy EBRB expectations. As fathers model healthy fruit and vegetable intake along with physical activity, they will shape the health trajectory of youth's fruit and vegetable intake and physical activity. Also, as fathers have high expectations for youth's fruit and vegetable intake and physical activity, they will shape youth's physical activity.

Expectations and Social Cognitive Theory

In addition to role modeling, fathers can have healthy expectations for their children. Bandura explains humans create and strengthen cognitive expectations of personal effectiveness and that perceived self-efficacy can influence which activities they engage in and the amount of effort they spend on these activities, along with how long they will persist in these activities when facing obstacles (Bandura & Adams, 1977). Social cognitive theory posits that one's self-reflective thinking mediates between knowledge and action and through this reflexive process, humans evaluate prior experiences and thinking processes (Bandura, 1986a; Pajares, 1996). Further, having knowledge, skills, and prior attainments are not sufficient in curbing behaviors because individuals' beliefs about their abilities powerfully influence their behaviors.

Several frameworks theorize a person's decision or intention proves important when seeking to alter a behavior (Kremers et al., 2005). A person's attitude includes their thoughts on

the benefits and costs of an EBRB (Kremers et al., 2005) and a person's observed or experienced consequences can result in outcome expectations, which can then serve as motivation for role modeling behaviors (Bandura, 1986b). People can also create expectations based on what they believe is socially normal (Ajzen, 1991). One study has offered that EBRB expectations can be partly developed through people's experiences with foods (Baranowski et al., 1999). Parents play an important role in socializing their children and shaping their expectations, beliefs, and goals (Gadsden et al., 2016). For example, if a father has a positive experience with eating fruits and vegetables, then they are more likely to have expectations about eating these types of foods (Baranowski et al., 1999).

Findings from one study's focus groups of Mexican-American fathers revealed they have healthy expectations for their youth's fruit and vegetable intake and physical activity (Zhang et al., 2018). While there is limited research regarding Latinx fathers' healthy expectations for their youth's fruit and vegetable intake and physical activity, a comprehensive review of correlates of physical activity for adolescents revealed that intentions and parent support were consistently associated with youth physical activity (Sallis et al., 2000). In addition to fathers' expectations, family and support can shape youth's health outcomes.

Family encouragement and support can be related to adolescents' (ages 11-15) daily fruit and vegetable intake ($p<.01$) (Zabinski et al., 2006). When looking at differences between boys and girls, family encouragement and support can predict fruit and vegetable intake among girls (Zabinski et al., 2006). Social influence, in the form of support from people important in one's life to eat fruits and vegetables and whether these people consumed fruits and vegetables, can predict people's intention to consume salads ($p<.05$) but not vegetables or fruit (Brug et al., 1995). Physical activity expectations can predict college students' exercise intentions ($p<.001$)

(Yordy & Lent, 1993). These studies offer evidence about the role that cognitions play in fruit and vegetable intake and physical activity and have informed prior obesity prevention efforts.

Prior Obesogenic Interventions

Studies have sought to improve individual level child BMI outcomes with varying results (Bleich et al., 2013). Given that reducing mean child BMI can be difficult to achieve (Crespo et al., 2018), some researchers have focused on proximal energy-balanced related behavior (EBRB) outcomes, such as fruit and vegetable intake (Mytton et al., 2014) and child physical activity behaviors (Perdew et al., 2020). Addressing energy balance-related behaviors is just one strategy to combat child obesity. Because of the limited impact of previous pediatric obesity efforts (Perdew et al., 2020), some researchers have called for more randomized clinical trials to test the efficacy of culturally appropriate obesogenic approaches among Latinx populations (Kirk et al., 2005). In addition to careful attention to study design, researchers have also looked at child obesity in different environmental contexts.

Research has sought to address child obesity outcomes in community and school settings with varying results. Combining diet and physical activity community-based interventions with a school component can have child health effects (Bleich et al., 2013). Intervention can shape child adiposity and weight-related health outcomes (Bleich et al., 2013). Since reducing Latinx child body mass index (BMI) can be challenging to achieve statistically significant effects (Crespo et al., 2018), some researchers have focused on proximal energy balance-related behaviors (Mytton et al., 2014), such as fruit and vegetable intake and youth physical activity behaviors (Perdew et al., 2020).

In Delaware, a leading child health care provider implemented a statewide obesity prevention initiative for children ages 2-17 (Chang et al., 2010). The program utilized a

socioecological approach for implementing the "5-2-1-Almost None" program. This program encouraged children to eat at least five servings of vegetables and fruits per day, have no more than two hours of screen time, and have one hour of physical activity, and drink almost no sugar-sweetened drinks. The results, however, did not reveal significant effects for changing the prevalence of overweight and obese children. In addition to Delaware, research has been conducted in other contexts, such as in Australia.

In Australia, a child obesity intervention called Romp & Chomp sought to reduce body mass index (BMI) and the prevalence of overweight behaviors for children aged 2 and 3.5 years old (de Silva-Sanigorski et al., 2010). The intervention encouraged eating healthy and active play within educational and child-care settings. Results indicated a significant lower mean weight, BMI for 3.5-year-olds and a significantly lower prevalence for overweight/obesity in 2- and 3.5-year-olds than in the comparison group. In addition to Australia, research has been conducted in Europe.

A study of 10-12-year-old children in seven European countries found that children in Norway and the Netherlands spent more time bicycling to school than children in other countries and had the lowest percentage of overweight children compared to the other countries except for Belgium (Brug et al., 2012). In Belgium, however, bicycling is also a relevant mode of transportation. In another study, computer and video game sedentary behaviors was found to be significantly associated with increased cardiometabolic risk and waist circumference in boys and girls (Saunders et al., 2013). Researchers have also looked at the role parents can play in child EBRBs.

Parenting Energy Balance-Related Behavior Practices

Additionally, some researchers have expanded their inquiry to include family environmental factors when addressing youth obesity (Glanz et al., 2005). A literature review discovered dietary habits are formed at a young age and parental feeding strategies are the most dominant determinant of child intake behaviors (Scaglioni et al., 2018). Whereas most children prefer sweet and salty flavors, bitter flavors (e.g. vegetables) are often refused when first tasted, but accepted as parents continue exposing vegetables to their child (Scaglioni et al., 2018). Fruit, juice, and vegetable availability at home may be associated with child fruit, juice, and vegetable intake (Cullen et al., 2001) and first-generation Latinx U.S. residents may consume more fruit and vegetables than successive generations, which provides evidence that father's acculturation level may influence diet intake and physical activity EBRB behaviors (Batis et al., 2011; Gordon-Larsen et al., 2003). Adolescents with authoritative parents can eat more fruit than adolescents with other parenting styles (Kremers et al., 2003). Berge found mothers' authoritative parenting style predicted lower youth BMI (Berge, Wall, Loth, et al., 2010) and mothers' dietary restraint and perceptions of daughters' overweight risk had predicted child-feeding practices (Birch & Fisher, 2000). Obesity in fathers can be associated with a four-fold increase in obesity risk for children of both sexes at the age of 18 (Burke et al., 2001). A randomized control trial of culturally diverse low-income parents (13% Latinx) discovered that positive behavior support was significantly predictive of young children's dietary quality one year later (Montaño et al., 2015).

Among Latino families, food parenting practices can be related to obesogenic dietary intake among children (LeCroy et al., 2019). Latino parents can prevent child obesity through teaching and modeling (Vereecken et al., 2010). Although some Latino fathers encourage

children to eat unhealthy food (Mena et al., 2015), some Latino fathers value physical activity as a way to prevent disease and maintain a healthy weight (Zhang et al., 2018). Whereas Latina mothers are traditionally held as the primary caretaker for children, Latino fathers are traditionally viewed as the head of the home with decision-making responsibilities (Villarruel, 1998), which may prove important to food purchasing decisions. While researchers have looked at the ways parents influence child EBRBs, they have also looked at family EBRB congruence within the family system.

Coparenting and Father-Child Energy Balance-Related Behavior Congruence

Given that families are complex systems, it should come as no surprise that members can disagree with regard to food intake and physical activity. One study investigated whether adolescents have different perceptions regarding food rules, food availability, and food accessibility compared to their parents' perceptions and whether adolescent's dietary intake was more related to their own perceptions than parent's perceptions (van Assema et al., 2007). The study found disagreements between parents and adolescents and specifically found that parents and adolescents significantly differed in their report of how many fruit servings the child should eat (van Assema et al., 2007). Parents also reported higher availability and accessibility of fruit than adolescents reported (van Assema et al., 2007). One important limitation of this study, however, was that the parent responses were given to primarily only the mothers and if the mothers were not able to complete the surveys, then the measures were given to the fathers.

Families can encourage healthy eating through: 1) management of what types of foods enter the home environment, 2) management of food intake through food preparation and intake role modeling, and 3) inclusion of children in food-related behaviors, such as grocery shopping and cooking (Kaplan et al., 2006). Four contexts can make eating healthy challenging: 1)

children's refusal to eat certain foods, 2) lack of time due to scheduling problems (e.g. sports, work, childcare), 3) disagreement regarding food portion sizes, and 4) limited economic resources (Kaplan et al., 2006). Authoritative parenting style can include practices such as using questions, negotiations, and reasoning to influence child food intake behaviors (Kaplan et al., 2006). Fathers can disagree with their partners in regards to food preparation and preferences, such as preferring food cooked with lard and large quantities of red meat (Lora et al., 2017). These qualitative studies reveal the complex interactions that family systems undergo when managing food intake.

While families can experience disagreement, they can also experience cohesion. One study found a significant negative association between family cohesion and adolescents' consumption of sweets (Welsh et al., 2011). Latinx youth in engaged families with higher family cohesion and support can have fewer depressive symptoms compared to intrusive families with lower levels of family cohesion and support (Bámaca-Colbert et al., 2018). Family cohesion may be associated with more fruit and vegetable intake (Franko et al., 2008). Higher family cohesion (i.e. helping/supporting each other and getting along) can predict lower BMI scores among adolescent girls (Heredia et al., 2019). Fathers' perceived cohesion (i.e. degree of emotional interaction between members of the family) can be related to mothers' perceived cohesion (Dinsmore & Stormshak, 2003). An increase in family cohesion (i.e. family togetherness and support) can result in a decreased likelihood of reporting child overweight/obesity (Frontini et al., 2017). Family cohesion (i.e. enjoy doing things together with family and feeling close with family members) may not predict fruit and vegetable intake (Welsh et al., 2011).

Building upon this prior research, there is a need for applied research in the context of community based programs that target minoritized fathers and their children. Fathers have

recommended that child health researchers should consider recruiting fathers through community sports events and social service programs (Davison et al., 2017). By conducting research in partnership with community organizations, researchers can learn from community leaders about the particular needs of fathers and their families (Zhang et al., 2018). For example, through collaborating with Latinx community organizations, researchers can better understand cultural contexts that fathers face when seeking to support the wellbeing of their children. Also, community agencies can offer important feedback regarding recruitment and retention of Latinx fathers. Through dialog, researchers and community agencies can work together to promote men's involvement in child EBRBs. One study exemplifying this process is the Padres Preparados program.

Padres Preparados, Jóvenes Saludables Program

Since 2017, the Padres Preparados, Jóvenes Saludables (Prepared Parents, Healthy Youth) program has sought to help Latinx coparents and their adolescents with healthy EBRBs (Zhang et al., 2019). Community agencies asked for help to address obesity prevention among Latinx youth, so researchers created a parenting education curriculum in consultation with a father advisory group (Zhang et al., 2018; Zhang et al., 2019). Researchers implemented the program in the Saint Paul Minnesota region with the aims of: 1) increasing the frequency of father's positive parenting practices regarding healthy eating and physical activity and 2) improving the eating and physical activity behaviors of parent's 10-14 year-olds. The father advisory board provided critical feedback to researchers regarding cultural beliefs, experiences, and preferences regarding program format, duration, and content (Zhang et al., 2019). In response, researchers created the program to include eight weekly sessions that met for 2.5 hours in person at community sites to participate in skill-building activities, such as healthy food

preparation and healthy parent-child communication activities. The sessions included components that allowed parents and their youth to interact together and also separately (Zhang et al., 2019).

In 2019, the research team adapted the program into a blended format that included three sessions via a mobile health app and five sessions in-person (Hurtado et al., 2019; Rodriguez et al., 2019), due to researchers increased attention of using technologies in weight management approaches and increasing program accessibility among Latinx fathers and youth (Kirk et al., 2005; Perdew et al., 2020). In 2020, the COVID-19 pandemic forced the program to replace in-person-only sessions with Zoom sessions facilitated by community health workers (Kelly et al., 2016) coupled with WhatsApp discussion groups (Hurtado Choque et al., 2021; Parra et al., 2018).

There has been some research regarding the Padres curriculum's program satisfaction and feasibility (Zhang et al., 2019). The Padres youth-reported measure of their father's behavioral role modeling and healthy expectations achieved sufficient criterion validity (Zhang, Reyes Peralta, et al., 2020). While preliminary evidence revealed improvement in father-reported expectations for their youth's fruit and vegetable intake and physical activity (Reicks et al., 2019), recent research shows reporting discrepancies between fathers and their children, which may derive from father's social desirability bias (Zhang, Baltaci, et al., 2020). Building upon the research of the Padres program, this study presents a theoretically informed model of Latinx father involvement in the context of youth EBRBs.

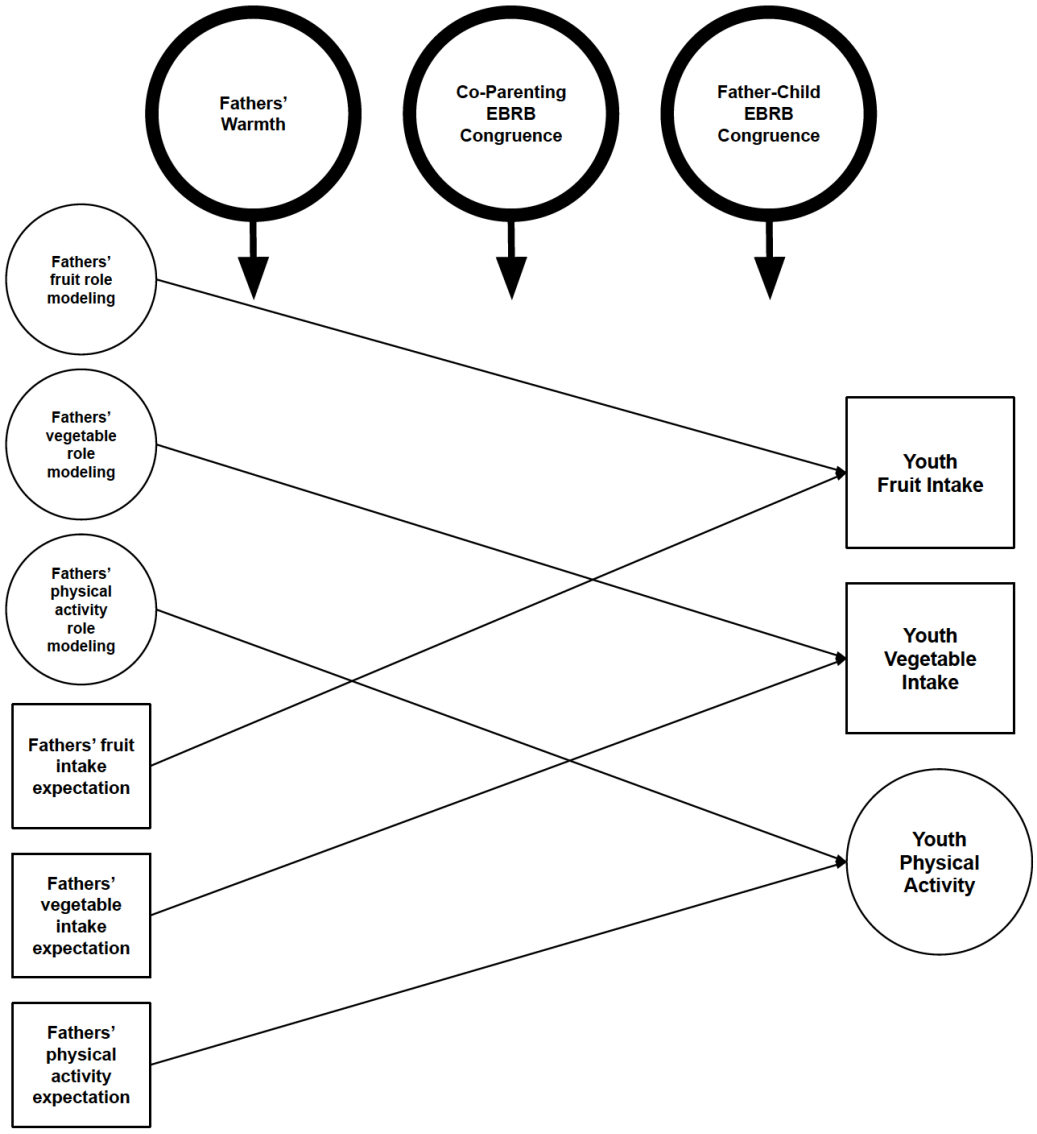
Theorizing Latinx Father Involvement In The Context of Energy Balance

Building upon prior father involvement research, this study utilizes multiple domains of father involvement, which include affect, behaviors, and cognitions. This study grounds father

involvement in the context of Latinx families and energy balance-related behaviors. In the context of this study, father involvement will be conceptualized as the warmth (Rohner & Britner, 2002), intimacy, and concern fathers have for their children coupled with fathers' external representation of actions (i.e. role modeling) (Bandura, 1986b) and internal self-reflective thinking (i.e. expectations) (Pajares, 1996) about their children's healthy dietary intake and physical activity (See also Palkovitz, 1997). While understanding this is a rather specific and narrow definition of father involvement, this study builds upon the important foundation laid by previous father involvement researchers.

For the purposes of this study, fathers' warmth may be defined as the internal feeling of love, affection, and intimacy that manifests in external responses, such as showing interest, acceptance, concern, and comfort to their youth (Barrett & Bliss-Moreau, 2009; Rohner, 1998; Rohner & Britner, 2002). As states of cognitive affect occur, fathers will then respond through certain behaviors. When fathers internally feel degrees of love, affection, and intimacy, they will respond to their youth with showing interest, acceptance, concern, and comfort. In the context of EBRBs, warmth is theorized to moderate the associations between fathers' role modeling and expectations and youth EBRBs. Given that affect influences one's mind in a way that is linked to the body (Barrett & Bliss-Moreau, 2009), fathers' positive responses are theorized to reinforce their fruit, vegetable, and physical activity role modeling behaviors so that youth will be more likely to imitate these healthy behaviors. Figure 4 illustrates the moderating effects that fathers' warmth, coparenting EBRB congruence, and father-child EBRB congruence are theorized to have on all of the associations between fathers' involvement and youth health outcomes.

Figure 4. *Final Conceptual Model with Predictors, Moderators, and Outcomes*



Research Questions and Hypotheses

The primary overarching research question for this study is to understand: To what extent is fathers' healthy parenting involvement related to youth energy-balance related behaviors? This overarching research question has two specific components: 1) To what extent is fathers' EBRB role modeling related to youth EBRBs? and 2) To what extent is fathers' EBRB expectation for their youth's EBRBs related to youth EBRBs?

The study's secondary research questions seek to understand: To what extent does fathers' warmth, coparenting EBRB congruence, and father-child EBRB congruence moderate the associations between fathers' EBRB role modeling/expectations and youth fruit/vegetable intake and moderate-to-vigorous physical activity? This overarching secondary research question has six specific components: 1) To what extent does fathers' warmth moderate the associations between fathers' EBRB role modeling and youth EBRBs? 2) To what extent does fathers' warmth moderate the associations between fathers' expectations for youth EBRBs and youth EBRBs? 3) To what extent does coparenting EBRB congruence moderate the associations between fathers' EBRB role modeling and youth EBRBs? 4) To what extent does coparenting EBRB congruence moderate the associations between fathers' expectations for youth EBRBs and youth EBRBs? 5) To what extent does father-child EBRB congruence moderate the associations between fathers' EBRB role modeling and youth EBRBs? 6) To what extent does father-child EBRB congruence moderate the associations between fathers' expectations for youth EBRBs and youth EBRBs?

RQ1. To what extent is fathers' EBRB role modeling related to youth healthy development?

Hypothesis 1a: Greater fathers' fruit intake role modeling will significantly predict greater youth fruit intake, after covariates are controlled for.

Hypothesis 1b: Greater fathers' vegetable intake role modeling will significantly predict greater youth vegetable intake, after covariates are controlled for.

Hypothesis 1c: Greater fathers' physical activity role modeling will significantly predict greater youth moderate-to-vigorous physical activity, after covariates are controlled for.

RQ2. To what extent is fathers' EBRB expectation for their youth's EBRBs related to youth EBRBs?

Hypothesis 2a: Greater fathers' fruit intake expectation will significantly predict greater youth fruit intake, after covariates are controlled for.

Hypothesis 2b: Greater fathers' vegetable intake expectation will significantly predict greater youth vegetable intake, after covariates are controlled for.

Hypothesis 2c: Greater fathers' physical activity expectation will significantly predict greater youth moderate-to-vigorous physical activity, after covariates are controlled for.

RQ3. To what extent does fathers' warmth moderate the associations between fathers' EBRB role modeling and youth EBRBs?

Hypothesis 3a: Greater fathers' warmth will significantly strengthen the positive association between fathers' fruit intake role modeling and youth fruit intake, after covariates are controlled for.

Hypothesis 3b: Greater fathers' warmth will significantly strengthen the positive association between fathers' vegetable intake role modeling and youth vegetable intake, after covariates are controlled for.

Hypothesis 3c: Greater fathers' warmth will significantly strengthen the positive association between fathers' physical activity role modeling and youth moderate-to-vigorous physical activity, after covariates are controlled for.

RQ4. To what extent does fathers' warmth moderate the associations between fathers' expectations for youth EBRBs and youth EBRBs?

Hypothesis 4a: Greater fathers' warmth will significantly strengthen the positive association between fathers' expectation for youth fruit intake and youth fruit intake, after covariates are controlled for.

Hypothesis 4b: Greater fathers' warmth will significantly strengthen the positive association between fathers' expectation for youth vegetable intake and youth vegetable intake, after covariates are controlled for.

Hypothesis 4c: Greater fathers' warmth will significantly strengthen the positive association between fathers' expectation for youth physical activity and youth moderate-to-vigorous physical activity, after covariates are controlled for.

RQ5. To what extent does coparenting EBRB congruence moderate the associations between fathers' EBRB role modeling and youth EBRBs?

Hypothesis 5a: Greater coparenting EBRB congruence will significantly strengthen the positive association between fathers' fruit intake role modeling and youth fruit intake, after covariates are controlled for.

Hypothesis 5b: Greater coparenting EBRB congruence will significantly strengthen the positive association between fathers' vegetable intake role modeling and youth vegetable intake, after covariates are controlled for.

Hypothesis 5c: Greater coparenting EBRB congruence will significantly strengthen the positive association between fathers' physical activity role modeling and youth moderate-to-vigorous physical activity, after covariates are controlled for.

RQ6. To what extent does coparenting EBRB congruence moderate the associations between fathers' expectations for youth EBRBs and youth EBRBs?

Hypothesis 6a: Greater coparenting EBRB congruence will significantly strengthen the positive association between fathers' expectation for youth fruit intake and youth fruit intake, after covariates are controlled for.

Hypothesis 6b: Greater coparenting EBRB congruence will significantly strengthen the positive association between fathers' expectation for youth vegetable intake and youth vegetable intake, after covariates are controlled for.

Hypothesis 6c: Greater coparenting EBRB congruence will significantly strengthen the positive association between fathers' expectation for youth physical activity and youth moderate-to-vigorous physical activity, after covariates are controlled for.

RQ7. To what extent does father-child EBRB congruence moderate the associations between fathers' EBRB role modeling and youth EBRBs?

Hypothesis 7a: Greater father-child EBRB congruence will significantly strengthen the positive association between fathers' fruit intake role modeling and youth fruit intake, after covariates are controlled for.

Hypothesis 7b: Greater father-child EBRB congruence will significantly strengthen the positive association between fathers' vegetable intake role modeling and youth vegetable intake, after covariates are controlled for.

Hypothesis 7c: Greater father-child EBRB congruence will significantly strengthen the positive association between fathers' physical activity role modeling and youth moderate-to-vigorous physical activity, after covariates are controlled for.

RQ8. To what extent does father-child EBRB congruence moderate the associations between fathers' expectations for youth EBRBs and youth EBRBs?

Hypothesis 8a: Greater father-child EBRB congruence will significantly strengthen the positive association between fathers' expectation for youth fruit intake and youth fruit intake, after covariates are controlled for.

Hypothesis 8b: Greater father-child EBRB congruence will significantly strengthen the positive association between fathers' expectation for youth vegetable intake and youth vegetable intake, after covariates are controlled for.

Hypothesis 8c: Greater father-child EBRB congruence will significantly strengthen the positive association between fathers' expectation for youth physical activity and youth moderate-to-vigorous physical activity, after covariates are controlled for.

CHAPTER II. METHOD

Procedure: Site and Data

Program and Intervention

Padres Preparados was a community-based participatory research (CBPR) family skills program implemented in the Minneapolis/St. Paul metropolitan Minnesota region between September 2017 to February 2020. The Padres program originated through a collaboration between researchers and community based organizations and a father advisory group. The goals of the program were to: 1) increase parenting practices through healthy eating and physical activity and 2) improve eating and physical activity of youth. Central to the parenting program was an emphasis on setting expectations, creating supportive environments, and being a role model to youth. The curriculum consisted of an 8-week program that supported parents and their youth with energy balance-related behaviors and other positive parenting skills. The program was delivered primarily in Spanish for the adults and English for the youth (ages 10-14).

The program was delivered to a total of seven community organizations, such as Latinx community centers and churches. Latinx family participants were recruited from these community centers and churches. Community partners recruited Latinx families through community promoters or "promotores" (Nelson et al., 2011). The study used cross sectional data collected at baseline before Latinx participants entered the program. Analyses concentrated on this subset of secondary data including fathers, mothers, and youth at baseline before the Padres program started (n=193).

Sample

To participate in the study, recruits needed to: 1) be a father, 2) have a child (ages 10-14), 3) speak Spanish, and 4) identify as a Latino. The data for this study was collected at baseline

and included (*n*=193) Latinx fathers, mothers, and youth. The majority of fathers reported being born in Mexico (65%). Fathers were on average older (42 years) than the mothers (40 years) and had been in the U.S. longer (19 years) than mothers (17 years). A lower percentage of fathers spoke only Spanish (75%) compared to mothers (86%). Fathers and mothers had very similar educational attainment with 80% of fathers obtaining a high school or GED education compared to 79% of mothers obtaining a high school or GED education. Most of the fathers reported being married to their partner (85%). There were similar percentages of male children (49%) compared to female children (51%). Regarding employment, working full time had the greatest percentage for both fathers (74%) and mothers (42%). A majority of the families (60%) had an annual household income of $34,999 or lower and a third of the fathers (33%) reported having either a moderate or low level of food security. See Table 2.

Table 2. *Baseline Characteristics of the Sample (n=193)*

	N (%)	M	SD
Sociocultural History			
Father's number of years in U.S.		19	6.49
Mother's number of years in U.S.		17	6.36
Father's Language			
Native only (e.g. only Spanish)	142 (75)		
More native than English	18 (9)		
Equal native and English	27 (14)		
More English than native	3 (2)		
English only	0 (0)		
Mother's Language			
Native only (e.g. only Spanish)	95 (86)		
More native than English	8 (7)		
Equal native and English	7 (6)		
More English than native	1 (1)		
English only	0 (0)		
Country of Birth[a]			
Mexico	79 (65)		
Ecuador	36 (30)		
El Salvador	3 (2)		
Columbia	1 (1)		
Nicaragua	1 (1)		
Venezuela	1 (1)		
United States	1 (1)		
Age			
Father's Age		42	7.36
Mother's Age		40	6.35
Child's Age		12	1.5
Child's Sex			
Male	94 (49)		
Female	96 (51)		
Father's Educational Attainment			
No school	3 (2)		
Primary school	59 (31)		
Middle school	9 (5)		
High school	71 (37)		
GED	10 (5)		

Some college or technical school	31 (16)
Bachelor's degree	5 (3)
Advanced degree	2 (1)
Mother's Educational Attainment	
No school	2 (2)
Primary school	36 (33)
Middle school	4 (4)
High school	34 (31)
GED	10 (9)
Some college or technical school	18 (16)
Bachelor's degree	6 (5)
Advanced degree	0 (0)
Father's Marital Status	
Single	12 (6)
Married	160 (85)
Separated	3 (2)
Divorced	1 (1)
Living with partner	13 (7)
Father's Employment Status	
Student	1 (1)
Self-employed	28 (15)
Unemployed	6 (3)
Part-time	12 (6)
Full-time	138 (74)
Homemaker	1 (1)
Mother's Employment Status	
Student	3 (3)
Self-employed	2 (2)
Unemployed	4 (4)
Part-time	18 (17)
Full-time	46 (42)
Homemaker	36 (33)
Father's Report of Annual Household Income	
<$15,000 per year	21 (11)
$15,000 to $24,999	52 (28)
$25,000 to $34,999	38 (21)
$35,000 to $49,999	44 (24)
$50,000 to $74,999	23 (12)
$75,000 to $99,999	7 (4)

Father's Report of Food Security	
Low security	9 (5)
Moderate security	53 (28)
High security	128 (67)

[a] Country of birth percentages don't equal to 100 due to rounding error.

Data Collection and Measures

Demographic Characteristics

Fathers completed a self-reported demographics questionnaire (Appendix A) asking for their age, educational attainment, marital status, employment status, annual household income, language spoken at home, number of years in the U.S., and food security. The food security measure (Appendix A) had 2 items and was found to be valid among low-income families with children (Hager et al., 2010). Youth reported their age and biological sex.

Youth Healthy Behaviors (Primary Outcome)

The study used Nutrition Data System for Research (NDSR) 24-hour dietary recall to measure youth healthy food intake, which is well established as being the gold-standard for capturing nutritional consumption information (Arsenault et al., 2020; Baxter et al., 2003). The 24-hour recalls have been found to be valid in measuring food intake among fourth-graders within 67% accuracy (Baxter et al., 2003) and 12-14-year-olds within 85% accuracy (Arsenault et al., 2020). Trained diet technicians recorded the youth's fruit and vegetable intake using the University of Minnesota's Nutrition Data System for Research (NDSR) software (Smith et al., 1995; University of Minnesota, 2021).

Youth physical activity was measured using two survey items (Appendix B) assessing the number of hours spent in a normal week on vigorous and moderate exercises with response options including (0, <30 minutes, 0.5 to 2 hours, 2.5 to 4 hours, 4.5 to 6 hours, and >6 hours) (Godin & Shephard, 1985; McGuire et al., 2002). The reliability coefficients of this measure

ranged between 0.83 and 0.85 and the concurrent validity ranged between 66% to 69% with correctly classifying maximum oxygen intake and body fat (Godin & Shephard, 1985).

Fathers' EBRB Role Modeling and Expectations for Youth's EBRBs

Fathers' role modeling (Appendix C) of fruit and vegetable intake and physical activity along with fathers' healthy expectations (Appendix D) for their youth's dietary intake and physical activity were measured based on questions developed from validated scales (Matthews-Ewald et al., 2015; Pinard et al., 2014; Singh et al., 2012) and based on feedback from Latinx father focus groups (Zhang et al., 2018). The survey was first created in English and then translated into Spanish. The Spanish version was then translated back into English to confirm the accuracy of the survey items across both languages (Zhang, Reyes Peralta, et al., 2020). A preliminary study assessed the psychometrics of the role modeling and expectation measures and found them to have limited criterion validity (Zhang, Reyes Peralta, et al., 2020). The role modeling questionnaire for food intake had four items "How many times in a week does your child see you eating fruit/vegetables?" and "How many times in a week do you eat fruits/vegetables with your child?" with Likert responses ranging from 1=Almost never or never to 5=Once a day or more. The role modeling questionnaire for physical activity had two items "How many times in a week does your child see you being physically active?" and "How many times in a week are you physically active with your child?" with Likert responses ranging from 1=Almost never or never to 5=Once a day or more. The expectations questionnaire for food intake had two items "How may cups of fruit/vegetables do you want your child to eat in a day?" with responses ranging from 0=As many as he/she wants to 3=3 cups or more.

Moderators: Warmth and Congruences

Fathers' warmth was measured (Appendix E) using six father-reported items (Domenech Rodríguez et al., 2009; Zhang et al., 2021). These questions measured different dimensions of fathers warmth, such as affection, concern, intimacy, acceptance, and comfort. Questions were asked to fathers, including: 1) affection: "I physically express affection to my child (e.g. hugging, kissing, holding)", 2) interest: "I encourage my child to talk about his/her troubles," 3) acceptance: "I encourage my child to freely express him/herself even when disagreeing with parents," 4) interest: "I listen when my child has something to say," 5) intimacy: "I have warm and intimate times together with my child," and 6) comfort: "I give comfort and show understanding when my child is upset." Responses included a Likert scale ranging from 1 = Almost never or never to 5 = Almost always or always. The psychometric properties of the fourth item was analyzed (Zhang et al., 2021).

Coparenting EBRB congruence was measured (Appendices F and G) using 9 items that fathers, mothers, and youth individually rated. Questions were asked, such as "How often do you disagree with your child's father/mother about your child's fruit intake?" and "How often does your father disagree with your mother about your fruit intake?" Responses included a Likert scale ranging from 1 = Almost never or never to 5 = Almost always or always.

Father-child EBRB congruence was measured (Appendices H and I) using 6 items that fathers and youth individually rated. Questions were asked, such as "How often do you disagree with your child about his or her fruit intake?" and "How often do you disagree with your father about your fruit intake?" Responses included a Likert scale ranging from 1 = Almost never or never to 5 = Almost always or always.

Covariates: Sex and Age of Youth

Youth's sex and age were added as covariates given that one study found fathers' parenting style differed significantly between boys and girls as well as older and younger boys (Berge, Wall, Neumark-Sztainer, et al., 2010; Lawman & Wilson, 2012). Given that authoritative parenting style encompasses warmth, adding youth sex and age controls for differences in parenting style across youth sex and age. One study of first-generation Latinx parents and their youth (aged 4-9) found that parents' expectations were different for boys compared to girls (Domenech Rodríguez et al., 2009). This decision to add youth sex and age as covariates is also supported by findings from another study that found younger 14-18 year old girls (primarily African American) to be more active compared to older girls and biological fathers' nurturance was significantly associated with physical activity (Bungum & Vincent, 1997). Also one study suggests that family EBRB disagreement regarding household rules and availability/accessibility regarding fruit intake, snack intake, and eating breakfast may possibly be influenced by a child's age (van Assema et al., 2007).

Data Analyses

Univariate statistics were performed for all continuous data to understand means, standard deviations, ranges, normality of sample distributions using the Shapiro-Wilk test (Shapiro & Wilk, 1965), and interquartile plots to detect potential outliers (Barbato et al., 2011). For discrete data, frequencies and bar plots were analyzed to understand distributional characteristics. Data entry errors were analyzed by reviewing response ranges.

Missing data were assessed using Little's test (Little, 1988) to determine whether data were missing completely at random. In addition, analysis of the mechanisms for missingness were performed using the Kruskal Wallis test for continuous data and Chi-Squares for discrete

data. Associations between discrete study variables were conducted using Spearman correlations. See Tables 4-7. All descriptives and correlations were performed using the R Studio statistical software version 1.1.463.

I used structural equation modeling (SEM), which is an analytic process that allows for testing a prioritized hypotheses of causal relationships among observed and latent variables, which is driven by theory (Mueller & Hancock, 2019). Unlike multiple or logistic regression where the model cannot be assessed, SEM has a process to assess whether the theorized model fits the data. While many model fit assessments are available, this study used three model fit assessments. First, the root mean squared residual (SRMR) and root mean square error of approximation (RMSEA) were performed. The SRMR assesses the theorized model's ability to reproduce the observed associations between the variables in a way that is interpretable (Pavlov et al., 2021). The RMSEA measures data-model fit and assesses if there are too many parameters (Hancock, 2022; Hancock & Mueller, 2013). In addition, an incremental model fit index measured the proportion of improvement for the target model compared to the null model in which all of the observed variables were uncorrelated. To do so, the Comparative Fit Index (CFI) was performed (Bentler & Bonett, 1980). Research has suggested adequate fit to have the following cutoff values that are close to .06 for RMSEA, .08 for SRMR, and .95 for CFI (Hu & Bentler, 1999).

The study also used moderation analysis, which seeks to understand how a variable affects the direction and/or strength of the association between a predictor and outcome (Baron & Kenny, 1986). Unlike a mediation analysis which seeks to understand the mechanism through which a predictor influences the outcome, moderation analysis tests under which conditions a predictor has maximal effects on the outcome (Baron & Kenny, 1986). The moderator

hypothesis is supported if the interaction or product between the predictor and moderator is statistically significant. Significance was determined at $\alpha \leq .05$.

The CFA models used maximum likelihood estimation with robust standard errors (MLR) to adjust for any multivariate non-normality in the data (Satorra & Bentler, 1994). Missing data was handled using full information maximum likelihood, which estimates model parameters and standard errors using all available information in the raw data (Allison, 2012; Barajas-Gonzalez & Brooks-Gunn, 2014). All predictor and outcome variables were measured using a Likert ordinal scale with at least five levels, except for two variables that measured fathers' expectations for youth fruit and vegetable intake, which were measured using an ordinal scale with four levels. These two variables were treated as continuous data because of the theorized underlying continuum of responses.[1] Given that the predictors had ordinal responses on a continuum from small to large, the decision was made that treating these two variables as continuous (as opposed to a series of binary variables for each level) would preserve more information about each variable's underlying continuum of responses from low to high. More details regarding these two variables are discussed in the limitations at the end of this paper. All of the models treated all predictor and outcome variables as if they were continuous (Dolan, 1994; Hancock & Mueller, 2013; Muthén & Kaplan, 1985).

For the study's main analyses using SEM, a step-approach was used to analyze the predictors and moderators in sequential order given the inability to converge one large comprehensive model including all predictors, covariates, and moderators. Four steps were used to test the study's primary and secondary research questions. More details are provided below

[1] The Mplus software also does not allow for modeling categorical exogenous variables other than by creating dummy codes for each level or treating them as continuous data.

regarding the research decisions that were made while specifying the models. Confirmatory measurement and structural analyses were performed using Mplus 8 version 1.6 (1).

Step 1: Confirmatory Measurement Model

The first step included a confirmatory measurement model, which included just the predictors, moderators, outcomes, and covariates. Three latent predictors were imposed for fathers' fruit and vegetable intake and physical activity role modeling. One latent factor was imposed for the youth physical activity outcome. Fathers' expectations, youth fruit and vegetable intake, child age, and child sex were observed variables. Three latent moderators were imposed for fathers' warmth, father-child EBRB congruence, and coparenting EBRB congruence. No moderation interactions were included in the measurement model.

The original measurement model also had 8 additional theorized covariates for fathers' age, number of years father had been in the U.S., family food security, fathers annual household income, and 4 variables for mothers' fruit and vegetable role modeling. Including these 8 covariates reduced the fit of the model to an unacceptable level with a CFI below .90. These covariates were excluded from all three of the measurement models for the following theorized reasons: 1) fathers' average age was 42 and there may not have been enough heterogeneity between younger and older fathers, 2) the average number of years fathers reported being in the U.S. was 19, so there may not have been enough heterogeneity between immigrant fathers being in the U.S. for shorter versus longer periods, 3) a majority of the families shared the same lower income demographic with U.S. annual household incomes ≤ $34,999 (60%), 4) a previous Padres study discovered that mothers were more likely to report food insecurity compared to fathers (Nagao-Sato et al., 2021), so fathers' report of food security may have been underreported, and 5) over half of the data (65%) from mothers was not available at baseline

because the study's focus was on father-child involvement and many mothers were thereby not required to complete the measures. In addition, reducing the number of covariates would reduce the number of residual covariances and provide a more parsimonious model.

When specifying one comprehensive model with all of the predictors, moderators, covariates, and outcomes, I encountered convergence issues due to a non-zero derivative of the observed-data loglikelihood. As a result, I decided to respecify the model into three smaller models—one model per moderator. The first model included fathers' warmth as a moderator. The second model included coparenting EBRB congruence as a moderator. The third model included father-child EBRB congruence as a moderator. When specifying the covariance of residuals, however, only the first model converged using a prioritized residual covariances. To achieve convergence for the second and third models, I decided to use significant Chi-Square modification indices suggestions using a univariate modification strategy based on theory (Byrne, 2012). For example, I would include one modification suggestion at a time that was part of the a prioritized list of residual covariances. Any residual covariances outside of this original a prioritized list were not included due to theoretical considerations.

Regarding the first model's specification, a priori covariances of residuals included: 1) outcomes with all other outcomes, 2) all covariates, predictors, and moderators with each other, and 3) EBRB congruence indicators. The EBRB congruence indicator residuals were allowed to covary a priori because the study theorized that fruit/veggie and physical activity congruence among fathers, mothers, and children could relate to each other. See Table 6.

For the second and third models, residual covariances included: 1) outcomes with all other outcomes, 2) all covariates, predictors, and moderators with each other, and 3) EBRB congruence indicators as specified by the significant modification indices suggestions. After

using the suggested significant modification indices, which were guided by theory, the second and third models converged. All three measurement models had acceptable model fit, which is described below in the results section.

Step 2: Structural Model (Fathers' Warmth Interaction)

The second step was used to test research questions 1-4 and included three regression that were ran simultaneously with the addition of six moderator interactions for fathers' warmth (2 interactions per regression model). The first regression added two interactions for fathers' warmth with fathers' fruit role modeling and fathers' warmth with fathers' expectation for youth fruit intake. The second regression added two interactions for fathers' warmth with fathers' vegetable role modeling and fathers' warmth with fathers' expectation for youth vegetable intake. The third regression added two interactions for fathers' warmth with fathers' physical activity role modeling and fathers' warmth with fathers' expectation for youth physical activity. Because there was missing data on the moderator's indicators, a Monte Carlo integration with 5000 integration points was performed when running the regressions.

Step 3: Structural Model (Coparenting EBRB Congruence Interaction)

The third step was used to test research questions 1-2 and 5-6 and included the same procedure outlined in Step 2, but with six interactions for coparenting EBRB congruence. The first regression added two interactions for coparenting EBRB congruence with fathers' fruit role modeling and coparenting EBRB congruence with fathers' expectation for youth fruit intake. The second regression added two interactions for coparenting EBRB congruence with fathers' vegetable role modeling and coparenting EBRB congruence with fathers' expectation for youth vegetable intake. The third regression added two interactions for coparenting EBRB congruence

with fathers' physical activity role modeling and coparenting EBRB congruence with fathers' expectation for youth physical activity.

Step 4: Structural Model (Father-Child EBRB Congruence Interaction)

The fourth step was used to test research questions 1-2 and 7-8 and followed the same procedure as Steps 3, but with six interactions for father-child EBRB congruence. The first regression added two interactions for father-child EBRB congruence with fathers' fruit role modeling and father-child EBRB congruence with fathers' expectation for youth fruit intake. The second regression added two interactions for father-child EBRB congruence with fathers' vegetable role modeling and father-child EBRB congruence with fathers' expectation for youth vegetable intake. The third regression added two interactions for father-child EBRB congruence with fathers' physical activity role modeling and father-child EBRB congruence with fathers' expectation for youth physical activity.

CHAPTER III. RESULTS

Data Preparation

The original data (n=215) had 22 cases that was missing most of the baseline measures, so these cases were deleted with a total remaining sample size n=193. Little's Test was performed to analyze missing data characteristics across the variables used for the confirmatory models. Results revealed the data were not missing completely at random $\chi^2 = 3443.73$, df = 3098, $p = .001$.

To investigate the mechanisms of missing data, analyses were then performed to research the associations between the missing and observed data to understand whether the data were Missing At Random (MAR). To do so, the R packages finalfit and GGally were used to calculate the percentage of missingness per variable along with the associations between variables with missingness and other variables in the models. When a particular variable had missingness, differences between the means/frequencies of other observed and missing data were calculated using the Kruskal Wallis test (continuous data) and Chi-Squares (discrete data). For example, if variable ff1 had missingness, then the mean differences of ff2 (when ff1 was missing versus when ff1 was not missing) were calculated to see if this difference was significant. If so, then ff1's missingness was significantly associated to ff2 and ff1's missingness was attributed to being at random (MAR). Based on analyzing every variable in the models, the data's missingness were found to be Missing At Random (MAR). See Table 3 for missing data patterns along with a description of the missingness mechanism for each variable.

When assessing potential outliers using interquartile ranges (Barbato et al., 2011), two variables measuring youth fruit and vegetable intake had 14 outliers (i.e. 7 outliers each). These fourteen observations were deleted while preserving the other participant data.

Table 3. *Mechanisms of Missing At Random (MAR) Analyses (n=193)*

Variable with Missingness	Missingness N (%)	Comparison Variable	*p*-value	Missingness Mechanism
Youth Variables				
ndf.a	13 (6.7)	cage.a	.01	Older youth
ndv.a	12 (6.2)	fdp6.a	.001	More EBRB disagreement
cpat1.a	2 (1)	fdp2.a	.053	More EBRB disagreement
cpat2.a	2 (1)	fdp2.a	.053	More EBRB disagreement
cdf1.a	2 (1)	fdp2.a	.053	More EBRB disagreement
cdf2.a	3 (1.6)	fps13.a	.054	Youth can express themselves more
cdf6.a	4 (2.1)	fps18.a	.047	Lower warmth
cdp1.a	4 (2.1)	--	--	2 of the 4 youth with missingness had missingness for almost all other youth-reported variables; The rest had missingness for all three cdp variables
cdp2.a	4 (2.1)	--	--	(see above)
cdp6.a	4 (2.1)	--	--	(see above)
cage.a	3 (1.6)	cdf2.a	.003	More EBRB disagreement
csex	3 (1.6)	fdp1.a	.044	More EBRB disagreement
Father Variables				
ff1.a	4 (2.1)	fdp1.a	.015	More EBRB disagreement
ff2.a	7 (3.6)	fps2.a	.003	Lower affection
ff3.a	13 (6.7)	fdp6.a	.001	More EBRB disagreement
fv1.a	10 (5.2)	fps14.a	.013	More listening
fv2.a	3 (1.6)	--	--	Only 3 cases with missingness and one of those had missingness for all 3 vegetable items
fv3.a	7 (3.6)	fdp6.a	.028	More EBRB disagreement
fp1.a	10 (5.2)	fdp6.a	.034	More EBRB disagreement
fp2.a	6 (3.1)	cpat2.a	.013	More moderate physical activity
fp3.a	8 (4.1)	cpat2.a	.039	More moderate physical activity
fps2.a	1 (0.5)	cpat1.a	.014	More vigorous physical activity
fps5.a	3 (1.6)	cpat1.a	.004	More vigorous physical activity
fps13.a	2 (1.0)	fp2.a	.010	More physical activity role modeling
fps14.a	1 (0.5)	--	--	Only one case with missingness
fps18.a	5 (2.6)	ff1.a	.014	Less expectation for youth fruit intake
fps26.a	3 (1.6)	ff3.a	.037	More fruit intake role modeling
fdp1.a	11 (5.7)	--	--	9 cases were missing all 6 variables (fdp and fdc)
fdp2.a	10 (5.2)	fps13.a	.021	Youth can express themselves less
fdp6.a	9 (4.7)	--	--	9 cases were missing all 6 variables (fdp and fdc)
fdc1.a	11 (5.7)	--	--	(see above)

fdc2.a	13 (6.7)	--	--	(see above)
fdc6.a	13 (6.7)	--	--	(see above)
Mother Variables				
mdp1	88 (45.6)	--	--	All but 3 cases had missingness for all 3 variables (mdp)
mdp2	88 (45.6)	--	--	(see above)
mdp6	91 (47.2)	fps13.a	.044	Youth can express themselves less

Note: *p*-values were calculated using the Kruskal Wallis test (continuous data) and Chi-Squares (discrete data).

Preliminary Analyses

Spearman correlations were conducted on continuous and discrete variables to understand how the variables associated with each other based on hypothesized latent constructs. See Tables 4-7. Table 4 reveals fathers' role modeling indicators were significantly correlated with each other by type, which provides some statistical support for grouping these variables into 3 latent role modeling constructs for fruit intake, vegetable intake, and physical activity.

Table 5 reveals that all six variables for parenting warmth had statistically significant correlations, which provides support for grouping them into one latent construct for fathers' warmth. The six items measured: 1) affection: "I physically express affection to my child (e.g. hugging, kissing holding)," 2) interest: "I encourage my child to talk about his/her troubles," 3) acceptance: "I encourage my child to freely express him/herself even when disagreeing with parents," 4) "I listen when my child has something to say", 5) "I have warm and intimate times together with my child," and 6) comfort: "I give comfort and show understanding when my child is upset."

When modeling the coparenting EBRB and father-child EBRB congruence latent constructs, there was a larger proportion of missing data from mothers compared to fathers. For example, while fathers had *n*=124 complete cases (64%), mothers had *n*=87 complete cases (45%). Table 6 reveals significant associations among father-, mother-, and youth-reported

EBRB congruence. Because there was a greater number of significant associations between father- and mother-reported EBRB congruence, evidence supports separating EBRB congruence into two separate latent constructs for coparenting EBRB congruence and father-child EBRB congruence.

Table 7 reveals youth vigorous physical activity level was significantly associated with youth moderate physical activity level. Also, youth biological sex was significantly associated with youth vigorous physical activity level.

Table 4. *Fathers' Expectations and Role Modeling Spearman Correlations (n=193)*

	1	2	3	4	5	6	7	8	9
1. ff1	--								
2. fv1	0.48**	--							
3. fp1	0.26**	0.24*	--						
4. ff2	-0.05	-0.06	-0.02	--					
5. ff3	-0.01	-0.04	0.08	0.58**	--				
6. fv2	-0.05	0.15*	-0.01	0.40**	0.42**	--			
7. fv3	0.02	0.12	0.09	0.37**	0.53**	0.57**	--		
8. fp2	-0.19	-0.17	-0.04	0.25*	0.31**	0.20*	0.15*	--	
9. fp3	-0.04	-0.14	-0.05	0.23*	0.29**	0.18*	0.13*	0.52**	--

**$p \leq .001$; *$p \leq .05$

Box 1: ff1=Fruit expectation; fv1=Vegetable expectation; fp1=Physical activity expectation

Box 2: ff2-ff3=Fruit role modeling; fv2-fv3=Vegetable role modeling; fp2-fp3=Physical activity role modeling. For measure items, please see Appendices C and D.

Table 5. *Fathers' Warmth Spearman Correlations (n=193)*

	1	2	3	4	5	6
1. fps2	--					
2. fps5	0.55**	--				
4. fps13	0.40**	0.57**	--			
5. fps14	0.43**	0.62**	0.65**	--		
6. fps18	0.44**	0.50**	0.46**	0.46**	--	
7. fps26	0.45**	0.49**	0.48**	0.56**	0.41**	--

**$p \leq .001$

fps2-fps26 measured fathers' warmth. For measure items, please see Appendix E.

Table 6. *Family EBRB Congruence Spearman Correlations (n=193)*

	1	2	3	4	5	6	7	8	9	13	14	15	16	17	18
1. fdp1	--														
2. fdp2	0.83**	--													
3. fdp6	0.40**	0.53**	--												
4. fdc1	0.53**	0.56**	0.55**	--											
5. fdc2	0.44**	0.48**	0.53**	0.88**	--										
6. fdc6	0.31**	0.39**	0.58**	0.60**	0.51**	--									
7. mdp1	0.43**	0.38*	0.29*	0.33*	0.34*	0.15	--								
8. mdp2	0.40**	0.37*	0.26*	0.32*	0.37**	0.15	0.92**	--							
9. mdp6	0.38**	0.30*	0.28*	0.15	0.19*	0.07	0.57**	0.57**	--						
13. cdp1	-0.03	-0.04	0.08	0.13*	0.08*	0.02*	0.11	0.07	0.13	--					
14. cdp2	-0.08	-0.05	0.12	0.09*	0.04*	0.02*	0.09	0.04	0.07	0.87**	--				
15. cdp6	-0.09	-0.07	0.16*	0.08*	0.14*	0.03*	0.04	0.07	0.04	0.53**	0.62**	--			
16. cdf1	0.01	-0.01	0.04	0.11*	0.07	0.02	0.07	0.05	0.09	0.59**	0.56**	0.48**	--		
17. cdf2	-0.06	-0.04	0.04	0.05	0.03	0.0	0.03	0.02	0.08	0.57**	0.58**	0.35**	0.79**	--	
18. cdf6	-0.12	-0.03	0.21*	0.07	0.11	0.20*	0.03	0.08	0.02	0.42**	0.54**	0.59**	0.58**	0.55**	--

**$p \leq .001$; *$p \leq .05$

Box 1: Father's report; Box 2: Mother's report; Box 3: Youth report. For measure items, please see Appendices F to I.

Table 7. *Covariates and Youth Health Outcomes Spearman Correlations (n=193)*

	1	2	3	4	5	6
1. ndf	--					
2. ndv	0.14	--				
3. cpat1	0.16	0.09	--			
4. cpat2	0.09	0.07	0.52**	--		
5. cage	-0.08	0.07	0.07	0.09	--	
6. csex	0.10	0.06	-0.12*	-0.08	-0.05	--

**$p \leq .001$; *$p \leq .05$

Box 1: Youth outcomes; Box 2: Youth demographics. For measure items, please see Appendix A.

Confirmatory Model Results

Step 1: Confirmatory Measurement Models Results

As mentioned previously, three separate measurement models were created to assess model fit for each moderator. The first measurement model was performed for the Warmth latent moderator model. A priori covariances of residuals were identified for fathers', mothers', and youth's report of EBRB congruence. Due to convergence issues for the Coparenting Congruence and Father-Child Congruence structural models, however, the a priori covariance of residuals were replaced with significant Chi-Square modification indices suggestions using a univariate modification strategy based on theory (Byrne, 2012). Specifically, the Coparenting and Father-Child Congruence measurement models only included modification indices suggestions that included a prioritized covariances.

Assuming the theorized causal mechanisms were accurate and based on the measurement models' acceptable fit, there were no statistical reasons to reject the measurement models' factorial validity. As such, the models' acceptable fit of the data justified performing the confirmatory structural analyses. See Table 8.

Table 8. *Measurement Models Chi-Squares, Degrees of Freedom, and Fit Indices*

Model	χ^2	df	RMSEA	CFI	SRMR
Warmth Measurement Model[a]	760.546	516	.048	.906	.080
Coparenting Congruence Measurement Model[b]	695.817	517	.041	.931	.066
Father-Child Congruence Measurement Model[c]	695.817	517	.041	.931	.066

[a]A priori residual covariances were included for fathers', mothers', and youth's report of EBRB congruence.
[b, c]Modification indices were included (instead of a priori) for fathers', mothers', and youth's report of EBRB congruence. Suggested residual covariances were only included if they were part of the a priori theorized list.

Step 2: Confirmatory Structural Model Results (Fathers' Warmth)

The confirmatory structural analyses tested the theorized causal associations for research questions 1-4 regarding the moderating effects of fathers' warmth on fathers' role modeling and expectations for their youth's EBRBs. Three regressions were performed simultaneously for each youth outcome. See Table 9 and Figure 5. The first regression revealed fathers' role modeling of fruit intake did not significantly predict youth fruit intake β=0.140, *p*=.103 and fathers' expectation for youth fruit intake did not significantly predict youth fruit intake β=0.054, *p*=.394. Fathers' warmth did not significantly moderate fruit role modeling β=0.045, *p*=.505 nor fathers' expectations for youth fruit intake β=0.087, *p*=.199.

The second regression revealed fathers' role modeling of vegetable intake did not significantly predict youth vegetable intake β=0.180, *p*=.059 and fathers' expectation for youth vegetable intake did not significantly predict youth vegetable intake β=0.123, *p*=.094. Fathers' warmth significantly moderated vegetable role modeling β=0.263, *p*=.019 but did not significantly moderate fathers' expectations for youth vegetable intake β=-0.036, *p*=.753.

The third regression revealed fathers' role modeling of physical activity significantly predicted youth moderate-to-vigorous physical activity β=0.363, *p*=.009 but fathers' expectation

for youth physical activity did not significantly predict youth moderate-to-vigorous physical activity β=-0.047, *p*=.643. Fathers' warmth did not significantly moderate fathers' physical activity role modeling β=0.093, *p*=.446 and did not significantly moderate fathers' expectations for youth physical activity β=-0.081, *p*=.446. Youth biological sex significantly predicted youth moderate-to-vigorous physical activity β=-0.211, *p*=.005.

Table 9. *Confirmatory Structural Latent Moderation Standardized Results (Fathers' Warmth)*

Variable	Model 1		Model 2		Model 3	
	β	SE	β	SE	β	SE
Fruit Intake Role Modeling	.140	.085				
Fruit Intake Expectations	.054	.064				
Vegetable Intake Role Modeling			.180	.095		
Vegetable Intake Expectations			.123	.074		
Physical Activity Role Modeling					**.363***	.140
Physical Activity Expectations					-.047	.102
Fathers' Warmth	-.081	.136	-.031	.157	.032	.172
Coparenting EBRB Congruence	-.039	.150	.018	.057	-.047	.083
Father-Child EBRB Congruence	.043	.156	.020	.089	.101	.108
Interactions						
Fruit Role Modeling X Warmth	.045	.067				
Fruit Expectations X Warmth	.087	.068				
Vegetable Role Modeling X Warmth			**.263***	.112		
Vegetable Expectations X Warmth			-.036	.116		
Physical Activity Role Modeling X Warmth					.093	.123
Physical Activity Expectations X Warmth					-.081	.106
Covariates						
Youth Age	-.077	.073	.119	.073	.131	.098
Youth Biological Sex	.068	.077	.046	.072	**-.211***	.075

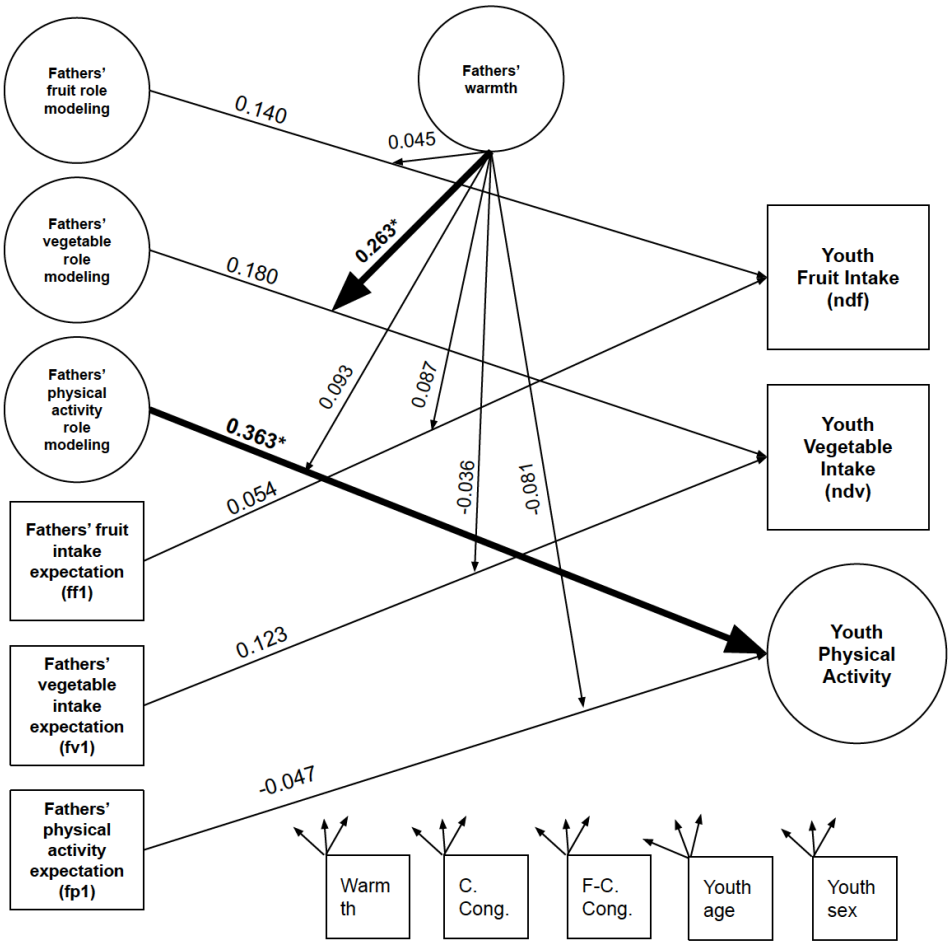
* $p \leq .05$; Referent category for youth biological sex = Male

Model 1: Dependent variable = Youth fruit intake

Model 2: Dependent variable = Youth vegetable intake

Model 3: Dependent variable = Youth moderate-to-vigorous physical activity

Figure 5. *Structural Model Standardized Factor Loadings (Fathers' Warmth)*



All path coefficients were standardized (STDYX). Control variables were added for the moderators, youth age, and youth biological sex. For brevity, the following were not illustrated: 1) path coefficients for controls, 2) indicators for latent factors, and 3) exogenous errors for all indicators. *$p \leq .05$

Step 3: Confirmatory Structural Model Results (Coparenting EBRB Congruence)

The confirmatory structural analyses tested the theorized causal associations for research questions 1-2 and 5-6 regarding the moderating effects of coparenting EBRB congruence on fathers' role modeling and expectations for their youth's EBRBs. Three regression models were performed simultaneously for each youth outcome. See Table 10 and Figure 6. The first

regression model revealed fathers' role modeling of fruit intake did not significantly predict youth fruit intake β=0.142, *p*=.103 and fathers' expectation for youth fruit intake did not significantly predict youth fruit intake β=0.066, *p*=.286. Coparenting EBRB congruence did not significantly moderate fruit role modeling β=-0.086, *p*=.568 nor fathers' expectations for youth fruit intake β=-0.061, *p*=.446.

The second regression model revealed fathers' role modeling of vegetable intake did not significantly predict youth vegetable intake β=0.183, *p*=.133 and fathers' expectation for youth vegetable intake did not significantly predict youth vegetable intake β=0.138, *p*=.099. Coparenting EBRB congruence did not significantly moderate vegetable role modeling β=0.099, *p*=.487 and did not significantly moderate fathers' expectations for youth vegetable intake β=-0.069, *p*=.432. Youth age did significantly predict youth vegetable intake β=0.148, *p*=.037.

The third regression model revealed fathers' role modeling of physical activity significantly predicted youth moderate-to-vigorous physical activity β=0.434, *p*=.002 but fathers' expectation for youth physical activity did not significantly predict youth moderate-to-vigorous physical activity β=-0.072, *p*=.467. Coparenting EBRB congruence did not significantly moderate fathers' physical activity role modeling β=-0.102, *p*=.502 and did not significantly moderate fathers' expectations for youth physical activity β=-0.039, *p*=.792. Youth biological sex significantly predicted youth moderate-to-vigorous physical activity β=-0.189, *p*=.023.

Table 10. *Confirmatory Structural Latent Moderation Standardized Results (Coparenting EBRB Congruence)*

Variable	Model 1		Model 2		Model 3	
	β	SE	β	SE	β	SE
Fruit Intake Role Modeling	.142	.087				
Fruit Intake Expectations	.066	.062				
Vegetable Intake Role Modeling			.183	.122		
Vegetable Intake Expectations			.138	.083		
Physical Activity Role Modeling					**.434***	.143
Physical Activity Expectations					-.072	.099
Fathers' Warmth	.039	.093	-.104	.082	-.150	.110
Coparenting EBRB Congruence	.053	.182	.213	.193	.314	.296
Father-Child EBRB Congruence	-.011	.109	-.043	.105	-.066	.115
Interactions						
Fruit Role Modeling X Coparenting EBRB Congruence	-.086	.151				
Fruit Expectations X Coparenting EBRB Congruence	-.061	.080				
Vegetable Role Modeling X Coparenting EBRB Congruence			.099	.142		
Vegetable Expectations X Coparenting EBRB Congruence			-.069	.088		
Physical Activity Role Modeling X Coparenting EBRB Congruence					-.102	.152
Physical Activity Expectations X Coparenting EBRB Congruence					-.039	.148
Covariates						
Youth Age	-.078	.074	**.148***	.071	.157	.092
Youth Biological Sex	.082	.073	.061	.070	**-.189***	.083

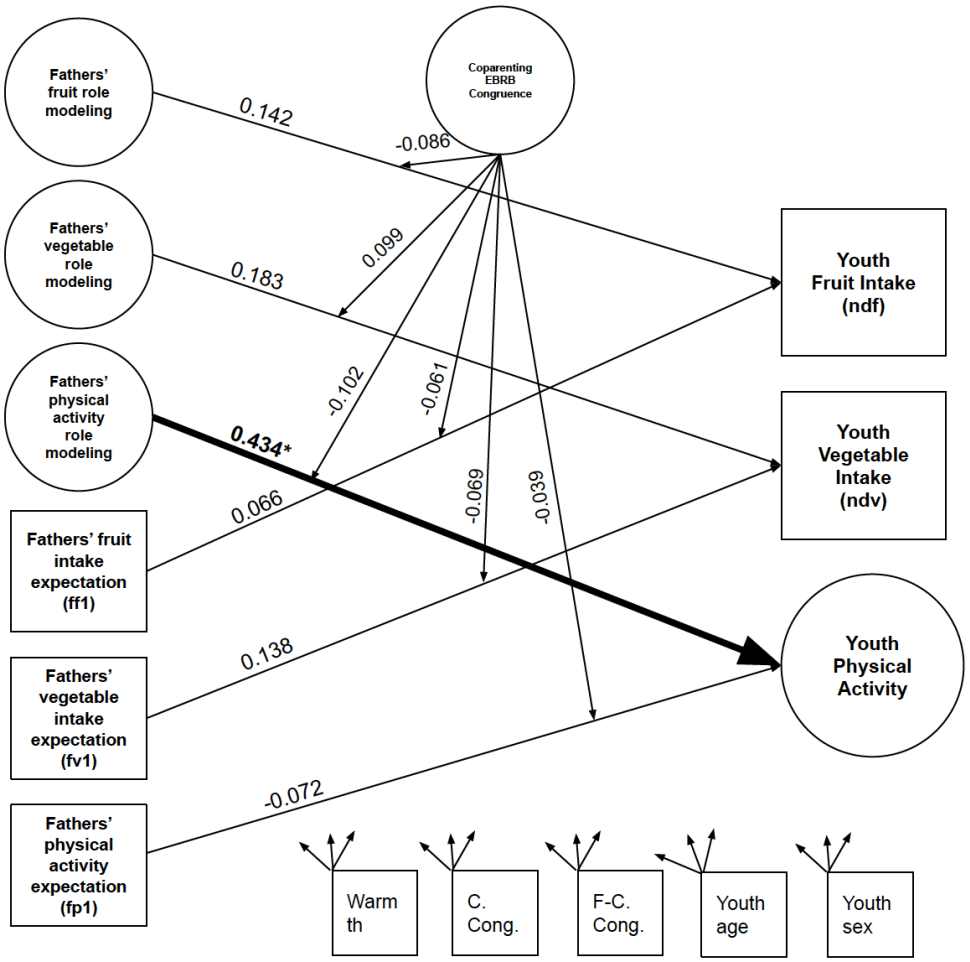
* $p \leq .05$; Referent category for youth biological sex = Male

Model 1: Dependent variable = Youth fruit intake

Model 2: Dependent variable = Youth vegetable intake

Model 3: Dependent variable = Youth moderate-to-vigorous physical activity

Figure 6. *Structural Model Standardized Factor Loadings (Coparenting EBRB Congruence)*



All path coefficients were standardized (STDYX). Control variables were added for the moderators, youth age, and youth biological sex. For brevity, the following were not illustrated: 1) path coefficients for controls, 2) indicators for latent factors, and 3) exogenous errors for all indicators. *$p \leq .05$

Step 4: Confirmatory Structural Results (Father-Child EBRB Congruence)

The confirmatory structural analyses tested the theorized causal associations for research questions 1-2 and 7-8 regarding the moderating effects of father-child EBRB congruence on fathers' role modeling and expectations for their youth's EBRBs. Three regression models were performed simultaneously for each youth outcome. See Table 11 and Figure 7. The first

regression model revealed fathers' role modeling of fruit intake did not significantly predict youth fruit intake β=0.143, *p*=.103 and fathers' expectation for youth fruit intake did not significantly predict youth fruit intake β=0.063, *p*=.310. Father-child EBRB congruence did not significantly moderate fruit role modeling β=-0.025, *p*=.798 and did not significantly moderate fathers' expectations for youth fruit intake β=-0.062, *p*=.400.

The second regression model revealed fathers' role modeling of vegetable intake did not significantly predict youth vegetable intake β=0.181, *p*=.084 and fathers' expectation for youth vegetable intake did not significantly predict youth vegetable intake β=0.144, *p*=.146. Father-child EBRB congruence did not significantly moderate vegetable role modeling β=0.036, *p*=.847 and did not significantly moderate fathers' expectations for youth vegetable intake β=-0.148, *p*=.360. Youth age did significantly predict youth vegetable intake β=0.157, *p*=.029.

The third regression model revealed fathers' role modeling of physical activity did significantly predict youth moderate-to-vigorous physical activity β=0.431, *p*=.003 but fathers' expectation for youth physical activity did not significantly predict youth moderate-to-vigorous physical activity β=-0.055, *p*=.574. Father-child EBRB congruence did not significantly moderate fathers' physical activity role modeling β=-0.041, *p*=.713 and did not significantly moderate fathers' expectations for youth physical activity β=0.081, *p*=.392. Youth biological sex did significantly predict youth moderate-to-vigorous physical activity β=-0.194, *p*=.020.

Table 11. *Confirmatory Structural Latent Moderation Standardized Results (Father-Child EBRB Congruence)*

Variable	Model 1		Model 2		Model 3	
	β	SE	β	SE	β	SE
Fruit Intake Role Modeling	.143	.088				
Fruit Intake Expectations	.063	.062				
Vegetable Intake Role Modeling			.181	.105		
Vegetable Intake Expectations			.144	.099		
Physical Activity Role Modeling					**.431***	.143
Physical Activity Expectations					-.055	.098
Fathers' Warmth	.054	.093	-.092	.086	-.141	.115
Coparenting EBRB Congruence	-.055	.141	.171	.156	.249	.183
Father-Child EBRB Congruence	.092	.162	.084	.133	-.177	.166
Interactions						
Fruit Role Modeling X Father-Child EBRB Congruence	-.025	.097				
Fruit Expectations X Father-Child EBRB Congruence	-.062	.073				
Vegetable Role Modeling X Father-Child EBRB Congruence			.036	.186		
Vegetable Expectations X Father-Child EBRB Congruence			-.148	.162		
Physical Activity Role Modeling X Father-Child EBRB Congruence					-.041	.112
Physical Activity Expectations X Father-Child EBRB Congruence					.081	.094
Covariates						
Youth Age	-.076	.072	**.157***	.072	.161	.090
Youth Biological Sex	.082	.074	.059	.070	**-.194***	.083

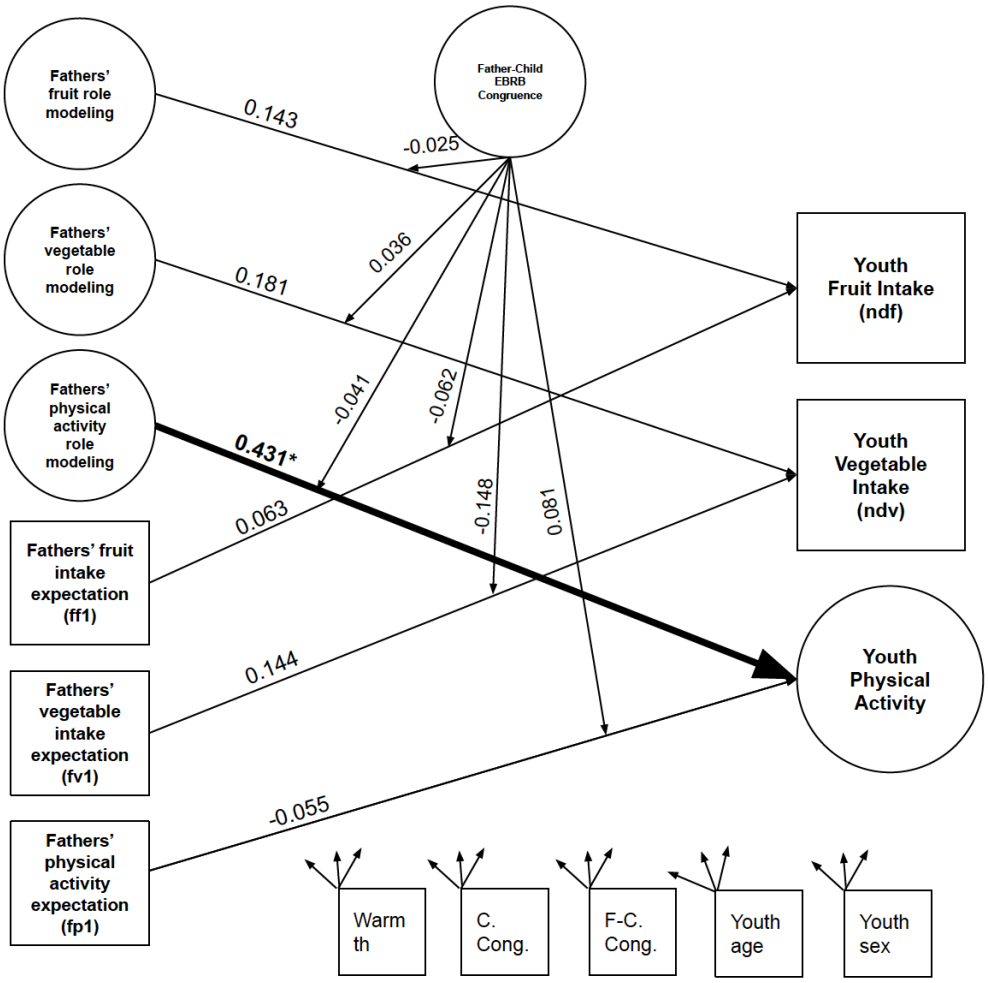
* $p \leq .05$; Referent category for youth biological sex = Male

Model 1: Dependent variable = Youth fruit intake

Model 2: Dependent variable = Youth vegetable intake

Model 3: Dependent variable = Youth moderate-to-vigorous physical activity

Figure 7. *Structural Model Standardized Factor Loadings (Father-Child EBRB Congruence)*



All path coefficients were standardized (STDYX). Control variables were added for the moderators, youth age, and youth biological sex. For brevity, the following were not illustrated: 1) path coefficients for controls, 2) indicators for latent factors, and 3) exogenous errors for all indicators. *$p \leq .05$

Summary of Results

Regarding the study's primary objective, evidence suggests we must fail to reject hypothesis 1c. First, in all three interaction models, fathers' physical activity role modeling significantly predicted youth moderate-to-vigorous physical activity. Fathers' role modeling of

fruit and vegetable intake, however, was not significantly predictive of youth fruit and vegetable intake and moderate-to-vigorous physical activity. Also, fathers' expectations for youth fruit and vegetable intake and physical activity was not significantly predictive of youth fruit and vegetable intake and moderate-to-vigorous physical activity.

For the study's secondary objective, evidence suggests we must fail to reject hypothesis 3b. Fathers' warmth significantly moderated the association between fathers' vegetable intake role modeling and youth vegetable intake. Coparenting EBRB congruence and father-child EBRB congruence did not significantly predict youth outcomes.

When analyzing the covariates, youth age was significantly predictive of youth vegetable intake. With an increase in age, youth reported eating more vegetables compared to younger youth. In addition, youth female biological sex had an inversely significant association with youth moderate-to-vigorous physical activity.

CHAPTER IV: DISCUSSION

In this study, I investigated the associations between Latinx fathers' healthy parenting involvement and youth energy-balance related behaviors. The primary objective was to research two specific components: 1) To what extent is fathers' EBRB role modeling related to youth fruit/vegetable intake and moderate-to-vigorous physical activity? and 2) To what extent is fathers' EBRB expectation for their youth's EBRBs related to youth fruit/vegetable intake and moderate-to-vigorous physical activity? The secondary objective was to research: 1) To what extent does fathers' warmth, 2) coparenting EBRB congruence, and 3) father-child EBRB congruence moderate the associations between fathers' EBRB role modeling/expectations and youth fruit/vegetable intake and moderate-to-vigorous physical activity?

As was hypothesized, fathers' warmth provided a *context* that significantly moderated the associations between fathers' role modeling and youth physical activity. Fathers' warmth may be an important context in which role modeling has greater potential to positively influence youth physical activity. The results of this study show that fathers' warmth significantly moderated the associations between fathers' physical activity role modeling and youth moderate-to-vigorous physical activity. While previous research has highlighted fathers' hands-on caregiving role as nurturer (Marsiglio & Roy, 2012), this study compliments this study by providing evidence to suggest that warmth and nurturance may also be a context that can explain when children can expect to achieve positive health outcomes. Dowd writes, "Nurture...means more than simply doing; it also means the *manner* [emphasis mine] in which things are done, and their results for children" (Dowd, 2000). If so, warmth and nurturance may be conceptualized as both a context and a hands-on caregiving behavior, which can expand our understanding of father involvement.

The significant findings from this study align with previous research suggesting that fathers' warmth and caring may be a key variable for daughters' fruit and vegetable intake (Berge, Wall, Loth, et al., 2010). In particular, prior research found that fathers with high emotional responsiveness and less home structure created conditions where daughters consumed more vegetable and fruits (Berge, Wall, Loth, et al., 2010). Prior research has also suggested the social-affective context surrounding the presentation of foods to children influences the creation of child food preferences (Birch et al., 1980). Specifically, as children received food in the context of a reward, they were more likely to eat that particular food (Birch et al., 1980). Children's food intake patterns may partially stem from the social-affective context that fathers create within the family system. In short, fathers can foster an emotional context that supports the intake of certain foods. Along with fostering warm relationships, fathers' role modeling is another important factor that can influence youth outcomes.

The study also found that fathers' physical activity role modeling significantly predicted youth physical activity. The other role modeling predictors did not significantly predict youth outcomes. Several considerations may be pertinent to these findings. First, perhaps Latinx fathers' prioritized physical activity role modeling over food-related role modeling due to cultural expectations for fathers to be involved in physical activities and mothers to be involved with food-related activities (O'Connor et al., 2018). Second, perhaps role modeling does not perform consistently across all organisms as social cognitive theory appears to suggest (Bandura, 1986b).

Also, fathers' expectations did not significantly predict youth outcomes. While previous Padres research had found fathers do have healthy expectations for their youth (Zhang et al., 2018), the measurement of expectation included just one indicator. Prior research of Palkovitz's

domains of father involvement differentiate between *overt* and *covert* cognitions (Green & Chuang, 2021). Overt cognitions include reasoning with youth and covert cognitions include thinking about youth's needs (Green & Chuang, 2021). The indicators used for this study measured covert cognition by asking, "How many cups of fruit/vegetables do you want your child to eat in a day?" or "How much time do you want your child to be physically active in a day?" Perhaps this study did not find cognitions to significantly predict youth outcomes due to a lack of indicators that measured overt and covert dimensions of cognitions.

Further, coparenting EBRB congruence and father-child EBRB congruence did not significantly moderate the associations between fathers' involvement and youth outcomes. It should be noted that only one indicator was measured for each respondent per health outcome. For example, for father-child EBRB congruence, only two items were loaded onto the latent factor per health outcome (e.g. "How often do you disagree with your child about his or her fruit intake" and "How often do you disagree with your father about your fruit intake?"). Perhaps more indicators were needed to better measure the latent factors for coparenting and father-child EBRB congruence.

Regarding covariates, this study reveals the differential effects of youth biological sex within the family system. The results showed that youth who were biologically male reported significantly higher moderate-to-vigorous physical activity compared to females. Perhaps fathers' involvement within the family system had differential effects on their youth based on cultural expectations for males and female. Recent research discovered Latinx male youth engaged in more moderate-to-vigorous physical activity compared to females (Evenson et al., 2019). Also, previous Mexican-heritage research has found that fathers reported interacting in more activities with their sons than daughters (McClendon et al., 2021).

The results of this father involvement study have implications for research, theory, programs, and policy. These implications can strengthen our understanding of the ways fathers relate to their children. Also, the implications can help our U.S. society partially address obesogenic health disparities among Latinx families.

Implications

Implications for Research

This study provides implications for research. More studies that include fathers in child obesogenic studies are needed (Davison et al., 2016). Grounding father involvement in a particular context, such as health and nutrition, increases understanding about the ways Latinx fathers influence their children's vegetable intake and moderate-to-vigorous physical activity. This understanding fills an important gap by providing evidence regarding the ways that Latinx fathers shape youth's dietary intake and physical activity, which are important components of routine family life (Daly, 2003). Given the suggestive and significant findings from this study, Latinx fathers can influence youth physical activity behaviors, which provides evidence to encourage future interventions to include Latinx fathers in the design of their research studies.

Methodologically, including observations from fathers, mothers, and youth, the study increased differing family perspectives. By including multiple perspectives within the family system, the study provides more rigor to the findings. Sometimes fathers are not represented in obesity prevention efforts (Davison et al., 2016). Recruitment of fathers can be challenging given that fathers have demanding work schedules, which can be a barrier of program engagement (Garcia-Huidobro et al., 2016). The Padres program's intentional focus on including fathers is an approach that is worth considering for future pediatric obesity prevention initiatives. By

including more members of the family system, future research can better understand the dynamics involved in preventing obesity.

Implications for Theory

This study provides implications for theory. The results from this study contribute to our understanding of father involvement in the context of nutrition and physical activity. This investigation extends the discussion on father involvement literature by testing Palkovitz conceptual framework including affect, behaviors, and cognition (Green & Chuang, 2021; Palkovitz, 1997, 2019; Toth & Xu, 1999). Previous research using nationally-representative data compared between group father involvement differences for African American, Latinx, and White fathers and discovered Latinx fathers were more likely to monitor and spend time with their children compared to White fathers (Toth & Xu, 1999). Palkovitz's conceptual model has also been tested qualitatively with Afro-Jamaican fathers (Green & Chuang, 2021). Building upon Palkovitz's, Toth's, and Green's research, this dissertation focuses on Latinx fathers and the extent to which affect, behaviors, and cognitions shape youth energy balance-related behaviors.

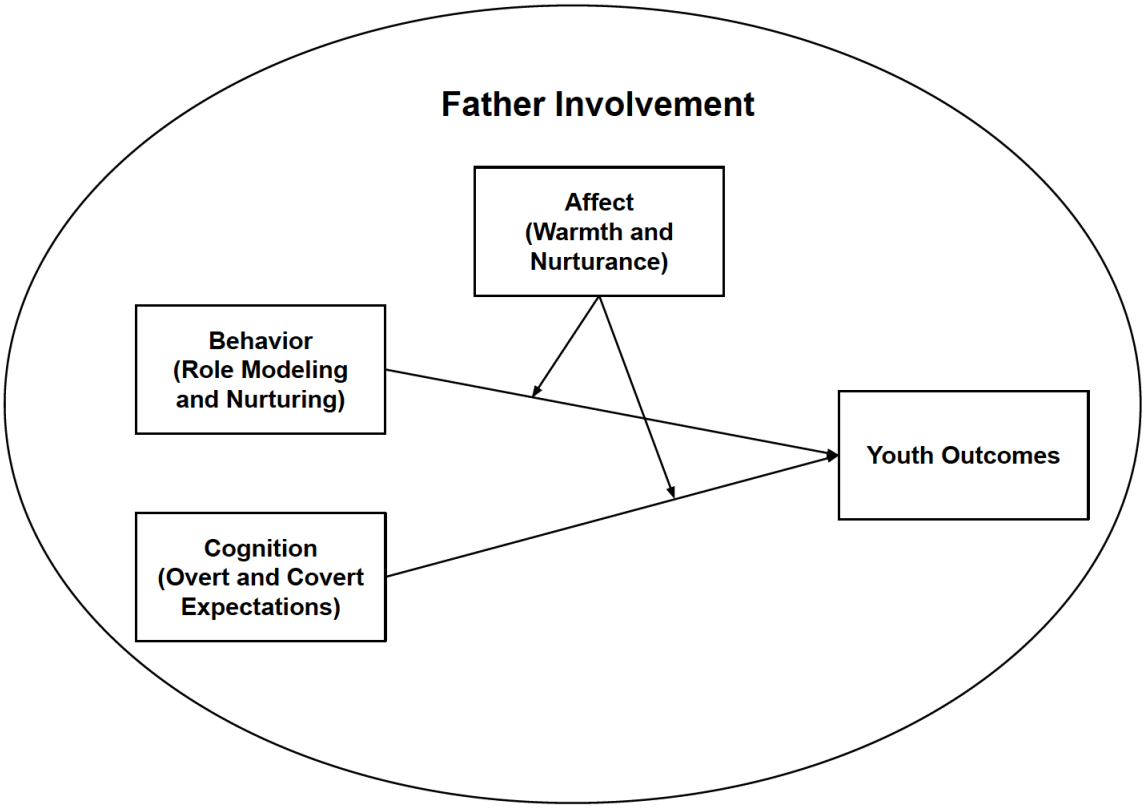
This study expands researchers' applications of family systems theory. The findings of this study shed light upon the father-child subsystem within the context of physical activity. This study found that Latinx fathers' influenced their youth's physical activity levels. Perhaps fathers' positive and negative feedback regarding physical activity prompted their youth to respond in ways that achieved the desired effect of more moderate-to-vigorous physical activity. Previous qualitative research found that Latinx fathers promoted their youth's physical activity by "pushing him to play" or asking "Why don't you go to the park and run" (Zhang et al., 2018).

Having warm relationships with youth can be helpful as fathers seek to support their youth's vegetable intake. From a family systems perspective, having warm relationships may be

a key factor in the father-child subsystem. The warmth and caring daughters feel from their fathers may be an important factor for female adolescents fruit and vegetable intake (Berge, Wall, Loth, et al., 2010). As youth respond to their fathers' warmth, perhaps the parent-child subsystem can move toward homeostasis whereby fathers and youth share in the common family goal of consuming more vegetables.

When conceptualizing father involvement in the family system, researchers may consider operationalizing fathers' warmth/nurturance as a *behavior* and/or a *context*. While fathers' caretake their children in nurturing ways, such as role modeling vegetable intake, warmth/nurturance may also be a context that fathers create to enhance engagement with their children. As fathers create warm relationships with their children (e.g. appropriate physical affection), fathers can create healthy family system contexts for their children to consume vegetables. Building upon the work of Palkovitz, Marsiglio, and Roy (Marsiglio & Roy, 2012; Palkovitz, 1997), perhaps father involvement can be conceptualized with affect as both a moderator and a predictor (i.e. nurturing) of youth health outcomes. This study provides evidence of affect (e.g. warmth and nurturance) as a moderating context. Marsiglio and Roy discuss fathers' nurturing role as a behavior. As such, Figure 8 illustrates that nurturance/nurturing can be hypothesized conceptually as both a behavior and a moderating context of father involvement. In addition, Figure 9 adds multiple dimensions of overt and covert cognitions (i.e. expectations), given that this study did not find significant effects with just covert cognitions.

Figure 8. *Hypothesized Re-Conceptualization of Father Involvement Domains*



The study's significant finding regarding warmth increases our understanding of social cognitive theory and how children learn when interacting with their fathers. Parents who provide warmth and consideration of a child's developmental capacity may increase the child's capacity for regulating intake behaviors (Rhee et al., 2006). In contrast, parents lacking warmth may create strict rules regarding intake behaviors (e.g. "clean your plate or else") that reinforce eating behaviors based on external cues as oppose to internal cues (Rhee et al., 2006). Children having authoritarian (i.e. lower warmth and higher expectations), permissive (i.e. higher warmth and lower expectations), and neglectful (i.e. lower warmth and lower expectations) parents can be significantly at greater risk of overweight compared with authoritative parents (i.e. higher warmth and higher expectations) (Rhee et al., 2006).

Warmth may operate differently among involved versus uninvolved fathers. For example, while lower maternal sensitivity (but not lower paternal sensitivity) has been found to be significantly associated with adolescent obesity, the fathers in the study were required to be actively engaged in the study (Neal Davis et al., 2011). If the program had allowed fathers who were unengaged in the study to participate, perhaps lower warmth may have been significantly predictive of adolescent obesity among lower engaged fathers compared to more engaged fathers.

It is noteworthy that the latent constructs for coparenting EBRB congruence and father-child EBRB congruence did not reveal statistically significant results. From a family systems perspective, theory would suggest that more congruence would lead to equilibrium. For example, as coparents increase their agreement on the amounts of fruit and vegetable intake their youth consume, the family system would find balance. The results from this study, however, do not provide evidence that EBRB congruence plays a significant role in moderating the associations between fathers' involvement and youth fruit/veggie intake and moderate-to-vigorous physical activity.

One observation from Table 6 is the significant associations between mothers' report of EBRB coparenting congruency and fathers' report of EBRB coparenting congruency. In contrast, there are fewer significant associations between the youths' report of EBRB coparenting congruence than those reported by fathers and mothers. Previous research has found discrepancies between fathers' report and youths' report of EBRB behaviors, which may partially explain this discrepancy (Zhang, Baltaci, et al., 2020). Can congruence between fathers and mothers be a form of homeostasis as the coparenting subsystem seeks to increase healthy dietary intake and physical activity within the family system?

This study also contributes to our understanding of social cognitive theory's conceptualization of fathers' role modeling. The findings revealed fathers' physical activity role modeling significantly predicted youth moderate-to-vigorous physical activity. While Bandura's work has emphasized that role modeling is a powerful influence, this study reveals that Latinx fathers have the ability to influence their children's physical activity. Bandura explains that role modeling can aid mastery of complex skills. As fathers provide social cues to their children, such as going outside and playing soccer, children learn about the importance of engaging in an active lifestyle.

More research is needed to understand whether Latinx fathers' role modeling of fruit and vegetable intake shapes youth fruit and vegetable intake. Research has suggested that discrimination can limit the quantity of resources and access to those resources that minoritized communities can expect to acquire (Coll et al., 1996). If fathers have limited access to fresh produce, then there may be less opportunity to role model fruit and vegetable intake. For example, low income Latinos in Pomona California may face challenges with finding stores with fresh produce within walking distance (Algert et al., 2006). As such, could discrimination have prevented Latinx fathers from accessing fresh fruits and vegetables due to environmental contexts, such as food deserts?

Implications for Programs and Policy

This study provides implications for programs and applied research. The results from this study provide evidence for government-funded programs seeking to support positive father-child relationships. For example, many Responsible Fatherhood programs have historically focused on fathers involved with child welfare or child support. Might Responsible Fatherhood programs consider funding programs that increase father-child engagement in the context of nutrition

education? Community health organizations in cooperation with the Supplemental Nutrition Assistance Program (SNAP Ed) may create nutrition education programs tailored for educating Latinx fathers about what their role can be with supporting their youth's vegetable intake.

One way local governments can support the needs of fathers and their adolescent youth is to support family-based physical activity programs. For example, departments of park services may consider funding family programs that include Spanish-speaking fathers and their children. Through creating family-based programs, physical activity programs can help fathers increase their involvement with their children. Through ongoing engagement with children through physical activity programs, fathers can have more opportunities to role model physical activity behaviors with their children and foster warm relationships. Also, fathers and their children can burn calories through engaging in the physical activities together, which can have long-term energy balance health implications.

One innovative family-based physical activity program is called Dads And Daughters Exercising and Empowered (DADEE) (Pollock et al., 2020). The 8-week DADEE program engaged fathers and daughters (ages 4 to 12) from Australia in fun cophysical activities, such as sports skills, rough and tumble play, and aerobic and muscular fitness (Morgan et al., 2019). The program also taught fathers how to improve their daughters' social-emotional well-being along with improving the quality of the father-daughter relationship. The program was guided by self-determination theory and social cognitive theory. To increase father participation, the program was offered after work hours and had male and female program facilitators to increase relatability. A randomized controlled trial of the DADEE program discovered that fathers participating in the intervention significantly increased their daughters' physical activity at post-test (Morgan et al., 2019). The randomized controlled trial of the DADEE program also

discovered the daughters participating in the intervention had a medium-to-large improvement in overall wellbeing (Young et al., 2019).

While government-funded programs have disproportionately focused on nonresidential fathers (Kim & Jang, 2018; Sarfo, 2018), this study included residential fathers. The majority of Latinx fathers in this study were married (85%) and were required to have at least three meals with the focal child per week to ensure consistent involvement. A national survey found that 82% of Latinx fathers in the U.S. were either married or cohabitating and 85% have children with only one partner (Karberg et al., 2017). Efforts to support the needs of residential Latinx fathers can provide critical support to ethnic minority families.

For fathers who struggle to show warmth and love to their children, community programs may consider establishing rapport between the program staff and the fathers in a nurturing and supportive program environment. A previous qualitative study of a father program found that men enjoyed a small group program format where they formed camaraderie with other men (Gallagher et al., 2014). Supportive program environments can teach fathers how to cultivate warm relationships with their children. These programmatic efforts to strengthen fathers' warmth can potentially help as fathers seek to influence their children's vegetable intake.

Programs seeking to help fathers engage with their youth regarding nutrition and physical activity may also consider innovative approaches to increase engagement, such as using text messaging (Grutzmacher et al., 2017). Nutrition education programs utilizing mobile technology have the potential to reach Latinx fathers who may struggle with demanding work schedules and need flexible options for program participation. During the COVID-19 pandemic, the Padres program adapted their in-person program to an online-only program delivery and discovered that 41% of fathers in the online-only program format had moderate-to-high program participation

compared to 69% of fathers who attended the in-person program prior to the pandemic (Hurtado Choque et al., 2022). Initiatives like these may have the possibility of reducing program participation barriers for Latinx fathers who seek to engage in nutrition education programs while managing hectic work schedules.

This study provides implications for policy. Descriptive statistics reveal 33% of the Latinx fathers in this sample reported low to moderate food security. Given that 60% of the fathers in this study reported annual household incomes of $34,999 or below, perhaps fathers struggled with having enough economic means to purchase fresh fruits for their youth. Research has shown that poverty can potentially be associated with food insecurity (Theodore et al., 2007). The recent efforts of the Biden Administration to expand the Child Tax Credits as part of the American Rescue Plan for economically disadvantaged households may be a key federal policy that Congress may consider re-funding (U.S. Department of the Treasury, 2021). The Children's Defense Fund has estimated the American Rescue Plan Act could potentially cut poverty for children of Latinx families by 45% (King, 2021). Given that the American Rescue Plan does not currently support undocumented U.S. residents, expanding the child tax credits benefits to include undocumented families can strengthen lower income family's access to expensive fruits. While the American Rescue Plan is one policy at the federal level that should be considered, there are also considerations for state and local government policies.

State Extension efforts can increase nutrition education to fathers through custom-tailored programs, such as Padres. Extension educators can create culturally relevant programs that support Latinx fathers' roles in influencing their children's energy balance-related behaviors, such as fruit and vegetable intake and moderate-to-vigorous physical activity. Also, local governments may consider supporting local farmers markets as vehicles for distributing fruits

and vegetables to families struggling with lower income (Sawyer-Morris et al., 2021). Allowing families to use supplemental nutrition assistance program credits (SNAP) at local farmers' markets may be one way to help increase Latinx families access to fruits and vegetables (Sawyer-Morris et al., 2021). By passing federal, state, and local policies, governments can address exogenous factors such as access to resources that can help families increase their healthy EBRBs.

Limitations

This study did not use a nationally representative sample and therefore it is not known how generalizable these results are for other Latinx families in different regions of the U.S. and abroad. Prior research has shown that fathers participating in the Padres program may over-report their healthy EBRBs compared to youth's report of father's healthy EBRBs (Zhang, Baltaci, et al., 2020) and underreport food insecurity compared to mothers' report of food insecurity (Nagao-Sato et al., 2021). Also, responses to the self-reported measures may be subject to social desirability bias.

The use of cross sectional data did not allow for assessing temporal changes in youth health outcomes (Hill, 1965). In addition, the data collection had issues with missing data and the patterns of missing data were missing at random. The study did not measure factors that may have influenced moderate-to-vigorous physical activity level, such as weather conditions (Dowda et al., 2017).

For two of the predictors measuring fathers' expectations for their youth's fruit and vegetable intake, the variable had four levels of ordinal data instead of five levels. Previous research has found that five response levels are needed when using the maximum likelihood estimator to Pearson product moment correlations (Dolan, 1994). Also, because Mplus does not

allow for treating exogenous factors using the CATEGORY ARE command, a decision was made to treat these two ordinal variables as continuous data given the theorized continuum of responses from low to high. Mplus allows for treating exogenous variables using dummy codes, but by doing so, the underlying continuum of responses from low to high would have been lost. As such, these two variables with four discrete ordinal levels were treated as continuous data in the study.

When performing the structural analysis, convergence was not achieved for one comprehensive model with all predictors, covariates, and moderator interactions together. The reason for a lack of convergence was due to a non-zero derivative of the observed data loglikelihood. Because of this, a step-approach was used to analyze each moderator separately. But when running the models for the coparenting congruence and father-child congruence models, convergence became an issue so the a priori congruence residual covariances were respecified using significant modification indices suggestions.

Future Directions

One future direction is to investigate the role of nurturance as both a context and a behavior of father involvement. While the results of this study found warmth as a significant moderator for Latinx fathers, future studies should investigate nurturance with other demographics, such as African American, Asian, and White fathers. When measuring fathers' warmth, researchers may consider including questions that include different dimensions of nurturing and nurturance. Also, researchers may consider measuring fathers' nurturance in nonresidential contexts (e.g. transnational fathering, incarceration, divorce/separation). See the Father Involvement Nurturance Scale (FINS) that I created (Appendix J) to capture numerous dimensions of nurturing (behaviors) and nurturance (context).

Another future direction is to perform exploratory research to investigate whether the two theorized moderators for coparenting EBRB congruence and father-child EBRB congruence act as mediators instead of moderators. Perhaps fathers' role modeling and expectations have direct effects on EBRB congruence and in return EBRB congruence has direct effects on youth fruit/vegetable intake and physical activity. Through performing exploratory research, this study can investigate how these two theorized latent constructs relate to youth health outcomes.

Given that the Padres program collected longitudinal data, future studies can run more complex structural equation models that measure changes in father involvement and child health outcomes over time. Further, while this study has focused on three EBRBs, the Padres data has collected other EBRBs, such as screen time behaviors and intake of sugary sweetened beverages. Future studies can look at how father involvement shapes these additional EBRBs.

More research is also needed that includes larger samples of Latinx fathers, mothers, and their children in the context of energy balance-related behaviors. Actor partner structural models (i.e. the influence fathers have on themselves, their partners, and their children) can provide an innovative way to capture the effects that fathers can have on their own EBRBs as well as the EBRBs of their partners and children. Mixed-methods designs can help researchers understand the processes, contexts, and meaning-making that fathers ascribe to shaping their children's energy balance-related behaviors.

More research is needed that centers the variation and diversity of lived experiences of Latinx fathers, as opposed to including Latinx fathers as a comparison group. Latinx families have unique cultural values and more research is needed to understand how these cultural influences, such as familismo contribute to the wellbeing of Latinx fathers and their families.

Also, more studies should include a variety of methods, such as qualitative ethnographies in order to understand how process, context, and meaning contribute to Latinx family EBRBs.

Given that the data collected from this study focused on the father-child dyadic relationship, future studies should include more the entire family system, such as mothers, grandparents (Xie et al., 2020), uncles and aunts, and siblings. By including more family member perspectives, researchers will have greater clarity on the causal pathways that shape Latinx youth energy balance-related behaviors.

Appendices

Please note: Measured variables used for this study are in bolded brackets.

Appendix A: Measure of Father's and Mother's Report of Demographics

This part asks some basic information about you, your child and your family.

1. Your sex:	2. How old are you? **[FAGE]**
O Male Female Other	_____years old

3. How many years have you lived in the U.S? **[FUS]**
_____years O I born in the U.S. If you were not born in the U.S., what is your country of birth? _____

4. What is your highest level of formal education? (mark only one) **[FEDU]**	5. What is your current employment status? (mark only one) **[FEMP]**
O I didn't go to school Primary school O Middle school High school O GED Some college or technical school Bachelor's degree Advanced degree	O Student Self-employed O Unemployed Employed part-time O Employed full-time Homemaker Retired

6. What is your current marital status? (mark only one) **[FMAR]**	7. What is your annual household income? (mark only one) **[FINC]**
O Single Married O Separated Divorced O Widowed Living with a partner	O Under $15,000 $15,000 to $24,999 O $25,000 to $34,999 $35,000 to $49,999 O $50,000 to $74,999 $75,000 to $99,999

8. How many children under the age of 18 live in your household?

_____ child(ren)

9. How many adults including yourself live in your household?

_____ adults

10. What languages are used in your household?

Native language only (Spanish or any language other than English)
More native language than English
Almost equal amount of native language and English
More English than native language
English only

11. Do you or anyone in your household participate in any of these programs? (mark all that apply)

WIC
SNAP (Supplemental Nutrition Assistance Program)
Free or reduced price foods at school
Minnesota Family Investment Program (also known as Cash Assistance)
None
I don't know

The next two statements are about the food eaten in your household and whether you were able to afford the food you need.

12. Within the past 12 months, we worried about whether our food would run out before we got money to buy more.

Often true
Sometimes true
Never true

13. Within the past 12 months, the food we bought just didn't last and we didn't have money to get more. **[FFS2]**

Often true
Sometimes true
Never true

In the past year, did you or anyone in your household participate in any classes, training, or other group activities for becoming a better parent?

Yes
No
I don't know

14. Have you or anyone in your household ever attended any of the following nutrition classes?

SNAP (Supplemental Nutrition Assistance Program (Food Stamps) education
EFNEP (Expanded Food and Nutrition Education Program)
WIC
Cooking Matters
Extension, community education or school nutrition course
Any other nutrition and/or fitness classes, please specify _____
I have not attended any such classes
I don't know

The following questions are about the child who is participating in this program. Please only think about this child when you answer these questions.

15. What is your relationship to the child participating in this study?

Father
Mother
Grandfather
Grandmother
Uncle
Aunt
Sibling
Guardian male
Guardian female
Other, please specify

_____

16. How concerned are you about your child's current weight as an adolescent?	17. How concerned are you about your child's future weight as an adult?
Not concerned at all	Not concerned at all
A little concerned	A little concerned
Quite concerned	Quite concerned
Very concerned	Very concerned

Appendix B: Measure of Youth's Report of Physical Activity

Youth moderate to vigorous physical activity (items 1 and 2)

In a usual week, how many hours do you spend doing the following activities?

1. Vigorous exercise (heart beats rapidly) each week **[CPAT1]**	
O None O Less than 30 minutes O 30 minutes-2 hours O 2 1/2-4 hours O 4 1/2-6 hours O 6+ hours	Examples: soccer, aerobic dancing, running, swimming laps, basketball, biking fast, tennis, skating, cross-country skiing
2. Moderate exercise (not difficult) each week **[CPAT2]**	
O None O Less than 30 minutes O 30 minutes-2 hours O 2 1/2-4 hours O 4 1/2-6 hours O 6+ hours	Examples: walking quickly, baseball, gymnastics, easy bicycling, volleyball, skiing, snowboarding…
3. Mild exercise (little effort) each week	
O None O Less than 30 minutes O 30 minutes-2 hours O 2 1/2-4 hours O 4 1/2-6 hours O 6+ hours	Examples: walking slowly (to school, to friend's house, etc.), light house chores

Appendix C: Measure of Father's Report of EBRB Role Modeling

Father's role modeling of fruit intake

For the questions below, please circle the number that best describes you or your child.

How many times in a week	Almost never or never	Less than once in a week	1-3 times in a week	4-6 times in a week	Once a day or more
1. does your child see you eating fruit? **[FF2]**	1	2	3	4	5
2. do you eat fruits with your child? **[FF3]**	1	2	3	4	5

Father's role modeling of vegetable intake

For the questions below, please circle the number that best describes you or your child.

How many times in a week	Almost never or never	Less than once in a week	1-3 times in a week	4-6 times in a week	Once a day or more
1. does your child see you eating vegetables? **[FV2]**	1	2	3	4	5
2. do you eat vegetables with your child? **[FV3]**	1	2	3	4	5

Father's role modeling of physical activity

For the questions below, please circle the number that best describes you or your child.

How many times in a week …	Almost never or never	Less than once in a week	1-3 times in a week	4-6 times in a week	Once a day or more
1. does your child see you being physically active? **[FP2]**	1	2	3	4	5
2. are you physically active with your child? **[FP3]**	1	2	3	4	5

Appendix D: Measure of Father's Report of Expectations for Youth

Father's expectations for youth fruit intake

3. How many cups of fruit do you want your child to eat in a day? **[FF1]**

O None

O 1 cup

O 2 cups

O 3 cups or more

O As many as he or she wants

*one cup of fruit equals one small apple, one large banana, or eight large strawberries.

Father's expectations for youth vegetable intake

3. How many cups of vegetables do you want your child to eat in a day? **[FV1]**

O None

O 1 cup

O 2 cups

O 3 cups or more

O As many as he or she wants.

*a cup of vegetables equals one large bell pepper, two large stalks of celery, or 3 spears of broccoli.

Father's expectations for youth physical activity level

3. How much time do you want your child to be physically active in a day? **[FP1]**

O	0 minutes
O	30 minutes or less
O	30 minutes to one hour
O	1 hour to 2 hours
O	2 hours or more
O	As much as he or she wants

Appendix E: Measure of Father's Report of Affect

Father's affection and warmth

The following statements ask about what you do with your child. Sometimes there may be statements you think are not applicable to you and your child. Please try to answer these questions as best as you can. At times, there may be questions for which you might think: "I would like to act this way, but in reality, I am not doing this." Please answer these questions by indicating what you are actually doing.

How often do you do following?	Almost never or never	Seldom	About half of time	Usually	Almost always or always
1. I give my child a lot of freedom to make up his/her own mind.	1	2	3	4	5
2. I physically express affection to my child (e.g., hugging, kissing, holding). **[FPS2]**	1	2	3	4	5
3. I provide instructions to my child for appropriate behavior.	1	2	3	4	5
4. I take my child's desires into account before asking my child to do something.	1	2	3	4	5
5. I encourage my child to talk about his/her troubles. **[FPS5]**	1	2	3	4	5
6. I respect my child's opinion and encourage him/her to express it.	1	2	3	4	5
7. I encourage my child to look at both sides of the issue.	1	2	3	4	5
8. I ask my child's opinion about decisions that will affect him or her.	1	2	3	4	5

How often do you do following?	Almost never/never	Seldom	About half of time	Usually	Always/almost always
9. I help my child understand the impact of behavior by encouraging him/her to talk about the consequences of his/her actions.	1	2	3	4	5
10. I explain to my child how I feel about his or her good and bad behavior.	1	2	3	4	5
11. When my child does something that is not allowed, I do not talk to him/her until he/she says he/she is sorry.	1	2	3	4	5
12. I am easy-going and relaxed with my child.	1	2	3	4	5
13. I encourage my child to freely express him/herself even when disagreeing with parents. **[FPS13]**	1	2	3	4	5
14. I listen when my child has something to say. **[FPS14]**	1	2	3	4	5
15. I tell my child how much I appreciate it when he/she helps me.	1	2	3	4	5

How often do you do following?	Almost never/never	Seldom	About half of time	Usually	Always/almost always
16. I take away privileges as punishment for misbehavior.	1	2	3	4	5
17. I have clear expectations for how my child should behave.	1	2	3	4	5
18. I have warm and intimate times together with my child. **[FPS18]**	1	2	3	4	5
19. I use physical punishment as a way of disciplining my child.	1	2	3	4	5
20. When I ask my child to do something, I expect him/her to do it	1	2	3	4	5

21. When my child has a friend over, I frequently check to see what they are doing.	1	2	3	4	5
22. I set and enforce rules.					
23. I help my child understand the impact of his/her behavior by talking about the consequences.					
24. I take into account my child's preferences when making family plans.					
25. I do not allow or tolerate behavior that is immature or problematic					
26. I give comfort and show understanding when my child is upset **[FPS26]**					

Appendix F: Measure of Father's and Mother's Report of Coparenting EBRB Congruence

Father's/mother's report of coparenting EBRB congruence (items 1, 2, 6)

How often do you disagree with your child's mother/father about …	Almost never or never	Rarely	Sometimes	Often	Almost always or always
1. your child's fruit intake? **[FDP1, MDP1]**	1	2	3	4	5
2. your child's vegetable intake? **[FDP2, MDP2]**	1	2	3	4	5
3. your child's intake of sugary drinks?	1	2	3	4	5
4. your child's intake of sweets or salty snacks?	1	2	3	4	5
5. your child's intake of fast foods?	1	2	3	4	5
6. your child's physical activities? **[FDP6, MDP6]**	1	2	3	4	5
7. your child's screen time?	1	2	3	4	5

Appendix G: Measure of Youth's Report of Coparenting EBRB Congruence

Youth's report of coparenting EBRB congruence (items 1, 2, 6)

How often does your FATHER disagree with your MOTHER about ...	Almost never or	Rarely	Sometimes	Often	Almost always
1. your fruit intake? **[CDP1]**	1	2	3	4	5
2. your vegetable intake? **[CDP2]**	1	2	3	4	5
3. your intake of sugary drinks?	1	2	3	4	5
4. your intake of sweets or salty snacks?	1	2	3	4	5
5. your intake of fast foods?	1	2	3	4	5
6. your physical activity? **[CDP6]**	1	2	3	4	5
7. your screen time?	1	2	3	4	5

Appendix H: Measure of Father's Report of Father-Child EBRB Congruence

Father's report of EBRB congruence with youth (items 1, 2, 6)

How often do you disagree with your child about ..	Almost never or never	Rarely	Sometimes	Often	Almost always or always
1. his or her fruit intake? **[FDC1]**	1	2	3	4	5
2. his or her vegetable intake? **[FDC2]**	1	2	3	4	5
3. his or her intake of sugary drinks?	1	2	3	4	5
4. his or her intake of sweets or salty snacks?	1	2	3	4	5
5. his or her intake of fast food?	1	2	3	4	5
6. his or her physical activities? **[FDC6]**	1	2	3	4	5
7. his or her screen time?	1	2	3	4	5

Appendix I: Measure of Youth's Report of Father-Child EBRB Congruence

Youth's report of EBRB congruence with father (items 1, 2, 6)

Intake means the amount and kind you eat or drink.

How often do you disagree with your FATHER about ...	Almost never or never	Rarely	Sometimes	Often	Almost always or always
1. your fruit intake? **[CDF1]**	1	2	3	4	5
2. your vegetable intake? **[CDF2]**	1	2	3	4	5
3. your intake of sugary drinks?	1	2	3	4	5
4. your intake of sweets or salty snacks?	1	2	3	4	5
5. your intake of fast foods?	1	2	3	4	5
6. your physical activity? **[CDF6]**	1	2	3	4	5
7. your screen time?	1	2	3	4	5

Appendix J: Father Involvement Nurturance Scale (FINS)

The following is a scale created by Matthew R. Rodriguez.

When thinking about your focal child this **past month**, please rate your experiences.	Almost never or never	Rarely	Sometimes	Often	Almost always or always
1. I physically express affection to my child (e.g. hugging, kissing, holding, listening)	1	2	3	4	5
2. I encourage my child to talk about his/her troubles.	1	2	3	4	5
3. I encourage my child to freely express him/herself even when disagreeing with parents.	1	2	3	4	5
4. I listen when my child has something to say.	1	2	3	4	5
5. I have warm and intimate times together with my child.	1	2	3	4	5
6. I give comfort and show understanding when my child is upset.	1	2	3	4	5
7. I tell my child I love them.	1	2	3	4	5
8. My child tells me they love me.	1	2	3	4	5
9. I care for my child (e.g. spend time, play with, think about)	1	2	3	4	5
10. I feel my child loves me.	1	2	3	4	5
11. I will always love my child no matter if they make mistakes in life.	1	2	3	4	5
12. I joke or have fun with my child.	1	2	3	4	5
13. I support my child (e.g. give encouragement, buy food, teach)	1	2	3	4	5
14. I feel my child wants to be emotionally close to me.	1	2	3	4	5
15. I want to be emotionally close to my child.	1	2	3	4	5

Note: items 1-6 were taken from the Parenting Style measure (Domenech Rodríguez et al., 2009). Items 9 and 13 were based on Marsiglio's and Roy's conceptualization of fathers'

nurturance (Marsiglio & Roy, 2012). Item 12 is based on Child Trend's measure of nurturance (Hofferth, 2003).

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