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Constructing and Validating a Multiple-Indicator Construct of Economic Hardship in a National Sample of Adolescents with Disabilities

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Abstract

The purpose of the current study was to develop a multi-indicator construct of economic hardship among adolescents with disabilities (*N* = 9,230) participating in the National Longitudinal Transition Study–2, the largest, most comprehensive investigation of adolescents with disabilities ever conducted. Five theoretically relevant indicators (i.e., family income, head-of-household education, head-of-household employment, participation in social programs, and lack of resources) contributed to the formation of an economic hardship latent construct. Scores on this factor were validated through associations with demographic, tangible-resource, school, and family factors. The implications of these findings for continued efforts to understand and respond to economic hardship among adolescents with disabilities are discussed.

Numerous investigations conducted within the United States indicate that exposure to poverty during childhood and adolescence is predictive of poor developmental outcomes (Cushon, Vu, Janzen, & Muhajarine, 2011). The detrimental effects of poverty have been demonstrated in hundreds of scientific studies and appear to extend across the life span, negatively affecting long-term educational and occupational attainment among youth and young adults (Brooks-Gunn, Duncan, & Aber, 1997; DiRago & Vaillant, 2007; Minkler, Fuller-Thomson, & Guralnik, 2006). Poverty is such a reliable predictor of such a broad range of outcomes that numerous social entitlement programs and expenditures are dedicated to combating it, and escape from poverty is celebrated within the social sciences (Elder, 1974; Werner & Smith, 1989). Although less is known about poverty and disability, a disproportionate number of individuals with disabilities live in poverty (Annual Disability Statistics Compendium, 2012), and recent descriptions indicate that youth with disabilities exposed to poverty have higher rates of absenteeism from school, lower achievement in reading and math, receive lower grades, and have lower rates of high school completion, participation in postsecondary education, and steady employment (Newman, Wagner, Cameto, & Knokey, 2009; Wagner, Newman, Cameto, Garza, & Levine, 2005; Wagner, Newman, Cameto, Levine, & Marder, 2003).

Despite widespread evidence regarding the negative consequences of poverty, there is considerable debate about how poverty is

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operationalized, defined, and measured (Brooks-Gunn et al., 1997; Conger et al., 2002; Crosnoe, Mistry, & Elder, 2002; DiRago & Valillant, 2007; McLoyd, 1998; Short, 2011). For example, the current definition of *poverty* used within the United States is founded on estimating the amount of income needed for an adequate diet, multiplying that amount by three (based on the assumption that only one third of a family's income should be dedicated to food), accounting for family size, and then determining whether a family's income falls above or below the poverty threshold (Aber, Bennett, Conley, & Li, 1997). Although simple to compute and apply in practice, the income–food cost method for determining poverty has been widely criticized. Aber et al. (1997) note that (a) there are wide variations in resources within the group of families falling below the poverty threshold with large segments of that population using far more than one third of their income for food costs, and (b) there are large numbers of families that fall just above the threshold that may need governmental support but do not qualify due to their "near-poor" status. Similar critiques include the lack of attention devoted to understanding different spending preferences among families, the differential effects of taxation on families, and the benefits associated with long-term assets available to some families, such as home ownership (U.S. Department of Commerce, 2005). Others have observed that the current definition does not account for variations in expenses necessary for holding a job (e.g., transportation and child care costs), variations in medical costs, and costs associated with living in different geographical regions, all of which have been shown to affect a family's disposable income (Short, 2011). Still others have argued that income-based conceptualizations of poverty do not account for the deprivation of individual capabilities and the conflict or strain that arises between capabilities and potential attainments (Alkire & Santos, 2010; Sen, 1992).

To address perceived limitations with the federal poverty threshold definition, some scientists have argued for a more multifaceted definition of poverty, one that incorporates a broader number of relevant stressors, such as family income, single-parent status, parental level of education, parental occupational status, access to resources, and access to essential services, such as health care (Arnold & Doctoroff, 2003; Brooks-Gunn et al., 1997; McLoyd, 1998; Santos & Alkire, 2011). A multi-indicator representation has the advantage of allowing greater specificity in the identification and measurement of the poverty experience and provides an opportunity to more finely quantify variation in the hardship experience (Dewilde, 2004; Tomlison, Walker, & Williams, 2007). A multi-indicator definition is also consistent with that proposed by the National Academy Science Panel on Poverty and Family Assistance (Citro & Michael, 1995) and the resource-based definition proposed by the U.S. Census Bureau. (2005), which accounts for an individual's perceptions of the availability of basic needs, such as consumer durables (e.g., washing machine, oven, refrigerator), housing conditions (e.g., leaks, broken windows, plumbing), crime and safety in neighborhoods (e.g., neighborhood considered safe), and the ability to meet basic needs (e.g., housing, food, essential services).

Poverty and Disability

There are several reasons why it is important to develop further understanding about poverty and economic hardship among people with disabilities. First, within the United States, children and youth with disabilities are more likely than those without disabilities to experience poverty (Fujiura & Yamaki, 2000; Wagner et al., 2003; Palmer, 2011). Parish, Rose, Weiss, Richman, and Andrews (2008) reported that regardless of income level, families of children with disabilities were living with significantly greater food insecurity, housing instability, telephone disconnection, and health care costs and lacked health care access compared to families without children with disabilities.

Second, a rapidly expanding body of literature suggests that poverty and economic hardship are both a cause and consequence of disability. Economic hardship is predictive of a wide range of disabilities (Lustig & Strauser, 2007; Minkler et al., 2006), and individuals

with disabilities have more difficulty finding employment, earning adequate incomes, and attaining basic resources, such as stable living arrangements, all of which contribute to living in poverty (Hughes & Avoke, 2010; Newman et al., 2009). Moreover, the estimated costs associated with living with a disability are approximately twice those of living without a disability (Rosano, Mancini, & Solipaca, 2009) suggesting that people with disabilities are dually disadvantaged by the costs associated with their disability and the concurrent challenges associated with achieving stable adult outcomes.

For interventionists, the identification of specific mechanisms through which economic hardship can be ameliorated by the deployment of risk reduction or protection enhancement efforts is of paramount importance.

Third, and perhaps most important, efforts to improve the developmental outcomes of youth and adults with disabilities requires a comprehensive understanding of how and why poverty and economic hardship exert a negative influence on development. Developing further understanding about the mechanisms through which economic hardship exerts a negative influence on outcomes can provide greater insight about the specific risk processes that contribute to negative developmental outcomes, whereas developing an understanding of the mechanisms that moderate the negative effects of economic hardship on outcomes has the potential to provide insights about factors that enable positive outcomes under adverse conditions. For interventionists, the identification of specific mechanisms through which economic hardship can be ameliorated by the deployment of risk reduction or protection enhancement efforts is of paramount importance.

Current Study

The current study was undertaken to develop an economic hardship construct among adolescents and young adults participating in the National Longitudinal Transition Study–2 (NLTS2). Because the word *poverty* has a specific meaning that refers to the unidimensional income–food cost definition within the United States, we use the term *economic hardship* to refer to the multi-indicator construct created here. The NLTS2 provides a unique opportunity to examine these issues because it is the largest, most comprehensive longitudinal investigation ever conducted of youth with disabilities in the United States. Despite the study's many strengths, the NLTS2 does not currently include a multidimensional measure of economic hardship and instead relies on an income-derived definition of poverty. However, the NLTS2 does contain variables that can be combined to develop such a construct (e.g., income, head-of-household [HOH] education level, HOH employment status, income resources, and lack of resources), and the creation of such a construct could aid future research efforts devoted to understanding processes and mechanisms associated with economic hardship among adolescents and adults with disabilities. Thus, the purpose of the current investigation was to utilize data available in the NLTS2 to develop a theoretically justifiable, valid, multi-indicator construct of economic hardship among adolescents with disabilities.

Method

Data Source

The NLTS2 is a nationally representative sample of over 11,000 13- to 17-year-old students who were receiving special education services during the 2000–2001 school years. NLTS2 participants were followed over a 10-year period ending in 2010. Information on the characteristics, experiences, and abilities of the NLTS2 student sample was provided by student participants, their parents, teachers, and school administrators. Data were gathered using telephone and mailed surveys, by direct interviews, through school records, and by direct measures (SRI International, 2000).

The NLTS2 was based on a two-stage, stratified, clustered sample design. A stratified random sample of local education agencies

(LEAs) was first selected from the universe of LEAs that provided special education services to students in Grades 7 through 12. LEAs were stratified on the basis of region, enrollment size, and community wealth. Out of the stratified sample of 3,650 LEAs and 80 special schools, 500 LEAs and 40 special schools agreed to participate. The roster of students receiving special education services from each of the participating LEAs and special schools was then stratified by disability category. Students were randomly selected from each disability category but with respect to a sampling fraction that would permit an acceptable level of precision in associated parameter estimates (i.e., standard errors <3.6%). Sampling proportions for each disability group were selected so as to produce enough students in each category, so that by the final study year, after accounting for attrition, findings would generalize to each category with an acceptable level of precision. To achieve this, lower-prevalence disability categories were purposely oversampled. However, by incorporating all of the design elements for this complex survey design (i.e., stratum, cluster, and sampling weights), findings generalize to the NLTS2 sampling frame: population of youth with disabilities 13 to 17 years of age. Thus, the sampling design allows for generalizations to adolescents with autism, traumatic brain injury, deaf-blindness, learning disabilities, mental retardation, serious emotional disturbances, multiple disabilities, and hearing, speech, visual, orthopedic, and other health impairments (SRI International, 2000).

One goal of NLTS2 was to gather data pertaining to the characteristics of secondary students with disabilities and their households. An additional intent was to measure individual, family, and school factors hypothesized to be associated with adjustment and adult outcomes among youth with disabilities (SRI International, 2000). Of particular importance for the proposed study is the range of background indicators and concurrently measured criterion variables that facilitate the construction and validation of a multi-indicator economic hardship construct. In the appendix, we provide an overview of variables, data sources, and initial estimates of missing data for variables utilized in the current study.

Study Participants

The study sample characteristics are presented in Table 1. The overall sample included any NLTS2 participant with Wave 1 parent data (n = 9,230) from two sources. First, at Wave 1, parents or guardians were interviewed by telephone to ascertain information regarding students' school and nonschool experiences (e.g., extracurricular activities), historical information (e.g., age disability first identified), household characteristics (e.g., single-parenting status), family expectations, and level and type of involvement in school-related areas. All parents who could not be reached by telephone were mailed a self-administered questionnaire (83% Wave 1 response rate). Second, a one-time, direct, face-to-face assessment with a focus on academic achievement and learning attitudes toward school was conducted when sample adolescents were between ages 16 and 18 years old (56% direct assessment response rate). Responses for each sample member were weighted to represent the number of adolescents in his or her disability category and characteristics of the LEA (e.g., regions, size, and wealth).

Measures

Indicators of Economic Hardship. Six theoretically and empirically relevant indicators were selected from the Wave 1 parent or guardian report in the NLTS2 for developing the multi-indicator economic hardship construct that included income, family size, HOH highest level of education, HOH employment status, participation in social programs, and lack of household resources. Each of these indicators is discussed next.

First, virtually all definitions of poverty include income level and family size as essential elements of poverty and economic hardship (Alkire & Santos, 2010; Citro & Michael, 1995), and these variables were incorporated here using an ordinal household income variable that ranged from $5,000 or less per year

Table 1. Sample Characteristics.

Variable	*n*[a]	%
Gender		
Male	5,980	64.8
Female	3,250	35.2
Age		
13 years	810	8.8
14 years	2,350	25.5
15 years	2,290	24.8
16 years	2,300	24.9
17 years	1,500	15.9
Did not report	10	0.1
Disability type		
Learning disability	880	9.5
Speech or language impairment	870	9.4
Intellectual disability	870	9.4
Emotional disturbance	840	9.1
Hearing impairment	870	9.4
Visual impairment	690	7.5
Orthopedic impairment	910	9.9
Other health impairment	920	10.0
Autism	920	10.0
Traumatic brain injury	370	4.0
Deaf-blindness	170	1.8
Multiple disabilities	920	10.0
Household income		
$25,000 and under	2,610	28.3
$25,001 to $50,000	2,350	25.5
$50,001 or more	2,750	29.8
Did not report	1,520	16.5
Ethnicity		
White	5,770	62.5
African American	1,910	20.7
Latino/a	1,240	13.4
Other	310	3.4
City designation		
Rural	720	7.8
Suburban	4,030	43.7
Urban	3,090	33.5
Did not report	1,390	15.1

[a]As per requirement of the Institute of Education Sciences restricted-use data agreement, all unweighted sample size numbers are rounded to the nearest 10.

to $75,000 or more per year, in $5,000 increments. For conceptual purposes, this variable (i.e., income) was reverse scored so that higher levels indicated greater economic hardship. Number of children in the household was measured with a count variable that ranged from zero to 19 children.

Second, HOH educational level and employment status have long been reflected in definitions of socioeconomic status (Sirin, 2005) and are increasingly being incorporated into multi-indicator poverty constructs (Aber et al., 1997; Alkire & Santos, 2010; Schofield et al., 2011). In the current study, HOH education status was

assessed with a 10-category ordinal measure ranging from eighth grade or less education to doctorate or other advanced degrees. This measure was collapsed into a four-level variable with response options "less than high school education," "high school diploma or GED," "associate's or bachelor's degree," and "advanced degree." HOH employment status was assessed with a three-level ordinal variable with response options "not employed," "employed part-time," and "employed full-time." For conceptual purposes, HOH education and employment status were reversed scored so that higher scores reflected lower employment and education.

Third, recent conceptualizations of poverty, such as the Supplemental Poverty Measure proposed by the U.S. Census Bureau (Short, 2001, 2011; Short, Garner, Johnson, & Doyle, 1999), incorporate resources derived from "income transfer" policies, such as food stamps and Supplemental Security Income (SSI). In the current study, social program resource access was computed by summing whether a family received Temporary Assistance for Needy Families state welfare, food stamps, or SSI. To evaluate participants' perceptions of financial challenges (U.S. Census Bureau., 2005), lack of household resources was calculated to reflect hardships experienced by families (Parish et al., 2008) by summing the five difficulties: living in a single-adult household, lack of adequate transportation, no phone in the household, living with other children with a disability, and living with an adult with a disability.

Validation Measures. Fifteen conceptually relevant indicators were used as validation measures for the economic hardship construct. Prior research suggests a relationship between indicators included in our economic hardship construct and demographic characteristics of youth, tangible resources, achievement, school performance, and family processes (Aber et al., 1997; Crosnoe, Mistry, & Elder, 2002; Melby, Wickrama, Conger, & Conger, 2008; Wagner, Newman et al., 2003). Demographic indicators of youth included (a) gender; (b) age in years; (c) ethnicity, categorized as White, African American, Latino/a, or Other; (d) household setting, indicating rural, suburban, or urban; and (e) primary disability label, including learning disability (LD), intellectual disability (ID), speech language impairment (SLI), emotional disturbance (ED), other health impairment (OHI), and other disability. Tangible resources included (a) primary type of health insurance, with response options including private, government, other, or none, and (b) whether or not a family was above or below the federal poverty line. Youth academic achievement indicators included standard scores measured on four academic skills subtests from the Woodcock-Johnson III (Woodcock, McGrew, & Mather 2001) that were collected as part of the youth direct assessment: (a) passage comprehension, (b) synonym-antonym, (c) applied problems, and (d) calculations. School performance included (a) an overall ordinal rating of the youth's academic work rated on a five-point scale (1 = *excellent* to 5 = *failing*) and (b) a five-level categorical measure of overall grades (1 = *mostly As* to 5 = *mostly Fs*). Family experiences included (a) the parent school involvement scale, computed as the sum of how often (0 = *never* to 4 = *more than 6 times*) an adult had done the following since the beginning of the academic year: attended general school meeting, attended school or class events, and volunteered at school; and (b) a parent expectations scale, computed as the mean score (1 = *definitely will not*, 4 = *definitely will*) of four items asking how likely it is that the youth will get a regular diploma, attend postsecondary school, live away from home, and earn enough to support themselves.

Procedures

Permission to analyze NLTS2 data for the current project was requested and attained through a restricted-use data license from the National Center for Education Statistics (NCES), Statistical Standards Program. All procedures followed those outlined in the NCES restricted data procedures manual to ensure data security and participant anonymity. In addition, the project was reviewed and received approval from the institutional

review board at the institution where all data were housed and analyzed.

Missing Data and Multiple Imputation Procedure

The percentage of missing data for each study variable is presented in the appendix. To account for missing data, 10 data sets were imputed for measures with less than 30% missingness. Although it is not possible to definitively know whether data were missing at random (MAR), the inclusion of additional predictors in the imputation model can reduce bias and make the MAR assumption more plausible (Allison, 2009; He, Zaslavsky, & Landrum, 2009; Rubin, 1996). The imputation model thus included a number of conceptually relevant auxiliary variables as a means for strengthening its generality (see appendix). As the robustness of using multiple imputations for missing data is also conditional on the sampling design (Reiter, Raghunathan, & Kinney, 2006), the imputation models included NLTS2 strata and clusters weights.

Sequential regression multiple imputation (SRMI; van Buuren, 2007) was used to impute the data sets using the IVEware software V0.2 (Raghunathan, Solenberger, & Van Hoewyk, 2002). SRMI specifies a multivariate model by separate conditional models for each incomplete variable, allowing for imputation of variables with different distributional properties. For the current study, three models were specified: a normal linear regression model for continuous variables, a logistic regression model for binary variables, and a generalized logit regression model for variables with more than two categories.

Data Analysis

Confirmatory factor analysis (CFA) was used to test the hypothesis that the six observed indicators would load on one common economic hardship factor. To ensure unbiased estimates, the NLTS2 complex survey design characteristics (e.g., clusters, sampling weights) were incorporated into the CFA model using the sampling weight from the Wave 1 parent assessments. Weighted least squares were used to estimate the model in order to account for the binary and ordinal nature of the indicators. Factor loadings and fit statistics were based on pooled estimates from the 10 imputed data sets. Indicators that loaded less than .32 were dropped and the model was rerun (Tabachnick & Fidell, 1996). Fit of the model was evaluated with the comparative fit index (CFI; Bentler, 1990; acceptable fit ≥.95), Tucker-Lewis index (TLI; Hu & Bentler, 1999; acceptable fit ≥.95), root mean square error of approximation (RMSEA; Browne & Cudeck, 1993; acceptable fit ≤.06), and the weighted root mean square residual (WRMR; Yu, 2002; acceptable fit ≤1.0). All models were run using Mplus Version 6.1 (Muthén, & Muthén, 1998–2011).

After construction of the multi-indicator economic hardship factor, group comparisons and correlational analyses were conducted to investigate the criterion-related validity of the construct. Computed factor scores were examined in relation to a set of concurrently measured demographic, educational, and familial variables to determine whether the composite could be validated based on the associations with key contextual variables.

Results

CFA

Results associated with the one-factor, six-indicator CFA model indicated moderate fit with the sample data (CFI = .93, TLI = .89, RMSE = .038, WRMR = 1.42). The chi-square test also indicated that the variance-covariance matrix implied by the model was discrepant from the variance-covariance matrix observed in the data, $\chi^2(9, N = 9{,}230) = 129.23$, $p < .05$. Examination of the standardized factor loadings indicated that number of children in the household loaded on the one common factor at .23, below the .32 threshold, whereas the other five indicators all loaded .40 or greater. Based on findings from the first model, the number-of-children measure was dropped, and a more parsimonious five-indicator, one-factor model was tested.

Estimation of the five-indicator model resulted in statistically significant improvement

in model fit on the Satorra-Bentler (Satorra, 2000) chi-square difference test, $\Delta\chi^2(4) = 141.4$, $p < .001$, and fit indices for the five-indicator model showed good fit: CFI = .97, TLI = .94, WRMR = 0.99, and RMSEA = .031. The associated chi-square test was statistically significant, $\chi^2(5, N = 9{,}230) = 55.32$, $p < .05$, indicating that the model did not provide an entirely satisfactory fit to the data; however, given the large sample size, only minor differences between the observed and implied covariance matrix would result in statistically significant discrepancy. HOH employment status had the highest standardized factor loading (.709), followed by income level (.690), sources of income (.629), lack of resources (.537), and HOH education level (.404). Factor scores from the five-indicator poverty model were then saved from each of the 10 imputed data sets and standardized to a mean of zero and standard deviation of one, with higher scores being indicative of greater levels of economic hardship.

Validity Analyses

Table 2 provides descriptive statistics and 95% confidence intervals of standardized factor score means as a function of demographic characteristics, tangible resources, and school performance. A visual representation of these data is also provided in Figure 1. As expected, several moderate-to-large group differences were observed. For example, the mean economic hardship score was greater for those identified below the poverty line than those above the poverty line ($M = 1.05$ vs. $M = -0.48$, $d = 1.92$). African American ($M = 0.43$) and Latino/a ($M = 0.28$) youth with disabilities had greater economic hardship scores than did White youth ($M = -.028$, $d = 0.74$ and $d = 0.59$, respectively). On the disability status comparisons, youth with ID ($M = .39$) had greater economic hardship scores than did youth with LD ($M = -.14$, $d = 0.54$), SLI ($M = -.22$, $d = 0.60$), OHI ($M = -.01$, $d = 0.38$), and other disabilities ($M = -.26$, $d = 0.64$); and youth with ED ($M = .16$) had greater economic hardship scores than did youth with other disabilities ($M = -.26$, $d = 0.41$).

Adolescents with disabilities in urban environments ($M = .17$) had greater economic hardship scores than did youth from suburban environments ($M = -.20$, $d = .35$). Participants with government insurance ($M = .83$) had greater economic hardship scores than did youth with private insurance ($M = -.46$, $d = 1.54$), other insurance ($M = -.16$, $d = .91$), and no insurance ($M = .13$, $d = .77$); and youth with no insurance ($M = .13$) had greater scores than did youth with private ($M = -.46$, $d = .76$) or other forms of insurance ($M = -.16$, $d = .38$).

On the measures of school performance, youth rated as failing ($M = .17$) in terms of their overall work level had greater economic hardship scores than did youth rated as excellent ($M = -.19$, $d = .035$) and youth rated as above average ($M = -.17$, $d = 0.33$). Similarly, youth rated as having mostly Fs ($M = .18$) had greater economic hardship scores than youth rated as having mostly As ($M = -.18$, $d = .035$), mostly Bs ($M = -.18$, $d = .036$), and mostly Cs ($M = -.16$, $d = .034$), respectively.

Correlational analysis between the economic hardship and youth's academic skills and family experience scale scores revealed statistically significant correlations with effect sizes in the small-to-moderate range. Higher values on the economic hardship construct were associated with lower scores on all subscales of the Woodcock-Johnson III—Passage Comprehension ($r = -.21$, $p < .001$), Synonym-Antonym ($r = -.21$, $p < .001$), Applied Problems ($r = -.17$, $p < .001$), and Calculation ($r = -.20$, $p < .001$)—and lower levels of parent school involvement ($r = -.24$, $p < .001$) and parent expectations ($r = -.12$, $p < .001$).

Discussion

The current study was designed to construct and validate a multiple-indicator construct of economic hardship among adolescents with disabilities. Using a confirmatory factor analytic technique and data from a nationally representative sample, results demonstrated that a five-indicator, one-factor economic hardship model provided adequate fit to the data. Validity analyses revealed that scores on the derived

Table 2. Descriptive Statistics for Validation Measures.

Variable	*N*[a]	*M*	*SD*[b]	*SE*	95% CI of mean
Poverty					
Above	6,380	–0.48	0.80	0.05	[–0.54, 0.35]
Below	2,850	1.05	0.79	0.14	[0.71, 1.32]
Gender					
Male	5,970	–0.09	1.03	0.05	[–0.19, 0.02]
Female	3,250	0.01	1.03	0.07	[–0.12, 0.15]
Age					
13 years	810	0.08	1.07	0.11	[–0.14, 0.30]
14 years	2,350	–0.01	1.04	0.07	[–0.14, 0.12]
15 years	2,290	–0.07	1.03	0.08	[–0.22, 0.07]
16 years	2,300	–0.07	1.03	0.06	[–0.19, 0.04]
17 years	1,470	–0.10	0.99	0.06	[–0.22, 0.02]
Race					
White	5,770	–0.28	0.94	0.03	[–0.34, –0.23]
African American	1,900	0.43	1.02	0.05	[0.33, 0.54]
Latino/a	1,230	0.28	0.99	0.15	[–0.02, 0.58]
Other	300	–0.09	1.06	0.35	[–0.80, 0.63]
Disability type					
Learning disability	880	–0.14	0.95	0.06	[–0.26, –0.02]
Speech or language impairment	870	–0.22	1.00	0.09	[–0.40, –0.04]
Intellectual disability	870	0.39	1.02	0.04	[0.30, 0.47]
Emotional disturbance	840	0.16	1.06	0.10	[–0.03, 0.35]
Other health impairment	920	–0.01	1.09	0.08	[–0.17, 0.15]
Other disability	4,850	–0.26	1.01	0.03	[–0.33, –0.20]
City designation					
Rural	820	–0.03	0.97	0.08	[–0.18, 0.12]
Suburban	4,750	–0.20	0.97	0.03	[–0.26, –0.14]
Urban	3,650	0.17	1.07	0.11	[–0.04, 0.38]
Health insurance					
Private	5,500	–0.46	0.78	0.04	[–0.53, –0.39]
Government	3,132	0.83	0.93	0.06	[0.70, 0.96]
Other	80	–0.16	0.83	0.17	[–0.50, 0.18]
None	520	0.13	0.75	0.07	[–0.01, 0.27]
Overall level of work at school					
Excellent	780	–0.19	1.04	0.13	[–0.45, 0.07]
Above average	2480	–0.17	1.01	0.05	[–0.27, –0.06]
Average	3240	–0.07	1.03	0.07	[–0.21, 0.08]
Below average	1440	–0.04	1.03	0.06	[–0.16, 0.08]
Failing	640	0.17	1.06	0.11	[–0.04, 0.38]
Grades across all subjects					
Mostly As	2,280	–0.18	1.02	0.13	[–0.43, 0.08]
Mostly Bs	2,150	–0.18	1.01	0.12	[–0.40, 0.05]
Mostly Cs	1,350	–0.16	1.00	0.12	[–0.41, 0.08]
Mostly Ds	380	–0.02	.99	0.17	[–0.34, 0.31]
Mostly Fs	90	0.18	1.01	0.21	[–0.23, 0.59]

Note. CI = confidence interval.

[a]Based on imputed data. As per requirement of the Institute of Education Sciences restricted-use data agreement, all unweighted sample size numbers are rounded to the nearest ten.

[b]Mean standard deviation across the 10 imputed data sets.

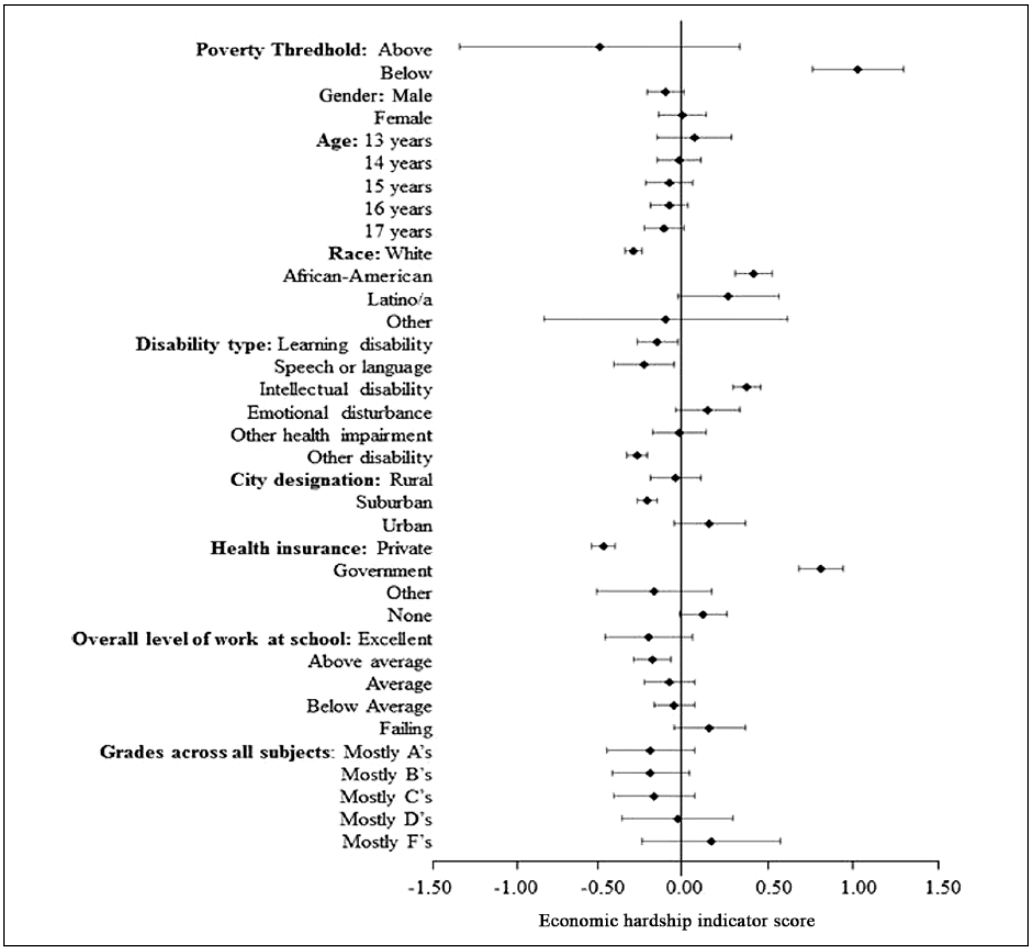

Figure 1. Economic hardship mean and 95% confidence intervals across various validation variables. Greater scores indicate greater levels of economic hardship.

economic hardship construct were associated with numerous demographic, tangible-resources, educational, and (to a lesser extent) family experience variables. Moreover, African American and Latino/a youth, youth with ID, youth in urban environments, and youth who reported receiving governmental health insurance had higher scores on the economic hardship construct than did White youth with disabilities, youth in other disability categories, youth in suburban environments, and youth who had private or other types of insurance, respectively. Similar patterns emerged for the school performance variables, where students with disabilities experiencing higher levels of economic hardship displayed greater levels of difficulty in school. Youth whose overall level of work at school was rated as failing had statistically greater economic hardship than did youth who were rated as excellent or above average, and correlations between the economic hardship construct and academic achievement on the Woodcock-Johnson demonstrated modest but significant negative relationships.

Also consistent with prior research, youth with ID had greater economic hardship scores than did youth with LD, SLI, or OHI and youth in the Other disability category (Erickson, Lee, & von Schrader, 2010; Wagner, Marder, Blackorby, & Cardoso, 2002). To further explore this finding, we examined descriptive statistics for each

of the five indicators of the economic hardship construct by disability category. Youth with ID had lower scores than did students in all other disability categories on four of the five economic hardship indicators, including HOH employment, HOH education, income, and participation in social programs, suggesting that the greater economic hardship score among youth in this category was not due to exceptionally high scores on one indicator but instead appeared across multiple indicators that composed the economic hardship construct. Similar findings have been reported in samples of younger children with disabilities (Wagner et al., 2002), and our findings are also consistent with evidence showing a negative relationship between exposure to poverty and cognitive development (Farah et al., 2006; McLoyd, 1998). These findings are discouraging because they suggest that students with ID are exposed to multiple environmental risks. Thus, finding ways to reduce exposure to poverty among children and youth with ID, as well as enhancing protective factors in the lives of economically disadvantaged children and youth with ID, is critical.

In addition to these disability status findings, we also observed associations between economic hardship and two family process variables (i.e., parent school involvement and parent expectations). These findings are consistent with research conducted by Conger and his colleagues (Conger et al., 2002; Conger & Donnellan, 2007), who have demonstrated that family processes mediate the relationship between economic hardship and developmental outcomes. According to this perspective, economic hardship experiences create pressures within the family that detract from positive involvement, warmth, and responsive parenting, which in turn contribute to poor adjustment and development among children. Our findings suggest that within the context of parental involvement in schooling, economic hardship may contribute negatively to parental involvement. Future investigations exploring models such as the one proposed by Conger and others (cf. Crosnoe et al., 2002; Hoff, 2003) would likely be useful for shedding additional light on the relationship between economic hardship, family processes, and adjustment among adolescents and young adults with disabilities in NLTS2. Moreover, the associations between our economic hardship construct and family factors are consistent with prior population estimates (Short, 2011) but add to prior research by showing that similar patterns exist among a population composed exclusively of youth with disabilities.

Youth with ID had lower scores than did students in all other disability categories on four of the five economic hardship indicators [...] suggesting that the greater economic hardship score among youth in this category was not due to exceptionally high scores on one indicator but instead appeared across multiple indicators that composed the economic hardship construct.

Because a primary goal of the current study was to develop a theoretically and empirically justifiable multi-indicator construct of economic hardship among youth with disabilities, the indicators selected for incorporation included traditional metrics, such as income, along with participants' perceptions of challenges pertaining to a lack of resources. Tentative support for the construct validity of our hypothesized model was obtained by empirical model fit and the pattern of indicator weights. Support for the criterion-related validity of the model was demonstrated by observed relationships between economic hardship and key individual, family, and school variables. For example, youth whose overall level of work at school was rated as failing had statistically greater economic hardship than did youth who were rated as excellent or above average, and zero-order correlations between the economic hardship construct and academic achievement on the Woodcock-Johnson demonstrated modest but significant negative relationships. Although relatively modest in size, the observed correlations between economic hardship and achievement are consistent with a recent meta-analysis of the overall relation-

ship between multi-indicator measures of socioeconomic status and achievement (cf. Sirin, 2005; $r = .29$) and with prior research demonstrating the adverse effects of poverty on achievement and learning (Entwisle, Alexander, & Olson, 2005). Efforts focused on understanding how exposure to economic hardship affects developmental outcomes among adolescents with disabilities are needed.

Despite contributing to a growing body of work that demonstrates that multi-indicator models provide conceptual and methodological benefits over traditional categorical poverty thresholds (Short, 2001, 2011; Tomlinson et al., 2007), this study suffers from several limitations that should be considered with the findings. First, the data used for these analyses were cross-sectional in nature, and efforts designed to understand the predictive nature of economic hardship on the adjustment of youth with disabilities over time will need to be undertaken. This investigation will aid in those efforts because it provides a conceptually and methodologically sound construct that can serve as the basis for such research. A second limitation is that we relied on items, measures, and scaling that existed within the NLTS2 database when constructing the economic hardship construct. Although each of the indicators gathered from the data had a conceptual basis in the larger literature on poverty and economic hardship, it was not possible to investigate other potentially important indicators that may not have been included in the NLTS2. Prospective investigations that rely on a priori hypotheses pertaining to economic hardship among adolescents with disabilities would aid in ameliorating this challenge. A third limitation is that a high percentage of the data pertaining to youth's academic achievement was missing (range 45%–46%), and we did not feel comfortable replacing those data through multiple imputation procedures. Therefore, reported relationships between economic hardship and academic performance may understate the association between poverty and achievement and should be interpreted with caution.

The implications that follow from the current investigation pertain primarily to researchers and policy makers interested in developing further understanding about economic hardship among adolescents and young adults with disabilities. Although unidimensional constructs of poverty used within the United States provide governmental agencies with an efficient means of identifying families in need of assistance, such measures suffer from numerous conceptual and methodological limitations. Categorical variables such as "does" or "does not" live in poverty have limited specificity, which inhibits researchers' ability to investigate how underlying features of the economic hardship experience contribute to development and outcomes. This is problematic for those interested in prevention and intervention efforts because the variables provide limited information about potential targets for intervention. By contrast, the findings presented here suggest that although traditional metrics such as income are germane to the formation of a multi-indicator economic hardship construct, additional indicators that reflect the emerging reconceptualization of poverty are also needed. Future research investigating the extent to which the construct (and underlying indicators) predicts or mediates important developmental milestones and outcomes among adolescents and young adults with disabilities has the potential to provide researchers with information that is more specific than that offered by the dichotomous poverty variable currently included in the NLTS2. Such efforts, in turn, will provide greater insight into understanding processes and mechanisms associated with economic hardship and disability.

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Appendix

NLTS2 Variable Labels,Type, and Percentage of Missing Data

Measure	NLTS2 variable name	Variable type	% Missing[a]
Poverty indicator			
Income level	Np1K15Detail	Ordinal	16.5
TANF/state current	Np1K12b	Dichotomous	0.3
Food stamps current	Np113b	Dichotomous	0.3
SSI current	Np1K14b	Dichotomous	0.3
No. children household	Np1K2a	Count	6.2
One-adult household	Np1SingleAdultHH	Dichotomous	7.7
Education level HOH	Np1HOHEd	Ordinal	8.5
Employment status HOH	Np1HOHWork	Ordinal	6.4
Lacked transportation	Np1LackTranstel	Dichotomous	6.5
No phone in household	Np1K17	Dichotomous	6.1
Other children with disability	NP1OtherChilddis	Dichotomous	2.9
Adult with disability	NP1k4b	Dichotomous	6.2
Validation measures			
Ethnicity	w1_EthHdr2001	Categorical	0.0
Urban, suburban, rural	w1_urb3	Categorical	15.1
Disability type	w1_dis12	Categorical	0.0
Gender	w1_EthHdr2001	Categorical	0.0
Age	w1_Age2001	Categorical	0.1
Health insurance	NP1HealthIns	Categorical	3.6
Youth covered by government assistance	np1c2	Dichotomous	5.0
Household above poverty line	Np1AbovePoverty	Dichotomous	13.0

(continued)

Appendix (continued)

Measure	NLTS2 variable name	Variable type	% Missing[a]
Academic: Passage comprehension[b]	ndaPC_ss	Continuous	44.5
Academic: Synonym-antonym[b]	ndaSS_ss	Continuous	44.6
Academic: Applied problems[b]	ndaAP_ss	Continuous	46.2
Academic: Calculation[b]	ndaCalc_ss	Continuous	45.5
Family support scale	np1FamSupScaleScore	Ordinal	20.9
Parent school involvement	np1ParentSchInv	Count	7.4
Parent expectations			
Youth will get regular diploma	np1J1	Ordinal	6.0
Youth will attend postsecondary	np1J2	Ordinal	6.3
Youth will live away from home	np1J7	Ordinal	5.7
Youth will earn enough to support self	np1J10	Ordinal	4.5
Overall grades across subjects	np1D9b	Categorical	1.0
Overall level of work at school	np1D9c	Categorical	1.6
Auxiliary measures for imputation			
Ever held back a grade	np1D7d	Dichotomous	1.7
Social skills scale	np1SocialSkills	Continuous	4.8
Ever been arrested	np1G7	Dichotomous	5.6
Adult went to IEP meeting	np1E2a	Dichotomous	0.7
How well youth gets along with other children	np1D10	Ordinal	1.2
How well youth gets along with teacher	np1D11	Ordinal	0.9
School is challenging for youth	np1D12a	Ordinal	2.1
Adult in school cares about youth	np1D12c	Ordinal	2.9
School good at meeting needs	np1D12d	Ordinal	1.9
Youth getting support at school	np1D12e	Ordinal	1.8
Youth enjoys school	np1D12b	Ordinal	1.5
Have a computer in the home	np1f1a	Dichotomous	4.9
Household responsibility scale	np1HouseRespSkill_r	Categorical	2.8

Note. NLTS2 = National Longitudinal Transition Study–2; TANF = Temporary Assistance for Needy Families; SSI = Supplemental Security Income; HOH = head of household; IEP = individualized education program.
[a]Does not include cases that were not asked the item due to skip patterns.
[b]Due to high rates of missing data, measures were not included for imputation.