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**EVALUATION OF A BEHAVIOURAL
TREATMENT PROGRAM FOR DEMENTIA**

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ABSTRACT

While behaviour modification has been used to manage behaviour disorders associated with intellectual disability in children for many years, its use in determining the effect of the social environment on institutionalised older adults is far less prevalent. This paper reports on an intervention trial to treat inappropriate vocalising in severely cognitively impaired psychogeriatric patients, its evaluation and its theoretical underpinnings.

Evaluation of a Behavioural Treatment Program for Dementia

1 Introduction

Basic research into the design and evaluation of health programs can have far reaching effects on the improvement of health services in Australia. Progress may be made in improving services not only by conducting macro-evaluations, but also by examining the theoretical underpinnings of health programs, isolating components of the programs and evaluating the components on a small scale. The present paper discusses the theoretical basis of a health program used to manage senile dementia. It outlines an intervention trial being conducted and discusses the contribution of cognitive theory to explaining the success or otherwise of the program described. Programs such as the trial being investigated have the potential to improve dementia services in a similar way to the changes that behaviour modification programs brought to the management of mental retardation in the 1960's.

What learning can take place during the development of senile dementia? We¹ are planning an intervention trial in which the aim is to reduce behavioural disturbance in severely demented elderly people through the use of behaviour modification techniques. This is an unusual trial. Very few reports have appeared in the literature in which behaviour modification techniques have been used to treat disturbances found in demented people. When one considers the analogous changes that were made to the management of intellectual disability following the refinement of these techniques, the trial has important implications for the management of dementia in general.

The present paper describes work in progress. I would like to be able to link the results of the trial in progress to a theoretical explanation for learning in dementia. In this paper, I would like to raise for discussion current theories of cognitive decline and cognitive plasticity in normal ageing and ask how can they help in explaining the information processing during the progression of dementia? Before doing that, I will

¹This work is being carried out in collaboration with Professor Daniel O'Connor, Department of Psychological Medicine, Monash University.

briefly describe the intervention trial.

Senile dementia is a degenerative brain disease which consists of loss of memory, intellectual decline and decline in the ability to carry out activities of daily living. In the early stages of the disease, those afflicted may remain in their own homes with appropriate care and support, while as the disease progresses, long-term residential care is eventually required. More than half of nursing home residents in Australia are thought to have some form of cognitive impairment attributable to a dementing disease (Snowdon & Donnelly, 1986). A proportion of these people show marked behavioural disturbances, which are distressing to carers and other residents of long term care, and are often resistant to standard drug treatments. Some of these people are so disturbed and disturbing that they must be admitted to special psychogeriatric units. Behaviour problems include continual noise-making, aggression, inappropriate voiding, wandering.

The intervention trial in progress examines the usefulness of behavioural management techniques in reducing behavioural disturbance. If these techniques prove successful, disturbed elderly persons could be cared for more effectively, without recourse to heavy sedating medications.

The trial is concentrating on one problem behaviour associated with dementia, that is, excessive noise-making. This can include continuous seeking out attention of carers, running commentary, stereotyped excessive noises such as whistling etc. This type of behaviour is common, can be very distressing to carers, and, more pragmatically, is suited to the experimental paradigm and will not place the research nurse/observer in any danger. The hypothesis being addressed is that excessive noise-making behaviour is contingent on the social or physical environment of the patient. We are testing this hypothesis by borrowing some standard techniques from behaviour modification.

Subjects

Subjects will be elderly, moderately to severely demented residents of a psychogeriatric interim care ward. The reason for hospital admission is usually that behaviour disturbances prevented their care from taking place elsewhere. Subjects are assessed on admission, which entails neuropsychological assessment if the client is testable, physical checkup, screening for depression etc. More easily remediable causes of the disturbance have usually been removed, such as urinary tract infection or acute confusional states, and the behaviour disturbance continues to be intractable to standard medical treatment.

Permission to engage the residents in the clinical trial will be obtained from the relevant Ethics Committee, residents' advocates and staff of the ward. Subjects will be observed if permission is granted and they meet the inclusion criteria of, first, a diagnosis of moderate to severe dementia and, second, presence of the behaviour disorder in question i.e., noise-making.

Procedure

Behavioural interventions are already tried occasionally in an *ad hoc* manner by psychogeriatric staff. Staff have noted that behaviour disturbances occur more frequently under certain conditions, although they have not tested their clinical

observations. The interventions being tried here are social reinforcement of alternative behaviour, music, and physical movement. These interventions are being used initially to save staff from having to learn completely new treatment as well as new schedules of reinforcement for their patients. A conservative, staged approach to the research question will be more palatable to nursing staff involved in the research, and is more ethical than introducing new interventions without first evaluating current management practices rigorously.

Stage 1

To determine the best method of demonstrating the effect of social treatments tried by staff, an observation-only stage is proposed. Each subject will be monitored informally in the ward setting to help decide on the most appropriate time frame for the intervention trial. The aim of this stage is to test methods of collecting baseline observational data in the subsequent intervention trial stage.

An ethnographic description of the surroundings of the patients when they are engaging in the excessive behaviour will be made, detailing the setting, number of people present, time of day, and context and consequences of the behaviour. After analysis of these data, a procedure for collecting baseline data will be designed according to the frequency and duration of the target behaviour.

Stage 2

In this stage, individual intervention trials will be tailored for each individual case in the trial. A formal experimental trial will be designed for each case study. The dependent variable is the frequency of occurrence of the behaviour over a set time period. Ward staff will carry out the intervention. The behaviour will be monitored at set time intervals during a baseline period, throughout an intervention period and again at followup. A registered psychiatric nurse-researcher will observe behaviour on the ward at predetermined time samples.

Data on the frequency of the target behaviour under baseline, intervention and return to baseline conditions will be used to test the effect of the intervention on the behaviour over time.

What evidence is there that this trial might work? Following is a summary of the literature relevant to an evaluation of this trial.

Evidence that the environment influences behavioural symptoms of dementia

This trial is challenging the view that behaviour disturbances and the loss of function seen in dementia are completely organic in origin and so cannot be altered by the environment. Much of the current work on the aetiology of dementia is based on this assumption. For example, Gilley et al (1991) tried to establish what the predictors of behavioural disturbance in Alzheimer's Disease are. They looked at disease severity, age at onset and presence of extrapyramidal symptoms (stereotyped reflex muscular movements) as possible predictors of behavioural disturbance. What they found was a weak relationship between behavioural disturbance and disease progression, which had to be qualified by the extent of heterogeneity found in the sample. As subjects were community dwelling, it is possible that environmental factors were contributing to the heterogeneity of presentation of symptoms found in the sample of subjects.

Little research attention has been given to behavioural symptomatology that occurs with senile dementia (Reisberg et al, 1986). Carstensen (1988) has suggested that neglect of behavioural symptomatology has occurred because such symptoms are considered secondary to disturbance in cognitive functioning and consequently as irremediable: that is, if learning is impaired, then behavioural intervention would yield little gain. Only a handful of studies have attempted to examine this proposition.

Correlational studies suggest that social isolation may exacerbate the problem behaviour. Cohen-Mansfield et al (1990) reported two studies of noise-making in nursing home residents. They found that five demented residents called out most during the evening, on weekends and most when they were alone, followed by when they were being touched. Music seemed to influence calling out, since residents calmed down when music was played, suggesting that music therapy may be an effective management technique.

Nilsson et al (1988) found that social reinforcement was successful in treating aggressive behaviour in dementing psychogeriatric patients. However, they were unable to attribute the success of their therapy to a specific component of the program, since it appeared that there was a Hawthorne effect, systematic observation of the patients by the staff resulting in a reduction in patient aggression. They suggested that nursing staff may have learned patients' individual aggression patterns and avoided provocative elements in their care.

Operant training techniques have been moderately successful in remediating some skills lost during the course of dementing illness. Green et al (1986) were able to modify the verbal behaviour of two mentally impaired elderly men through the use of operant techniques which were taught to their spouses. Hussian (1981) illustrated that changes in wandering and self-stimulatory behaviours could be elicited through manipulation of the environment, using stimulus control and operant techniques. In another report, Hussian and Brown (1987) reduced escape-seeking behaviour in demented patients to near-zero rates. Other researchers have found similar results. Using a multiple baseline design, Rosberger & MacLean (1983) effectively modified some target behaviours in a demented nursing home patient.

A study by Hussian & Hill (1980) is the only systematic observational study that I have been able to find of the effect of the environment on the behaviour of severely demented elderly. They made naturalistic observations of four long-term care patients. They found that barring limb restraints and gags, the only thing that interrupted ongoing behaviour was application of distractive auditory, visual or tactile stimulus. When this noncontingent, external stimulus was removed, the self-stimulatory behaviour returned after several seconds.

McEvoy and Patterson (1986) noted that demented patients can learn certain rudimentary skills as effectively as nondemented psychiatric controls, but more complex skills were beyond their capability. They suggested the conditions under which learning was most likely to occur were "...when physical practice was a large part of training, when feedback was received from many sensory systems, and when the least cognitive involvement was required" (p.487). With inappropriate verbal behaviour, which tends to be characteristic of moderate to severe dementia, it is difficult to see how physical practice could be incorporated into the learning process. Duchek et al (1991) showed

that demented subjects could learn a paired associate learning task if the material to be remembered was easy, i.e. made up of well-established associations in memory.

These studies demonstrate that while learning is impaired in dementia, it is not completely absent. Stimulus control, imagery and operant procedures have all been used with moderate success to ameliorate behavioural problems associated with cognitive impairment. However, the specific nature of learning deficits in dementia is still largely unknown.

On the basis of the above literature, behaviour problems can indeed be manipulated with social and behavioural techniques. However, systematic social interventions have rarely been tried in the management of dementia. There is some evidence that behaviour can be modified using operant learning techniques - how can we characterise the learning and memory capacity available at late stage dementia then? Most of the cognitive/experimental research into learning and memory in dementia has been carried out with mild to moderately demented elderly people, for practical reasons that most cognitive tests are not suitable for more severely demented people.

Theories of cognitive ageing and dementia

Finally, I would like to raise three theories of aging, and speculate on their applicability to pathological aging as seen in dementia.

(i) Plasticity

Baltes & Lindenberger (1988) suggested that the nature of cognitive aging involved a Janus-like character. Janus was a classical God with two faces. The two faces of aging according to them are continued plasticity (or modifiability of cognitive performance) accompanied by increasing limits to plasticity. At a theoretical level, they considered that the nature of aging of intelligence should be seen as an ongoing interaction between growth and decline. They suggested that,

"the possibility of growth is evident in the fact that most elderly possess a sizeable amount of reserve capacity which can be activated for new learning, refining and elaborating what is already available. The older organism is not a system whose primary feature is passive decay. This sizeable reserve capacity notwithstanding, however, the aging process entails also a definite loss in the range of plasticity; reserve capacity is reduced in magnitude. As a consequence, the adaptivity of the cognitive system of older persons is likely to be smaller..." (p.296).

What are the implications of this view for cognitive processing during the course of dementia? One could hypothesise that the effect of dementia is to reduce both absolute levels of performance and to narrow the amount of plasticity available to tap into in learning tasks. What type of memory processing does plasticity need though?

Does "plasticity" disappear completely? Available evidence would suggest that it does not.

(ii) Automatic vs. effortful processing

Age differences increase in magnitude as the cognitive task is made more complex, and dementia has an interactive effect on this phenomenon. Jorm (1986) postulated that the distinction between automatic and controlled information processing may be helpful in

describing the nature of cognition in dementia. Automatic encoding is presumed to require little or no attentional capacity, to occur incidentally, without intention, and to be unaffected by age, practice, or concurrent processing. For example, the encoding of stimulus attributes such as frequency of occurrence and spatial location is thought to be genetically "prewired" and thus encoded automatically. The type of encoding required in classical conditioning and operant learning might be considered to be automatic. On the other hand, effortful processes require allocation of attentional capacity for encoding to occur.

Hasher & Zacks (1984) suggested that capacity constriction occurs with age and that such constriction limits elders' ability to effortfully encode, but not their ability to automatically encode. Jorm (1986) suggested that capacity constriction may also occur to an extreme in the later stages of dementia, such that even automatic processes will be impaired. Rohling, Ellis and Scogin (1991) tried to test this hypothesis using encoding of frequency and spatial location as indications of automatic encoding. They found that demented subjects were impaired in automatic encoding compared with normal elderly subjects and college students. Others have found similar results, with dementia patients performing poorly on both automatic and effortful encoding.

Therefore theoretically the course of dementia is characterised by, initially, effortful processing being impaired, and in later stages automatic processing being impaired as well. Cognitive impairment in every aspect of processing ties in with the global tissue loss seen neurologically. This is not a particularly insightful account of the progression of dementia, though. How could the very basic level of functioning characteristic of late-stage dementia be explained?

(iii) Altered input processes

More complex tasks disadvantage the aged disproportionately. Considering the reverse, the effect of age and pathological ageing is at its smallest with the simplest of tasks, which require the least amount of higher order processing. A final, less developed theory is that not only are central processes impaired but input processes become damaged in late-stage dementia. In that case, at the very lowest level of functioning, there may be reduced sensitivity to environmental stimuli and the environmental cues that previously controlled behaviour. Hussian (1985) suggested that in late-stage dementia, behaviours such as stereotyped repeated movements or repeated noises similar to those seen in autism can be explained as being self-stimulatory due to a lack of ability to process normal incoming environmental stimuli. Then the repetitive stereotyped movements are self-contained input and sensory reinforcement. Maybe more parallels with work on severe intellectual disability or autism would yield a better explanation for behaviour in severe to late-stage dementia.

Conclusion

Cognitive theory does not deal with change over time very well, so it is not surprising that theories to explain the diminishing cognitive abilities of someone with dementia are so inadequate. We are only just beginning to see studies which describe the course of dementia over time. This intervention trial is pooling behavioural gerontology with what we know about pathological memory processing. Further evaluations in this area should continue to take into account theoretical knowledge of the aetiology of dementia and experimental evidence of plasticity.

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