Measuring demographic group differences in cardiovascular reactivity to stress using a mental challenge in the laboratory: problems of interpretation

EDITOR,—In their recent paper Carroll et al showed that men and women in non-manual occupations exhibited greater diastolic blood pressure and heart rate reactivity to a mental arithmetic task than did people in manual occupations, a finding that they contrasted with known socioeconomic patterning of cardiovascular disease. They also demonstrated lower systolic blood pressure and heart rate reactivity to the test in women, which they considered more consistent with sex differences in cardiovascular disease. It does indeed seem likely that lower catecholamine and blood pressure reactivity to stress in women is one of the explanations for their lower rates of cardiovascular disease, an effect that has been ascribed largely to the effects of oestrogen.

However, I suggest that Carroll et al cannot claim to have tested cardiovascular reactivity to stress, but only cardiovascular reactivity to a mental arithmetic test. Presumably the authors’ aim was to use a mental arithmetic task to cause feelings of stress among participants, but they provide no information on whether this was indeed the effect of the task, and, most crucially, whether its effects were the same in all the demographic groups tested. Girdler and Light showed that women reported greater feelings of helplessness than men in response to a variety of laboratory stressors, but particularly after a mental arithmetic task than did men. It certainly seems possible that similar effects may have occurred in the experiments conducted by Carroll et al, in which case we might be even more impressed by the fact that women showed less cardiovascular response, and more likely to ascribe this to biological differences between men and women.

Author’s reply

EDITOR,—In analyses of three large age cohorts of men and women, we found that women showed lower cardiovascular reactions to a mental arithmetic challenge than men and manual lower reactions than non-manual social class groups.1 We concluded that differences in cardiovascular disease among men and women could be mediated by variations in cardiovascular reactivity, but that this sort of mechanism was unlikely to underlie differences in the prevalence of cardiovascular disease among different social class groups. Dr Pollard challenges these conclusions, largely on the basis of our use of mental arithmetic as a stress task. She cites scattered findings by Girdler and colleagues2 to the effect that women feel more helpless after but less engaged with the task in this group. Indeed, in the absence of any plausible biological mechanism to suggest that higher socioeconomic groups should show more cardiovascular reactivity to stress, an explanation based on differing subjective reactions to the arithmetic task seems far more probable. Without data on subjective experience of the test, I suggest that general conclusions about demographically defined differences in cardiovascular reactivity to stress are difficult to justify from the data presented; the conclusions should be limited to a description of responses to a mental arithmetic test.

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LETTERS TO THE EDITOR

It seems equally probable that the non-manual and manual groups may have experienced the stressor in very different ways. Thus, for example, the lower reactivity in the manual group could easily reflect lesser engagement with the task in this group. Indeed, in the absence of any plausible biological mechanism to suggest that higher socioeconomic groups should show more cardiovascular reactivity to stress, an explanation based on differing subjective reactions to the arithmetic task seems far more probable. Without data on subjective experience of the test, I suggest that general conclusions about demographically defined differences in cardiovascular reactivity to stress are difficult to justify from the data presented; the conclusions should be limited to a description of responses to a mental arithmetic test.

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