Schizophrenia, Latitude and Temperature

Donald I. Templer, Ph.D., Julie Hintze, M.A., Neal H. Trent, M.S.¹
Ann Trent, M.A.²

Abstract

Countries with higher schizophrenia rates were found to have lower January temperature, lower July temperature, higher geographical latitude, and higher per capita income. The findings were related to previous research on the epidemiology of schizophrenia.

This research was conducted in the context of a series of studies that determined the geographical distribution similarities of schizophrenia and multiple sclerosis (Templer, Regier & Corgiat, 1985; Templer, Cappelletty & Kauffman, 1989; Templer, Hughey, Chalguijain, Lavoie, Trent, Sahwell & Spencer, 1990). The findings of the last cited study form most of the empirical rationale for the present research. Correlations of .77, .81, and .84 were reported between latitude and three measures of multiple sclerosis for the states of the U.S.A. (Limburg, 1950; Kurtzke, Beebe & Norman, 1979; Kurtzke, 1978). The respective correlations were -.65, -.56, and -.60 for January mean low temperature and -.65, -.64, and -.69 for July mean high temperature (all p's < .001). For the 17 districts of Italy, the latitude correlation of .43 was only of marginal significance, and neither the January nor the July temperature approached significance. The high correlations discovered between latitude and multiple sclerosis should be regarded as confirmatory rather than a completely new discovery. This is because the greater incidence of multiple sclerosis with greater distance north of and south of the equator has long been almost common knowledge in the literature on M.S., even though the magnitude of the association has never been quantified (McAlpine, Lumsden & Acheson, 1972).

For schizophrenia, neither the findings of the Templer et al (1990) study nor the previous literature provide a definitive perspective with respect to the association of this disorder with latitude and temperature. Torrey (1979) stated that schizophrenia is more common in northern than in southern Europe, and more common in the northern than southern states of the U.S.A., but did not provide supporting quantification. In the Templer et al (1990) study, schizophrenia was not significantly correlated with January or July temperature for either Italy or the United States. Latitude was not significantly correlated with schizophrenia in the United States, but was correlated (r = .54, p < .05) in Italy. Thus for the nine temperature and latitude correlations with schizophrenia only one was significant. In the present research, the latitude and temperature correlations with schizophrenia rates were determined using data from 25 countries (Scheper-Huges, 1979). It was not the original intention to include per capita income, but visual inspection of the schizophrenia rates revealed that the wealthier countries had higher schizophrenia rates. It was the intention to use as many sets of schizophrenia rates as possible, but no others could be found.

Methods

Scheper-Huges (1979) provided a table of psychiatric hospitalization rates for a group of 20 countries in 1955 and for a group of 25 countries in 1965. The countries that comprise the latter, in descending order are Republic of Ireland, Sweden, Austria, New Zealand, Israel, Scotland, Northern Ireland, England and Wales, United States, Canada, Poland, Italy, Chile, Ceylon, Spain, Japan, Cyprus, Greece, Portugal, Brazil, Ghana, Mexico, Kenya, Senegal, and Nigeria. These countries had rates quite similar in 1955 but did not include rates for Chile, Greece, Kenya,

1. California School of Professional Psychology, 1350 M Street, Fresno, CA 93721.
2. California State University, Fresno, CA.
Mexico, and Senegal. Temperature, latitude and per capita income data were obtained from encyclopedic sources.

Results

Table 1 shows the product-moment correlations of both 1955 schizophrenia and 1965 schizophrenia with latitude, January mean low temperature, July mean high temperature, and per capita income. It is apparent that all of the independent variables were significantly related to both indices of schizophrenia.

It was decided to do partial correlations with per capita income controlled for since temperature and latitude were viewed as the theoretically more important variables of this study. These partial correlations are contained in Table 1. It is apparent that latitude and July temperature remained significantly correlated with schizophrenia rate but January temperature did not.

Discussion

The schizophrenia correlations with latitude and temperature are consistent with the strong and accumulating evidence that schizophrenia is very much of a disorder with an epidemiology (Torrey, 1979). It is also consistent with the above reviewed research showing epidemiological similarities with multiple sclerosis. The latter disorder is more common in colder climates and with increasing distance from the equator. Multiple sclerosis is also more common in the more prosperous countries of the world.

The negative correlations of temperature with both schizophrenia and M.S. mesh with the contention of some authors that some sort of infectious process could cause M.S. It is also consistent with the contention of some authors that some sort of infectious process could cause schizophrenia. Templer et al (1990) inferred from the findings of their study that "Perhaps the most omnibus generalization permitted by the present findings is that schizophrenia and multiple sclerosis both seem to be associated with geographical variables that at least folklore has traditionally regarded as unhealthy. The unhealthy variables associated with high multiple sclerosis rates include colder temperatures, closer...

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ings of the present study do constitute strong and confirmatory evidence that schizophrenia has an epidemiology, and that this epidemiology has similarities to that of multiple sclerosis.

References

Table 1 Correlations of Schizophrenia Rates with Latitude, Temperature & Per Capita Income

<table>
<thead>
<tr>
<th>Schizophrenia Rates</th>
<th>January Temperature</th>
<th>July Temperature</th>
<th>Income</th>
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<tbody>
<tr>
<td>1955 (20 countries)</td>
<td>.69***</td>
<td>-.52**</td>
<td>-.64***</td>
</tr>
<tr>
<td>1965 (25 countries)</td>
<td>.68***</td>
<td>-.54**</td>
<td>-.60***</td>
</tr>
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</table>

Partial correlations with income controlled for

|1955 (20 countries) | .54** | -.25 | -.68*** |
|1965 (25 countries) | .45* | -.21 | -.42* |

*p < .05  **p < .01  ***p < .001