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The Identification of Family Social Environment Typologies Using Latent Class Analysis: Implications for Future Family-Focused Research

Jiwoo Lee, PhD, RN [Research Associate],

School of Nursing, University of Minnesota, 308 Harvard St. SE. Minneapolis, MN 55455

Martha Y. Kubik, PhD, RN [Professor],

Department of Nursing, College of Public Health, Temple University, 3307 North Broad Street, Philadelphia, PA 19140

Jayne A. Fulkerson, PhD [Professor],

School of Nursing, University of Minnesota, 308 Harvard St. SE. Minneapolis, MN 55455

Nidhi Kohli, PhD [Associate Professor],

Department of Educational Psychology, 56 East River Parkway, Minneapolis, MN 55455

Ann E. Garwick, PhD, RN, LP, LMFT, FAAN [Professor]

School of Nursing, University of Minnesota, 308 Harvard St. SE. Minneapolis, MN 55455

Abstract

The family social environment is the first environment that a child experiences and has implications for children's health. However, the majority of family social environment measures do not account for its complexity. There is a need for novel approaches for assessing the family social environment that transcends the traditional way of measuring family composition and interaction. The purpose of this secondary data analysis research was to identify distinct family social environment typologies that consider both family composition and interaction and to describe characteristics of the identified family social environment typologies. A series of latent class analysis results indicated three distinct typologies of family social environment with significant differences in family composition, family problem-solving skills and demographic characteristics. The process used to identify the typologies and significant differences between the typologies showcase how the field could advance family-focused research by considering family composition and interaction.

Keywords

family social environment; family composition; family interaction; latent class analysis

Address all correspondence to: Jiwoo Lee, PhD, RN, Research Associate, School of Nursing, University of Minnesota, 308 Harvard St. SE. Minneapolis, MN 55455; leex5222@umn.edu.

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The first social environment children experience is the family. The social environment is described as the setting in which “defined groups of people function and interact” (Barnett & Casper, 2001, p. 465). Children are socialized in the family social environment where they learn emotion regulation, cooperation, assertion, conflict resolution, and communication skills (El Nokali, Bachman, & Votruba-drzal, 2010; Fosco & Grych, 2013; Jarrett, Hamilton, & Coba-Rodriguez, 2015). Children also develop their health behaviors within the family social environment. They observe health behaviors of other family members in the household (Bandura, 1998). Their health behaviors are reinforced through encouragement or discouragement based on a set of family expectations (de Vet, de Ridder, & de Wit, 2011; Pedersen, Grønhoj, & Thøgersen, 2015). Creating a healthy family social environment is particularly important for children who rely on adult caregivers for support in promoting their healthy development (Britto et al., 2017; Viner et al., 2012).

Family composition is an important aspect of the family social environment as it provides information about how a household is comprised (Demo, Aquilino, & Fine, 2005). Many researchers have assessed family composition as one-parent versus two-parent household and have reported that the two-parent household serves as a protective factor for children’s health behaviors (Byrne, Cook, Skouteris, & Do, 2011; Pearson, MacFarlane, Crawford, & Biddle, 2009; Ryan, Claessens, & Markowitz, 2015). However, a limitation to this approach is that the number of children or non-parental adults in the household, including their ages and genders, is not often taken into account. Having more children in the household may dilute available parental time and resources (Cain & Combs-Orme, 2005; Chen & Escarce, 2010; Downey, 1995; Taylor, Washington, Artinian, & Lichtenberg, 2007). It is also possible that non-parental adults in the family provide support for the children in the household instead of, or in addition to, the primary parent/caregiver. New approaches are needed to assess family composition as a whole unit rather than focusing solely on the number of parents in the household. Such approaches would reflect the complexity of the family social environment as divorce and non-marital partnerships contribute to diverse household compositions (Kreider & Ellis, 2011; United States Census Bureau, 2015).

Family interaction is also a critical component of family social environment. Family Systems Theory suggests that family interaction is affected by family composition since family members are interdependent (Whitchurch & Constantine, 1993). Family interaction may influence parents’ ability to support their children’s healthy development. Children who perceive positive family interactions are less likely to be engaged in unhealthy or delinquent behaviors (Ackard, Neumark-Sztainer, Story, & Perry, 2006; Dufur, Hoffmann, Braudt, Parcel, & Spence, 2015; Li, Lo, & Cheng, 2018). It is possible that negative family interaction increases stress for parents that may undermine parental efforts to support child’s healthy behaviors such as dietary practices (Rhee, 2008).

Despite the intertwined aspect of family composition and family interaction, previous research has limited assessment to either family composition or family interaction (Hadfield, Amos, Ungar, Gosselin, & Ganong, 2018; Repetti et al., 2002; Roustit et al., 2011). For example, the Family Environment Scale, a widely used 90-item measure of family environments, places an emphasis on measuring family interaction (Moos, 1990), but it does not address family composition. This approach does not account for how family composition

may impact family interaction or vice versa. This limitation highlights a need for new approaches for defining important family social environments. Capturing both family composition and interaction would enhance our understanding of family social environment.

One way to better understand the complexity of the family social environment is to identify meaningful subgroups measured by indicators of family composition and interaction. Latent class analysis allows discovery of underlying classes (subgroups) of individuals that exist within a heterogeneous population by using a set of indicators of a latent variable (Lanza, Collins, Lemmon, & Schafer, 2007; Lanza & Cooper, 2016; Nylund, Asparouhov, & Muthén, 2007). Given that the family social environment is diverse beyond two-parent households and single-parent households, the present study proposes that families, defined as people who live together in a household, can be categorized into a finite number of homogeneous groups based on the unique characteristics of family social environments assessed by family composition and interaction.

The objectives of this study were to identify distinct family social environment typologies that consider both family composition and interaction and to describe characteristics of the identified family social environment typologies. To address the study aims, a secondary dataset that provided information about both family composition and interaction was examined using latent class analysis. This analysis may provide a novel way to measure complex family social environments at a household level (family as a whole unit) based on family composition and family interaction.

Method

Study Design and Sample

The Healthy Home Offerings via the Mealtime Environment (HOME) Plus study ($N = 160$) was a two-group (intervention and control) randomized controlled trial which aimed to prevent obesity by increasing the frequency of healthful family meals among families with children via a family-focused, community-based intervention program (Fulkerson et al., 2015; Fulkerson et al., 2018). Children and their primary meal-preparing parent/guardian (hereafter called parents) in the HOME Plus study were primarily recruited from community sites in six geographic areas in the Minneapolis/St. Paul, Minnesota metropolitan region. Flyers, media, emails, and visits to community events and festivals were utilized in recruiting participants. Inclusion criteria for children were: (a) 8 to 12 years of age, and (b) age- and gender-adjusted body mass index (BMI) percentiles at the 50th percentile or above. Children and parents were excluded if they had: (a) a plan to move within the next 6 months, (b) severe food allergies or medical condition limiting study participation, and (c) difficulty speaking and writing in English (Fulkerson et al., 2014). Parents and children completed written informed consent and assent, respectively, for study participation. The HOME Plus study and the present study were approved by the Institutional Review Board of the University of Minnesota.

Families who were randomly assigned to the intervention group ($n = 81$) participated in 10 monthly sessions that provided opportunities to practice cooking skills and to be involved in hands-on nutrition education activities. Families in the attention-only control group ($n = 79$)

received 10 monthly newsletters on family activities unrelated to the HOME Plus program (Flattum et al., 2015).

Baseline data from the study were used for the present secondary analysis research to identify family social environment typologies. Six parents were excluded due to missing data; three parents did not provide age and gender information on adults living in the household and another three parents did not complete the Family Problem-Solving Skill Scale. Thus, the analytic sample for the present study included 154 families.

Measures

Two trained staff members conducted 1.5–2 hour visits at participants' homes during the summers of 2011 and 2012 for baseline data collection (see Fulkerson et al. (2014) for details). For the present study, only demographic and family environment survey data collected from parents were analyzed.

Family composition.

Measures of family composition on the parent survey included parent marital status and the number of adults and children residing in the home. Parent marital status was assessed by the question, "What is your current marital status? (Check one answer)." The number, age and gender of adults and children in the household were assessed with the following question: "Please list the age (in years) and sex of all of the people who are currently living in your household. Please start with the oldest person living in your household then continue to list people oldest to youngest." Indicators of interest were assessed as follows:

Parent marital status.—Response options included (a) married, (b) not married but living with significant other (i.e. common law relationship), (c) separated, (d) divorced, (e) widowed, and (f) single/never married. Responses were dichotomized for analysis as married (response a) versus unmarried (responses b through f) consistent with previous research in determining parent marital status (Brown, 2004).

Number of adults and children.—Adults were defined as 18 years old or older. The number of adults in the household was classified as one adult versus two or more adults. Children were defined as younger than 18 years old. For analysis, the number of children in the household was classified as one child versus two or more children.

Age composition of adults.—Adult age composition was determined by examining the distribution of ages of all adults in the household. Younger adults were defined as 18 years old or older but younger than 45 years old ($18 \leq \text{age} < 45$). If all adults were in this age group, the family's adult age composition was classified as younger adults only. Any other compositions of adult age such as older adults only ($45 \leq \text{age} < 65$) or adult ages mixed ($\text{age} \geq 18$) were classified as adult ages mixed. This classification was used in the 2010 national census reports (Howden & Meyer, 2011).

Age composition of children.—Younger children were defined as younger than 10 years old ($0 < \text{age} < 10$). If all children were in this age group, the family's child age

composition was classified as younger children only. Older children were defined as 10 years old or older, but younger than 18 years old ($10 \leq \text{age} < 18$). If all children were older children, child age composition was classified as older children only. Families with both younger and older children ($0 < \text{age} < 18$) were classified as child ages mixed. The age classification was consistent with criteria used by the World Health Organization (World Health Organization, n.d.).

Gender composition of adults and children.—If gender of all adults was male or female only, adult gender composition was classified as male or female only. If gender of all children included boys or girls only, child gender composition was classified as boys or girls only. The remaining participants were classified as male and female for adult gender composition and boys and girls for child gender composition.

Family interaction.

Family interaction was measured using the Family Problem-Solving Skill Scale from the McMaster Family Assessment Device (Epstein, Baldwin, & Bishop, 1983). This scale measures the family's ability to resolve problems through family interactions at a level that maintains effective family functioning. The scale consists of five items: (a) we usually act on our decisions regarding problems; (b) after our family tried to solve a problem, we usually discuss whether it worked or not; (c) we resolve most emotional upsets that come up; (d) we confront problems involving feelings; and (e) we try to think of different ways to solve. Response options included strongly agree, agree, disagree, and strongly disagree. The mean score was calculated with a range of scores from 1 to 4 (Epstein, Baldwin, & Bishop, 1983). Lower scores indicated better family problem-solving skills. The Family Problem-Solving Skill Scale was tested in parents of children aged 7 to 17 years old and showed acceptable internal consistency reliability (Cronbach's $\alpha = 0.74$ and 0.77 ; Bihun, Wamboldt, Gavin, & Wamboldt, 2002; Epstein, Baldwin, & Bishop, 1983, respectively). In the present study, Cronbach's α was 0.85 . The Family Problem-Solving Skill Scale has been positively correlated with other measures of family functioning ($r > 0.05$), including a 30-item Family Adaptability and Cohesion Evaluation Scale II and an 80-item Family Unit Inventory, and indicates concurrent validity (Miller, Epstein, Bishop, & Keitner, 1985).

Participant characteristics.

Race/ethnicity, age and gender of parent and child, number of adults and children in the household, and the receipt of public assistance were used to assess the characteristics of participants and family social environment typologies. Children and parents' race/ethnicity were dichotomized for analysis as white versus non-white, including Hispanic or Latino/Latina, American Indian, Asian, black or African American, Native Hawaiian or Pacific Islander and others, to ensure adequate sample size. The receipt of public assistance was measured by the two questions: (a) does your child receive free or reduced priced lunches at school?; and (b) does your household receive public assistance like food support/stamps, Electronic Benefit Transfer (EBT), Women, Infants, and Children (WIC), Temporary Assistance for Needy Families (TANF), Supplemental Security Income (SSI), or Minnesota Family Investment Program (MFIP)?. Responses were (a) yes, (b) no, and (c) I don't know.

The receipt of public assistance was categorized as yes if the parent answered yes to one or both of the two questions.

Table 1 describes characteristics of parents and children. Most parents were females (95%), white (79%), employed (67%), married (60%) and college graduates (71%). Of the children, 53% were boys and 65% were white.

Statistical Analysis

Latent class analysis was used to identify family social environment typologies. Latent class analysis is similar to cluster analysis in that both methods categorize people into distinct subgroups. However, latent class analysis allows the identification of unobserved (latent) classes using a set of observed variables (i.e., indicators). It also quantifies measurement error (i.e., which indicators are not perfectly related to class membership) (Lanza & Rhoades, 2013).

A series of latent class models that imposed different numbers of classes were conducted by using Mplus software Version 7.3 (Muthén & Muthén, 1998–2012) to identify the ideal model (Eid, Langeheine, & Diener, 2003). Standard bivariate residuals that were estimated by using an option of Tech 10 in Mplus were reviewed to test the validity of the local independence assumption for latent class analysis (Muthén & Muthén, 2012). The conceptual interpretation of the resultant classes as well as several model fit indexes, including χ^2 , Akaike information criterion (AIC), Bayesian information criterion (BIC), Lo-Mendell-Rubin (LMR) probability and entropy which were obtained from the output options of Tech 1, Tech 11 and 14 were evaluated to determine the best fitting model (Nylund, Asparouhov, & Muthén, 2007).

After determining the best fit-model, probabilities and means of all indicators that were included in the latent class analysis were reviewed to distinguish the unique family social environment characteristics in each identified class (results of this examination are provided in Table 4). Additionally, participating parent, child and family's individual characteristics such as race/ethnicity, age, gender and receipt of public assistance were compared across the identified classes using Chi-square tests, Fisher's exact tests and ANOVA with Scheffe's post hoc test meeting a p-value < 0.05. These analyses were completed in SAS software version 9.4 (SAS Institute Inc., Cary, NC, USA).

Results

Distribution of Family Social Environment Indicators

Across families, 60% were married parents. The majority of families had two or more adults (73%) and two or more children (80%). Fifty-six percent of families included only younger adults (18 ≤ age < 45), 31% only younger children (0 < age < 10) and 21% only older children (10 ≤ age < 18). More than half of families had both male and female adults in the household (66%). In contrast, less than half of families included both boys and girls in the household (45%). The mean family problem-solving skill score was 1.89 ($SD = 0.49$) on a 1- to 4-point scale. See Table 2 for details.

Modeling of the Family Social Environment

Table 3 shows the model-fit indices of two to five latent class models that were compared to select the best fit classification of the family social environment. Akaike information criterion (AIC) and Bayesian information criterion (BIC) values were smallest in the four-class model which suggested that the four class model is slightly superior. However, a smaller probability of Lo-Mendell-Rubin (LMR) and greater entropy value favored the three-class model as the better fitting model than the four-class model. There were only four cases (2.6%) in which the most likelihood probabilities were smaller than 0.7 but higher than 0.6 to be assigned to one of the identified classes. They were not excluded in further analysis since the higher entropy (0.96) supported that the estimated most likely class membership is adequate (Wang & Wang, 2012). The three-class model was selected instead of the four-class model after a careful examination of the theoretical meaning of both models.

Typologies in the three-class model had unique differences across the classes with greater parsimony when compared to the four-class model. Two typologies in the four-class model had overlapping characteristics regarding family social environment indicators, and the only difference between the two typologies was the number of children.

Description of the Three-Class Model of the Family Social Environment

As shown in Table 4, the three-class model included Households with Two Parents (68%), Smaller Households with One Parent (14%) and Larger Households with One Parent (18%). The Households with Two Parents class was characterized by families with two or more adults (probability 1.000), both genders (probability 0.955), married (probability 0.880) and one or more children (probability 0.867). Half of the families in this class had both young and older children (53%) and children of both genders (50%). The Smaller Households with One Parent class consisted of one child (probability 0.810) and one adult (probability 0.829) who was not married (probability 1.000). Half of the children in this class were older children (52%). These families reported the highest problem-solving skills (lowest score) when compared to the other two classes ($F = 4.28$, $p = 0.02$). The Larger Households with One Parent class was composed of two or more children (probability 1.000) and one adult (probability 0.905) who was unmarried (probability 1.000) and young (18 age < 45; probability 0.893). The number of children in the Larger Households with One Parent class ranged from two to seven. About two-thirds of children in this class were in the larger age range of 0 to 18 years (64%) and both male and female genders (60%). The family problem-solving skill score of these families was the lowest (highest score). However, Scheffe's post hoc test indicated that the mean family problem-solving skill score of the Larger Households with One Parent class was not statistically different from that of the Households with Two Parents class ($p = 0.63$).

Characteristics of Parents and Children by Family Social Environment Typology

Bivariate analyses that examined differences in parent and child characteristics are presented in Table 5. More children in the Households with Two Parents class (77%) were white when compared to the other two classes ($p < 0.0001$). More parents in the Larger Households with One Parent class were non-white (46%, $p = 0.0006$), younger (mean age 35 years, $p < 0.0001$), less educated (67% completed some college education or less, $p = 0.0026$),

unemployed (50%, $p = 0.0392$) and received public assistance (92%, $p < 0.0001$). The parents in the Smaller Households with One Parent class were older (mean age 44 years) than parents in other latent classes.

Discussion

The goals of the present study were to identify family social environment typologies through measures of family composition and family interaction and describe the unique characteristics of the identified typologies in an effort to demonstrate how measurement advances may add to the field of family research. Family social environment typologies were constructed to go beyond the traditional measures of number of adults in the households by expanding the measures to include important contributing indicators such as the number of children in the households, adult and child age and gender composition, parent marital status and the family problem-solving skills, as a proxy of family interaction. Results of the latent class analysis revealed three distinct typologies of family social environment: Households with Two Parents, Smaller Households with One Parent, and Larger Households with One Parent that had differences in family composition and family problem-solving skills. This novel approach of using latent class analysis to include indicators of both family composition and family interaction allowed for discovery of family typologies that may have not otherwise been identified. The three typologies which characterize different family composition and interaction expanded the approach to measuring family social environment.

The finding that one-parent households were classified into two typologies deserves further discussion. These two latent classes have a common characteristic of single parenthood. They would have been considered as one group if family social environment was only measured by the typical method of classifying by parent marital status or the number of parents in a household (Larson, Russ, Crall, & Halfon, 2008). It is well known that family functioning differs between one-parent and two-parent households (Ford-Gilboe, 1997; Schmeer, 2012), but little is known about the differences within one-parent households. The two latent classes identified in the present study that separated single parent households by the number of children they are rearing, lack of parental employment and receipt of public assistance highlight differences in families that otherwise may appear similar. These differences may be important for family health research (Jackson & Scheines, 2005). These findings suggest that the family social environment can be heterogeneous even when families share one common characteristic, such as a single parent. They provide support for the notion that even slight differences in family social environment may have broader implications in family health outcomes.

It should be noted that the study finding of the importance of the number of children in a household within the classification of the family social environment is similar to previous research. Education research has shown that children with more siblings had lower academic performance than children with fewer siblings (Jæger, 2009). It was surmised that parental resources including time, energy, and finance were diluted as the number of children increased (Downey, 1995). However, siblings' influence on the target child's health behaviors was mixed, which suggests that siblings may exert both positive and negative influences. An example of a positive influence is that children with more siblings spent less

time watching television and spent more time doing physical activities (Bagley, Salmon, & Crawford, 2006). Additionally, children with siblings who engaged in substance abuse were more likely to be involved in substance abuse (Windle, 2000). Given that siblings may have bidirectional influences on parents and children in the family, further investigations should examine how the number of children in the family impacts family health outcomes.

Another interesting finding is that Smaller Households with One Parent had a better family problem-solving score (1.61 ± 0.45) than any other families in the present study. This is inconsistent with previous published research. The majority of previous research studies have reported that single-parent families have a less hierarchical communication style with less clearly differentiated boundaries compared to two-parent families (Arditti, 1999; Lachance, Legault, & Bujold, 2000; Walker & Hennig, 1997). However, unlike our study, the number of children or their age distribution was not accounted for in those previous studies. It is possible that the Smaller Households with One Parent class is less likely to have conflicts or more likely to resolve conflicts easily due to a smaller family size which may make family interactions less complicated (Moos & Moos, 1976). A caveat is that the Family Problem-solving Skill Scale did not detect unique problem solving situations for single-parent families since some single parents may make decisions on their own without involving the children (Williamson, Skrypnik, & de Los Santos, 2011). Further study should be undertaken to replicate the use of the Family Problem-Solving Skill Scale as well as another validated family interaction measures such as the General Functioning Scale (Mansfield, Keitner, & Dealy, 2015) to examine if the family problem-solving skills indeed differ by the family social environment typologies and if the differences are associated with various child development outcomes.

The strength of the present study is that indicators to describe concepts of family social environment that may be important in advancing measurement in family research were included. The indicators captured household information, including age and gender composition of all members of the household. This was accomplished by utilizing a novel statistical approach, latent class analysis, not previously employed to assess family social environment. Utilizing this statistical approach helped advance our understanding of family social environments by applying a view of family as a whole unit rather than solely focusing on parents or primary caregivers.

Although this study suggested a new way of assessing family social environment, there are limitations to consider. Families were enrolled in an obesity prevention intervention study and thus they may not represent the general population. However, the study participants' racial/ethnic diversity was representative of the county where the participants were recruited (Fulkerson et al., 2015). Another limitation was that the sample size was small ($N = 154$) for latent class analysis, which is a data driven method. Consequently, some of the family social environment indicators were classified in a simple way to account for the distribution in each category (e.g., married versus non-married for parent marital status). Other unique classes might have been discovered if the sample was larger and more diverse. Finally, as the current study was a secondary analysis of an existing dataset, the survey questions assessing family social environment did not account for all elements of the family social environment, such as physical surroundings and/or cultural aspects of the family, which Barnett and Casper (2001)

identified as important aspects of social environment. Further research is needed to develop and test a questionnaire that assesses family social environment more comprehensively. Potential additional items to consider include housing arrangement, fluctuation of family composition, family norms and expectations.

Implications for Health Professionals and Researchers

The most commonly employed research measurement approach to understanding the meaningful components of family has been limited to the marital status of parents or primary caregivers which hinders healthcare professionals and researchers from developing family-based interventions. The present study attempted to broaden our understanding of how to measure family as a whole unit by considering number of children, their gender and age distribution in addition to those of adults and how they interact with each other. The three typologies identified in the study suggest that families can be classified as different groups, at least, based on the number of children, the number of adults and their interaction style. Considering these factors into nursing practice and research may inform more feasible and cost-effective strategies for targeting resources or interventions by developing individualized programs for the prevention and treatment of unhealthy behaviors (Lanza & Rhoades, 2013).

It is important to note that the three typologies identified in the present study warrant further investigation. Building upon the analytic methods used in this study, family researchers may examine if there are additional critical components of family social environment that need to be assessed. Using a larger and more diverse sample would help to facilitate this discovery. Such research would be helpful to develop a more refined understanding of the complex family social environment. Ongoing research is also recommended to examine the roles of family social environment typologies in children's healthy development. Discovering important subgroups within the family social environment may help identify risk or protective factors that influence children's health- or development- related outcomes.

Conclusion

In summary, the current study adds to the family health science literature by demonstrating a novel way to assess the family social environment that transcends the traditional way of measuring family structure. Three classes of family social environments emerged when latent class analysis was applied. These included Households with Two Parents, Smaller Households with One Parent and Larger Households with One Parent. Although there are limitations in the identified typologies, the analytic demonstration identified different types of family social environments. It is important to note that the two typologies that had a common characteristic of single parenthood would not have been identified if the commonly employed practices of classifying single parenthood had been used to identify family social environments. The current study serves as a methodological framework for future research attempting to measure the complex family social environments in society.

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Table 1

Baseline Demographic Characteristics of Analytic Sample, Minnesota, 2011–2012 (N=154)

		Child	Parent
Age	Mean $\pm$ SD	10.3 $\pm$ 1.4	40.7 $\pm$ 7.7
	Median	10.3	41.5
	Minimum – Maximum	8 – 12.9	24 – 65
Gender	Male	82 (53%)	8 (5%)
	Female	72 (47%)	146 (95%)
Race/Ethnicity	White/Caucasian	100 (65%)	122 (79%)
	Non-white ^a	54 (35%)	32 (21%)
Education ^b	Less than high school	-	2 (1%)
	High school graduate		11 (7%)
	Completed some college		31 (21%)
	Associate's degree		18 (12%)
	Bachelor's degree		53 (35%)
	Master's, professional or doctoral degree		36 (24%)
Employment	Homemaker	-	30 (19%)
	Unemployed		21 (14%)
	Part time		43 (28%)
	Full time		60 (39%)
Marital Status	Married	-	93 (60%)
	Not married, living with significant other		11 (7%)
	Separated		2 (1%)
	Divorced		19 (12%)
	Widowed		1 (1%)
	Single/Never married		28 (18%)
Public Assistance ^b	Free or reduced-priced lunch and/or public assistance		56 (37%)

^a Non-white includes Hispanic or Latino/Latina, American Indian/Alaskan, Asian, black/African American, Native Hawaiian/Pacific Islander and others.

^b Total sample size (N) varies due to missing; n for Education=151; n for Public Assistance=152.

Table 2

Distribution of Family Social Environment Indicators of Analytic Sample, Minnesota, 2011–2012 (N=154)

Indicator	Categorization	<i>n</i>	%
Marital status	Married	93	60.4
	Unmarried • Not married, living with significant other (n=11, 7.1%) • Separated (n=2, 1.3%) • Divorced (n=19, 12.3%) • Widowed (n=1, 0.7%) • Single/Never married (n=28, n=18.2%)	61	39.6
Number of adults	One adult	42	27.3
	Two or more adults • 2 adults (n=95, 61.7%) • 3 adults (n=13, 8.4%) • 4 adults (n=4, 2.6%)	112	72.7
Number of children	One child	32	20.8
	Two or more children • 2 children (n=76, 49.4%) • 3 children (n=27, 17.5%) • 4 children (n=13, 8.4%) • 5 children (n=5, 3.3%) • 7 children (n=1, 0.7%)	122	79.2
Adult age	Younger adults only (18 age <45)	86	55.8
	Adult ages mixed (age 18) • Older adults only (45 age <65 years old, n=30, 19.5%) • Ages mixed (age 18 years old, n=38, 24.7%)	68	44.2
Child age	Younger children only (0< age <10)	47	30.5
	Older children only (10 age <18)	33	21.4
	Child ages mixed (0<age<18)	74	48.1
Adult gender	Male and female	101	65.6
	Male or female only • Male only (n=3, 2.0%) • Female only (n=50, 32.5%)	53	34.4
Child gender	Boys and girls	69	44.8
	Boys or girls only • Boys only (n=47, 30.5%) • Girls only (n=38, 24.7%)	85	55.2
Family problem-solving skills	1.89±0.49, Median 1.89, Min-Max: 1–3.8, Potential range: 1–4		

Table 3

Model-fit Indices for Four Latent Class Models of Family Social Environment of Analytic Sample, Minnesota, 2011–2012 (N=154)

Index	Number of classes			
	2	3	4	5
χ^2	242.777	156.794	68.522	65.416
χ^2 degree of freedom	174	165	156	147
χ^2 p-value	0.0004	0.6637	>.05	>.05
AIC	1471.099	1431.908	1400.727	1405.042
BIC	1531.838	1523.016	1522.205	1556.890
Adjusted BIC	1468.535	1428.062	1395.599	1398.632
Log likelihood	-715.550	-685.954	-660.363	-652.521
LMR probability	<.0005	0.0027	0.0103	0.1235
Entropy	0.981	0.961	0.942	0.949

AIC= Akaike information criterion; BIC= Bayesian information criterion; LMR= Lo-Mendell-Rubin

Table 4

Estimated Probabilities and Means (Standard Deviations) of the Family Social Environment Typologies of the Best Fitting Three Class Model, Minnesota, 2011–2012 (N=154)

	Total sample (N=154)	Class 1: Households with Two Parents 68% (n=105)	Class 2: Smaller Households with One Parent 14% (n=21)	Class 3: Larger Households with One Parent 18% (n=28)
Adult				
Number: One adult	0.273	0.000	0.829	0.905
Age: Younger adults only (18 < Age < 45)	0.558	0.494	0.472	0.893
Gender: Male or female only	0.344	0.045	1.000	1.000
Marital Status: Married	0.604	0.880	0.000	0.000
Children				
Number: One child	0.208	0.133	0.810	0.000
Age: Younger children only (0 < Age < 10)	0.305	0.295	0.476	0.199
Age: Older children only (10 < Age < 18)	0.214	0.171	0.524	0.125
Age: Child ages mixed (0 < Age < 18)	0.481	0.533	0.000	0.677
Gender: Boys or girls only	0.552	0.503	1.000	0.370
Family problem-solving skills ^a	1.888 (0.487)	1.922 (0.489)	1.610 (0.450)	1.971 (0.406)

^aContinuous variable. The scale score ranges from 1–4 with 1 being higher family problem-solving skills. Score in Class 2 was significantly lower than the scores of Classes 1 and 3 ($F=4.28$, $p=0.02$)

Table 5

Individual Parent and Child Characteristics by Family Social Environment Typology, Minnesota, 2011–2012
(N=154)

	Class 1: Households with Two Parents	Class 2: Smaller Households with One Parent	Class 3: Larger Households with One Parent	<i>F</i> statistics	<i>p</i> -value
	68% (n=105)	14% (n=21)	18% (n=28)		
Parent age	41.68 (0.70)	43.71 (1.57)	34.64 (1.36)	12.72	<.0001
Child age	10.15 (0.14)	10.30 (0.31)	10.97 (0.26)	3.77	0.0253
Parent gender					
Female	94.3%	90.5%	100%		0.3279 ^a
Male	5.7%	9.5%	0%		
Child gender					
Boy	57.1%	52.4%	39.3%	2.84	0.2419
Girl	42.9%	47.6%	60.7%		
Child race					
Non-white ^b	22.9%	61.9%	60.7%	21.61	<.0001
White	77.1%	38.1%	39.3%		
Parent race					
Non-white ^b	13.3%	23.8%	46.4%	14.84	0.0006
White	86.7%	76.2%	53.6%		
Parent education					
College ^c	68.0%	47.6%	33.3%	11.89	0.0026
< College ^c	32.0%	52.4%	66.7%		
Parent employment					
Unemployed ^d	30.5%	23.8%	50.0%	10.07	0.0392
Part-time ^e	33.3%	14.3%	17.9%		
Full-time ^f	36.2%	61.9%	32.1%		
Parent marital status					
Married	88.6%	0%	0%	109.6	<.0001
Non-married ^g	11.4%	100%	100%		
Number of adults	2.19	1.24	1.10	81.92	<.0001
Number of children	2.34	1.14	2.82	20.09	<.0001
Public Assistance					
Yes	18.1%	57.1%	92.0%	51.86	<.0001
No	81.9%	42.9%	8.0%		

^a *p*-value was obtained from a Fisher's exact test.

^b Non-white included Hispanic or Latino/Latina, American Indian/Alaskan, Asian, black/African American, Native Hawaiian/Pacific Islander and others.

^c College education included associate's degree, bachelor's degree, master's, professional or doctoral degree.

^dUnemployed included homemaker and/or not working status (unemployed, retired, student).

^ePart-time included work hours greater than 0 hours per week but less than 40 hours per week.

^fFulltime included work hour equal to 40 hours per week or more.

^gNon-married included (a) not married, living with significant other, (b) separated, (c) divorced, (d) widowed, and (e) single/never married.

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