

Life event severity moderates genetic influences on cognitive function

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Life events represent discrete and observable social and/or environmental changes that can be threatening and result in some level of stress. Greater reports of life events are associated with poorer cognitive function and this association may differ depending on the severity of the life event (i.e., the extent to which an event has a negative impact on the individual). Given genetic influences contribute to cognitive function and some evidence suggesting life events may show heritable influences, we tested GE interplay in the life event severity-cognition relationship using an extended univariate model accounting for self- and cotwin- reports of life event stress. Our analytic sample consisted of 5090 twins (2166 MZ, 2924 DZ; age range: 25–99; 49% female) from six studies of the IGEMS consortium. Participants indicated whether they experienced a common set of five life events across studies (death of a spouse, divorce, retirement, death of a friend, and death of a child) and they completed a range of cognitive assessments. Life events were weighted by the average severity ratings obtained from an independent sample. Severity scores for each life event were on a four-point scale from “no effect” to “a strong effect”; the average total severity was 2.35 (SD = 2.34; Median = 1.84). The MZ twin correlation of weighted life events was .58 ($p < .0001$) and the DZ twin correlation was .53 ($p < .0001$) suggesting environmental influences. Further, severity weighted life event scores were associated with poorer cognitive performance in all tasks (R_s - .37 to - .03, $p_s < .002$). We tested for moderation of life event severity on genetic and environmental influences on cognitive function, while accounting for age moderation. More severe life events were associated with reduced additive genetic variance and amplified environmental influences on verbal and speed of processing abilities—a similar, but not statistically significant, pattern was found for spatial abilities. Moreover, non- shared environmental variance decreased with more severe life events. Life events counts were associated with increases in both additive genetic and environmental variance, in comparison. Results demonstrate that severity weighted and life event counts may influence the etiology of cognitive function differently.