

ZWICK, W. R. & VELICER, W. F. (1986) Comparison of five rules for determining the number of components to retain. *Psychological Bulletin*, **99**, 432–442.

CHRIS EVANS
BRIDGET DOLAN

Section of Forensic Psychiatry

DETTE LYNCH

Section of Biostatistics
St George's Hospital Medical School
Jenner Wing
Cranmer Terrace
London SW17 0RE

Maternal viral infection and schizophrenia

SIR: Sham *et al* (*Journal*, April 1992, **160**, 461–466) suggest that “maternal viral infection is an important cause of schizophrenia”. They imply that the robust finding of a winter-birth excess among schizophrenics is due, in part at least, to a viral effect. They go on to state that this viral effect can help to explain the reported decline in the incidence of schizophrenia in countries in which there has been “an improvement in the living conditions in recent decades”.

The explanatory hypothesis rests on the grounds that the viral infection of the mother adversely affects the developing brain of the foetus, predisposing it to later schizophrenia. This would be consistent with the neurodevelopmental theory of schizophrenia, but certain important factors remain unexplained.

Firstly, one of the hallmarks of neurodevelopmental schizophrenia is the early age of onset (Murray *et al*, 1992). In an extensive review of the literature, Bradbury & Miller (1985) found no consistent schizophrenic subtype to be more prone to the seasonality effect. However, Takei *et al* (1992) among others, have reported winter birth to be associated with schizophrenia of later onset. Additionally, in an epidemiologically-based study, Castle *et al* (1992) reported that later-onset ‘paranoid’ patients showed a winter-birth effect, while early-onset ‘neurodevelopmental’ patients did not.

Secondly, it is clear that it is males rather than females who show a particular vulnerability to the severe, early-onset “neurodevelopmental” form of schizophrenia (Castle & Murray, 1991). It is thus intriguing that, in an analysis of the “schizophrenogenic effect” of the 1957 influenza epidemic, O’Callaghan *et al* (1991) reported that such an effect was confined to females. Furthermore, in England and Wales, Der *et al* (1991) reported that the rates of schizophrenia for both sexes have declined, and that the sex-ratio has remained much the same over the years. In Ireland, Waddington & Youssef (1992) found the decline to be greatest for females and later-

onset cases. Should the decline indeed be due to improved living conditions and less maternal viral infection, surely such an effect would be more emphatic in males?

BRADBURY, T. N. & MILLER, G. A. (1985) Season of birth in schizophrenia: a review of evidence, methodology, and aetiology. *Psychological Bulletin*, **98**, 569–594.

CASTLE, D. J. & MURRAY, R. M. (1991) The neurodevelopmental basis of sex differences in schizophrenia. *Psychological Medicine*, **21**, 565–575.

—, WESSELY, S., SHAM, P., *et al* (1992) Early onset schizophrenia: a preponderance of males with severe illness associated with premorbid dysfunction. *Schizophrenia Research*, **6**, 103–104.

DER, G., GUPTA, S. & MURRAY, R. M. (1990) Is schizophrenia disappearing? *Lancet*, **335**, 513–516.

MURRAY, R. M., O’CALLAGHAN, E., CASTLE, D. J., *et al* (1992) A neurodevelopmental approach to the classification of schizophrenia. *Schizophrenia Bulletin* (in press).

O’CALLAGHAN, E., SHAM, P. C., TAKEI, N., *et al* (1991) Schizophrenia after prenatal exposure to 1957 A2 influenza epidemic. *Lancet*, **337**, 1248–1250.

TAKEI, N., O’CALLAGHAN, E., SHAM, P., *et al* (1992) Winter birth excess in schizophrenia: its relationship to place of birth. *Schizophrenia Research*, **6**, 102.

WADDINGTON, J. L. & YOUSSEF, H. A. (1992) The declining incidence of schizophrenia in a rural Irish population of unusual homogeneity: secular trend towards early onset and male preponderance. *Schizophrenia Research*, **6**, 101.

DAVID CASTLE
MICHAEL GILL

Genetics Section
Institute of Psychiatry
De Crespigny Park
London SE5 8AF

AUTHOR’S REPLY: The concept of ‘neurodevelopmental’ schizophrenia was proposed on the basis that early onset and male cases of schizophrenia have a high frequency of obstetric complications, childhood personality and cognitive problems, and dystrophic brain abnormalities. By proposing this concept (Murray & O’Callaghan, 1991), we hoped to promote a developmental perspective on schizophrenia, and yet draw attention to possible clinical and aetiological heterogeneity.

Drs Castle & Gill surmise that if prenatal exposure to influenza epidemics increases the risk of subsequent schizophrenia in the unborn child by impairing neurodevelopment, then the season-of-birth effect ought to be most obvious in early-onset and male cases of schizophrenia. They point out, however, that some reports suggest that the late winter/spring excess of births is most evident in later-onset and female (see Boyd *et al*, 1986) cases. It is also true that we regard ‘neurodevelopmental’ schizophrenia as having a poor prognosis, and yet two studies claim that the season-of-birth effect is greater