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Research article

Adverse experiences in infancy and toddlerhood: Relations to adaptive behavior and academic status in middle childhood

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ABSTRACT

Findings from the Adverse Childhood Experiences (ACE) study articulated the negative effects of childhood trauma on long-term well-being. The purpose of the current study is to examine the associations between ACEs experienced in infancy and toddlerhood and adaptive behavior and academic status in middle childhood. We used data collected from a sample of low-income families during the impacts study of Early Head Start (EHS). Data were collected by trained interviewers demonstrating at least 85% reliability with protocols. Data come from 1469 socio-demographically diverse mothers and children collected at or near ages 1, 2, 3, and 11. At ages 1, 2, and 3, an EHS-ACEs index was created based on interview and observation items. The EHS-ACEs indices were averaged to represent exposure across infancy and toddlerhood. At age 11, parents were asked about school outcomes and completed the Child Behavior Checklist. Across development, children were exposed to zero (19%), one (31%), two (27%), and three or more ACEs (23%). Logistic regression analyses, controlling for EHS program assignment, and parent, school, and child characteristics, showed ACEs were significantly associated with parental report of the child: having an individualized educational program since starting school and in the current school year, having been retained a grade in school, and problems with externalizing and internalizing behavior, as well as attention. Findings suggest that ACEs influence children's behavioral and academic outcomes early in development.

1. Introduction

Adverse Childhood Experiences (ACEs), including child maltreatment and household dysfunction, are associated with problems for health and adaptive behavior during adulthood (Anda et al., 2006; Centers for Disease Control & Prevention, 2014; Felitti et al., 1998). Approximately 52% of adults in the United States report having experienced ACEs in their childhoods (Anda et al., 2006; Felitti et al., 1998). While it is helpful to understand the negative effects of ACEs on development, retrospective reports leave unanswered questions as to how adverse experiences earlier in life lead to particular negative outcomes. The purpose of the current study is to examine how very early exposures to ACEs may have negative associations with behavioral and academic outcomes prior to adolescence. We focus our study on behavioral and academic outcomes as these are associated with successful development into adulthood (Ek, Sovio, Remes, & Järvelin, 2005; Fergusson, John Horwood, & Ridder, 2005; Narusyte, Ropponen, Alexanderson, &

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Svedberg, 2017). Additionally, behavioral and academic outcomes are domains of development in which there are strong associations within and across time (Achenbach, Ivanova, Rescorla, Turner, & Althoff, 2016; Masten & Cicchetti, 2010). Below we summarize the extant literature on the association between ACEs and: 1) adaptive behavior (e.g., problems with externalizing and internalizing behaviors and attention) and 2) academic status (e.g., grade retention and individualized services).

1.1. ACEs and adaptive behavior in childhood

There is cross-sectional empirical evidence that ACEs experienced in childhood are associated with less adaptive behavior. Multiple studies have reported the impact of ACEs on children's development using data from the National Survey of Children's Health (NSCH), a nationally representative sample of children aged 6–17 years. One study using NSCH data reported that 3% of the population had externalizing behavior problems, but the rates increased to 24% and 61% if they had 1 or 2 or more ACEs, respectively (Bethell et al., 2014). Using those same data, associations were demonstrated between ACEs and the sum number of behavioral health conditions, including problems with attention, depression, anxiety, or conduct (Porche, Costello, & Rosen-Reynoso, 2016). Finally, ACEs were also associated with increased odds of having an emotional, mental, or behavioral condition that required treatment or counseling (Bethell, Gombojav, Solloway, & Wissow, 2016).

Additional cross-sectional studies have shown ACEs experienced very early in childhood, before school entry, are associated with less optimal behavioral development. Using a child welfare sample of children under 6 years of age, Kerker et al. (2015) documented an association between cumulative ACEs and behavioral health, documenting a 32% increase of having clinically significant behavioral health difficulties for every additional ACE. A study using a low-income community sample of children under the age of six (average age 33 months) examined the impact of ACEs on social-emotional development. The study reported that, compared to children in families with no ACEs, the odds of screening at risk for social-emotional delay were double for children with 1 adversity, more than two and a half times higher for children with 2 or 3 adversities, and 6 times higher for children with four or more ACEs (McKelvey, Whiteside-Mansell, Conners-Burrow, Swindle, & Fitzgerald, 2016).

Longitudinal research on exposure to adversities, especially as it applies to exposures during particular developmental periods, is only beginning to emerge. One study demonstrated ACEs reported by parents at age 5 were related to attention, social, and aggression problems at the end of kindergarten (Jimenez, Wade, Lin, Morrow, & Reichman, 2016). Two recent studies have examined the association between ACEs and behavioral outcomes using data collected from children in the Fragile Families and Child Wellbeing Study. The studies report the deleterious effects of lifetime ACEs reported by parents at age 5 on elevated internalizing and externalizing behavior problems (Hunt, Slack, & Berger, 2017) and parent-reported attention-deficit/hyperactivity diagnosis at age 9 (Jimenez et al., 2017). Further, a recent study examined temporal patterns of exposure to ACEs across infancy and toddlerhood and reported that both emotion regulation and aggressive behaviors at age 5 were associated with risk exposure at any point in earlier development (McKelvey, Selig, & Whiteside-Mansell, 2017).

1.2. ACEs and academic status in childhood

Several studies indicate child maltreatment and family dysfunction is a predictor of a school-related difficulties (Leiter & Johnsen, 1997; Margolin & Gordis, 2000; Trickett, Noll, & Putnam, 2011), including repeating grades (Eckenrode, Laird, & Doris, 1993) and special education (Jonson-Reid, Drake, Kim, Porterfield, & Han, 2004; Solis, Shadur, Burns, & Hussong, 2012). Cross-sectional studies of ACEs also demonstrate negative effects on academic status. Compared to school-aged children without a lifetime history of ACEs, children with a lifetime history of ACEs exposure had increased odds of less optimal academic outcomes, including 1) decreased school engagement, 2) missing more than 2 weeks of school during a school year, 3) having an Individual Education Plan (IEP), and 4) grade retention (Bethell, Newacheck, Hawes, & Halfon, 2014; Porche et al., 2016).

As these studies include items that represent parental report of ACEs that occurred within their child's lifetime, these studies leave questions as to the importance of the timing of ACEs exposure for predicting school and behavioral outcomes. To our knowledge, there have not been published studies of the longitudinal impact of ACEs experienced before entry into school on school outcomes. We are aware of two studies that examined the longitudinal impacts of ACEs exposure on academic abilities. One study found ACEs were negatively associated with academic and pre-literacy skills measured later in kindergarten (Jimenez et al., 2016). Another study examined patterns of ACEs experienced at ages 1, 2, and 3 and reported that adversities that occurred at closer temporal proximity to the measurement of academic skills at age 5 (i.e., those patterns with higher ACEs at age 3) were a stronger predictor of performance than patterns with earlier exposures (McKelvey et al., 2017). While these studies may help us understand how ACEs influence children's cognitive development, we are not aware of studies of academic outcomes in later childhood.

2. Current study

The goal of this study is to examine the association between experiences of ACEs in infancy and toddlerhood and academic and behavioral outcomes in a low-income community sample. We assessed exposure to ACEs at ages 1, 2, and 3 to capture adversity very early in development. Given the rapid brain growth experienced during infancy and toddlerhood, children exposed to ACEs during this period of development may be at a critical level of risk than children exposed at later time points (Shonkoff et al., 2012).

The concepts of toxic stress and allostatic load are key to any discussion of mechanisms by which ACEs impact child development. Toxic stress is the physiological response that develops when an infant or young child experiences severe or prolonged early adversity, especially in the absence of a nurturing caregiver (Johnson, Riley, Granger, & Riis, 2013; Shonkoff et al., 2012). Toxic stress

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