



We thank SV Subramanian and Karen Ertel<sup>1</sup> for their letter regarding our paper on the association between self-rated health (SRH) and mortality ("The association between self-rated health and mortality in different socioeconomic groups in the GAZEL cohort study". *Int J Epidemiol* 2007;36:1222–28)

A. Singh-Manoux, M. J Shipley, M. Zins, J. E Ferrie

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It is also worth mentioning that the NHIS data used in our study would not allow a comparable analysis, as these respondents were surveyed only at one time with mortality ascertainment conducted later through matching of individuals to the National Death Index.<sup>2</sup>

We agree with Subramanian and Ertel that our paper addressed the narrower empirical question of whether self-rated health predicted mortality differently by SES group. We did not directly test the question of whether health inequalities are over or underestimated using self-rated health compared with mortality and how large this potential bias might be. We intended our analysis to be one step forward in understanding whether such biases might be present, and our on-going work seeks to shed light on the broader important issues raised by Subramanian and Ertel. The SRH–SES interactions reported in our paper reflect the risk of mortality on a relative rather than absolute scale, making the estimation of the magnitude of bias more challenging. Given that any reporting differences in SRH by SES could differ both in the location of cut-points (an index shift) as well as the distance between and relative position of categories (a cut-point shift), our results could not determine the direction or magnitude of the potential bias.<sup>3</sup> The fact that low self-rated health is more predictive of mortality for higher SES individuals, for example, could reflect a larger absolute distance between the poor and

excellent categories for higher SES individuals (cut-point shift), or a uniformly more pessimistic scale for the lower SES individuals (index shift). These distinctions are important and our on-going work explores the dynamics underlying the significant SES–SRH interactions in predicting mortality in order to accurately characterize the potential bias. Despite the EPESE results described in Subramanian and Ertel's correspondence, we feel that the question of whether different SES groups use different reporting standards when reporting SRH and whether these differences might introduce important bias into the study of health inequalities is yet to be answered.

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## Author's Response

From ARCHANA SINGH-MANOUX,<sup>1,2\*</sup> MARTIN J SHIPLEY,<sup>2</sup> MARIE ZINS<sup>1</sup> and JANE E FERRIE<sup>2</sup>

We thank SV Subramanian and Karen Ertel<sup>1</sup> for their letter regarding our paper on the association between self-rated health (SRH) and mortality.<sup>2</sup> We agree with them that testing whether the SRH and mortality association varies by socioeconomic position (SEP) provides only indirect clues as to whether the use of SRH instead of a more 'objective' measure of health under- or over-estimates social inequalities in health. However, the primary purpose of our paper, and the two others published alongside,<sup>3,4</sup> was to examine whether markers of SEP moderate the association between SRH and mortality. The Idler and Benyamini review of 27 papers on the association between SRH and mortality suggested a stronger association in

men compared with women;<sup>5</sup> more recent work adds age as another moderator of the association between SRH and mortality.<sup>6</sup> SRH is an important research tool, allowing a simple question to monitor population health. This makes it important to identify conditions under which the association with mortality 'strengthens, weakens, or disappears'.<sup>6</sup>

Previous research suggested no moderating effect for SEP<sup>7,8</sup> but all three papers show SEP to moderate the association between SRH and mortality.<sup>2–4</sup> Our results are different to those reported in the other two papers, our analysis shows SRH to be less predictive of mortality in the high SEP groups. However, these results were robust as we examined whether the results held using SRH as a continuous variable and estimated differences in absolute risk. Clearly, further research is required to understand the discrepancy in the results and thereby the role played by SEP in shaping the association between SRH and mortality. One element that needs further attention is age, as the SRH mortality association has been shown to weaken with age.<sup>6</sup> Our analysis was based on individuals aged 35 to 50 at baseline followed up for 17 years;

<sup>1</sup> INSERM U687, Hôpital Paul Brousse, Bâtiment 15/16, 94807 Villejuif Cedex, France.

<sup>2</sup> Department of Epidemiology & Public Health, University College London, London, WC1E 6BT, UK.

\* Corresponding author. INSERM U687, Hôpital Paul Brousse, Bâtiment 15/16, 16 avenue Paul Vaillant Couturier, 94807 Villejuif Cedex, France.

E-mail: Archana.Singh-Manoux@inserm.fr

**Table 1** Social inequalities in mortality and SRH

	<b>Mortality (1989–2001) N = 19 255 OR (95% CI)<sup>a</sup></b>	<b>Poor self-rated health 2001 N = 13 602 OR (95% CI)<sup>a</sup></b>
<b>Education</b>		
Higher secondary and tertiary	1	1
Lower secondary	1.50 (1.19–1.88)	1.22 (1.12–1.33)
Primary	2.44 (1.76–3.38)	1.52 (1.29–1.79)
<b>Occupational position</b>		
Managers	1	1
Skilled	1.40 (1.12–1.76)	1.41 (1.29–1.54)
Unskilled	2.33 (1.78–3.05)	1.99 (1.76–2.25)
<b>Income</b>		
High	1	1
Medium	1.33 (1.06–1.67)	1.51 (1.39–1.65)
Low	1.89 (1.47–2.43)	1.82 (1.63–2.03)

<sup>a</sup>OR, odds ratio; Model adjusted for age, sex, household size and marital status at baseline (1989).

the other studies were on those aged 25–74 years (follow-up 13 years)<sup>3</sup> and 25–99 years at baseline (follow-up 11 years).<sup>4</sup> Thus, there are clear differences in the age-groups examined in the three papers.

Even though the implication of our analysis for social inequalities research using SRH was not the key focus of our paper, the points raised by Subramanian and Ertel are important. The dissonance between self-reported health and mortality has been discussed previously by Sen. In interstate comparisons using Indian data he observed that states with highest life expectancy also have highest self-reported morbidities.<sup>9</sup> Further research is required to examine whether these discrepancies are context dependent and explore the reasons behind them. Here, we replicate the analyses of Subramanian and Ertel in the GAZEL cohort with the three markers of SEP used in our paper, see Table 1. The outcomes used are mortality till 2001, a follow-up of 12 years similar to the Established Populations for Epidemiologic Studies of the Elderly (EPESE) data and SRH in 2001. The mean age of participants at baseline was

44.2 (SD 3.5) years, considerably younger than the EPESE elderly. The results for education suggest that using SRH instead of mortality underestimates social inequalities. However, this does not appear to be the case for occupational position or income. In general terms, SRH is a simple, inexpensive and quite an accurate measure of health. Nevertheless, the social patterning of discrepancies between objective and subjective measures of health is important as it might provide clues as to the range of information used by people to rate their own health.

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