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The Concept of Negative Symptoms

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In a recent edition of the *Schizophrenia Bulletin* devoted to negative symptoms, the editor suggested at the beginning of his preface that what he called the "positive–negative symptom distinction" had been introduced into psychiatry only a decade previously (Levine, 1985). Many authors in the same volume seemed to agree with him; at least they did not emphasise any continuity with earlier work. There were a few notable exceptions. Since, for more than 30 years, I have seen the relationship between psychological deficit (cognitive defect, negative syndrome) and the productive (florid, positive) symptoms as lying at the heart of the mystery of schizophrenia, it seemed possible that some account of how that interest arose and developed might still be timely. This is part of the history of the Social Psychiatry Research Unit of the Medical Research Council.

It is debatable who introduced the 'positive–negative symptom distinction' into psychiatry — it was in the air by the time of Kraepelin's first interest in the subject — but Venables & O'Connor were among the first to operationalise it. A distinction was drawn, on the basis of behaviour scales rated by nurses, between predominantly positive or 'paranoid' and predominantly negative or 'non-paranoid' forms (Venables, 1957; Venables & O'Connor, 1959). Among the residents of the psychiatric hospitals of those days it was easy to demonstrate a syndrome whose central characteristic, statistically speaking, was social withdrawal. Aspects of behaviour such as slowness, underactivity, poverty of speech, lack of interests and poor self-care were highly correlated with social withdrawal, and the total sum of ratings (SW score) was stable over quite long periods of time (Wing, 1959, 1961, 1962; Wing & Brown, 1970).

Also associated but in lesser degree, and subject to much greater fluctuation so that it was not very stable over time, was a syndrome (called 'socially embarrassing behaviour') composed of four elements: overactivity, laughing and talking to self, posturing and mannerisms, and threatening or violent behaviour (SE score).

In addition to these behavioural measurements, a standardised clinical interview was designed to allow the rating of four key phenomena — flatness of affect, poverty of quantity or content of speech, incoherence of speech, and coherently-expressed delusions. This was one of the precursors of the Present State Examination (Wing *et al*, 1967). Among the long-stay schizophrenic group there was a marked and sustained relationship between flatness of affect and poverty of speech rated at interview and the social withdrawal syndrome rated independently by ward nurses on the same patients. A classification was constructed into those who showed none of the four symptoms at interview (1a), those who showed none severely (1b), those who showed only flatness of affect severely (1c), those whose predominant symptom was coherently expressed delusions (2), or incoherence of speech (3), or poverty of speech (4) or muteness (5) (Wing, 1961). Both the classification and the social withdrawal score were highly correlated with other aspects of social performance (Catterson *et al*, 1963).

Group 2, showing coherent delusions without severe incoherence or poverty of speech, always had markedly lower SW scores and rarely had severe flattening of affect, compared with those with other severe disorder. If this group was omitted, there appeared to be a substantial relationship between both SW score and clinical classification and measures of 'arousal' such as skin potential and two-flash threshold (Venables & Wing, 1962).

The particular interest of these ideas for a clinical research worker was that symptoms long thought immutable might well be subject to environmental influence, because there was an underlying psychophysiological mechanism for the interaction. This theory contradicted the concept of inevitable cognitive deterioration in schizophrenia, originating in Kraepelin's early writing on dementia praecox and further pursued by empirical psychologists such as Babcock (1933).

Motivating severely disabled schizophrenic patients

The theory was tested by a design in which controlled social stimulation to improve the work performance of severely disabled schizophrenic patients, allocated at random to two workshops, was brought to bear by two experienced staff nurses, both well known to them (Wing & Freudenberg, 1961). Medication was withdrawn from half of them at random but no ill-effects were noted. After a baseline period during which there was a slow linear improvement on a simple task, paid at piece rates, one of the staff nurses was asked to take such measures as she thought necessary to improve the performance of patients in her workshop. She did so by sitting down next to those who were working slowly

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or not at all, showing them how to proceed and encouraging them verbally and non-verbally to try. The result was an increase in output from the very first session, but this again did not follow the expected form of a learning curve. (Some patients, however, did not respond at all.) Having reached a peak of about twice the baseline output during the first two sessions, no further change occurred until the staff nurse was asked to stop the active supervision and return to the passive condition. At that point, there was a fall in output to below the level at the start of the experimental period.

In the control group, however, which had continued under the passive condition, there was an initial spurt in output apparently due to the fact that there was an open door between the workshops and patients could hear what was going on in the next room. This was followed in the second session by a dramatic drop in output, which continued until the end of the active supervision next door, when output rose to above the initial level.

After a further period with no active supervision in either group, both supervisors became active, with results that confirmed the earlier findings. Whenever performance improved, 'junk' behaviour (such as aimless pacing or twiddling bits of paper or blankly staring into space) decreased concomitantly. There was, however, no 'transfer of training' — no difference was observable in the behaviour of the two groups when they returned to their wards.

This experiment seemed to demonstrate:

(a) that the stimulation was *social* in nature;
(b) that it resulted in immediate improvement in performance, in some patients, which did not take the form of the expected learning curve;
(c) that the improvement lasted only as long as the stimulation, raising the question of how long it must be kept up. A basic principle of rehabilitation is that passive exercise must be applied until active function returns, otherwise impairment may be amplified;
(d) that stimulation is situation-specific;
(e) that the patients' impairments were at the most severe end of the spectrum and, therefore, that mildly or moderately disabled patients might be less locked into dependence on environmental stimuli, allowing the hope that active function could more readily be restored in some cases.

A comparative longitudinal study of long-stay patients in hospitals providing different social environments

These are large conclusions to draw from one study of the most severely disabled people in hospital at the end of the 1950s. Several other projects were being mounted at the same time, however, which tested a range of hypotheses based on the general theoretical approach. A survey of the long-stay population of two hospitals near London showed that SW scores were correlated with length of stay, as were ignorance of elementary facts about the outside world, absence of plans for the future, and the wish to stay in hospital (Wing, 1962).

The possible reasons for such correlations were examined in an 8 year study of three hospitals, each fully responsible for a geographical catchment area, chosen because their social and rehabilitation policies were markedly different (Wing & Brown, 1961). Analysis of the data, both cross-sectional and longitudinal, controlling for age and length of stay, did nothing to disprove the hypothesis that poverty of the social environment acted on a specific vulnerability to amplify or diminish disablement in people afflicted by schizophrenia.

There was no evidence of any general tendency to deterioration (psychological deficit increasing with time).

Four major conclusions from this large study were as follows:

(a) A core of deficit in many patients is impervious to social influence and constitutes a threat of deterioration if the social environment becomes understimulating.
(b) If this deficit has been amplified in conditions of social poverty, it is possible to reverse the process by making the environment socially more rich.
(c) The effort put into creating an optimal social environment must therefore be sustained because the risk of deterioration remains.
(d) The principles of social treatment would be likely to hold wherever the patients were treated. It could not be assumed that the environment would change for the better simply because a patient had been discharged 'to the community'.

Application to rehabilitation

This theory of schizophrenic vulnerability and reactivity was further tested in pilot research carried out to discover whether such principles when applied to the rehabilitation of long-stay patients would lead to their successful resettlement outside hospital (Wing & Giddens, 1959; Wing, 1960).

The results were sufficiently encouraging to mount a larger study, of 45 moderately disabled long-stay men (Wing *et al*, 1964). Of these, 21 were self-supporting in employment a year later, 10 of them in sheltered work. Three others were employed but their condition was doubtfully satisfactory. In all, 17 patients were

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living outside hospital. Six patients showed an unmistakable exacerbation of positive symptoms soon after starting a course; none had shown symptoms during the previous 3 months. Five of the six were from a hospital where there had been very little preparation for the new and highly challenging environment they were to encounter. Stone & Eldred (1959) had already pointed out that over-vigorous rehabilitation carried such risks.

A third experiment was carried out later to discover how far chronic psychotic patients, aged under 55 and living outside hospital but unemployed for at least a year, could be helped by attending a course at a newly set up rehabilitation workshop attached to a day hospital where preparatory help could be given (Bennett, 1972; Wing, L. *et al*, 1972). Using the Camberwell Register and case records 75 (44 per 100 000 total population) such patients were identified. There was little improvement in the 14 patients selected at random for the course from the group of 28 who indicated a readiness to take part, compared with controls. Five of these 14 patients had adverse reactions, due mainly to the higher standards of performance required and the pressure to join in group meetings which they disliked, though no harm was done in the long term.

Studies of hostels, group homes, day units and shelters for the destitute have suggested that much less control of the environment is possible 'in the community' than in hospital, although the opportunities for social stimulation generally are richer (Wing & Olsen, 1979).

In the most recent studies of long-term attenders at day hospitals and day centres in the inner London district of South Southwark (Wing, 1982; Brewin *et al*, 1987, 1988; Brugha *et al*, 1988) it has been possible to assess needs for care and for services in the context of resources that are substantially better than in most areas of the country. As is the case with patients at home (Creer & Wing, 1974), the most frequent needs of schizophrenic patients involve negative symptoms and social performance.

Relationship between negative and positive symptoms

One of the social factors liable to precipitate relapse was noted in the second IRU study (Wing *et al*, 1964). This was unrealistic (iatrogenic) pressure to perform up to impossible social and occupational standards, particularly in patients who were quite unprepared for the experience. Another observation, often reminiscent of the same process, was that life changes of various kinds appeared to precipitate relapse (Brown & Birley, 1968). Thirdly, what later came to be called 'high expressed emotion' (most simply operationalised in terms of critical comments made by some key relatives, by no means all) were found to be related to a recrudescence, usually of positive, symptoms (Brown *et al*, 1962, 1972; Vaughn & Leff, 1976).

It became obvious from a 5-year retrospective follow-up study of patients admitted to hospitals A, B and C in 1956 that negative and positive symptoms could occur together or separately throughout the course of most schizophrenic illnesses (Brown *et al*, 1966). This was also found to be true in the World Health Organisation studies (WHO, 1973, 1979; Sartorius *et al*, 1986) in subsequent European studies, and in a controlled trial of preventive medication (Stevens, 1973).

If one studies the vertical hierarchy evident in many diagnostic systems, for example the International Classification of Diseases, there is a progression in the priority given to certain key positive symptoms in the order: organic, first rank, severe affective, anxiety/phobic and obsessional, non-specific. Key symptoms or syndromes higher in the hierarchy tend to be associated with many of the symptoms lower down, but not *vice versa* (Wing, 1978; Wing *et al*, 1974; Sturt, 1981). During recovery from an acute episode of schizophrenia, the key symptoms tend to disappear first while symptoms at lower levels persist longer (Knights *et al*, 1980). Non-specific and affective symptoms tend to recur as prodromal symptoms of relapse (Herz & Melville, 1980; Hirsch *et al*, 1987).

There is an opposite progression in the negative syndrome, which tends to decrease down the hierarchy, being more prominent in dementing conditions, post-encephalitic disorders, parkinsonism and autistic-spectrum disorders (Wing, 1981, 1985) than in schizophrenia. The syndrome occurs at lesser frequency and severity in severe depression and becomes much less evident at lower levels.

These observations suggest that the relationships between positive and negative symptoms in schizophrenia need to be considered in a broader phenomenological and nosological context.

There seem to be at least two environmental processes at work on a biological vulnerability. On the one hand, too little stimulation tends to increase symptoms such as social withdrawal, passivity, inertia and lack of initiative. This process was seen most in the old-fashioned type of mental hospital but it now occurs 'in the community'. On the other hand, there is a tendency to break down, with an effusion of florid symptoms, under conditions of social over-stimulation. This second process is most frequently seen outside hospital but it can also be seen within it. These are general statements and the two processes sometimes vary together. Negative symptoms, in part, are a protective reaction against the disorder of thought and the lack of reward from social contact that ensues because of the communication impairment, and they can, in addition, be amplified in conditions of environmental poverty.

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The communication impairment is compounded of several elements, often difficult to separate from each other clinically. There is incoherence of thought and speech, inability to speak to a purpose, a defect of 'willed intention', slowness, and poor non-verbal skill or 'body language'. The same patient may show any of these at various times in the course. An ordered, structured and emotionally neutral environment, providing only demands that can be understood and coped with, but making demands that do exercise real talents, allows the patient to make the best use of assets and compensating skills without amplifying the impairment. On the other hand, if impossible demands are made and the patient is unable to withdraw, the underlying cognitive disorder becomes clinically manifest in productive symptoms and behaviour. The person afflicted by schizophrenia therefore has to walk a tightrope between two kinds of dangerous environment (Wing, 1960; Wing & Brown, 1970; Wing, J.K. *et al* 1972).

Several psychological models have been put forward, each potentially explaining part of this central core of schizophrenia, in which neither positive nor negative symptoms are regarded as 'primary' (Broadbent, 1958; Hemsley & Zawada, 1976; Frith, 1987; Hemsley, 1987). Such models are necessary in order to bridge the gap between the clinical phenomena and the neuropharmacological and neuroanatomical information that is now available.

This assumption of an 'intrinsic' component in schizophrenia does not, of course, rule out 'extrinsic' influences, i.e. factors additional to any psychobiological model that might be constructed. How any disabled person reacts to impairment, whatever its nature, will depend partly on him or her and on circumstances.

In some people with schizophrenia, perhaps 10% according to Bleuler (1978), the disorder is so severe and overwhelming that recovery never occurs. Extrinsic factors mean little in such cases. In 20–25%, recovery occurs within 5 years anyway. In the majority of cases it matters a great deal what the environment is like and those afflicted have to learn to live with schizophrenia much as one might have to live with diabetes or cancer or an amputated limb. This knowledge should be used as the basis for constructing services that will minimise the social disablement of people with schizophrenia and provide them with the highest quality of life possible.

Conclusion

There has been no fundamental discontinuity in the development of theories and methods of investigation of negative symptoms nor of their relationship to positive symptoms. Recently introduced non-invasive methods of examining brain structure and function allow better tests of biological theories and deserve to be exploited to the full. Such preoccupations should not, however, exclude consideration of how putative causes and pathologies may influence the two-way interaction between host and environment. Brain, thought and behaviour can each be isolated and studied in fragments but scientists cannot be satisfied until they understand the links between all three within their social context.

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