

## Intelligence differences may explain the link between childhood psychological problems and adult socioeconomic status

By using prospective data collected from 17,000 children tracked from birth to age 50 y, Goodman et al. (1) showed that childhood emotional maladjustment may profoundly affect social mobility. The authors estimate the lifetime net family income loss of such emotional problems to be in the region of £388,000 (\$640,000). This figure provides a clear economic rationale for intervening to attempt to ameliorate psychological problems in the early years of life. However, it is possible that the emotional maladjustment observed could be a proxy for other important unexamined psychological determinants of adult socioeconomic status. Previous studies suggest that childhood intelligence is a powerful predictor of adult socioeconomic status (2), and it is likely that less intelligent children are less well adjusted. It is therefore necessary to disentangle the effects of emotional maladjustment and intelligence to identify if childhood psychological problems should be a primary target of intervention policy.

Here I use data from 6,900 children who participated in the 1970 British Birth Cohort (3) to show that intelligence may account for a large portion of the relation between childhood emotional maladjustment and adult socioeconomic status. At age 10 y, each child's teacher used visual analog scales to rate if the child is "afraid of new things/situation," "fussy or over-particular," "worried and anxious," and "behaves nervously." Total maladjustment scores were negatively correlated with adult occupational status in 2004, when participants were aged 34 y [ $r(6,900) = -0.124$ ;  $P < 0.01$ ] and with the highest academic qualification received by the participant by age 34 y [ $r(6,900) = -0.147$ ;  $P < 0.01$ ]. As expected, emotionally maladjusted children appeared to be less intelligent [ $r(6,900) = -0.235$ ;  $P < 0.01$ ] as indicated by their scores on the 120-item British Abilities Scale (4). The partial correlation between childhood

emotional maladjustment and adult occupational status adjusting for intelligence scores was  $r(6,900) = -0.055$  ( $P < 0.01$ ), and that between emotional maladjustment and educational achievement was  $r(6,900) = -0.042$  ( $P < 0.01$ ). This uncomplicated illustration shows that the variance in adult socioeconomic status explained by childhood psychological problems could be overstated by 5- to 12-fold when intelligence is not considered.

Regression analyses yielded similar results. Emotional maladjustment strongly predicted low adult occupational status and educational achievement in analyses that adjusted for sex and father's social status at birth (Table 1). When intelligence is entered into the regression, these relations are markedly attenuated. Thus, further work is required to decipher if the large effects of childhood psychological problems on adult socioeconomic status observed by Goodman et al. (1) exist independently of childhood intelligence. A further possibility that cannot be ruled out by the analyses reported here is that childhood emotional problems may adversely affect intelligence and thus may impact on adult socioeconomic outcomes. Delineating the contributions of emotional problems and intelligence to adult socioeconomic outcomes and the temporal interrelations between changes in psychological problems and intelligence will greatly assist in identifying clear targets for policy interventions in the early years of life.

**Michael Daly**<sup>1</sup>

*School of Psychological Sciences, University of Manchester, Manchester M13 9PL, United Kingdom*

1. Goodman A, Joyce R, Smith JP (2011) The long shadow cast by childhood physical and mental problems on adult life. *Proc Natl Acad Sci USA* 108:6032–6037.
2. Deary IJ, et al. (2005) Intergenerational social mobility and mid-life status attainment: Influences of childhood intelligence, childhood social factors, and education. *Intelligence* 33:455–472.
3. Elliott J, Shepherd P (2006) Cohort profile: 1970 British Birth Cohort (BCS70). *Int J Epidemiol* 35:836–843.
4. Elliot C, Murray D, Pearson L (1978) *British Ability Scales* (National Foundation for Educational Research, Windsor, UK).

Author contributions: M.D. designed research, performed research, analyzed data, and wrote the paper.

The author declares no conflict of interest.

<sup>1</sup>E-mail: michael.daly@manchester.ac.uk.

**Table 1. Relationship between childhood psychological problems and adult occupational status and educational achievement adjusting for intelligence**

Variable	Result at age 34 y, B(SE)t			
	Occupational status*		Highest academic qualification <sup>†</sup>	
Childhood emotional maladjustment	–0.696 (0.079)	–8.87 <sup>‡</sup>	–0.231 (0.021)	–11.05 <sup>‡</sup>
Inclusive of childhood intelligence <sup>§</sup>	–0.331 (0.078)	–4.24 <sup>‡</sup>	–0.077 (0.02)	–3.9 <sup>‡</sup>

Variables included in the analysis but not displayed in the model are child sex and father's social status when the child was born.

\*Occupational status was specified using the 17 category National Statistics Socioeconomic Classification (NS-SEC) classification system, coded here with high scores indicating high occupational status.

<sup>†</sup>Academic qualifications ranged from 0, representing none, to 5, representing higher degree/postgraduate certificate in education.

<sup>‡</sup> $P < 0.001$ .

<sup>§</sup>Total of matrices, recall of digits, word definitions, and word similarities scores.