International Journal of Education and Practice
2017 Vol. 5, No. 12, pp. 199-216
ISSN(e): 2310-3868
ISSN(p): 2311-6897
DOI: 10.18488/journal.61.2017.512.199.216
© 2017 Conscientia Beam. All Rights Reserved.
Check for updates

CHILDHOOD ADVERSITY, FAMILIES, NEIGHBORHOODS, AND COGNITIVE OUTCOMES: TESTING STRUCTURAL MODELS OF THE BIOECOLOGICAL FRAMEWORK

Mark W. Olofson[1]

[1]*Center for Education Research and Policy Studies College of Education, The University of Texas at El Paso; Education Building, 500 W University El Paso, Texas, USA*
Email: molofson@utep.edu

Article History
Received: 26 October 2017
Revised: 24 November 2017
Accepted: 29 November 2017
Published: 4 December 2017

Keywords
Adverse childhood Experiences
Bioecological model of Development
Structural equation Modeling
Panel study of income Dynamics
Educational Psychology family conflict
Neighborhood quality

ABSTRACT

Over half of the children in the U.S. experience adversity early in childhood. These experiences, along with conditions in their families and neighborhoods, have profound developmental effects. The bioecological model of development includes these proximal contexts in a theory of development that incorporates the threats and supports present in these spaces to describe child development. This study used structural equation modeling to build latent measures of childhood adversity, family conflict, and neighborhood quality and tested theoretically-implied pathways to determine the relationships among these measures and cognitive outcomes in children. This study of US children ages 5-17 (N = 2,907) employed a nationally representative sample from the Panel Study of Income Dynamics to create and test these measures. Results indicate that adversity, family conflict, and a lack of neighborhood quality negatively impact cognitive function, even when controls for socioeconomic status and race are introduced. Testing of models indicated that family conflict and neighborhood quality are mediated by adverse childhood experiences, and these contexts should not be related to cognitive outcomes without the inclusion of adversity measures. This study provides further insight into the relationships among these contexts and children's lives, and offers guidance for future research with these constructs.

Contribution/Originality: This study contributes to the literature on Adverse Childhood Experiences and the Bioecological model of development by identifying the mediational nature of family conflict and neighborhood quality measures when relating ACEs to young adolescent outcomes. Additionally, the paper identifies and analyzes latent measures of these variables.

1. INTRODUCTION

The bioecological model of development posits that children develop through interactions with individuals, groups, and structures within their proximal and distal contexts (Bronfenbrenner, 1994; Bronfenbrenner and Morris, 2006). To better understand how a child develops, it is necessary to understand and analyze the context in which the child experiences development, as such contexts have direct and indirect effects (Bronfenbrenner, 1979). This bioecological perspective is used by the World Health Organization (Blas and Kurup, 2010) and the US Department of Health and Human Services (2010) to conceptualize various phenomena and conduct research

© 2017 Conscientia Beam. All Rights Reserved.

related to human development and public health. In order to understand child development, it is vital to understand the conditions within these developmental contexts.

Two such proximal contexts are the family environment and the childhood neighborhood (Berns, 2010). Families and neighborhoods have been shown to be linked to both cognitive and socioemotional outcomes in children (Repetti *et al*., 2002; Fowler *et al*., 2009; Burdick-Will *et al*., 2011; Cicchetti, 2013). Families can be conceptualized as having both supportive and deleterious influences on development (Evans *et al*., 2008; Hill and Tyson, 2009). Similarly, characteristics of neighborhoods have been shown to have positive and negative influences on developmental outcomes (Leventhal and Brooks-Gunn, 2000; Sharkey and Faber, 2014). While researchers have posited a number of routes or mechanisms for these influences, their existence is well-accepted (Sharkey and Faber, 2014; Finkelhor *et al*., 2015).

Developmental science contains multiple models of human growth, including personal change, contextual, regulation, and representational (Sameroff, 2010). This study is situated within the contextual growth model, and focuses on families and neighborhoods as proximal systems that contribute to the individual's safety, security, and development. Rather than parsing out the individual effects of contexts and situations, theoretical models measuring dimensions of these constructs can be used (Sameroff, 2010). This study uses cross-sectional data from children ages 5-17 to measure constructs of individual adversity as designated by the Adverse Childhood Experiences (ACEs) framework, family conflict, and neighborhood quality, and models the relationships of these constructs with cognitive outcomes. A bioecological framework of development was used to guide the structure of these models and to provide an analytical framework for interpretation of the results.

2. THEORETICAL AND CONCEPTUAL FRAMEWORKS

2.1. Bioecological Model of Human Development

Human development can be conceptualized as "the person's evolving conception of the ecological environment, and his relation to it, as well as the person's growing capacity to discover, sustain, or alter its properties." (Bronfenbrenner, 1996). The bioecological model of human development (Bronfenbrenner, 1976;1986; Bronfenbrenner and Morris, 2006) expanded on previous models of development by broadening and elevating the role of context. This model recognizes that the individual develops through "progressively more complex reciprocal interaction between an active, evolving bio-psychological human organism and the persons, objects, and symbols in its immediate external environment" (Bronfenbrenner and Morris, 1998). These "proximal processes" occur over extended periods of time and may contribute to competence or dysfunction (Bronfenbrenner and Morris, 1998).

In the bioecological framework, a microsystem is a contextual element with which the individual directly interacts (Bronfenbrenner, 1976). The microsystem and the individual influence each other through these interactions. The family can be considered to be a microsystem, as the developing individual interacts directly with the family and its dynamics (Bronfenbrenner, 1986). Similarly, the neighborhood, including individuals and institutions, is a microsystem (Bronfenbrenner, 1994; Berns, 2010). Developmental contexts in bioecological theory expand outward from the micro level to include mesosystems, or interactions between microsystems; exosystems, or interactions between microsystems and larger systems; and macrosystems, or larger social or cultural contexts within which individual development occurs.

Although Bronfenbrenner's nomenclature of these systems is not universally accepted, the conceptual framework is widely used to guide developmental research (Sameroff, 2010). Studies that employ the bioecological model necessarily investigate the structures that impact development in their naturally occurring context, rather than an artificial environment, in order to maintain the ecological integrity of the study (Bronfenbrenner, 1994). This idea intimates the utilization of existing measures of the individual and developmental contexts.

© 2017 Conscientia Beam. All Rights Reserved.

2.2. Adverse Childhood Experiences

The Adverse Childhood Experiences (ACEs) framework is a conceptualization of adversity that is widely used in the social sciences and public health (Felitti *et al.*, 1998; McLaughlin *et al.*, 2014; Center for Disease Control and Prevention, 2015). Originally constructed by Felitti *et al.* (1998) the ACEs framework has been used to link childhood experiences with deleterious repercussions in adulthood. The framework categorizes adverse experiences into abuse, neglect, and household dysfunction (Felitti *et al.*, 1998; Felitti and Anda, 2010). Although conceptually distinct, such experiences rarely occur in isolation (Dong *et al.*, 2004). ACEs have been shown to be correlated with adult outcomes such as smoking (Anda *et al.*, 1999) drug use (Dube *et al.*, 2003) and overall personal health (Felitti *et al.*, 1998).

The negative impact of ACEs is measurable during childhood and adolescence. Similar to studies of adults, teens who report adverse experiences are more likely to experience depression, drug abuse, and antisocial behavior in young adulthood (Schilling *et al.*, 2007). In addition to health outcomes, children who were reported to have experienced multiple ACEs were more likely to have issues with behavior and developmental tasks (Marie-Mitchell and O'Connor, 2013). These individuals have also been shown to have lower rates of engagement at school (Bethell *et al.*, 2014). The persistent occurrence of ACEs has greater negative effects on IQ and behavior than limited occurrences (Jaffee and Maikovich-Fong, 2011). The multidimensional nature of adversity and its connections to other contextual elements are apparent early in a child's life (Hindman *et al.*, 2010).

2.3. Family Conflict

"The maltreating home represents such a dramatic violation of the average expectable environment, research on child maltreatment informs developmental theory by elucidating the conditions necessary for normal development and healthy adaptation" (Cicchetti, 2013). In the bioecological framework, the family environment can be conceptualized as a microsystem influencing development (Repetti *et al.*, 2002; Berns, 2010). Families can shape the cognitive development of the child through the support and the conflict that is present in the home (Evans *et al.*, 2008; Hill and Tyson, 2009). Family conflict can be modeled on a continuum from physical violence (Evans *et al.*, 2008) to relational hostilities (Forehand *et al.*, 1998). In this study the family microsystem is modeled as family conflict. Although the individual is exposed to conflict, this conflict is considered contextual with respect to individual adversity.

Family conflict has been found to be predictive of negative mental and behavioral health outcomes later in life (Paradis *et al.*, 2009; Herrenkohl *et al.*, 2012). The effects of familial conflict can be manifested much earlier, including in early adolescence (Evans *et al.*, 2008). Children exposed to familial conflict experience negative impacts on educational outcomes in both the short and long term (Forehand *et al.*, 1998). Children exposed to conflict or violence in the home express higher incidence of negative socioemotional outcomes (Sheeber *et al.*, 1997; Evans *et al.*, 2008). Clarkson (2014) found that children from families with high levels of conflict, aggression, or hostility have an increased risk for internalizing and externalizing behaviors, poor social skills, and difficulty processing their emotions. However, these families do not exist in isolation, and the interplay between families and their neighborhood contexts is complex and mixed (Briggs *et al.*, 2010).

2.4. Neighborhood Quality

The mechanisms through which neighborhoods cause a developmental effect on the individual can be categorized in a number of different ways. Leventhal and Brooks-Gunn (2000) conceptualized institutional resources, interpersonal relationships, and neighborhood norms as vital dimensions of the influence of neighborhoods. Galster (2012) elaborated on these categories, identifying neighborhood cohesion, interpersonal interactions, and the collective social norms as elements of a social interaction mechanism that operationalizes neighborhood effects. Neighborhood violence is generally conceptualized as a separate but vital element of

© 2017 Conscientia Beam. All Rights Reserved.

neighborhoods that has an impact on children (Fowler *et al.*, 2009; Galster, 2012). Both social interaction mechanisms such as cohesion and collective norms and environmental mechanisms such as safety have been shown to have development impacts (Brooks-Gunn *et al.*, 1993; Fowler *et al.*, 2009; Burdick-Will *et al.*, 2011). This study uses neighborhood cohesion, collective norms, and safety to create a measurement of neighborhood quality.

Academic outcomes can be used to measure the long-term effects of neighborhoods (Duncan and Magnuson, 2011). Brooks-Gunn *et al.* (1993) found that the presence or absence of positive influences in the neighborhood, rather than the presence of negative influences affected children's test scores. Although neighborhoods have been shown to have an effect on cognitive outcomes independent from schools (Burdick-Will *et al.*, 2011) as argued by Sharkey and Faber (2014) neighborhood effects should not be considered in isolation.

3. PURPOSE OF THIS STUDY

Developmental science, particularly that which operationalizes a bioecological model, remains in relatively early development (Bronfenbrenner and Morris (2006). Empirical studies utilizing the framework can advance this science "by seeking and obtaining empirical findings that might call into question relationships posited in the existing theoretical model" (Bronfenbrenner and Evans, 2000). The purpose of this paper is to use path analysis to investigate the relationships among ACEs, family conflict, and neighborhood quality on cognitive outcomes through the lens of a bioecological model of development. When modeled independently, children with more occurrences of ACEs and conflict in the family have been shown to have worse cognitive outcomes than children with fewer occurrences of ACEs and conflict, while quality neighborhoods have been shown to be positively predictive of cognitive outcomes. However, rather than family conflict and neighborhood quality directly influencing cognitive outcomes, the bioecological model posits that these contexts should be modeled as acting through the individual. This study seeks empirical evidence for this interpretation.

According to Bronfenbrenner and Morris (2006) bioecological development research that occurs in "discovery mode" is theoretically driven and should increase in complexity, with the theoretical implications serving as vital outcomes. In this study, increasingly complex interactions among the three variables of interest were tested. First, the individual constructs were tested for fit and relationship to the outcome variables of interest. Following these foundational analyses, structural models were constructed to test the viability of direct and indirect paths from the microsystems of families and neighborhoods through the individual to cognitive outcomes. These two stages, then, address two different research questions:

1) When modeled using ACEs, family conflict, and neighborhood quality, what are the relationships among the individual, families, neighborhoods, and cognitive outcomes?
2) Are the relationships between the family and neighborhood contexts and cognitive outcomes better modeled as direct pathways or as indirect pathways through the individual as measured by ACEs, consistent with the bioecological model of development?

4. METHODS

4.1. Instrument

The data for this study were taken from the Panel Study of Income Dynamics Child Development Supplement (PSID-CDS). The larger Panel Study of Income Dynamics (PSID) collects information about the economic and life course development of families in the United States (McGonagle *et al.*, 2012). Since its inception in 1968, the PSID has collected data on a nationally representative sample (U.S.) of families, following their offspring and subsequently increasing in size and scope. In 1997 the PSID-CDS was launched to better understand the lives of children. The data set contains over 500 indicators collected from children, parents, and other caregivers (Hofferth *et al.*, 1997). Although frequently used in economics, this data is beginning to be used by researchers investigating childhood adversity and development (e.g., (Ciula and Skinner, 2015; Olofson, 2017)).

© 2017 Conscientia Beam. All Rights Reserved.

4.2. Sample

At its launch in 1997, the PSID-CDS identified 3653 children ages 12 and younger from 2705 families in the PSID core sample for sampling (Hofferth *et al.*, 1997). These same children were eligible to be sampled in subsequent waves in 2002 and 2007. Data from the 2002 wave were used in this study to maximize the sample size of children with some life experience. In 2002, data were collected on 2907 children ages 5-17. By using weights associated with the data, the sample can be considered nationally representative (Duffy and Sastry, 2012). Following the PSID-CDS technical documents, the primary caregiver/child weight was used in this analysis, which balances the sample on race, geographic location, urbanicity, and level of education of the head of household (Gouskova, 2001). Summaries of demographic characteristics of the weighted sample used in this study are presented in Table 1.

Table-1. Demographic characteristics of PSID-CDS 2002 sample

Category	Classification	Percent of Sample
Gender	Male	49.6
	Female	50.4
Race	Person of Color	36.2
	White	63.8
Census Region	Northeast	17.9
	North Central	24.4
	South	31.8
	West	25.9
Urbanicity	Metropolitan Statistical Area	63.8
	Non-Metropolitan Statistical Area	36.2
Head Education Level	Did not graduate high school	19.5
	Graduated high school	80.5

Note: Percentages based on weighted data.

4.3. Variables

In this study, individual adversity was modeled using the ACEs framework, families were modeled using indicators of physical and relational conflict, and neighborhoods were modeled with elements of cohesion, collective norms, and safety. These dimensions of the developmental contexts were chosen due to the necessity in bioecological research to provide descriptions of the ways in which the contexts and individual might interact, rather than simply as descriptors of the environments (Bronfenbrenner and Morris, 2006). ACEs, family conflict, and neighborhood quality were modeled as separate latent variables. The variables used as indicators from the PSID-CDS for the latent variables are described in Table 2. The variables used to measure ACEs are aligned with the original ACEs framework (Felitti *et al.*, 1998; Felitti and Anda, 2010). This measure has previously demonstrated to provide an excellent fit for this data (Olofson, 2017). To aid in interpretability, a simplified one-factor model of ACEs was used in this study. The measures of family conflict originated in the National Survey of Families and Households (Institute for Social Research, 2010). These items examine methods of conflict resolution within families. The measure of neighborhood quality consisted of eight items that originated in National Longitudinal Study of Youth (ISR, 2010). Except where noted, all indicator variables were collected from the child's primary caregiver. As indicated, when appropriate, variables were reverse-scored in order to maintain coherent directionality across the latent variable. Due to the limited range of response options, all variables were treated as categorical in modeling except where otherwise noted.

© 2017 Conscientia Beam. All Rights Reserved.

Table-2. ACEs measures from the PSID-CDS

Latent Variable	Variable	N*	Scale
Adverse Childhood Experiences (ACEs)	Both biological parents present[a]	2891	Dichotomous
	Disagreement about alcohol use	2893	Dichotomous
	Caregiver: nervous	2897	5-point Likert Scale: Frequency
	Caregiver: hopeless	2895	5-point Likert Scale: Frequency
	Caregiver: restless	2895	5-point Likert Scale: Frequency
	Caregiver: everything an effort	2892	5-point Likert Scale: Frequency
	Caregiver: sad	2895	5-point Likert Scale: Frequency
	Caregiver: worthless	2895	5-point Likert Scale: Frequency
	Physical affection[b]	2734	Continuous
	Hostility towards child[c]	2369	5-point Likert: Intensity
	Warmth towards child[b,c]	2369	5-point Likert: Intensity
	Hit or threaten child in response to bad behavior[d]	2784	Dichotomous
Family Dysfunction (FAM)	Family fights a lot	2215	5-point Likert Scale: Agree
	Family throws things	2215	5-point Likert Scale: Agree
	Family calmly discusses problems[b]	2213	5-point Likert Scale: Agree
	Family criticizes each other	2215	5-point Likert Scale: Agree
	Family hits each other	2215	5-point Likert Scale: Agree
Neighborhood Quality (NHOOD)	Length of residence[b]	2898	4 category: Length of stay
	Place to raise kids	2897	5-point Likert Scale: Rating
	Difficulty identifying strangers	2893	3-point Likert Scale: Difficulty
	Neighbor report: selling drugs	2876	4-point Likert Scale: Likelihood
	Neighbor report: kids in trouble	2882	4-point Likert Scale: Likelihood
	Neighbor report: disrespectful child	2869	4-point Likert Scale: Likelihood
	Neighbor report: child stealing	2873	4-point Likert Scale: Likelihood
	Safe to walk around after dark	2894	4-point Likert Scale: safety

Notes: * All N values from weighted data. Values rounded to nearest whole person. [a] Collected from demographic information. [b] Score reversed for conceptual coherence. [c] Reported by the PSID staff member who completed a home interview with the primary caregiver. [d] Constructed from three variables that provided the same prompt but are separated by age group in the data.

Three childhood assessments were used to construct the cognitive outcome latent variable. Age-standardized broad reading and applied problems scores from the Woodcock-Johnson Psycho-Educational Battery-Revised were used (Woodcock and Johnson, 1989). Along with reading and math, scores from the Wechsler Intelligence Scale for Children (WISC) - Revised Digit Span Test for Short Term Memory (Wechsler, 1974) were used. These indicators represent the full complement of cognitive outcome assessments available in the 2002 wave of the PSID-CDS (ISR, 2010).

Variables of socioeconomic status (SES), gender, and race were constructed for use as controls in path models. The race variable collapsed all groups into a white or person of color binary, in order to maintain group size, provide an interpretable split, and due to similarities in achievement gaps between whites and different communities of color (Todd and Wolpin, 2007). The gender variable was dichotomous indicating non-overlapping groups of males and females, as present in the data set. Following the framework set out by Duncan *et al.* (1972) the SES variable was a composite variable consisting of total household income, highest educational level achieved by the head of the household, and head of household occupational prestige (Hauser and Warren, 1996). A scale score was constructed by standardizing the three continuous variables and summing the standardized values to generate the SES control variable.

4.4. Missing Data

Cases were analyzed for missing data at the scale level (Newman, 2009). Missing data for the indicators associated with the latent variables were identified, and those cases missing more than half of the indicators on any one of the latent variables were regressed on the variables used to balance the PSID-CDS data set (Gouskova, 2001)

© 2017 Conscientia Beam. All Rights Reserved.

no significant relationships were determined. All cases were retained for further analysis using maximum likelihood estimation, as maximum likelihood is considered acceptable for data missing at the item or scale level and maximum likelihood procedures are favored when using structural equation modeling (Enders, 2010). The full information maximum likelihood (FIML) algorithm native to MPlus was used to estimate parameters based on the data available for all subsequent analyses (Muthén and Muthén, 1998). Auxiliary variables were used in the FIML procedure. Auxiliary variables are correlated with indicator variable residuals and are not used elsewhere in the analysis (Graham, 2003; Enders, 2010). FIML with auxiliary variables has been shown to yield parameter estimates that are equally unbiased and efficient when compared to estimation maximization and multiple imputation approaches (Graham, 2003). Eight auxiliary variables measuring household demographic characteristics and child behavior were used.

4.5. Analysis

The analyses consisted of two stages: confirmatory factor analysis (CFA) and structural equation modeling (SEM). In the first stage, the latent variables representing ACEs, families, and neighborhoods were constructed and assessed for their ability to recreate relationships present in the data. The structures of these latent variables are presented in Figure 1. The ACEs factor contained 12 indicators aligned with the ACEs framework (Felitti *et al.*, 1998; Felitti and Anda, 2010). These indicators were gathered under one latent factor. The residual error for the six indicators of caregiver emotional distress were allowed to covary to allow for methodological effects (Brown, 2015). Prior research using this approach to ACEs modeling with the PSID-CDS has been shown to be acceptable (Olofson, 2017).

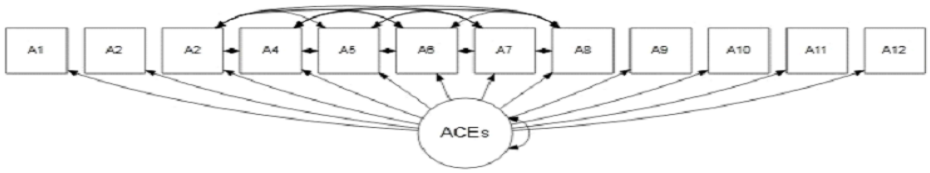

Figure 1a

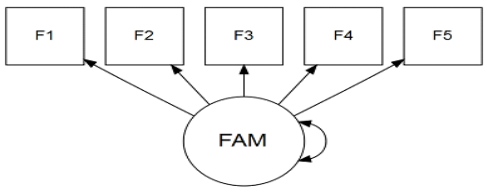

Figure 1b

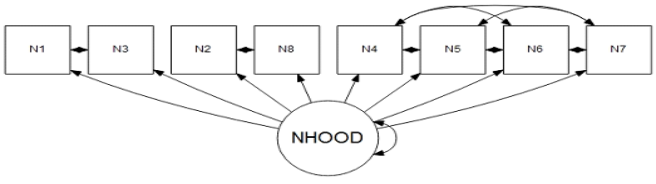

Figure 1c

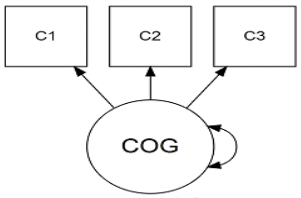

Figure 1d

Figure-1. Latent models for ACEs, family conflict, and neighborhood quality. The residuals associated with indicators A3 – A8 were allowed to covary (1a). The residuals for N1 and N3, N2 and N8, and N4 – N7 were allowed to covary (1c). For full variable descriptions see Table 2 and Table 3.

© 2017 Conscientia Beam. All Rights Reserved.

The family conflict latent variable consisted of five conceptually-aligned variables. For the neighborhood quality variable, all indicators were gathered into one latent factor, while residual covariance was specified for those indicators related to the same sub-constructs. That is, the "length of residency" and the "ability to identify strangers" indicators were specified with residual covariance because they are both related to the construct of neighborhood cohesion. Similarly, the two indicators of neighborhood safety were specified with residual covariance, and the four indicators of collective norms were specified with residual covariance. This approach allows for conceptually similar indicators to be gathered under a larger latent variable, rather than modeling multiple levels of latent variables. The cognitive outcomes variable consisted of the three tests of cognitive function contained in the PSID-CDS, which were modeled with no residual covariance.

Following the theoretical construction, the psychometric properties of the measures were assessed. The CFA procedure tested the factor structure of the latent variables. The CFA was performed with MPlus 7 (Muthén and Muthén, 1998) using the weighted least squares means and variances (WLSMV) method of estimation, due to the presence of categorical variables as indicators. The latent structure was evaluated for goodness of fit using the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). For RMSEAs, values less than .08 and .05 were taken to reflect acceptable fit and excellent fit, respectively (Hu and Bentler, 1999). For CFI and TLI, values greater than .90 and .95 were taken to reflect acceptable fit and excellent fit, respectively (Bentler, 1990).

The second stage of the analysis utilized structural equation modeling (SEM) to build increasingly complex and theoretically aligned relationships among these variables, consistent with bioecological development research functioning in the discovery mode (Bronfenbrenner and Morris, 2006). The first set of models in this stage tested the individual effects of ACEs, family conflict, and neighborhoods on the cognitive outcome variable, as shown in Figure 2. In accordance with prior research, it was hypothesized that increases in ACEs, family conflict, and problems with neighborhood quality would be associated with decreases in cognitive function (Brooks-Gunn *et al*., 1993; Forehand *et al*., 1998; Jaffee and Maikovich-Fong, 2011).

The second set of models further operationalized the bioecological theory of development by measuring the effect of ACEs, families, and neighborhoods in conjunction with one another. These models are presented in Figure 3 and Figure 4. In the first approach, generalized in Figure 3, the outcome was regressed directly on all three latent indicators; the individual as modeled by ACEs and the two microsystems of families and neighborhoods. The final group of models followed the bioecological approach of considering families and neighborhoods as separate microsystems, and modeled indirect pathways from these microsystems through ACEs to the cognitive outcome (Figure 4a). This model also tested for the direct effect of neighborhoods and family conflict (Figure 4b). Models were evaluated for their fit with the data, compared to each other using the WLSMV-adjusted Sattora-Bentler chi-square values (Satorra, 2000) and related to theory by the relative value and statistical significance of pathway coefficients.

5. RESULTS

5.1. Confirmatory Factor Analysis

The results from the CFA with the individual latent variables (Figure 1) indicated an overall excellent model fit.

© 2017 Conscientia Beam. All Rights Reserved.

Table-3. Factor loadings, standard errors, and communalities from CFA results

Latent Variable	Indicator	Factor Loading	Standard Error	Communality	Standard Error
ACEs	A1: Biological parents	.332*	.039	.110*	.026
	A2: Alcohol use	.321*	.052	.103*	.033
	A3: Nervous	.274*	.031	.075*	.017
	A4: Hopeless	.438*	.036	.192*	.032
	A5: Restless	.260*	.031	.068*	.016
	A6: Effort	.335*	.034	.112*	.023
	A7: Sad	.452*	.037	.205*	.033
	A8: Worthless	.491*	.047	.242*	.046
	A9: Physical affection	.148*	.030	.022*	.009
	A10: Hostility	.679*	.025	.461*	.034
	A11: Warmth	.710*	.026	.505*	.036
	A12: Hit or threaten	.333*	.088	.111	.058
FAM	F1: Fight	.774*	.017	.599*	.026
	F2: Throw	.808*	.019	.653*	.030
	F3: Calm	.387*	.027	.150*	.021
	F4: Criticize	.634*	.021	.402*	.027
	F5: Hit	.655*	.023	.429*	.031
NHOOD	N1: Length of residence	.124*	.038	.015	.009
	N2: Place to raise kids	.817*	.044	.668*	.072
	N3: Strangers	.477*	.032	.228*	.031
	N4: Selling drugs	.663*	.046	.160*	.029
	N5: Kids in trouble	.400*	.037	.167*	.028
	N6: Disrespectful child	.408*	.034	.049*	.016
	N7: Child stealing	.222*	.035	.122*	.026
	N8: Safe after dark	.350*	.037	.440*	.061
COG	C1: Broad Reading	.813*	.022	.658*	.035
	C2: Applied Problems	.811*	.021	.661*	.037
	C3: WISC	.452*	.026	.205*	.024

Note: * indicates $p < .05$

These values were generated in a simultaneous CFA that allowed all individual latent variables to covary but introduced no other higher-order structure onto the latent variables. The RMSEA value for the model was .031, with a 90% confidence interval of 0.030 – 0.033, well below the cutoff of .05 indicating excellent fit. The CFI value was .955, above the cutoff of .950 indicating excellent fit, and the TLI value was .947, near the .95 cutoff for excellent fit and above the .90 cutoff indicating acceptable fit. The factor loadings and commonalities for all indicators, sorted by the latent variables, are presented in Table 3. All standardized factor loadings were found to be statistically significant ($p < .05$), with nearly all loadings at the $\lambda > .30$ level commonly used to identify salient factors (Brown, 2015).

The covariance among these latent variables is presented in Table 4. These values were generated in the same analysis. With no other constraints applied, the latent variables correlated at a moderate level, with higher values of ACEs, family conflict, and lack of neighborhood quality corresponding with lower values for cognitive outcomes. Given the acceptable to excellent fit of the latent variables, and the relationships among the latent variables, all were used as modeled in further analyses. Additionally, all designated residual covariances demonstrated statistical significance ($p < .05$) and thus were similarly maintained in path analyses.

Table-4. Latent variable correlations

	ACEs	FAM	NHOOD	COG
ACEs	1			
FAM	.482*	1		
NHOOD	.465*	.314*	1	
COG	-.427*	-.172*	-.305*	1

Note: * indicates $p < .05$

© 2017 Conscientia Beam. All Rights Reserved.

5.2. SEM

In the first SEM analyses, the ACEs, family, and neighborhood latent variables were modeled individually as predictors of cognitive outcomes. In these models (Figure 2), the cognitive outcome latent variable was regressed on the predictor variables one at a time. These models were also run with SES, gender, and race controls. Results from these analyses are presented in Table 5. These results indicate that, as hypothesized, as ACEs and family conflict increase, cognitive outcomes decrease. Additionally, as lack of neighborhood quality increases, cognitive outcomes decrease. All path coefficients between the individual latent variables and the outcomes were significant and robust to the introduction of control variables. Analysis of the control variables across the models show that children from higher SES backgrounds had higher assessment scores, and children of color had lower scores than their white counterparts. In these models, gender did not have a statistically significant relationship with the outcome.

Table-5. Cognitive outcomes on individual latent predictors

Variable	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8
ACEs	-.413*	-.195*					-.389*	-.191*
FAM			-.169*	-.102*			.061	-.011
NHOOD					-.303*	-.090*	-.134*	-.038
SES		.395*		.398*		.397*		.395*
Female		.020		.021		.021		.021
Person of Color		-.188*		-.188*		-.188*		-.189*
Communality								
R^2	.170*	.291*	.029*	.266*	.092*	.262*	.199*	.297*
Fit Statistics								
RMSEA	.035	.038	.043	.036	.040	.056	.031	.036
CFI	.974	.950	.973	.968	.987	.950	.955	.922
TLI	.963	.936	.960	.959	.979	.933	.947	.910

Notes: Values are standardized path coefficients. * indicates $p < 0.05$.

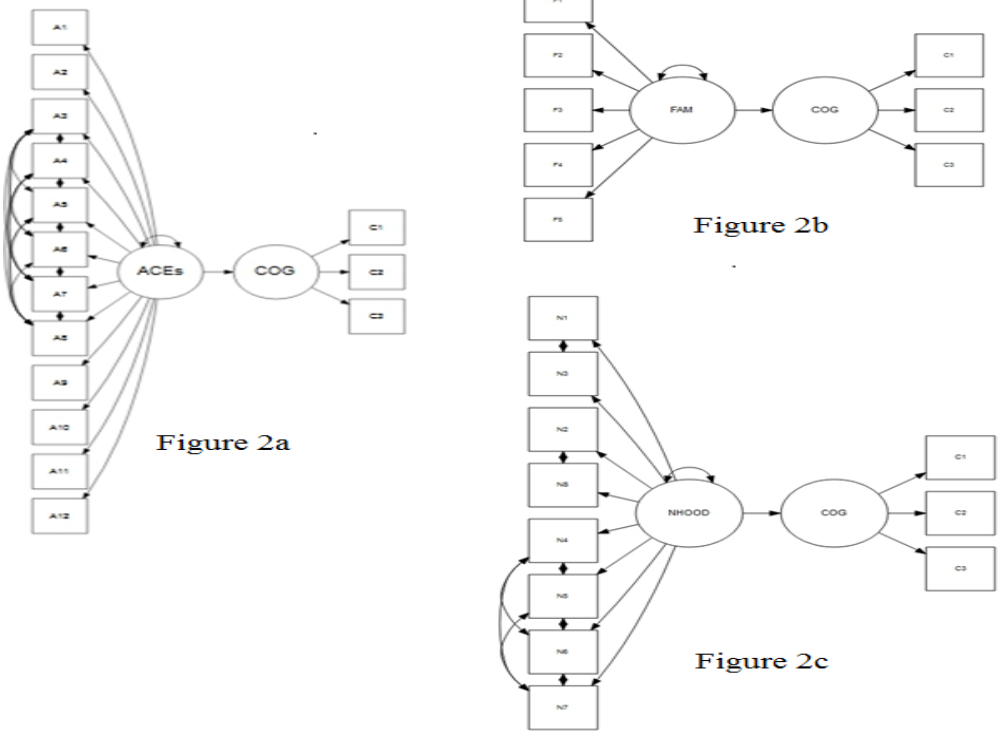

Figure-2. Individual models of ACEs, family conflict, and neighborhood quality as predictors for cognitive outcomes. See Table 5 for path coefficients. Not shown: control variables of socioeconomic status, gender, and race.

© 2017 Conscientia Beam. All Rights Reserved.

In the next group of SEM analyses, the cognitive outcome latent variable was regressed on the ACEs, family, and neighborhood latent variables simultaneously. The first set of models contained individual direct pathways from these latent variables to the outcomes. These models are visualized in Figure 3 and the results from these models are presented in Table 5. In the initial models, the latent variables were allowed to covary, and the model was tested with and without control variables (Table 5, Models 7 and 8). ACEs continued to have a significant negative relationship with cognitive outcomes when modeled in conjunction with family conflict and neighborhood quality. The addition of controls to the models decreased the value of the path coefficients; however, they remained statistically significant. The path coefficient from the family conflict latent variable to cognitive outcomes was not statistically significant, and while the path from the neighborhood latent variable to the outcome was statistically significant in Model 7, this relationship failed to maintain significance with the introduction of controls. However, the covariances among the latent variables were moderate and significant, functioned in the hypothesized direction, and were robust to the introduction of controls. This demonstrates the untenability of modeling ACEs, family conflict, and neighborhood quality as independently affecting cognitive outcomes.

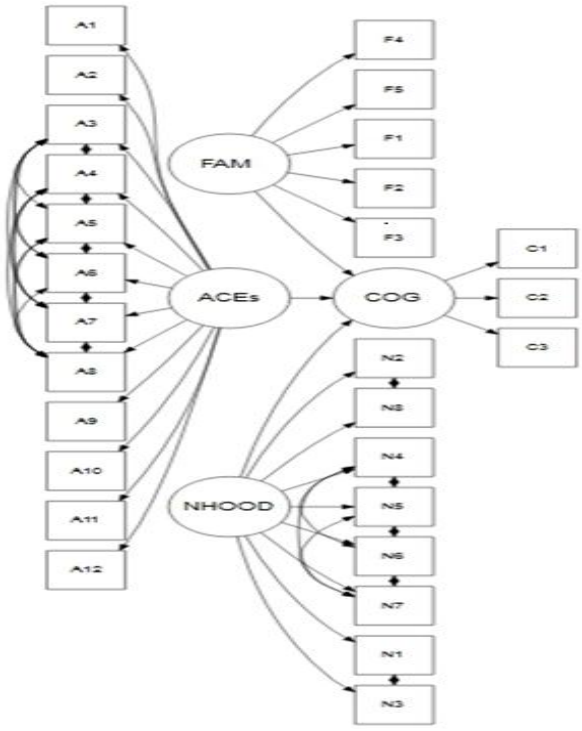

Figure-3. Path model of cognitive outcomes on ACEs, family conflict, and neighborhood quality. Predictor variables are modeled to function simultaneously on cognitive outcomes. See Table 5 for path coefficients. Not shown: control variables of socioeconomic status, gender, and race.

The final set of models provided two paths for development. As shown in Figure 4, one path modeled the proximal process between the neighborhood and the individual, while the other modeled the relationships between the family and the individual, with both paths leading through ACEs and to cognitive functioning. Similar to previous approaches, this model was tested with and without demographic controls. Path coefficients for these models (9 and 10) are presented in Table 6.

© 2017 Conscientia Beam. All Rights Reserved.

Table-6. Cognitive outcomes for ACEs path diagrams (Figure 4)

Variable	Model 9	Model 10	Model 11	Model 12
COG on ACES	-.455*	-.220*	-.389*	-.191*
ACES on FAM	.345*	.373*	.372*	.372*
ACES on NHOOD	.397*	.192*	.348*	.181*
COG on FAM (Indirect)	-.157*	-.082*	-.145*	-.071*
COG on NHOOD (Indirect)	-.180*	-.042*	-.136*	-.035*
COG on FAM (Direct)			.061	-.011
COG on NHOOD (Direct)			-.143*	-.038
SES		.395*		.395*
Female		.021		.021
Person of Color		-.189*		-.188*
Covariance				
FAM with NHOOD	.315*	.280*	.315*	.280*
Communality				
R^2 (COG)	.207*	.310*	.199*	.297*
R^2 (ACES)	.363*	.216*	.341*	.209*
Fit Statistics				
RMSEA	.031	.036	.031	.036
CFI	.955	.924	.955	.922
TLI	.947	.913	.947	.910

Notes: Values are standardized path coefficients. * indicates $p < 0.05$.

All direct path coefficients reached statistical significance and functioned in the direction that would be expected. The indirect path coefficients are included for these models, and demonstrate the statistical significance of the path of family conflict through ACEs to the outcomes and the path of neighborhood quality through ACEs to the outcomes. Models 11 and 12 introduced direct pathways along with the indirect pathways for family conflict and neighborhood quality to predict cognitive outcomes, testing with and without controls. While the indirect effect of family conflict is negative and significant, the direct path coefficient is small, positive, and not statistically significant. The results for the neighborhood quality variable are qualitatively the same. Using difference testing, the removal of the direct pathways from neighborhood quality to outcomes and family conflict to outcomes only marginally increased the misfit for the data for the model without controls, and did not significantly increase the misfit for the models with controls when compared to the models with the direct pathways for ACEs (Model 11 and 9: $\chi^2 = 10.270$; $df = 2$; $p < .01$; Model 12 and 10: ($\chi^2 = 1.136$; $df = 2$; $p > .01$). These results offer empirical support for framing family conflict and neighborhood quality as fully mediated by adversity, with respect to cognitive outcomes.

© 2017 Conscientia Beam. All Rights Reserved.

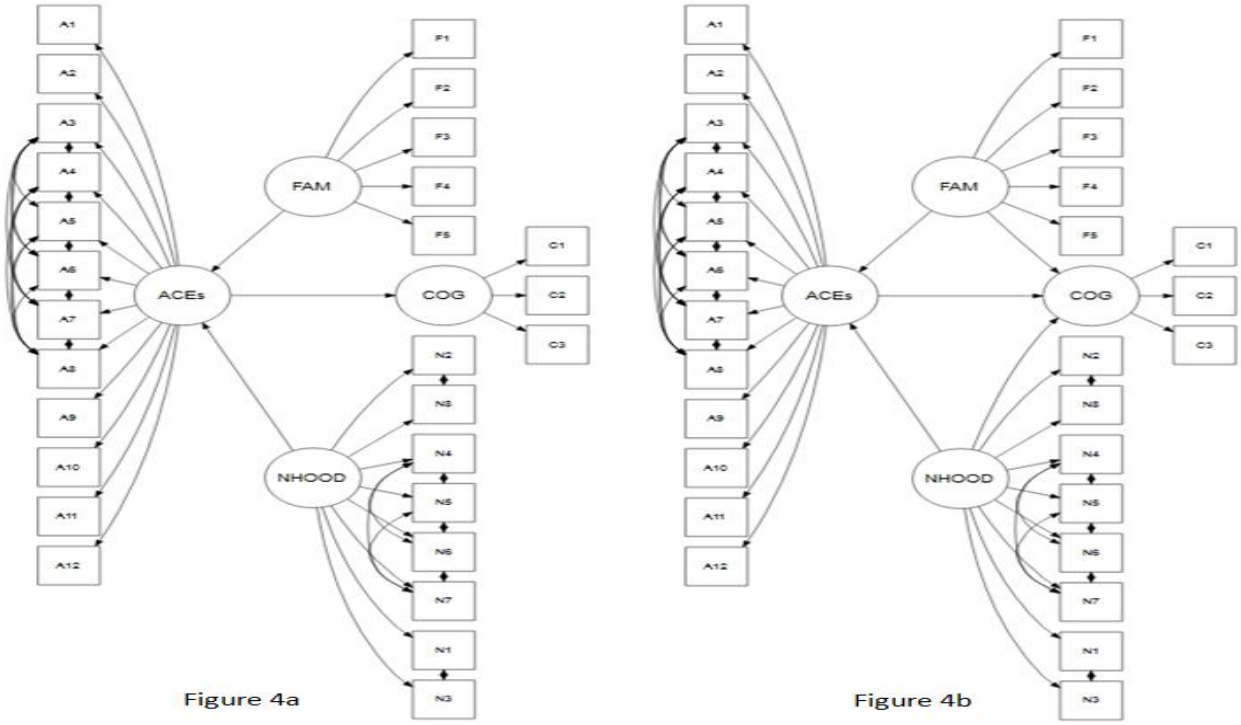

Figure-4. Path models aligned with interpretation of the bioecological model of development. Family conflict and neighborhood quality modeled as microsystems influencing individual as modeled by ACEs. See Table 6 for path coefficients. Not shown: control variables of socioeconomic status, gender, and race.

6. DISCUSSION

The purpose of this study was to investigate the relationships among ACEs, family conflict, neighborhood quality, and cognitive outcomes using the bioecological model of development as a guiding theoretical framework. Results from the initial CFA indicated that the latent variables of ACEs, family conflict, and neighborhood quality all represented acceptable to excellent fit for the data in the PSID-CDS. These findings are in alignment with previous studies of ACEs that use a latent factor approach with the PSID-CDS and other data sets (Brown *et al.*, 2015). The fit of the family conflict variable containing indicators ranging from physical and relational dysfunction supports the utility of such dimensions as used elsewhere (Forehand *et al.*, 1998; Evans *et al.*, 2008). Additionally, the results from the neighborhood latent model support the modeling of neighborhoods using dimensions of cohesion, collective norms, and safety (Sampson *et al.*, 2002; Burdick-Will *et al.*, 2011; Galster, 2012). With respect to the bioecological model of development, the results from the CFA provide evidence for these dimensions of individuals, along with the microsystems of families and neighborhoods, to be measured in such a way.

Results from the first group of SEM analyses indicate significant regression coefficients when cognitive outcomes are regressed on ACEs, family conflict, and neighborhood quality individually. These findings align with existing research about ACEs (Jaffee and Maikovich-Fong, 2011; Bethell *et al.*, 2014) families (Sheeber *et al.*, 1997; Evans *et al.*, 2008) and neighborhoods (Burdick-Will *et al.*, 2011; Duncan and Magnuson, 2011). Results from control models indicate the presence of race and SES gaps in achievement, consistent with research (Sirin, 2005). The models do not show a gap in achievement related to gender (Perie *et al.*, 2005; Hyde *et al.*, 2008). These models provide empirical support for the inclusion of these constructs in developmental models that are predictive of cognitive outcomes. The results from Models 7 and 8, which incorporated all three predictors, indicate that the effect of ACEs, family conflict, and neighborhoods cannot be disentangled from one another. The covariances among these variables are statistically significant, and remained so when demographic controls were introduced into the structural model. This supports the notion from bioecological theory that the individual is nested within microsystems, and that the microsystems cannot be considered as independent from each other. The covariances between ACEs and the microsystem variables of families and neighborhoods are moderate in size, statistically

© 2017 Conscientia Beam. All Rights Reserved.

significant, and robust to the introduction of controls. This points to proximal processes occurring at the junction of the individual and these contexts with implications for cognitive functioning. The microsystems do not independently relate to cognitive outcomes, rather, they are mediated by ACEs. The covariance between families and neighborhoods demonstrates the relationship between microsystems. This covariance is significant and robust to the introduction of controls. While family conflict and neighborhood quality have been shown repeatedly to be related to cognitive outcomes (Evans *et al*., 2008; Burdick-Will *et al*., 2011; Duncan and Magnuson, 2011) this indicates difficulties in conceptualizing these microsystems as independent from adversity at the individual level.

Following this conclusion, the two-path models treated family conflict and neighborhood quality as microsystems functioning through the individual as measured by ACEs. These models clarify the relationships between the family and neighborhood microsystems with cognitive outcomes. When the models with direct pathways from family conflict and neighborhood quality to outcomes are compared to those without, the function of these latent variables is revealed to be through the individual, as measured by the indirect effect, rather than an independent function, as measured by the direct effect. This also highlights the central role of ACEs in predicting cognitive outcomes. This model demonstrates the continued relationship between individual adversity and the microsystems of families and neighborhoods; however, these findings indicate a lack of evidence for a separate effect of these pathways on cognitive outcomes. Family conflict and neighborhood quality matter, but they cannot be used as predictors of cognitive outcomes without the inclusion of individual adversity. Future research using the final model which highlighted the presence of an indirect effect but the lack of a direct effect from family conflict or neighborhood quality to cognitive outcomes could be conducted to observe shifts in this phenomena across groups. Individuals interact with developmental contexts differently at different ages, changing the ways in which contexts drive development, along with the extent to which they have an effect (Sameroff, 2010). This study utilized a wide sample of children from different developmental stages. Analysis of subsamples consisting of individuals in developmental groups could further elaborate on the relationships between the individual and the family and neighborhood contexts and how they are different at different stages. This study can serve as a reference point for such a line of research.

7. CONCLUSION

The bioecological model of human development posits that contexts and individuals interact directly and indirectly to drive development. Consequentially, knowledge of contexts and the individual should be able to partially predict developmental outcomes. This study explored the relationships between ACEs, family conflict, neighborhood quality, and cognitive functioning. The first guiding question, which asked if the measures of the individual, families, and neighborhoods produced the type of relationships with cognitive outcomes that would be predicted by existing research, can be answered in the affirmative. All three of the predictor variables demonstrated a good fit for the data, the paths from adversity and family conflict to cognitive outcomes were negative and significant, and the path from lack of neighborhood quality to cognitive outcomes was negative and significant. The second guiding question inquired as to nature of the path from family conflict to cognitive outcomes and the path from neighborhood quality to cognitive outcomes. It was found that individual childhood adversity cannot be disregarded in this modeling, and that whereas a direct pathway from ACEs to cognitive outcomes is empirically supported, direct pathways from the proximal contexts are not. This finding highlights the importance of measurement at the individual level, along with the incorporation of measures of developmental contexts, for understanding development that affects cognitive outcomes and long-term achievement.

Funding: The collection of data used in this study was partly supported by the National Institutes of Health under grant number R01 HD069609 and the National Science Foundation under award number 1157698.
Competing Interests: The author declares that there are no conflicts of interests regarding the publication of this paper.

© 2017 Conscientia Beam. All Rights Reserved.

REFERENCES

Anda, R.F., J.B. Croft, V.J. Felitti, D. Nordenberg, W.H. Giles, D.F. Williamson and G.A. Giovino, 1999. Adverse childhood experiences and smoking during adolescence and adulthood. JAMA, 282(17): 1652–1658. *View at Google Scholar | View at Publisher*

Bentler, P.M., 1990. Comparative fit indexes in structural models. Psychological Bulletin, 107(2): 238-246. *View at Google Scholar | View at Publisher*

Berns, R., 2010. Child, family, school, community: Socialization and support. 8th Edn., Belmont, CA: Wadsworth/Cengage Learning.

Bethell, C.D., P. Newacheck, E. Hawes and N. Halfon, 2014. Adverse childhood experiences: Assessing the impact on health and school engagement and the mitigating role of resilience. Health Affairs, 33(12): 2106–2115. *View at Google Scholar | View at Publisher*

Blas, E. and A.S. Kurup, 2010. Equity, social determinants, and public health programmes. Geneva, Switzerland: World Health Organization.

Briggs, X.D.S., S.J. Popkin and J.M. Goering, 2010. Moving to opportunity: The story of an American experiment to fight ghetto poverty. New York: Oxford University Press.

Bronfenbrenner, U., 1976. The experimental ecology of education. Educational Researcher, 5(9): 5–15. *View at Google Scholar | View at Publisher*

Bronfenbrenner, U., 1979. Contexts of child rearing: Problems and prospects. American Psychologist, 34(10): 844-850. *View at Google Scholar | View at Publisher*

Bronfenbrenner, U., 1986. Ecology of the family as a context for human development: Research perspectives. Developmental Psychology, 22(6): 723-742. *View at Google Scholar | View at Publisher*

Bronfenbrenner, U., 1994. Ecological models of human development. In M. Gauvain & M. Cole (Eds.), Readings on the development of children. 4th Edn., New York: Worth Publishers. pp: 3–8.

Bronfenbrenner, U., 1996. The ecology of human development: Experiments by nature and design. Cambridge, Mass: Harvard University Press.

Bronfenbrenner, U. and G.W. Evans, 2000. Developmental science in the 21st century: Emerging questions, theoretical models, research designs and empirical findings. Social Development, 9(1): 115–125. *View at Google Scholar | View at Publisher*

Bronfenbrenner, U. and P.A. Morris, 1998. The ecology of developmental processes. In W. Damon & R. M. Lerner (Eds.), Handbook of child psychology: Theoretical models of human development. 5th Edn., Hoboken, NJ: John Wiley & Sons, Inc, 1: 993–1028.

Bronfenbrenner, U. and P.A. Morris, 2006. The bioecological model of human development. Handbook of Child Psychology. *View at Google Scholar | View at Publisher*

Brooks-Gunn, J., G.J. Duncan, P.K. Klebanov and N. Sealand, 1993. Do neighborhoods influence child and adolescent development? American Journal of Sociology, 99(2): 353–395. *View at Google Scholar | View at Publisher*

Brown, M.J., S.W. Masho, R.A. Perera, B. Mezuk and S.A. Cohen, 2015. Sex and sexual orientation disparities in adverse childhood experiences and early age at sexual debut in the United States: Results from a nationally representative sample. Child Abuse & Neglect, 46(Aug): 89–102. *View at Google Scholar | View at Publisher*

Brown, T.A., 2015. Confirmatory factor analysis for applied research. 2nd Edn., New York ; London: The Guilford Press.

Burdick-Will, J., J. Ludwig, S.W. Raudenbush, R.J. Sampson, L. Sanbonmatsu and P. Sharkey, 2011. Converging evidence for neighborhood effects on children's test scores: An experimental, quasi-experimental, and observational comparison. In G. J. Duncan & R. J. Murnane (Eds.), Whither opportunity? Rising inequality, schools, and children's life chances. New York, Chicago: Russell Sage Foundation; Spencer Foundation. pp: 255–276.

Center for Disease Control and Prevention, 2015. Behavioral risk factor surveillance system survey ACE module data, 2010. Atlanta, GA: U.S. Department of Health and Human Services, Centers for Disease Control and Prevention.

© 2017 Conscientia Beam. All Rights Reserved.

Cicchetti, D., 2013. Annual research review: Resilient functioning in maltreated children–past, present, and future perspectives. Journal of Child Psychology and Psychiatry, 54(4): 402–422. *View at Google Scholar* | *View at Publisher*

Ciula, R. and C. Skinner, 2015. Income and beyond: Taking the measure of child deprivation in the United States. Child Indicators Research, 8(3): 491–515. *View at Google Scholar* | *View at Publisher*

Clarkson, F.P.A., 2014. Prevalence and relationship between adverse childhood experiences and child behavior among young children. Infant Mental Health Journal, 35(6): 544–554. *View at Google Scholar* | *View at Publisher*

Dong, M., R.F. Anda, V.J. Felitti, S.R. Dube, D.F. Williamson, T.J. Thompson and W.H. Giles, 2004. The interrelatedness of multiple forms of childhood abuse, neglect, and household dysfunction. Child Abuse & Neglect, 28(7): 771–784. *View at Google Scholar* | *View at Publisher*

Dube, S.R., V.J. Felitti, M. Dong, D.P. Chapman, W.H. Giles and R.F. Anda, 2003. Childhood abuse, neglect, and household dysfunction and the risk of illicit drug use: The adverse childhood experiences study. Pediatrics, 111(3): 564–572. *View at Google Scholar* | *View at Publisher*

Duffy, D. and N. Sastry, 2012. An assessment of the national representativeness of children in the 2007 panel study of income dynamics (Technical Services Paper No. 12–1). PSID Survey Research Center, Institute for Social Research, University of Michigan.

Duncan, G.J. and K.A. Magnuson, 2011. The nature and impact of early achievement skills, attention skills, and behavior problems. In G. J. Duncan & R. J. Murnane (Eds.), Whither opportunity?: Rising inequality, schools, and children's life chances. New York, Chicago: Russell Sage Foundation; Spencer Foundation. pp: 47–69.

Duncan, O.D., D.L. Featherman and B. Duncan, 1972. Socioeconomic background and achievement. New York: Seminar Press.

Enders, C.K., 2010. Applied missing data analysis. New York: Guilford Press.

Evans, S.E., C. Davies and D. DiLillo, 2008. Exposure to domestic violence: A meta-analysis of child and adolescent outcomes. Aggression and Violent Behavior, 13(2): 131–140. *View at Google Scholar* | *View at Publisher*

Felitti, V.J. and R.F. Anda, 2010. The relationship of adverse childhood experiences to adult medical disease, psychiatric disorders and sexual behavior: Implications for healthcare. In R. A. Lanius, E. Vermetten, & C. Pain (Eds.), The impact of early life trauma on health and disease: The hidden epidemic. Cambridge: Cambridge University Press. pp: 77–87.

Felitti, V.J., R.F. Anda, D. Nordenberg, D.F. Williamson, A.M. Spitz, V.J. Edwards and J.S. Marks, 1998. Relationship of childhood abuse and household dysfunction to many of the leading causes of death in adults: The adverse childhood experiences (ACE) study. American Journal of Preventive Medicine, 14(4): 245–258. *View at Google Scholar* | *View at Publisher*

Finkelhor, D., A. Shattuck, H. Turner and S. Hamby, 2015. A revised inventory of adverse childhood experiences. Child Abuse & Neglect, 48: 13–21. *View at Google Scholar* | *View at Publisher*

Forehand, R., H. Biggar and B.A. Kotchick, 1998. Cumulative risk across family stressors: Short-and long-term effects for adolescents. Journal of Abnormal Child Psychology, 26(2): 119–128. *View at Google Scholar*

Fowler, P.J., C.J. Tompsett, J.M. Braciszewski, A.J. Jacques-Tiura and B.B. Baltes, 2009. Community violence: A meta-analysis on the effect of exposure and mental health outcomes of children and adolescents. Development and Psychopathology, 21(1): 227–259. *View at Google Scholar* | *View at Publisher*

Galster, G.C., 2012. The mechanism(s) of neighbourhood effects: Theory, evidence, and policy implications. In M. van Ham, D. Manley, N. Bailey, L. Simpson, & D. Maclennan (Eds.), Neighbourhood effects research: New perspectives. 1st Edn., Netherlands: Springer. pp: 23–56.

Gouskova, E., 2001. The 2002 PSID child development supplement (CDS-II) weights (PSID Technical Report). Ann Arbor, MI: Survey Research Center, Institute for Social Research, The University of Michigan.

Graham, J.W., 2003. Adding missing-data-relevant variables to FIML-based structural equation models. Structural Equation Modeling, 10(1): 80–100. *View at Google Scholar* | *View at Publisher*

Hauser, R.M. and J.R. Warren, 1996. Socioeconomic indexes for occupations: A review, update, and critique (CDE Working Paper No. 96–1). Madison, WI: Center for Demography and Ecology, University of Wisconsin-Madison.

© 2017 Conscientia Beam. All Rights Reserved.

Herrenkohl, T.I., J.O. Lee, R. Kosterman and J.D. Hawkins, 2012. Family influences related to adult substance use and mental health problems: A developmental analysis of child and adolescent predictors. Journal of Adolescent Health, 51(2): 129–135. *View at Google Scholar* | *View at Publisher*

Hill, N.E. and D.F. Tyson, 2009. Parental involvement in middle school: A meta-analytic assessment of the strategies that promote achievement. Developmental Psychology, 45(3): 740–763. *View at Google Scholar* | *View at Publisher*

Hindman, A.H., L.E. Skibbe, A. Miller and M. Zimmerman, 2010. Ecological contexts and early learning: Contributions of child, family, and classroom factors during head start, to literacy and mathematics growth through first grade. Early Childhood Research Quarterly, 25(2): 235–250. *View at Google Scholar* | *View at Publisher*

Hofferth, S., P.E. Davis-Kean, J. Davis and J. Finkelstein, 1997. The child development supplement to the panel study of income dynamics: 1997 user guide. Ann Arbor, MI: Survey Research Center, Institute for Social Research, The University of Michigan.

Hu, L. and P.M. Bentler, 1999. Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. Structural Equation Modeling: A Multidisciplinary Journal, 6(1): 1–55. *View at Google Scholar* | *View at Publisher*

Hyde, J.S., S.M. Lindberg, M.C. Linn, A.B. Ellis and C.C. Williams, 2008. Gender similarities characterize math performance. Science, 321(5888): 494–495. *View at Google Scholar* | *View at Publisher*

Institute for Social Research, 2010. The panel study of income dynamics child development supplement user guide for CDS-II. Institute for Social Research. Retrieved from http://psidonline.isr.umich.edu/CDS/cdsii_userGd.pdf.

ISR, 2010. The panel study of income dynamics child development supplement user guide for CDS-II. Institute for Social Research. Retrieved from http://psidonline.isr.umich.edu/CDS/cdsii_userGd.pdf.

Jaffee, S.R. and A.K. Maikovich-Fong, 2011. Effects of chronic maltreatment and maltreatment timing on children's behavior and cognitive abilities. Journal of Child Psychology and Psychiatry, 52(2): 184–194. *View at Google Scholar* | *View at Publisher*

Leventhal, T. and J. Brooks-Gunn, 2000. The neighborhoods they live in: The effects of neighborhood residence on child and adolescent outcomes. Psychological Bulletin, 126(2): 309–337. *View at Google Scholar* | *View at Publisher*

Marie-Mitchell, A. and T.G. O'Connor, 2013. Adverse childhood experiences: Translating knowledge into identification of children at risk for poor outcomes. Academic Pediatrics, 13(1): 14–19. *View at Google Scholar* | *View at Publisher*

McGonagle, K.A., R.F. Schoeni, N. Sastry and V.A. Freedman, 2012. The panel study of income dynamics: Overview, recent innovations, and potential for life course research. Longitudinal and Life Course Studies, 3(2): 268–284. *View at Google Scholar* | *View at Publisher*

McLaughlin, K.A., M.A. Sheridan and H.K. Lambert, 2014. Childhood adversity and neural development: Deprivation and threat as distinct dimensions of early experience. Neuroscience & Biobehavioral Reviews, 47: 578–591. *View at Google Scholar* | *View at Publisher*

Muthén, L.K. and B.O. Muthén, 1998. Mplus user's guide. 7th Edn., Los Angeles, CA: Muthén & Muthén.

Newman, D.A., 2009. Missing data techniques and low response rates: The role of systematic nonresponse parameters. In C. E. Lance & R. J. Vandenberg (Eds.), Statistical and methodological myths and urban legends: Doctrine, verity and fable in the organizational and social sciences. New York: Routledge. pp: 7–36.

Olofson, M.W., 2017. A new measurement of adverse childhood experiences drawn from the panel study of income dynamics child development supplement. Child Indicators Research: 1-19. *View at Google Scholar* | *View at Publisher*

Paradis, A.D., H.Z. Reinherz, R.M. Giaconia, W.R. Beardslee, K. Ward and G.M. Fitzmaurice, 2009. Long-term impact of family arguments and physical violence on adult functioning at age 30 years: Findings from the Simmons longitudinal study. Journal of the American Academy of Child & Adolescent Psychiatry, 48(3): 290–298. *View at Google Scholar* | *View at Publisher*

Perie, M., R. Moran and A.D. Lutkus, 2005. NAEP 2004 trends in academic progress: Three decades of student performance in reading and mathematics. National Center for Education Statistics, US Department of Education, Institute of Education Sciences.

Repetti, R.L., S.E. Taylor and T.E. Seeman, 2002. Risky families: Family social environments and the mental and physical health of offspring. Psychological Bulletin, 128(2): 330-366. *View at Google Scholar* | *View at Publisher*

© 2017 Conscientia Beam. All Rights Reserved.

Sameroff, A., 2010. A unified theory of development: A dialectic integration of nature and nurture. Child Development, 81(1): 6–22. *View at Google Scholar* | *View at Publisher*

Sampson, R.J., J.D. Morenoff and T. Gannon-Rowley, 2002. Assessing neighborhood effects: Social processes and new directions in research. Annual Review of Sociology, 28(1): 443–478. *View at Google Scholar* | *View at Publisher*

Satorra, A., 2000. Scaled and adjusted restricted tests in multi-sample analysis of moment structures. In R. D. H. Heijmans, D. S. G. Pollock, & A. Satorra (Eds.), Innovations in multivariate statistical analysis. London: Klewer Academic Publishers. pp: 233–247.

Schilling, E.A., R.H. Aseltine and S. Gore, 2007. Adverse childhood experiences and mental health in young adults: A longitudinal survey. BMC Public Health, 7(1): 1–10. *View at Google Scholar* | *View at Publisher*

Sharkey, P. and J.W. Faber, 2014. Where, when, why, and for whom do residential contexts matter? Moving away from the dichotomous understanding of neighborhood effects. Annual Review of Sociology, 40(1): 559–579. *View at Google Scholar* | *View at Publisher*

Sheeber, L., H. Hops, A. Alpert, B. Davis and J. Andrews, 1997. Family support and conflict: Prospective relations to adolescent depression. Journal of Abnormal Child Psychology, 25(2): 333–344. *View at Google Scholar* | *View at Publisher*

Sirin, S.R., 2005. Socioeconomic status and academic achievement: A meta-analytic review of research. Review of Educational Research, 75(3): 417–453. *View at Google Scholar* | *View at Publisher*

Todd, P.E. and K.I. Wolpin, 2007. The production of cognitive achievement in children: Home, school, and racial test score gaps. Journal of Human Capital, 1(1): 91–136. *View at Google Scholar* | *View at Publisher*

US Department of Health and Human Services, 2010. Understanding and improving health and objectives for improving health. Washington, D.C: Government Printing Office, 1.

Wechsler, D., 1974. Wechsler intelligence scales for children - revised. New York: The Psychological Corporation.

Woodcock, R.W. and M.B. Johnson, 1989. Tests of achievement: Standard battery. Chicago, IL: Riverside Publishing.

Views and opinions expressed in this article are the views and opinions of the author(s), International Journal of Education and Practice shall not be responsible or answerable for any loss, damage or liability etc. caused in relation to/arising out of the use of the content.

© 2017 Conscientia Beam. All Rights Reserved.