

# Schizophrenia and Multiple Sclerosis: A State to Continent Perspective

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## Abstract

*Very high correlations between schizophrenia rates and multiple sclerosis rates of the six continents were found. However, the geographical association of these two disorders for Ireland was not significant in contrast to earlier research that found a correlation of .81 between these disorders in Italy. The association between schizophrenia and multiple sclerosis in the United States was positive but less strong than in a previous investigation. The findings of the present research were regarded as generally substantiating the geographical association of the two disorders in previous research.*

The present study extended the findings of two earlier studies that reported similar geographical distribution of schizophrenia and multiple sclerosis. The authors of the first study (Templer, Regier & Corgiat, 1985) investigated this relationship because of the common properties of the two disorders. Both are chronic disorders that begin in early adult life and run an irregular course. Both are familial disorders. Both appear to be more common in the colder parts of the world. The possibility of slow virus etiology has been suggested for both. Although Templer et al believed at the time they were the first to suggest the common properties of the two disorders, Torrey (1980) stated:

"Both are much more common in northern than southern Europe, in northern parts of the United States than in the South, in urban areas, and in technologically developed nations; and both afflictions were first described in the early years of the nineteenth century (Dean, 1970, 1971)" (p. 181).<sup>1</sup> California School of Professional Psychology, Fresno, California 93721.

Templer et al found that the 10 highest schizophrenia states of the U.S.A. had

significantly higher multiple sclerosis rates than the 10 lowest schizophrenia states. In the second study a surprisingly high correlation of .81 ( $p < .001$ ) between the rates of the two disorders in the districts of Italy was found (Templer, Cappelletty & Kauffman, 1988).

The specific objectives of the present research were to determine (1) The relationship between schizophrenia and M.S. using all of the states of the U.S.A.; (2) the schizophrenia-M.S. relationship for the other country (Ireland) for which rates for the two disorders could be found; and (3) the relationship between these 2 variables for the six continents.

## Method

It was the intention of the present study to use all of the states from the material cited by Torrey (1980) in presenting the 10 highest and 10 lowest schizophrenia states. However, the data for the other states could not be located. Therefore, the schizophrenia rates for the states were obtained from two other sources. One was the first admissions to state hospitals in 47 states in 1949 (Arieti, 1974). The other was the number of schizophrenic patients residing in state and county hospitals in 40 states in 1984 (National Institute of Mental Health, 1987).

Three multiple sclerosis rates for the United States were used. One was that used in the above-cited study by Templer, Regier and Corgiat (1985) and consists of the 1946 mortality rates for 48 states (Limburg, 1950; Friedman, 1980). The second was the mortality rates from 1959 through 1961 (Kurtzke, Beebe & Norman, 1979) for 48 states. The third was based on incidence in male veterans of World War II (Kurtzke, 1978) for 48 states.

For Ireland, two schizophrenia rates

were employed. One was based on the schizophrenics residing in psychiatric hospitals in 18 of Ireland's 27 counties in 1963 (Walsh, 1970). The other index was from a bar graph including 20 of the 27 counties of the first admissions in 1965-69 (O'Hare & Walsh, 1974). There were 20 bars since some of the 27 counties were combined. The 1971 multiple sclerosis prevalence rates were taken from Brady, Dean and Searbegovic (1974).

The determination of the schizophrenia rates for the 6 continents was made from a pictorial presentation of Torrey (1979). Torrey used a red dot for a very high area, a yellow dot for a high area, a green dot for an intermediate area, and a blue dot for a low area. The present authors assigned a value of 4 to a red dot, 3 to a yellow dot, 2 to a green dot, and 1 to a blue dot. The dots in each continent were averaged. The average was 2.69 for Europe, 2.00 for North America and Australia, 1.40 for Asia, 1.29 for Africa and 1.00 for South America.

The determination of the multiple sclerosis rates for the six continents was from two pictorial presentations. In one of McAlpine, Lumsden & Acheson (1972) circles of different sizes in proportion to M.S. rates were independently measured and added by two of the investigators. For both authors the ranks were 1 for Europe, 2 for North America, 3 for Australia, 4 for Asia, 5 for Africa, and 6 for South America. In the presentation of Kurtzke (1980) high M.S. localities were designated by black, medium by dotted, and low by dashed areas. The present authors measured the area for each continent and multiplied black areas by 3, dotted areas by 2, and dashed areas by 1. The mean of M.S. score for continents was determined. The highest was Europe, followed by Australia, North America, Asia, Africa, and South America.

### Results

As indicated by Table 1, for the United States, none of the six product moment correlations between multiple sclerosis and schizophrenia rates are significant. However, four of the six phi coefficients using the schizophrenia median split data are significant. For the Arieti schizophrenia rates, these coefficients are .32 ( $p < .05$ ) for the Limburg M.S. rates, .28 ( $p < .05$ ) for

the Kurtzke et al M.S. rates, and .28 ( $p < .05$ ) using the Kurtzke M.S. rates. For the N.I.M.H. schizophrenia median split the significant coefficient is .29 ( $p < .05$ ) for the Limburg M.S. rates. There was one significant phi coefficient using the top 10 and bottom 10 schizophrenia states. This coefficient is .52 ( $p < .01$ ) for the N.I.M.H. schizophrenia rates and the Limburg M.S. rates. For Ireland, the M.S. rate correlated -.37 (NS) for the O'Hare and Walsh schizophrenia index and .17 (NS) for the Walsh index. The rank order correlation between M.S. and schizophrenia for the 6 continents is .99 ( $p < .01$ ) for the McAlpine, Lumsden & Acheson (1972) representation and .94 ( $p < .02$ ) for the Kurtzke (1980) representation.

### Discussion

The lack of demonstrated relationship between schizophrenia and M.S. in Ireland is difficult to explain. Perhaps this difference has to do with the greater homogeneity of climate and geography in Ireland than in Italy, or to the much higher schizophrenia rates in Ireland (Torrey, 1980) in connection with the primary vs. secondary conceptualization in schizophrenia (Templer & Cappelletty, 1986). In the primary-secondary distinction, primary schizophrenia is viewed as having more of a genetic determination and secondary schizophrenia as being more of a function of harmful effects to the brain. Since schizophrenia has much higher rates in Ireland, one might assume that genetic determination is greater there. If there is a greater proportion of secondary schizophrenia in Italy e.g. schizophrenia caused by infection, then geographical and climatic differences in the various districts may account for a greater proportion of the variance.

The relationship between M.S. and schizophrenia in the United States seems stronger when the extremes of the distribution are considered and when the gross high vs. low categories rather than all data points over the entire distribution area are considered. However, the magnitude of the relationship seems weaker than the report of Templer, Regier and Corgiat (1985) would seem to suggest.

The rank order correlations of .99 and .94 between M.S. and schizophrenia for

Table 1.

## Correlations\* of Multiple Sclerosis and Schizophrenia Rates

Schizophrenic Rates (1950)	Multiple Sclerosis Rates			
	Limburg	Kurtzke et al	Kurtzke	(1979) (1978)
Arieti (1974)				.03 .13
Actual scores of all states (r)		.14		
Median split (0)		.32*		.28* .28*
Top 10 and bottom 10 states (0)		.20 NIMH		.00 .10
Actual scores of all states (r)		.14		.03 .09
Median split (0)		.29*		.18 .08
Top 10 and bottom 10 states (0)		.52**		.20 .30

\* p. < .05, \*\* p. < .01

\* It is noted that correlations using actual schizophrenic rates for all states are product moment and those using median-split schizophrenic rates for all states are phi coefficients, and those using 10 highest and 10 lowest schizophrenic states are phi-coefficients.

the 6 continents is obviously noteworthy. Nevertheless, these correlations may represent less potential for search into the etiological factors than is the case with Italy, where there may be less of a diversity of variables to investigate and control for. In general, the present findings mesh with the two earlier studies and provide further substantiation that the geographical resemblance of schizophrenia and multiple sclerosis is a genuine phenomenon rather than a chance or artifactual or isolated finding. The reasons for this relationship are not clear. However, climatic and related variables such as infection and nutrition appear to be worthy of investigation.

## References

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