

Use of Hierarchical Measures of Psychopathology to Capture the Long (and Wide) Shadow of Early Deprivation in the Bucharest Early Intervention Project Analysis

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It has long been recognized that early adversity represents a strong risk factor for the development of later psychopathology. However, proving a causal link between adverse exposures and mental disorder is often difficult because researchers cannot ethically randomize children to experiences that might cause them harm.

Traditionally, researchers have attempted to circumvent this problem by approaching causal inference through a series of increasingly rigorous observational designs. Longitudinal studies, for example, have shown that early adversity predicts multiple psychiatric disorders not only cross-sectionally but prospectively, suggesting that it is



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actual adversity—rather than simply the memory of adversity—that increases risk. Many studies of adversity also take steps to reduce the possibility of confounding by a third variable, either through introducing statistical controls, or by using propensity score-matching techniques in an attempt to “balance” covariates across exposed and nonexposed groups. However, the primary limitation of these approaches is that they account for only observable, measurable factors, which means that confounding by unobserved or unmeasured factors is still possible.

The Bucharest Early Intervention Project (BEIP) adopts an alternate approach. Rather than observing study participants who were raised in a typical family caregiving environment, BEIP investigators assessed children who were abandoned at or around the time of birth in Bucharest, Romania, and randomized half of the sample to receive high-quality foster care and half to “care as usual” within 1 of 6 institutions. Because these institutional settings were characterized by high child-to-caregiver ratios, high caregiver turnover, frequent isolation, regimentation, and inadequate cognitive and social stimulation, children who received “care as usual” were also exposed to relatively severe early deprivation and neglect. The BEIP can be thus be viewed not only as a randomized clinical trial that assessed the efficacy of foster care as an intervention for institutionalized young children, but also as a randomized clinical trial that allows investigators to isolate the causal effects of severe early-life deprivation on later outcomes.

In this issue of *JAMA Psychiatry*, Wade and colleagues use this design to test whether early foster care leads to less problematic trajectories of psychopathology in previously institutionalized children between age 8 and 16 years.¹ The authors

compare 3 groups: children randomized to early foster care, children randomized to “care as usual,” and a group of never-institutionalized controls.

For outcomes, the authors factor-analyzed parent- and teacher-reported measures of psychopathology that were administered at ages 8, 12, and 16 years to determine a continuous latent factor that represented general psychopathology (the “P-factor”), as well as 2 residual factors that represented variance in internalizing and externalizing symptoms not accounted for by this general factor. This approach aligns with recent research on the structure of psychopathology, which indicates that (1) psychiatric disorders are dimensional constructs rather than discrete categorical entities, and (2) individuals who meet the criteria for 1 disorder typically also meet criteria for others, both cross-sectionally and across the life course.² Latent growth models were used to test for between-group differences in these outcomes at each age, as well as the differences in the rate at which they changed over time.

As expected, never-institutionalized children reported significantly fewer symptoms of psychopathology than both previously institutionalized groups. However, children who were randomized to early foster care experienced declines in general psychopathology and residual externalizing symptoms throughout adolescence, whereas the symptoms for children randomized to care as usual remained stably high or increased. As a result, children raised in foster care scored significantly lower than children who received care as usual on both factor scores at ages 12 and 16 years, indicating a beneficial intervention effect on both general psychopathology and residual externalizing symptoms in adolescence.

These analyses by Wade and colleagues¹ join a growing literature indicating that nonspecific associations between adverse experiences and psychiatric disorder may be the rule rather than the exception. Indeed, research on exposures as diverse as child maltreatment, the terrorist attack on September 11, 2001, armed combat, and perceived discrimination has indicated that these experiences are associated with broad, general increases in psychopathology (eg, internalizing and externalizing symptoms) rather than increased rates of specific disorders or clusters of symptoms.³⁻⁶ Methodologically, the use of continuous (rather than categorical) measures of psychopathology also permits investigators to easily test for dose-response associations with their exposure of interest, as well as use more sophisticated analytical techniques, such as the latent growth models used by Wade et al.¹ Researchers test-

ing for associations between adverse exposures and psychopathology in future studies may therefore wish to consider the computation of a general factor of psychopathology as a useful first step in their analytic plan.

Another important contribution of this work is that it provides a cohesive theoretical framework that integrates previous findings from the BEIP. For example, earlier reports indicated that the primary intervention effect at age 4.5 years was to reduce internalizing problems, especially among girls, whereas the effect at age 12 years was to reduce externalizing problems, especially among boys.^{7,8} These findings make more sense given results from this study, which indicate that the overall effect of foster care was to reduce general liability to multiple disorders simultaneously. In addition, reports of autonomic nervous system and hypothalamic-pituitary-adrenal axis abnormalities among children randomized to remain in institutional care suggest a potential mechanism through which this generalized vulnerability might emerge.

As the authors note in their Discussion,¹ one problem with using hierarchical measures of psychopathology is that doing so can complicate interpretation, especially when using residual internalizing and externalizing factors. The traditional understanding of internalizing and externalizing derives from early research on the classification of childhood psychopathology, which converged on these 2 primary dimensions as a way to characterize childhood disorders (ie, those involving anxious and depressive symptoms vs those involving aggressive, delinquent, and hyperactive-impulsive symptoms). In this model, comorbidity among each set of disorders is explained by 1 of the 2 higher-order factors (ie, internalizing and exter-

nalizing), which are correlated. However, in the bifactor model used by Wade and colleagues,¹ the factors labeled “internalizing” and “externalizing” take on a different meaning. This is because they capture only the shared variation in symptom measures that exists after the variance attributable to general psychopathology (“P”) is removed, which sets the correlation between internalizing and externalizing to 0. This shift in how the 2 dimensions relate gives rise to interpretation difficulties, because although the meaning and correlates of the classical “externalizing” factor are well established, the meaning and correlates of the “parts of externalizing that are not attributable to general psychopathology” are not. Additional research using these residual factors is therefore needed to fully understand the significance of these findings, although it is worth noting that similar associations have also been reported between the residual externalizing factor and exposures such as adolescent adversity and chronic stress.^{9,10}

The analysis of Wade and colleagues convincingly illustrates how a period of profound early deprivation can have lasting and widespread consequences on later emotional and behavioral functioning. These results affirm the importance of early interventions for institutionalized children and suggest the hypothesis—testable in future research—that interventions for children exposed to less pervasive early adversity may yield similar benefits. Their results also underscore the notion that hierarchical models of psychopathology will continue to be important organizing structures in understanding not only patterns of comorbidity among disorders, but also how the liability to these conditions is shaped by environmental influences.

ARTICLE INFORMATION

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