Developmental Trajectories of Anxiety and Depression from Preschool Childhood to Early Adolescence: The Cumulative effects and Timing Effects of Poverty and Low Income

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Abstract:

In sociological literature, relatively little attention has been directed toward conditions evoking various types of psychopathological symptoms in the early stages of life. To bridge this gap, in this paper, three models are introduced to test the cumulative effects and timing effects of family income and poverty statuses on growth trajectories of child behavior problems after controlling for gender, race/ethnicity, the mother's marital status, cohorts and birth order. Methodologically, growth curve models are fitted to data from the Children of National Longitudinal Survey of Youth, 1979. Behavior problems are measured using an anxiety and depression subscale of the Behavior Problem Index. The effects of family income levels and poverty experiences during childhood turn out to be relatively small compared to the mother's marital status. Specifically, the Persistent Poverty model fails at detecting statistically significant, cumulative effects of poverty. The Time-Varying Poverty model and the Time-Varying Family Income model show relatively strong effects of poverty status and low income levels in early childhood and early adolescence. Possible biases and limitations of this study design are also discussed and a future line of research is outlined.

Introduction

Due to its critical implication on later stages of life, an investigation on a socioeconomic status and its association with the health status in childhood comprises a large body of literature within, as well as beyond, the sociological framework. Chen and associates (2002) briefly review the differential distribution of child health statuses through socioeconomic statuses (SES) and infer that a low strata of SES are related to an enhanced risk for injury, asthma, and blood pressure. A series of papers by Case and colleagues (2002, 2005, 2006) investigate relationships between the economic status of parents and a variety of physical health statuses, as well as their influences on social mobility, suggesting that a worsened health status concentrated in low income families inhibits a narrowed economic status in adulthood. In a similar vein, Palloni (2006) also reaches the same conclusion that early childhood health plays a key role in widening the intergenerational reproduction of social classes.

In contrast, relatively little attention has been directed toward integrating roles of SES in generating, fortifying, and enervating various types of psychological pathology in the early stages of life, let alone their effects on status attainment in later life. It is also remarkable that existing studies do not agree with each other. For example, Robert et al. (1997) report that, with a statistical significance, self-reported levels of SES are negatively associated with depression. However, Twenge and Nolen-Hoeksema (2002) couldn't find a significant effect of SES on childhood depression in their meta-analysis.

Regarding roles of poverty status and family income levels for evoking child behavior problems, cumulative and timing effects have attracted researchers' attention. Takeuchi and colleagues (1991) report that persistent recipients of welfare benefits are

more likely to express impulsive, antisocial and depressive behaviors than those who do not receive these benefits. However, Takeuchi and his colleagues couldn't find a difference between persistent recipients and new recipients. These relationships hold when they are replaced by a measure of poverty with perceived financial strains. In another study, though, persistent poverty turned out to be better related to internalizing mental problems than a significant current poverty status, whereas current poverty is associated with externalizing behavior problems (McLeod and Shanahan, 1993 and 1996). Duncan and associates (1994) find that not only is family income a robust predictor for child behavior problems, even after controlling for family structure and maternal schooling, but also that the effects of poverty are cumulative in that longer poverty spells tend to predict more serious behavior problems, while the timing of the poverty status is insignificant. However, Pagani et al. (1997) find that there are detectable cumulative and timing effects of poverty on an anxiety subscale of the Social Behavior Questionnaire, even though these effects disappear when family structure is introduced to adjust for confounding effects between poverty status and family structure.

Even though all aforementioned articles contribute to an understanding of cumulative and timing effects of poverty and low family income, they share common methodological limitations: they either use longitudinal data in a similar fashion as that of cross-sectional data or include small portions of follow-ups which are not enough to cover all periods of childhood in terms of age. Thus, they are unable to incorporate developmental perspectives into their study designs. When any of them considered timing effects, their operationalization is done in a very limited sense so that it must be systematically included into the statistical model. To overcome these shortcomings in

previous reports, this study incorporates growth curve models with data drawn from the Children of National Longitudinal Survey of Youth 1979, surveyed from 1986 to 2004. However, it is impossible to estimate cumulative and timing effects with one statistical model due to linear collinearity between family income and poverty status. Thus, this study sets up three models to investigate these effects. Also note that a group of following variables will be included as control variables, including sex or gender (Cockerham, 2006; Kovacs & Devlin, 1998; Zahn-Waxler et al., 2000; Hankin and Abramson, 1999; Twenge & Nolen-Hoeksema, 2002), race/ethnicity (Roberts et al., 1997; Kistner et al., 2003), the mother's marital status (Thompson et al., 1994; Kelly, 2000; Vandewater & Lansford, 1998), cohorts (Kessler et al., 2005 and Twenge, 2000) and birth order (Gate et al., 1988 and Sulloway, 2001).

Data, Measurements and Statistical Models

The Children of National Longitudinal Study of Youth, 1979 (NLSY 79) data set will be utilized for identifying growth trajectories in anxiety and/or depression symptoms, tracing preschool children, age 4, through early adolescence to age 14. Since 1986, the Children of NLSY 79 surveys have been conducted biennially. The sample of these surveys consists of all children born to NLSY 79 female respondents. Initially, interviews were executed to only mothers, but for the second survey round, namely from 1988, interviews with all children who were ages ten and over as of the end of each survey year were also completed using considerably encompassing self-report questionnaires (CHRR 2004).

Because growth curve models render age the primary index, two-year intervals between follow-ups expose researchers to challenging tasks in dealing with age. Simply put, a child who enters into the study at age four responds to the survey at ages 6, 8, 10, 12 and 14, or even years. Symmetrically, there are children whose data has been gathered only at odd years. Primarily, in order to augment available data, we use a combined data set, merging children who are 4 with those who are 5, those who are 6 with those who are 7, and so on. We also set them at age 5, 7, 9, 11, and 13. Additionally, the children's data follows children of the NLSY 79 cohort so that there is more than one child to many female members of the cohort, whose information is also available. To reduce the complexity of the models, this study only uses the eldest child if there is more than one child in a single family. It remains a future task to incorporate information of the remaining children, using an hierarchical approach.

From the first survey, the Children of NLSY 79 questionnaires include the Behavior Problems Index (BPI) items, created by James Peterson and Nicholas Zill (Achenbach and Edelbrock, 1981; Peterson and Zill, 1986; Baker et al., 1993; CHRR, 2004). The BPI gauges behavioral and psychological problems and symptoms found in children from ages 4 to 14. In this paper, of these six subscales, the anxious/depressed subscale is analyzed as a response variable that, in turn, composes of five items, including 1) sudden changes in moods/feelings, 2) feels/complains no one loves him/her, 3) too fearful or anxious, 4) feels worthless or inferior, and 5) feels unhappy, sad or depressed. In the original format, each item has three values ("often true", "sometimes true", and "not true"), but these values have been collapsed into two values, "yes"(=1: "often true" and "sometimes true") and "no"(=1: "not true"). Thus, the composite index

has a range of 0 to 5. Bigger values mean that children demonstrate more problematic behaviors.

Many researchers question the validity and reliability of the BPI, mainly because each item is designed for a parental response. Some critics of BPI ignore both informant-reported measures and BPI-reported measures. According to these critics, observers' reports are unreliable because they reflect observers' perceptions, rather than children's behaviors; for this reason, rates may vary too much to remain consistent or may be too biased to be valid. However, much evidence shows that the BPI is valid and reliable. Taking advantage of meta-analysis, Achenbach and colleagues (1987) show that the degree of validity attributable to parents' reports is similar to the degree of validity attributable to teachers' or mental health workers' reports. Moreover, Nicholas Zill finds that the test-retest reliability of the combined scale score is approximately .63 and that the reliability of a BPI containing 28 items is equal to .92 when the Spearman-Brown formula is used (recited from Baker et al., 1993). After controlling for significant confounding factors, Zuckerman et al.'s study (1995) shows that the BPI's anxiety-or-depression subscale has strong predictive power regarding frequent physician visits. Even though a substantial body of literature assures us that the BPI is a good index, one should proceed with some caution as one interprets BPI-based results. Other research projects have documented that the mother's psychopathological symptoms have a significant effect on reports of children's symptoms (Chilcoat & Breslau, 1997).

This study demonstrates three statistical growth curve models to test cumulative and timing effects on low income levels and poverty statuses. In the persistent poverty (PP) model, three patterns of poverty experiences are discretized: "persistent poverty" is

assigned when a child has experienced four to five poverty spells, “one poverty experience” is assigned when the child has experienced at least one time of poverty, and “no experience of poverty” is assigned when the child has not experienced poverty at all; the last category plays a baseline role. This poverty variable is then inserted as a time-invariant variable in the growth curve model. The following equations briefly show the model in scalar terms (Duncan et al., 1999; Bollen and Curran, 2006).

Equation 1

$$y_{it} = \alpha_i + \beta_i \lambda_t + \gamma_i \lambda_t^2 + \varepsilon_{it}$$

Equation 2

$$\alpha_i = \mu_\alpha + \sum_q^Q \rho_{\alpha q} x_{iq} + \zeta_{\alpha_i}, \quad \beta_i = \mu_\beta + \sum_q^Q \rho_{\beta q} x_{iq} + \zeta_{\beta_i}, \quad \gamma_i = \mu_\gamma + \sum_q^Q \rho_{\gamma q} x_{iq} + \zeta_{\gamma_i}$$

Here, i represents each individual and t denotes the time at which outcome y is observed. λ carries age so that here, the quadratic model is assumed (Hyun Sik Kim, 2007). Coefficients α, β, and γ are subscripted by i, showing that each coefficient is unique to individuals. All of these coefficients have their own mean levels, μ and error terms ζ, together with observed predictors’ value x and unknown parameters ρ. Therefore, the poverty variable is inserted into the PP model as one of x. However, we are interested in the value of ρ.

Next, we fit data to the time-varying growth curve model using poverty experience as a time-varying covariate. Here, the measure of the poverty status is dichotomized with 0, meaning no poverty, and 1, in poverty at each time point. The mathematical representation of this model in scalar terms can be seen in Equation 3.

Equation 3

$$y_{it} = \alpha_i + \beta_i \lambda_t + \gamma_i \lambda_t^2 + \delta_t w_{it} + \varepsilon_{it}$$

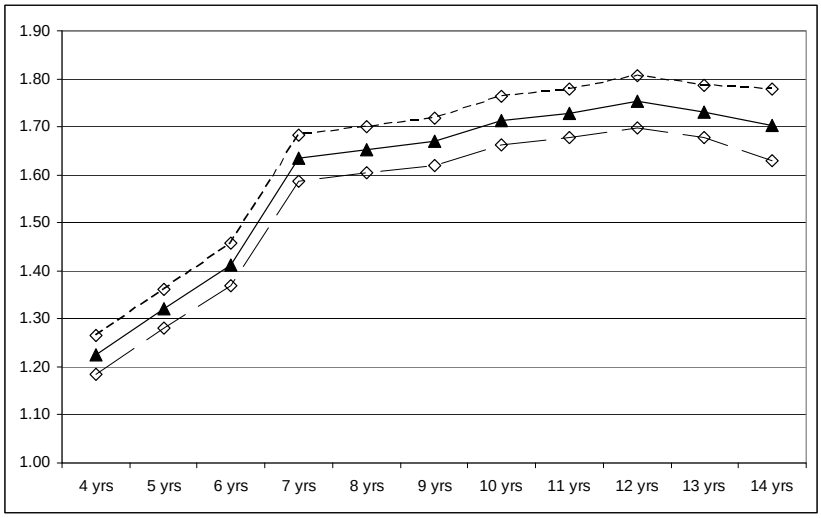
Equation 3 is different from Equation 1 in that w denoting poverty status is added in the level 1 equation after slipping out of x from Equation 2. Thus, our primary concern in this model is the unknown parameter of δ. Note that δ is subscripted by t, suggesting that this coefficient varies according to the age at which the survey is administered. This study refers to this model as the Time-Varying Poverty (TVP) model. Often, poverty status is not sufficient to reveal a relationship between socioeconomic status and mental health, because it tests differences in mental outcomes of marginalized groups in income distribution. Also, given that current interests in health-related literature focus on gradient by socioeconomic status rather than the threshold effect, testing effects of family income can be considered a natural extension of personal interests. Therefore, in the last model, we predict the growth curve of psychopathological symptoms using time-varying family income to see if there is a change or not in the coefficient of family income. Dubbed the Time-Varying Family Income (TVFI) model, this model uses log-transformed family income as a time-varying continuous variable. It is easy to find that this TVFI model follows Equation 3 in its mathematical expression. M-plus is used for the estimation of these three models and STATA is used for data preparation and graphical presentation.

Statistical Results

1) Descriptive Statistics

Figure 1 below shows the mean and standard deviation, as well as the 95% lower and upper bounds of the mean estimates of the anxiety-or-depression subscale when all data, even that with one-time point observations, are considered.

Figure 1. Means and Confidence Intervals from All Data



From Figure 1, it is possible to describe the trend of anxiety or depression by age. The anxiety or depression level goes up from age 4 until age 12 at a pace of a decreasing rate. This level exhibits a slight negative growth after age 12. From this table and graph, an hypothesis can now be formulated that sub-clinical symptoms of anxiety or depression, as reported by mothers, would be a quadratic function of age rather than a linear function.

To fit statistical models, we select data using a list-wise deletion approach. It should be remembered that we include in the final data set only those children who have completed all five interviews. Table 1 below shows descriptive statistics of the final data set. These descriptive statistics show that 1) we balance data in terms of a gender ratio, 2) we over-sample minorities regarding race/ethnicity, which can be traced back to the initial study design of NLSY 79, 3) we observe the insecure nature of a mother's marital

status, 4) the final data set has a high rate of persistent poverty spells in childhood, and 5) with respect to cohorts, we retain a balanced structure.

Table 1. Descriptive Statistics of the Final Data Set

Panel A				Panel B				Panel C			
		N	Per.			N	Per.	Poverty Status [5]			
Gender	Boys(=0)	451	50.2	Per. Pov. [2]	No Pov.	599	66.6			N	Perc.
	Girls(=1)	448	49.8		Per. Pov	238	26.5	Age 5	0	696	77.4
Race/Eth.	Eur-Ame.	520	57.8		AL Once	62	6.9		1	203	22.6
	Hispanics	157	17.5	Cohort [3]	1986	164	18.2	Age 7	0	713	79.3
	Afr-Ame.	222	24.7		1988	202	22.5		1	186	20.7
Mar. Sta.[1]	Stay Mar.	492	54.7		1990	166	18.5	Age 9	0	707	78.6
	Stay Sin.	192	21.4		1992	132	14.7		1	192	21.4
	Get Mar.	69	7.7		1994	124	13.8	Age 11	0	738	82.1
	Get Div.	97	10.8		1996	111	12.3		1	161	17.9
	Unstable	49	5.5	Parity [4]	Sec. Hi.	387	43.0	Age 13	0	738	82.1
					First.	512	57.0		1	161	17.9
Total		899	100	Total		899	100	Total		899	100

Note

1) In terms of the marital status, “stay married” means that the mother has stayed married throughout the study period; “stay single” means that the mother has stayed single throughout the study period; “get married” means that the mother was single during the initial survey but was married in the middle of the study period and has stayed married since that time; “get divorced” means that the mother was married during the initial survey but became divorced, separated or widowed in the middle of the study period and has remained single; “unstable” means that the mother has experienced at least two changes in her marital status during the study period. Here, “stay married” is a baseline.

2) Per. Pov. categorizes a persistent poverty status; “No pov” means no poverty experience exists; “per. pov.” means that the family has remained in a poverty status four to five times throughout the study period; “AL once” means that the child has experienced at least one poverty spell. Here, “no pov” is a baseline.

3) Cohort is divided according to which year a child was surveyed for the first time.

4) Parity is dichotomized into a first-order child and second-or-higher order child. The latter is a baseline.

5) With regards to poverty status, 0 means out of poverty and 1 means in poverty.

Table 2 below further shows family income distribution across all ages, in which data from the final data set are deflated according to the CPI-U, which sets consumer price indices from 1982 to 1984 to 100 (Bureau of Labor Statistics, 2007). Compared to representative national data, our data show no significant deviation.

Table 2. Family Income Distribution

Family Income Distribution						
Variable	Obs	Mean	Median	Std. Dev.	Min	Max
Age 5		26,958	22,316	42,666	365	620,841
Age 7		29,079	22,381	51,575	289	620,841
Age 9		28,346	24,191	35,666	8	620,841
Age 11		31,180	23,638	43,126	39	620,841
Age 13		30,305	24,569	28,112	212	217,155
National data[1)]	1982	27,391	23,433	Not Available		
	1983	28,638	24,580			
	1984	31,052	26,433			

Note: Income values of current data are connected to 1982-1984 and national data show values of those times. Source: Census Bureau 2007, Historical Income Tables-Families.

2) Results from Statistical Models

This study shows results confirming that the quadratic growth curve model fits the data par excellence to the linear model. Table 3 below aims at revealing this point. From every measure of goodness-of-fit, we see that the quadratic model outperforms the linear model so that the quadratic model fits in subsequent conditional models (for a brief review of fit measure, see Hu and Bentler, 1998 and 1999). In Table 3, it is worth mentioning that the covariance between interception and linear terms is not statistically significant, implying that an initial score of anxiety/depression measures does not relate to the growth rate of the symptoms. A correlation between a linear term and a quadratic term is not easy to interpret because the two types of terms similarly represent growth-rate effects. However, our previous analyses clearly show what the negative covariance

between the linear term and the quadratic term mean: the significant covariance makes differences in psychological symptoms in later childhood bigger than what would happen if the covariance were not as significant.

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Table 3. Model Comparison between the Linear and Quadratic Models

		Linear Model			Quadratic Model		
		Est.	SE.	t-value	Est.	SE.	t-value
Mean	Intercept	1.492	0.039	38.508	1.421	0.040	35.529
	Linear	0.040	0.006	6.684	0.115	0.019	6.064
	Quadratic				-0.009	0.002	-4.228
Variance	Intercept	0.916	0.072	12.702	0.877	0.113	7.743
	Linear	0.013	0.002	6.909	0.097	0.024	4.052
	Quadratic				0.001	0.000	3.501
Covariance	Intcp-Lin	-0.017	0.009	-1.873	-0.010	0.046	-0.212
	Intcp-Quad				-0.003	0.005	-0.605
	Lin-Quad				-0.009	0.003	-3.678
Unique Variance	Age 5	0.884	0.065	13.557	0.768	0.107	7.148
	Age 7	1.066	0.058	18.324	1.013	0.059	17.191
	Age 9	1.112	0.059	18.941	0.935	0.060	15.590
	Age 11	0.983	0.056	17.439	0.921	0.058	15.872
	Age 13	0.792	0.066	12.045	0.757	0.111	6.825
Goodness-of-Fit							
Chi-square	Statistics	80.503			7.455		
	Df	10.000			6.000		
	P-value	0.000			0.281		
NNFI		0.956			0.998		
RMSEA		0.085			0.016		
AIC		16,015.336			15,950.289		
SRMR		0.065			0.017		

Note: NNFI: Non-normed fit index (=TLI: Tucker-Lewis index); RMSEA: Root mean square error of approximation; AIC: Akaike information criterion; SRMR: Standardized root mean square residual.

Table 4 below presents equivalent statistics of the targeted three models, namely the Persistent Poverty (PP) model, the Time-Varying Poverty (TVP) model and the Time-Varying Family Income (TVFI) model. Even though this study is not interested in model

selection, we add various fit measures to facilitate a comparison with unconditional models. Of note is that across models, similar outcomes exist: 1) unexplained heterogeneity in interception, linear and quadratic terms; 2) insignificant covariance between interception and linear terms and significant covariance between linear and quadratic terms; 3) substantial amounts of residuals unexplained by predictors as seen in unique variance rows.

Table 4. Fit Measures of Three Models

		Persistent Poverty			Time-Varying Poverty			TV Family Income		
		Est	SE	t-value	Est	SE	t-value	Est	SE	t-value
Interception	Inter	1.322	0.094	13.987	1.293	0.090	14.371	1.349	0.091	14.834
	Linear	0.128	0.045	2.861	0.146	0.043	3.402	0.122	0.043	2.809
	Quad	-0.010	0.005	-1.924	-0.012	0.005	-2.421	-0.009	0.005	-1.821
Variance	Inter	0.703	0.109	6.435	0.701	0.109	6.436	0.696	0.109	6.400
	Linear	0.058	0.024	2.450	0.060	0.024	2.530	0.060	0.024	2.543
	Quad	0.001	0.000	2.047	0.001	0.000	2.095	0.001	0.000	2.118
Covariance	Int-Lin	0.055	0.045	1.232	0.055	0.045	1.224	0.054	0.045	1.193
	Int-Qua	-0.011	0.004	-2.416	-0.011	0.004	-2.423	-0.011	0.004	-2.386
	Li-Quad	-0.005	0.003	-2.005	-0.005	0.003	-2.074	-0.005	0.003	-2.097
Unique Variance	Age 5	0.834	0.107	7.798	0.825	0.106	7.744	0.824	0.106	7.735
	Age 7	0.922	0.058	16.022	0.921	0.057	16.027	0.923	0.058	16.041
	Age 9	0.897	0.059	15.074	0.894	0.059	15.045	0.897	0.060	15.061
	Age 11	0.898	0.059	15.214	0.899	0.059	15.214	0.897	0.059	15.212
	Age 13	0.832	0.119	7.003	0.837	0.119	7.049	0.838	0.119	7.068
Goodness-of-Fit										
Chi-square	Statistics	26.305			51.363			65.526		
	df	28			44			44		
	P-value	0.5563			0.2075			0.0193		
NNFI		1.003			0.991			0.974		
RMSEA		0			0.014			0.023		
AIC		24498.32			25482.37			32152.61		
SRMR		0.01			0.018			0.023		

Table 5 shows the results of main interests (for those who are also interested in the outcomes of controlled variables, we attach all statistical outcomes in the appendix).

Because we fit quadratic models indexed by age, there are three coefficients in each category of “at least once” and “persistent poverty”, which are compared to the baseline of “no poverty”.

Table 5. Main Statistical Results from Three Models

		PP model			TVP model			TVFI model		
		Est.	S.E	t-val.	Est.	S.E	t-val.	Est.	S.E	t-val.
AL. Once.	Inter.	-0.062	0.094	-0.663						
	Lin.	0.017	0.044	0.372						
	Quad.	-0.002	0.005	-0.368						
Pers. Pov.	Inter.	0.055	0.162	0.338						
	Lin.	0.041	0.077	0.532						
	Quad.	-0.004	0.009	-0.486						
Time Varying	Age5				0.213	0.102	2.085	-0.145	0.051	-2.858
	Age7				-0.04	0.093	-0.432	-0.004	0.046	-0.09
	Age9				-0.075	0.094	-0.794	-0.064	0.042	-1.513
	Age11				0.014	0.099	0.137	-0.085	0.046	-1.822
	Age13				0.105	0.115	0.913	-0.096	0.054	-1.8

In the PP model, no statistically significant terms are found in at-least-once poverty and persistent poverty. This means that we fail to detect cumulative effects of poverty statuses in childhood on trajectories of psychological symptoms. In other words, children who experience at least one instance of poverty or persistent poverty with at least four or five poverty spells show no difference in their initial stage of study, growth, and acceleration of growth from those who experience no poverty at all. These results are consistent with Twenge and Nolen-Hoeksema (2002), who find no significant relationship between SES and childhood depression when contrasting major streams of research (McLeod & Shanahan, 1993 and 1996; Robert et al., 1997; Duncan et al., 1994).

From the TVP model, we infer that a poverty status matters at age 5 (t-value: 2.085) but not at any other age. The TVFI model states that children of low-income families statistically and significantly have a higher risk of experiencing anxious and

depressive behavior problems. This matches the findings from the TVP model. However, at ages 11 and 13, children being raised in low-income families are in danger of experiencing high psychopathological levels because t-values are marginally insignificant. In summary, the following statements provide the core results of this paper:

1) No strong effects of persistent poverty are detected
2) We can infer strong effects of poverty in early childhood on anxiety and depression symptoms
3) Income gradients matter for psychopathological problems in early childhood, as well as early adolescence

Our findings seem to be inconsistent across all models. How can interception in the PP model be insignificant, while poverty status and family income gradients remain statistically significant in the TVP model and TVFI model, respectively? The interception term in the growth curve model is supposed to measure differences in initial status if we observe significant interception terms in the PP model. We explain this unusual outcome through two possibilities: defective measurement of poverty status and absorption of marital status, especially single mothers, of nefarious effects. On one hand, by the nature of the operational treatment of a poverty status, we don't distinguish whether a child is under a poverty status during the first interview year, however, we classify children according to the criteria of whether a child has fallen into poverty at least once or whether a child has remained in poverty four or five times throughout the study period. On the other hand, the effects of a poverty status are highly likely to be ameliorated by marital status effects. As can be seen in the appendix, the marital status of mothers is highly significant in the PP model, which suggests that some portion of poverty effects are

realized through single motherhood during the initial stage (Duncan et al., 1994; Pagani, 1997; McLeod & Shanahan, 1993). This reasoning gains more cogency given if a married mother is single by definition during the first year interview.

Discussion

Caution is advised when readers interpret our results because, by study design, this paper has several limitations. First and foremost, our response variable is reported by mothers, so there is a certain possibility for mothers to over-report a child's symptoms, especially when she is experiencing stressful life events. Second, selection bias might have come into play from when we selected our sample from data through list-wise deletion, especially since we chose to use only the eldest child. In the light of birth order, the eldest child is more likely to show psychological symptoms (Sulloway, 2001), which might affect our results. In addition, it should be emphasized that we merely look at a specific subscale of the Behavior Problem Index and do not utilize entire aspects of child behavior problems. As other research reports indicate (Takeuchi et al., 1991 and McLeod and Shanahan, 1993 and 1996), child behavior problems have several dimensions and their relationships with poverty statuses and family income might be different. Thus, we should develop our future research to incorporate these shortcomings.

Nevertheless, this paper consistently shows that timing effects have salient features in their own light. In other words, it is our contribution to find that anxious/depressive behavior problems in early childhood and adolescence are sensitive to poverty statuses and family income. These results emphasize the need for policies aiming towards those sensitive periods in childhood for more efficient intervention. One notable finding is the absence of cumulative effects. Even though measurement issues are critical

in our findings, we doubt that our results of an absence of cumulative effects will dramatically change with more sophisticated measurements, provided the significant level of statistical analyses. These results suggest that in the face of negative environments, children develop their own coping mechanisms and resilience to adapt to given environments. Thus, more attention should be paid to those mechanisms of resilience and adaptation for a more meaningful understanding of real life.

Appendix: Main Results for Controlled Variables

			Persistent Poverty			Time-Varying Poverty			TV Family Income		
			Est	SE	t-value	Est	SE	t-value	Est	SE	t-value
Gender		Int	-0.002	0.081	-0.030	-0.001	0.080	-0.017	0.001	0.080	0.013
		Lin	-0.005	0.038	-0.137	-0.005	0.038	-0.139	-0.006	0.038	-0.159
		Quad	0.003	0.004	0.679	0.003	0.004	0.686	0.003	0.004	0.701
Race/ Ethn.	Hisp.	Int	0.122	0.112	1.085	0.116	0.112	1.035	0.122	0.111	1.098
		Lin	-0.079	0.053	-1.488	-0.074	0.053	-1.391	-0.079	0.053	-1.477
		Quad	0.008	0.006	1.228	0.007	0.006	1.122	0.007	0.006	1.182
	Black	Int	-0.113	0.108	-1.048	-0.139	0.108	-1.284	-0.133	0.108	-1.237
		Lin	-0.093	0.051	-1.817	-0.081	0.052	-1.571	-0.089	0.051	-1.734
		Quad	0.005	0.006	0.862	0.004	0.006	0.640	0.005	0.006	0.773
Mar. Stat	Sing.	Int	0.335	0.114	2.924	0.257	0.122	2.104	0.210	0.125	1.676
		Lin	0.079	0.054	1.466	0.133	0.059	2.259	0.123	0.061	2.008
		Quad	-0.008	0.006	-1.245	-0.014	0.007	-2.026	-0.013	0.007	-1.827
	Marr.	Int	0.320	0.158	2.028	0.248	0.162	1.531	0.177	0.167	1.062
		Lin	0.121	0.075	1.620	0.165	0.077	2.146	0.177	0.078	2.257
		Quad	-0.017	0.009	-1.948	-0.021	0.009	-2.402	-0.022	0.009	-2.458
	Divor.	Int	0.137	0.135	1.015	0.132	0.134	0.982	0.135	0.134	1.006
		Lin	0.109	0.064	1.710	0.120	0.064	1.866	0.107	0.065	1.647
		Quad	-0.011	0.008	-1.448	-0.012	0.008	-1.642	-0.012	0.008	-1.545
	Unsta.	Int	0.009	0.183	0.050	-0.010	0.182	-0.055	-0.037	0.183	-0.202
		Lin	0.092	0.087	1.058	0.115	0.087	1.324	0.112	0.087	1.278
		Quad	-0.011	0.010	-1.058	-0.013	0.010	-1.311	-0.013	0.010	-1.288
Cohort		Int	-0.081	0.025	-3.253	-0.077	0.025	-3.079	-0.070	0.025	-2.772
		Lin	-0.004	0.012	-0.320	-0.007	0.012	-0.594	-0.008	0.012	-0.669
		Quad	0.001	0.001	0.600	0.001	0.001	0.857	0.001	0.001	0.937
Parity		Int	0.003	0.083	0.042	0.006	0.083	0.076	0.006	0.082	0.078
		Lin	-0.027	0.039	-0.677	-0.034	0.039	-0.863	-0.029	0.039	-0.734
		Quad	0.003	0.005	0.676	0.004	0.005	0.874	0.004	0.005	0.758

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