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BRIEF COMMUNICATION

Heterogeneity of cycloid psychoses: a latent class analysis

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ABSTRACT

Background. Three hypotheses have been proposed in regard to the origin of cycloid psychoses: (1) they are an independent nosological entity; (2) they are atypical cases of affective disorders; and (3) they are a heterogeneous group of disorders. This study examined the heterogeneity hypothesis by attempting to delineate distinct affective and non-affective subgroups.

Methods. In 60 cases drawn from a classic study of cycloid psychoses by Perris (1974), latent class analysis was used to delineate subgroups.

Results. Two classes were identified in the analysis: one characterized by the convergence of affective symptoms and family history of affective disorders and the other by the relative paucity of such features.

Conclusions. Cycloid psychoses are composed of at least two subgroups, distinguishable on the basis of symptoms and family history.

INTRODUCTION

In recent years, there has been a renewed interest in remitting psychoses with acute onset, especially a group of these disorders generally known as cycloid psychoses (Warkentin *et al*. 1992; Höffler *et al*. 1997; Stöber *et al*. 1997; Strik *et al*. 1997). This interest is also reflected in the most recent version of the International Classification of Diseases (ICD-10), which accommodated cycloid psychoses under the newly introduced group of acute and transient psychotic disorders (F23; World Health Organization, 1992).

Cycloid psychoses were originally introduced by Karl Kleist who described these cases as 'atypical autochthonous psychoses which have many features in common with circular (i.e. manic-depressive) disorders' (Kleist, 1974, p. 301). Kleist identified two kinds of cycloid psychoses: (1) 'confusional insanity', characterized by contrasting phases of confused excitement and stupor; and (2) 'motility psychosis', characterized by contrasting phases of hyperkinesis and akinesis. Leonhard (1961) further developed the study of cycloid psychoses by introducing a third kind, the 'anxiety–elation psychosis'. While noting the prominent affective symptoms in cases of anxiety–elation psychosis, Leonhard emphasized that these symptoms are of a different nature from those of the affective disorders:

> In anxiety–elation psychosis only the affectivity is involved … This affective change is not a change in the sense of a cheerfulness or sadness as in manic-depressive illness … The anxiety is associated with ideas of reference, the content of which indicates the affect … In the elation psychosis not only are expansive ideas produced, but, almost always, these patients want to make other people happy. They

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usually believe that they are able to bring salvation to mankind by religious or political means. (Leonhard, 1961, pp. 645–646.)

Both Kleist and Leonhard emphasized the independence of cycloid psychoses from schizophrenia and affective disorders – a view shared by a number of contemporary researchers (Perris, 1974; Brockington *et al.* 1982). At the same time, both Kleist and Leonhard noted the similarities of these psychoses and affective disorders in course and symptomatology.

It was on the basis of these similarities that other authors (e.g. Jamison, 1982; Cutting, 1990) characterized cycloid psychoses as atypical forms of affective disorders. Even among the authors who advocate the independent status of cycloid psychoses, there is a feeling that 'the main challenge is likely to come from those who believe that cycloid psychosis is merely a variant of manic-depressive disease' (Brockington *et al.* 1982, p. 104).

A third group of researchers have argued that cycloid psychoses may be a heterogeneous group. For instance, Fish (1964) argued that cycloid psychoses may consist of a mixture of cases of atypical manic-depressive psychosis, psychogenic reaction, epileptoid psychosis, as well as an independent group of 'true' cycloid psychoses.

However, heterogeneity of cycloid psychoses has rarely been empirically examined. In one such study, Jönsson (1992) found no meaningful differences in symptomatology between a subgroup of cycloid psychoses patients who had received DSM-III (American Psychiatric Association, 1980) diagnoses of affective disorders and a second subgroup who had received other diagnoses.

The present study pursues the question of heterogeneity of cycloid psychoses using a carefully diagnosed and followed-up historical sample of such patients. More specifically, the study addresses the issue of heterogeneity by attempting to delineate a separate 'affective' subgroup of cycloid psychoses characterized by affective symptoms and family history of affective disorders.

For this analysis data from a classic study by Perris (1974) were used. There were several reasons for using these data. Perris' 1974 study remains the most comprehensive and detailed study of cycloid psychoses to date, including data on symptomatology, course and family history for all subjects. Professor Perris personally interviewed all patients and a large number of relatives and followed the patients for many years. Furthermore, the set of criteria often used today for the diagnosis of cycloid psychoses (e.g. Höffler *et al.* 1997; Stöber *et al.* 1997; Strik *et al.* 1997) were originally formalized by Professor Perris for the study of the patients in this series. Therefore, the presentation of these patients' would be expected to match the criteria rather closely.

Reanalysis of classic data by sophisticated new analytical methods can be a useful supplement to research using new samples and reveal patterns in data that were not apparent to the original authors. For example, in their reanalysis of Kraepelin's 1908 data using the Grade of Membership (GOM) method, Jablensky & Woodbury (1995) confirmed Kraepelin's dichotomous classification of psychoses into dementia praecox (schizophrenia) and affective psychoses, however, they also noted that the catatonic syndrome occupied an intermediate position between these two major groups and shared many features with later diagnostic groupings of schizoaffective disorder and cycloid psychoses (Jablensky & Woodbury, 1995).

METHOD

The methodology of the study has been described in much detail by Perris (1974). The data-set on which this paper is based is included in an appendix to his 1974 monograph.

Subjects

Briefly, 60 cases fitting the criteria of cycloid psychoses, i.e. a remitting psychotic illness with complete remission between episodes, were included in the study. Selection of these 60 cases was based on a review of records of patients admitted with psychotic disorders to two hospitals in Sweden. All patients and at least one of their relatives were interviewed. Further information about family history was obtained from hospital records and parish registers. Patients were followed up for an average of 10 years.

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Variables

Three sets of variables were chosen as indicators of affective 'subgroup': (*a*) cycloid episodes of the 'anxiety–elation' type, as described earlier (in a number of cases, anxiety–elation features were mixed with features of confusion or motility psychosis); (*b*) occurrence of affective episodes in the course of illness in addition to the typical cycloid episodes (Perris labelled these affective episodes as '… mild affective episodes' and in the text of the monograph noted that: 'milder episodes occurred by some probands, which, if considered by themselves and not in relation to the whole course of the disease, could only with difficulty be differentiated from conventional affective disorders' (p. 42)); and, (*c*) family history of affective disorders (bipolar, unipolar or 'other affective disorders'), information on family history of psychiatric disorders was obtained either from a doctor's or hospital's record or from personal interview with the affected family member. For the analysis, each variable was dichotomized as present *v*. absent.

Data analysis

Latent class analysis (LCA) was used to examine the pattern of distribution of the three affective features listed above (McCutcheon, 1987). LCA identifies classes of individuals who share certain common features. For this, LCA uses the maximum likelihood estimation method to fit one or a series of hypothesized models to explain the association patterns among the observed variables. If the observed variables are unrelated, they will be distributed randomly and a model of 'independence' or a 'one class model' would fit the data. Clustering of the variables beyond chance, however, suggests the existence of distinct 'latent classes' of similar individuals. In this case, a model with two or more latent classes, corresponding to the number of distinct groups, is needed to explain the observed associations.

LCA produces two types of parameters: (*a*) 'latent class probabilities', which indicate the proportion of subjects in the sample who fall into each class; and (*b*) 'conditional probabilities' for individual features which indicate the probability of presenting the respective feature for each individual, conditional on that person's membership in a certain latent class. Data were analysed using the MLLSA module of CDAS 3.50 (McCutcheon, 1987; Eliason, 1990). A multiplicity of parameter estimates may be associated with the same model. In such cases the model is said to be unidentified. Goodman (1974) has proposed a method to assess the identifiability of a latent class model based on the rank order of a matrix of partial derivatives. This method was used in assessing the identifiability of the final LCA model.

RESULTS

The majority of the 60 patients in this sample were female ($N = 44$, 73%). The age at the time of the first episode was 30·5 years (S.D. = 9·8). Of the total of 60 patients, nine (15%) had anxiety–elation features, 15 (25%) had 'mild affective episodes' and 13 (22%) had a family history of affective disorders. In 10 cases out of the 13, the affective disorder of the family members could not be classified as bipolar or unipolar with confidence (labelled as 'other affective disorders' by Perris).

The first model tested in the LCA was a complete independence model. This is equivalent to testing a model with only one latent class. If not rejected, this model suggests that the observed variables are randomly distributed and do not form any recognizable pattern. However, as shown in Table 1, this model was rejected at the 0·05 level. Next, a two class model was tested. To avoid the problem of having 0 degree of freedom, it was necessary to introduce a restriction in the model. To this end, the conditional probability of anxiety–elation feature for cases in the 'affective class' was fixed at 1. The restricted model was not rejected at the 0·05 level and fit the data (Table 1). Furthermore, the model was identified according to Goodman's criterion (1974). Testing a model with more than two latent classes was not possible due to the small number of variables and cases.

Approximately 13% of subjects fell into the 'affective class', which was characterized by the presence of anxiety–elation symptoms, mild affective episodes and family history of affective disorders. The remaining 87% fell into the 'non-affective class', which was characterized by the relative paucity of affective symptoms and lower

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Table 1. *Model-fitting results for the latent class analysis of patients with cycloid psychoses*

	Likelihood ratio χ^2	Model χ^2	df	P*
Complete independence	11·1	17·2	4	< 0·05
Restricted 2 class model	0·3	0·3	1	NS

* A significant result indicates that the model does not fit the data.

Table 2. *Conditional probabilities of affective features for the two classes of cycloid psychoses identified by the latent class analysis (restricted 2 class model)*

Manifest variable	Affective class	Non-affective class
Anxiety–elation features		
Present	1·00*	0·03
Absent	0·00	0·97
Mild affective episodes		
Present	0·62	0·20
Absent	0·38	0·80
Affective disorder in family		
Present	0·62	0·16
Absent	0·38	0·84

* Fixed by the model.

likelihood of a family history of affective disorders. Conditional probabilities of affective features for each class are presented in Table 2.

DISCUSSION

Delineation of affective and non-affective subgroups in this study supports the heterogeneity hypothesis and challenges the view that all cases of cycloid psychoses are to be considered as atypical cases of affective disorders. It also appears that Leonhard's addition of anxiety–elation psychosis to the Kleist's group of cycloid psychoses may have, in fact, reduced the validity of this group by making it more heterogeneous. Contrary to Leonhard's (1961) view, the affective symptoms associated with the anxiety–elation psychosis are not of a different nature than affective symptoms associated with affective disorders. These symptoms, as well as explicitly affective episodes in the course of a cycloid disorder are highly suggestive of the affective origin of these cases. However, the much larger non-affective subgroup probably includes cases of 'true cycloid psychosis', to use Fish's (1964) term.

Similar results have been found in other remitting psychoses which are very similar in description to cycloid psychoses. For instance, McCabe & Strömgren (1975) reported that reactive psychoses are a heterogeneous group consisting of a subgroup of atypical affective disorders, characterized by more prominent mood abnormalities and more familial affective disorders, and a phenomenologically and genetically distinct subgroup of non-affective reactive psychoses. More recently, Toyoda and colleagues (1988) identified three subgroups in their sample of atypical psychoses (defined as psychoses with acute onset and remitting course): (*a*) a subgroup with good outcome and family history of homotypical psychotic disorder and convulsive disorder; (*b*) a smaller subgroup with affective symptoms, poorer outcome and family history of manic-depressive illness; and (*c*) a subgroup with early onset, poor outcome, residual symptoms and a family history of schizophrenia. The first two subgroups in Toyoda *et al.*'s study correspond to the 'non-affective' and 'affective' subgroups respectively, in the present study.

The findings of this study should be considered in the context of its limitations. First, LCS is a method for identifying distinct classes or categories, whereas the underlying phenomena

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may in fact be dimensional. This possibility could not be tested in this data-set because of the dichotomous nature of the manifest variables and their small number.

Secondly, the small number of clinical variables available in the data-set also excluded a detailed examination of clinical differences between the affective and non-affective subgroups. However, there were no statistically significant differences on the variables of age of onset, number of episodes and mode of onset (acute *v.* non-acute).

Implications for ICD-10

The classic descriptions of cycloid psychoses had a significant impact on ICD-10 formulation of acute and transient psychotic disorders (ATPD). Cycloid psychoses were included under two categories of ATPD: acute polymorphic psychotic disorder without symptoms of schizophrenia (F23.0); and, acute polymorphic psychotic disorder with symptoms of schizophrenia (F23.1) (World Health Organization, 1992). Affective symptoms, defined as 'emotional turmoil, with intense transient feelings of happiness and ecstasy or anxieties and irritability … ' (p. 101) were among the criteria introduced for these disorders.

There is now some evidence that, similar to cycloid psychoses, ATPD might include an affective subgroup (Jørgensen *et al.* 1997). The recent study of 51 cases of ATPD by Jørgensen *et al.* (1997) showed that the diagnosis in 28% of these cases had changed to affective disorders by the 1-year follow-up. Although these authors did not examine the association between affective symptoms during the cycloid episode and future change of diagnosis into an affective disorder, affective symptoms were prominent during the ATPD episode of the patient whose case they described as an example of such diagnostic change:

> … a 24-year-old woman realized within a few hours that she had been chosen for a religious mission … For 2 days her mental state changed in a turbulent way. She presented herself with an unstable rapidly changing clinical picture, including emotional turmoil … Seven months later she was readmitted because of an elevated mood with flight of ideas, pressure of speech and stable grandiose and religious delusions … (Jørgensen *et al.* 1997.)

Although more research is needed before clinical boundaries of ATPD or cycloid psychoses can be clearly identified, future investigators who use these diagnoses are well advised to analyse and report data for patients with affective features separately. This information would be crucial in interpreting the results of future treatment and validation studies.

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