

Socioeconomic Position across the Lifecourse: How Does it Relate to Cognitive Function in Mid-life?

ARCHANA SINGH-MANOUX, PHD, MARCUS RICHARDS, PHD,
AND MICHAEL MARMOT, FRCP

PURPOSE: To examine the association between socioeconomic position (SEP) over the lifecourse and cognitive function in middle age. Two alternative models were assessed: the “direct effects model” where temporally distinct measures of SEP have only direct effects on adult cognition, and the “indirect effects” model where the effect of early life SEP are mediated through later life measures of SEP.

METHODS: Data are from the Whitehall II study (N = 10,308 at baseline), a longitudinal cohort study of British civil servants, aged between 46 and 68 years at the time of cognitive testing. Structural equation models were used to compare the fit of direct and indirect effects models, and quantify the effects of different measures of SEP on cognition. Childhood SEP, education, and adult SEP were used to model SEP across the lifecourse. Cognitive function was assessed as a latent construct composed of the following: verbal memory, AH 4-I, Mill Hill, phonemic and semantic fluency.

RESULTS: The indirect effects model provided a better fit to the data. Childhood SEP had no direct effect on cognitive function but had a substantial “indirect effect,” mediated through education and adult SEP. 78.4% of the effect of education in men and 100% in women was indirect.

CONCLUSIONS: Socioeconomic differences in adult cognition are a result of the socioeconomic trajectory of individuals throughout their lifecourse. Early measures of SEP influence cognition indirectly, through their influence on later measures of SEP.

Ann Epidemiol 2005;15:572–578. © 2005 Elsevier Inc. All rights reserved.

KEY WORDS: Lifecourse, Childhood SEP, Direct and Indirect Effects, Cognitive Function, Health Inequalities.

INTRODUCTION

Investigation into the impact of socioeconomic factors on cognitive function is crucial for two reasons. First, research suggests that the social environment moderates the expression of genetic dispositions, with heritability ceasing to be important in poor environmental conditions (1). Moreover, adverse biological factors like low birth weight are more

important for cognition under adverse socioeconomic circumstances (2, 3). Second, low socioeconomic position (SEP) is related to cognitive impairment/dementia in old age (4, 5), making it, along with age and pathology, one of the key predictors of age-related cognitive decline (4).

Epidemiological research has widely linked SEP to various health and disease outcomes (6, 7), showing measures of SEP from childhood and adulthood to make unique contributions to health outcomes (8, 9). The same holds for adult cognitive ability (10–12). However, the true association between socioeconomic factors and cognition, or any other health outcome, is likely to be underestimated in regression-type analyses that model different measures of SEP as being independent of each other. We estimate the extent of this underestimation, using structural equation models, by comparing two alternate models: the “direct effects” and the “indirect effects” model. A “direct effects” model provides estimates of the effect of each measure of SEP independently of other measures of SEP. The “indirect effects” model also estimates effects of different measures of SEP that arise out of the interrelationship between these variables (13). In effect, the “indirect effects” model suggests that the influence of early life measures of SEP on adult cognitive function is mediated through later life measures of SEP.

From the International Centre for Health and Society, Department of Epidemiology and Public Health, University College London, London, UK (A.S.-M., M.M.); INSERM, Unit 88, Hôpital National de Saint-Maurice, Saint-Maurice Cedex, France (A.S.-M.); and MRC National Survey of Health and Development, Department of Epidemiology and Public Health, University College London, London, UK (M.R.).

Address correspondence to: Dr. Archana Singh-Manoux, INSERM, Unit 88, National Institute of Health and Medical Research, HNSM, 14 rue du Val d'Osne, France. Tel.: 33-(0)-1-45-18-38-63; Fax: 33-(0)-1-45-18-38-89. E-mail: A.Singh-Manoux@ucl.ac.uk; Archana.Singh-Manoux@st-maurice.inserm.fr

The Whitehall II study has been supported by grants from the Medical Research Council; British Heart Foundation; Health and Safety Executive; Department of Health; National Heart Lung and Blood Institute (HL36310), US, NIH: National Institute on Aging (AG13196), US, NIH; Agency for Health Care Policy Research (HS06516); and the John D. and Catherine T. MacArthur Foundation Research Networks on Successful Midlife Development and Socioeconomic Status and Health. MM is supported by an MRC Research Professorship.

Received June 1, 2004; accepted October 5, 2004.

Selected Abbreviations and Acronyms

SEP = socioeconomic position
AH 4-I = Alice Heim 4-I
SEM = structural equation modeling
RMSEA = root mean square error of approximation
CFI = comparative fit index

METHODS

Study Population

The Whitehall II study was established in 1985 as a longitudinal study to examine the socioeconomic gradient in health and disease among 10,308 civil servants (6895 men and 3413 women) (14). All civil servants aged 35 to 55 years in 20 London-based departments were invited to participate by letter. In total, 73% of those invited agreed to take part in Phase 1. Baseline examination (Phase 1) took place during the 1985 to 1988 period, and involved a clinical examination and a self-administered questionnaire containing sections on demographic characteristics, health, lifestyle factors, work characteristics, social support, and life events. Clinical examination included measures of blood pressure, anthropometry, biochemical measurements, neuroendocrine function, and subclinical markers of cardiovascular disease. Subsequent phases of data collection have alternated between postal questionnaire alone and postal questionnaire accompanied by a screening examination. Since baseline screening, five phases of data collection rounds have been completed, with the most recent phase of data collection (Phase 6) completed in 2001. A battery of cognitive tests was administered at Phase 5 (1997–1999), with 7830 individuals participating.

Measurement of Socioeconomic Position

SEP in childhood was conceptualized as a latent variable measured via four indicators. These were: 1) Mother's education, assessed through the question: "How old was your mother when she finished full-time education?" 2) Father's education, assessed through the question: "How old was your father when he finished full-time education?" 3) Father's social class, assessed through registrar general social class which was recoded on a 6-point scale, 1 denoting low SEP and 6 denoting high SEP, and finally 4) An indicator of financial circumstances in childhood was composed out of four items: father/mother unemployed when they wanted to be working, family had continuing financial problems, family did not have an inside toilet, and family did not have a car. Participants responded on a yes/no scale and the "no" responses were summed so that a high score indicated good financial circumstances in childhood.

SEP in early adulthood was assessed via education. Education was measured as the highest level of education achieved, with the respondent choosing one of 11 categories in the questionnaire. This was regrouped into five standard hierarchic levels: 1) no formal education, 2) lower secondary education, 3) higher secondary education, 4) university degree, 5) higher university degree.

Adult SEP was conceptualized as a latent construct assessed through measures of occupation and income.

Occupation Occupational position was assessed via civil service employment grade. All jobs in the civil service have a grade of employment. Employment grade of participants included in this study ranges from grade 1 to grade 6, with grade 1 representing the highest level and grade 6 the lowest. People in different grades differ with respect to salary, social status, and level of responsibility. For analyses presented in this article, employment grade has been recoded so that 6 represents high grade and 1 represents low grade.

Income was assessed via a question that asked respondents to pick a category that corresponded most closely with their annual personal income ("amount received annually from salary or wages, or pensions, benefits and allowances before deduction of tax"). There were eight categories, ranging from "less than £9,999" to "more than £70,000." For the purposes of analysis, the two highest and the two lowest personal income categories were collapsed to leave 6 categories. These categories are as follows: 6 = \geq £50,000; 5 = £35,000 to £49,999; 4 = £25,000 to £34,999; 3 = £20,000 to £24,999; 2 = £15,000 to £19,999; and 1 = \leq £14,999.

Cognitive Function in Middle Age

Cognitive function was conceptualized as a latent construct, composed of the following five standard tests.

Verbal memory test was assessed by a 20-word free recall test of short-term memory. Participants were presented a list of 20 one or two syllable words at 2-second intervals and were then asked to recall in writing as many of the words in any order within 2 minutes to do so.

The AH 4-I (15) is composed of a series of 65 items—32 verbal and 33 mathematical reasoning items of increasing difficulty. This is a test of inductive reasoning that measures the ability to identify patterns and infer principles and rules. Participants had 10 minutes to complete this section.

The Mill Hill vocabulary test (16) assesses knowledge of verbal meaning and encompasses the ability to recognize and comprehend words. We used the test in its multiple format, which consists of a list of 33 stimulus words ordered by increasing difficulty, and six response choices per word.

Two measures of verbal fluency: phonemic and semantic (17). Phonemic fluency was assessed via "S" words and semantic fluency via "animal" words. Subjects were asked to recall in writing as many words beginning with "S" and as

Download English Version:

<https://daneshyari.com/en/article/10038867>

Download Persian Version:

<https://daneshyari.com/article/10038867>

[Daneshyari.com](https://daneshyari.com)