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The classification of completed suicide into subtypes

RORY C. O'CONNOR¹, NOEL P. SHEEHY² & DARYL B. O'CONNOR³

¹Centre for Applied Social Psychology, Department of Psychology, University of Strathclyde, Glasgow, Scotland, ²School of Psychology, Queen's University of Belfast, Belfast, NI & ³Department of Endocrinology, University of Manchester, Manchester Royal Infirmary, Manchester, UK

Abstract

The classification of suicide into subtypes is important for suicide prevention. This study sought to classify suicide according to clinical, psychological and psychosocial factors. One hundred and forty two suicides were considered for analysis. The coroner's inquest papers for these suicides were content analysed and subsequently selected variables were included for cluster analysis. Three distinct clusters emerged which were stable and internally consistent. Cluster 1 was characterised by moderate incidences of depression and employment, often living alone but with little health-care contact. Members of cluster 2 often exhibited depression and other mental illness, had a history of self-harm, were sometimes hospitalised and were unlikely to be living alone. The third included those who were highly likely to be depressed, had a psychiatric history, had visited their GP in the 6 months prior to death, had a history of self-harm and were sometimes living alone. This typology illustrates a need to re-evaluate our perception of who is likely to commit suicide. The largest group (cluster 1) neither sought help nor acquired a diagnosis of mental illness.

Introduction

There have been many attempts to classify parasuicide but few have been concerned with the categorisation of completed suicide. Previous attempts can be divided into two distinct types. The first uses clinical, demographic and social variables to derive relatively intelligible and practical classifications of similar kinds of individuals. A diverse range of characteristics has been examined and many studies are rather loosely connected conceptually although they are milestones in the classification of suicidal

behaviour (Bostock & Williamson, 1974; Philip, 1970; Stengel, 1964).

The second method uses multivariate classification techniques. Studies in this tradition tend to consider larger numbers of characteristics in combination and as such have been more useful for predicting suicidal behaviour. Cluster analysis in particular has often been used to profile parasuicidal behaviour (e.g. Colson, 1973; Henderson *et al.*, 1977; Kiev, 1976; Kurz *et al.*, 1987).

Advocates of this approach argue that demographic and simple descriptive data are extremely limited. The classic demographic

Address for Correspondence: Rory C. O'Connor, University of Strathclyde, Centre for Applied Social Psychology, Department of Psychology, Graham Hills Building, Glasgow G1 1QE, UK. Tel: (0141) 548 4461; Fax: (0141) 548 4878; E-mail: rory.o-connor@strath.ac.uk

profile of suicides in western societies is well established (old and male) but this has been of limited value in reducing the suicide rates, especially among the young. It is important to move beyond univariate and bivariate statistical analysis and apply multivariate statistical techniques. Previous research has shown that suicidal subtypes derived from these techniques are not merely statistical artefacts, but make clinical sense (Colson, 1973). Exploratory investigations using these techniques have yielded some similarity in profiles but these are limited by the heterogeneity of variables measured. It is rare to find two studies that address the same aspects of suicide profiling and employ the same methods of measurement. This makes comparisons between samples problematic and limits the generalisability of findings. This problem is being addressed through the WHO/EURO Multi-centre on parasuicide that represents a concerted attempt to standardise methods of measuring the correlates of parasuicide.

Henderson *et al.* (1977) and Paykel & Rassaby (1978) identified three clusters based on information about previous suicidal behaviour: mental state, recent attempts, motivation and demographic characteristics. More recently, Kurz and colleagues (Kurz *et al.*, 1987) collected descriptive data on 493 patients admitted to the poisoning treatment unit of a German hospital. The patients were followed-up a year after their attempt and their statistical analysis also yielded a three-cluster solution that they judged to have both therapeutic and prognostic implications. Like Henderson *et al.* (1977) and Paykel & Rassaby (1978) this study also drew a distinction between serious and non-serious attempts.

Katschnig & Fuchs-Robetin (1984) replicated the cluster structure reported by Paykel & Rassaby (1978). Independent replications of this sort are both necessary and reassuring

because they add 'to the evidence that the classification is more than a methodological artefact' (Kurz *et al.*, 1987). (See Arensman & Kerkhof (1996) for a review of all empirical classifications of attempted suicide between 1963 and 1993.)

Classifying suicide

Classification studies of parasuicide have shown that statistical techniques, coupled with measurement instruments with proven clinical validity, can provide an important way forward in suicide prevention. Williams argues that 'one of the most obvious measures [for prevention] would be the more sensitive assessment of suicide risk by mental health professionals' (Williams, 1997, p. 177). More can be done to better integrate studies of parasuicide with the retrospective analysis of completed suicides. Psychological autopsy is one of the most frequently used methods but there have been few attempts to identify suicide subtypes through psychological autopsies of coroner's records. Coroners' inquest papers have been used (Cattell, 1988; Pearson, 1993) to profile suicides and confirm the presence of hypothesised risk factors but there have been no published studies of coroner's inquest papers which attempt to classify suicide into subtypes. This is somewhat surprising because sub-types of parasuicidal behaviour are well established and it is reasonable to hypothesise that there may be similar subtypes of completed suicide.

Baechler (1979) classified completed suicide into four types (escapist, aggressive, oblativ and ludic) each of which also had at least two further subtypes. Ovenstone & Kreitman (1974) identified two syndromes of suicide which they classified *a priori*: the first group was described as chronically disorganised with a history of parasuicide (the parasuicide group) and the second group was

described as acutely disrupted but with no parasuicidal history (no parasuicide group). Bagley *et al.* (1976), in a post-mortem study, identified three types of suicides which they labelled 'depressive', 'sociopathic' and 'physical illness'. Maris (1981) argues that there are probably between two and four types of suicide in its basic form. These possibly correspond to his four 'meanings' for suicide (escape, aggressive, self-change or self-giving and risk-taking). He argues that, although it is possible to generate more than four types, these essentially elaborate the core typology.

Bagley *et al.* (1976) and others have shown how, using readily available data, it is possible to profile potential victims and hopefully educate to prevent (to some degree) suicide. Unfortunately, the methodology used to investigate suicidal behaviour is often flawed (see O'Connor & Sheehy, 1997). It is important not simply to profile parasuicide but to take account of the data for completed suicide too.

The study reported here used a large corpus of archival data to profile completed suicide and the classification procedure adopted illustrates the benefits of applying multivariate analyses to such datasets. It could be argued that the classification of suicide has progressed little since the seminal work of Overstone & Kreitman (1974). That study has been of limited use in identifying those most at risk from suicide, although Maris (1981) emphasises the need to be sensibly parsimonious and the study reported here has as its objective a more parsimonious classification from coroner's inquest papers. It was predicted that, similar to work carried out with parasuicide individuals, at least two stable and internally consistent subtypes of completed suicide would emerge from the classification. A history of self-harm was also expected to be one of the most discriminating variables in the classification.

Method

All suspected suicides which came before HM Coroner's court for Greater Belfast in 1993 and 1994 were included for analysis. HM Coroner for Greater Belfast is responsible for three catchment areas (Greater Belfast, South Antrim and North Down) in Northern Ireland. There were 142 suicides (105 males and 37 females) in these 2 years, which represents a mean rate for the region of 8.7 per 100,000. The mean age for the whole sample was 41 years (range 13–86 years) and the mean ages for males and females were 38.7 years (range 13–86 years) and 47.8 years (range 25–82 years), respectively.

Classification of death as suicide

All unnatural deaths within the Greater Belfast catchment area are investigated by HM Coroner. In the case of a suspicious death, a suicide, or when the coroner is unsure of the cause of death, an inquest is held. The inquest papers of all deaths recorded in 1993 and 1994 suspected to be suicide were surveyed. Coroners do not officially classify a death as a suicide although they may make known their view of the cause of death. The coroner compiles a summary of findings which are forwarded to the Register General's Office for Northern Ireland. A clerk then classifies the death according to the International Classification of Diseases (ICD) and from this the mortality statistics are compiled.

Coroner's inquest papers

The coroner's inquest papers for all 142 suicides were classified using an existing coding frame which encompassed all the common risk factor domains (see O'Connor, 1997). The coding classes included physical health, mental health, psychiatric history, history of self-harm and incidence of life stressors. Demographic details were also

obtained for all the suicides. As a measure of reliability, a random sample of inquest papers ($n=15$) was analysed independently by a psychology graduate. There was agreement on all of the classifications and it was concluded that the coding procedure was reliable. Each inquest paper was subsequently classified using this coding frame. Patterns in the data were explored using cluster analytic procedures.

Cluster analysis

Twenty variables were entered in the cluster analysis, these were clinical, psychological or psychosocial in nature. All the variables were binary (dichotomous) and no demographic variables were used in the cluster analysis.

Two methods of cluster analysis were employed in the analysis: complete and average linkage. Complete was applied to the data first and then average linkage in order to determine whether the clusters were stable across different algorithms. Stability was measured in terms of 'transfer of cluster membership' (i.e. minimal transfer of membership across different clustering methods). Squared euclidean was the measure adopted in this analysis.

The 'split-half' technique was used to estimate the internal consistency of the clusters. The sample ($n=142$) was randomly split into two subsamples (each with 71 cases). Two separate cluster analyses (using complete linkage) were then carried out on each of the subsamples. If clusters are internally consistent there ought to be relatively little transfer of membership when each half is analysed independently. This cluster analytical procedure is described elsewhere (Alderdice *et al.*, 1994).

Results

Three distinct, stable clusters emerged for both complete and average clustering meth-

ods. Inspection of the agglomeration coefficients and assessment of the face validity of the dendrogram suggested a three-cluster solution which seemed to make clinical sense (see Colson, 1973). There was only 18.3% change in cluster membership when average linkage was compared with complete linkage. Furthermore, there was 30.1% and 32.4% change of membership, respectively, for each half using the split-half technique (complete linkage). Most change of membership occurred in the third, smaller cluster. Hence, the three clusters were stable and internally consistent.

Demographic characteristics of the clusters

Cluster 1 ($n=64$) and cluster 2 ($n=57$) were substantially larger than the third cluster ($n=21$). Table 1 describes the distribution of demographic characteristics across each of the three clusters. There were no significant differences in the demographic characteristics across any of the clusters.

There were substantially more men in each of the clusters and young people were always the modal group. There were no divorced or widowed people in the third cluster. The distribution of social class tended to be representative of the sample. Surprisingly, method of suicide did not vary across cluster. Previous research seemed to suggest that more violent methods tend to characterise particular types of suicide and attempted suicide (Pierce, 1981). Neither the type nor the lethality of the method varied significantly between the clusters. The most frequent method of suicide in cluster 1 was hanging. Poisoning and hanging were the modal methods of suicide in clusters 2 and 3.

Description of the clusters

The 20 variables included in the cluster analysis and their distribution across the three clusters is reported in Table 2.

Table 1: Distribution of demographic characteristics across the three clusters

Variable	Cluster 1 (<i>n</i> =64) %	Cluster 2 (<i>n</i> =57) %	Cluster 3 (<i>n</i> =21) %
<i>Sex</i>			
Male	79.7	71.9	61.9
Female	20.3	28.1	38.1
<i>Age</i>			
Young (1–33 years)	48.4	36.8	47.6
Middle (34–55 years)	35.9	35.1	42.9
Older (56+ years)	15.7	28.1	9.5
<i>Marital status</i>			
Single	42.2	38.6	38.1
Married	42.2	45.6	61.9
Divorced	12.5	5.3	0
Widowed	3.1	10.5	0
<i>Social class</i>			
Professional (0)	0	3.5	0
Managerial (1)	17.2	10.5	9.5
Skilled (non) (2)	14.1	14.0	4.8
Skilled (man) (3)	31.3	33.3	38.1
Partly skilled (4)	17.2	15.8	9.5
Unskilled (5)	3.1	12.3	14.3
Armed Forces (7)	3.1	1.8	4.8
Inadequately described (9)	14.0	8.8	19.0

Characteristics of cluster 1 (*n*=64)

This was the largest cluster, characterised by moderate incidences of depression (43.8%), less than one-fifth (18.8%) were clinically diagnosed as either suffering from alcoholism or were described as extremely heavy drinkers. Contact with the health care team was measured somewhat crudely by a number of variables: including contact with GP (during the 6 months prior to death), hospitalisation, medication and lifetime psychiatric contact. Less than 5% had contacted their GP, had any psychiatric history or had been hospitalised for any reason in the year

prior to death. These individuals were highly likely to complete (i.e. commit suicide) on the first attempt and nearly 50% – a much higher percentage than the other two clusters – were living alone at time of death. More than half (53.1%) of this group were in employment at time of death. This is a much higher level than observed in the other clusters.

Characteristics of cluster 2 (*n*=57)

Over half (52.4%) of this group was suffering from depression and less than 10% (9.5%) were living alone at time of death. This group

Table 2: Distribution (%) of variables across clusters

Variable	Cluster 1 %	Cluster 2 %	Cluster 3 %
Depression	43.8	52.4	86.0
Physical health	20.3	28.6	29.8
Marital/relationship problems	31.3	42.9	26.3
Work problems	11.0	0	7.0
Financial problems	4.7	0	5.3
Health problems	12.5	28.6	19.3
Other problems	20.3	33.3	15.8
Bereavement	9.4	9.5	12.3
Living alone	45.3	9.5	40.4
Hospitalisation	3.1	47.6	66.7
Verbalisation	26.6	52.4	36.8
Medication	29.7	57.1	77.2
Previous attempt	6.3	66.7	64.9
Psychiatric history	3.1	14.3	100
GP visits	3.1	14.3	100
Schizophrenia	3.1	0	10.5
Alcoholism	18.8	33.3	26.3
Epilepsy	0	19.0	3.5
Other mental illness	10.9	28.6	29.8
Working	53.1	19.0	31.6

exhibited the highest incidence of marital or relationship problems (42.9%). Almost all of those with epilepsy were represented in this cluster (19%) and 28.6% were also suffering from another mental disorder (e.g. personality or anxiety disorder). One-third (33.3%) were diagnosed as suffering from alcoholism or heavy drinking. Fourteen per cent of the deceased had visited their GP in the 6 months prior to death or had some lifetime psychiatric contact. However, a substantial percentage (47.6%) were hospitalised in the year prior to death (more often for physical rather than psychological reasons). Many were also on medication (57.1%), two-thirds (66.7%) had a suicidal history (previous attempt) and

less than 20% were working at time of death. This group cited marital or relationship problems as the most frequently occurring stressor (43%) and many individuals in this group (52.4%) expressed the intention to take their own life.

Characteristics of cluster 3 (*n*=21)

There was an extremely high frequency of depressive illness in this cluster (86%) and all members of this group had visited their GP in the 6 months prior to death. Seventy-seven per cent of individuals in the group were on medication. Two-thirds were hospitalised in the year before death and (similar to cluster 2) 65% had attempted suicide before. Nearly

40% of this cluster either suffered from alcoholism or had been diagnosed as schizophrenic. Nearly 30% were also likely to be suffering from another mental illness. The highest incidence of physical health problems was found in this group (29.8%). Just over 40% (40.4%) were also living alone at time of death, which is substantially more than those in cluster 2. Finally, two-thirds were not working.

Discussion

Three stable and internally consistent clusters emerged from the cluster analytical procedures. Those in the first cluster were unlikely to have had recent contact with their GP, any lifetime psychiatric history or to have been hospitalised in the year before death. These individuals were often working, depressed and living alone. The suicides in cluster 2 were similar to those in cluster 1. Many were depressed but were usually not living alone. They were also unlikely to have had recent contact with their GP or to have had any psychiatric history. Many had been hospitalised (usually for physical or medical conditions) and two thirds had attempted suicide previously. Alcoholism was frequently an associated mental illness but none of the suicides were schizophrenic. The final cluster resembled the traditional profile of suicide. Individuals in this cluster were highly likely to be depressed and often had another mental illness. They were sometimes living alone and one-third were working at time of death. All had a psychiatric history and all had visited their GP in the 6 months prior to death. Many had made previous attempts at suicide and had spent time in hospital. The results supported the hypotheses: three subtypes of suicide emerged from the cluster analysis and these were assessed as stable and internally consistent. A history of sui-

cide attempts was one of the variables that discriminated between the subtypes. Cluster 1 suicides were unlikely to have a history of self-harm whereas suicides in clusters 2 and 3 often had a parasuicidal history.

Cluster 1 suicides are not ostensibly at risk; they are probably stressed and depressed but do not seek help from professionals or from family and friends. Members of this group are probably under severe psychological strain but for some reason do not seek assistance. It is possible that they regard seeking help as a sign of failure, thereby adding to their sense of distress, and cannot engage in effective coping strategies. It is important to be aware that these people represent the largest subtype of suicide. Cluster 2 suicides fall through the caring profession safety net. They are unlikely to be living alone and have been hospitalised in the year before death. Two-thirds have a history of deliberate self-harm and the treatment interventions they receive, in-so-far as they were intended to prevent suicide, were unsuccessful. Interestingly, they do not have a psychiatric history. They may have used previous deliberate self-harm episodes as a means for signalling their difficulties. These communications having failed, the individual chooses suicide as the only remaining solution. Cluster 3 represents the traditional picture of death by suicide. Members of this cluster have histories of mental illness and extensive contact with healthcare professionals. They have received a range of treatments which, in-so-far as they were intended to prevent suicide, failed. They represent a subgroup of people who appear unable to benefit from extended assistance programmes.

This taxonomy offers a more complex picture of suicide than is often imagined. The majority of suicides do not conform to the traditional picture and the largest suicide subtype is characterised by a reluctance to seek

help of any kind. Thus, the study illustrates the changing profile of suicide.

The subtypes reported here appear to be consistent with other suicide classifications. In Paykel & Rassaby's (1978) classification previous suicide attempt discriminated significantly their subtypes. Their largest cluster was unlikely to have a history of self-harm (similar to the cluster 1 suicides reported here) and their smallest group was characterised by a history of repetition (similar to cluster 3 suicides reported here). The findings are also similar to Kurz *et al.*'s (1987) three-cluster solution. Those in their cluster A had more previous attempts and verbalised their suicidal intentions (similar to cluster 2 suicides), and those in their cluster C were characterised by low verbalisation and few previous attempts (comparable to cluster 1 suicides). This study illustrates a need to re-evaluate our beliefs about who is likely to commit suicide. A large proportion of those who kill themselves are not diagnosed as suffering from a psychiatric illness – they are not conspicuously 'abnormal'. Moreover, these individuals are unlikely to visit their GP, perhaps through fear of stigmatisation and a sense of failure (O'Connor *et al.*, in press), and are therefore unlikely to be identified as 'at risk'. This raises questions about effective intervention and prevention for this group and strengthens further the argument for national awareness campaigns that can alert people to the effectiveness of help-seeking as an effective coping strategy.

Conclusion

The cluster analysis yielded a three-cluster solution which has advanced the profiling of suicide and emphasises its clinical variability. The three subtypes provide a framework which may be useful for mental health professionals and highlight the fact that the large

est group (cluster 1) neither sought help nor acquired a diagnosis of mental illness.

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