THE EFFECTS OF CHANGE OF ENVIRONMENT ON DAYTIME INCONTINENCE IN PROFOUNDLY MENTALLY HANDICAPPED ADULTS

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INTRODUCTION

In recent years there has been a marked increase of interest in the problems of incontinence among the mentally handicapped. Most of this research has been devoted to investigating toilet training methods for this population (e.g. Azrin & Foxx 1971, Smith 1979a). Also, recently, much emphasis has been placed on trying to improve the living situations of mentally handicapped residents on hospital wards and elsewhere. The underlying reasons for these attempts to improve the general environment have, quite rightly, been largely humanitarian in nature. Not surprisingly, therefore, there is relatively little hard evidence of the effects of such improvements on the lives of the mentally handicapped residents themselves. However, in a study involving hospitalized patients suffering from senile dementia, Melin & Götestam (1981) have shown that straight-forward rearrangement of ward furniture and mealtime routines can have a significant effect upon communication and eating behaviours.

The aim of this study was to observe and record the incontinence behaviour of the same group of profoundly mentally handicapped adults in two different ward environments. There is little or no discussion in the literature concerning the effects of such problems as overcrowding, boredom and poor amenities on incontinence behaviour among the mentally handicapped, although it seems likely that these might have important repercussions both on incontinence and on the success or failure of training programmes. It also seems reasonable to speculate that rate of incontinence may be one indicator of an individual's well-being and that in addition this may be affected by the general ward environment. Some aspects of the effects of available space, such as dominance and agression, and the way in which space is used by the hospitalized mentally handicapped, have already been documented, (Palluck & Esser, 1971 (a) & (b); Esser 1973; Rago, 1978). Indeed, Hereford *et al.* (1973), present some evidence that increase in available territory may lead to a decrease in nocturnal wetting and soiling, in nine profoundly handicapped adult males. There is basically, however, a paucity of discussion on the relationship between the issues of incontinence and environment. For a review and discussion of the available literature see Smith, 1979 (a).

The opportunity arose to observe directly the effects of different environments when three wards, accommodating profoundly mentally handicapped adults were decanted into a temporary Portakabin unit while their own wards were being modernised. Conditions in the decanting unit were generally agreed to be poor. Three wards occupied a unit designed for one; there was only one overcrowded dormitory; one large dayroom; two baths; eight toilets; one quiet room and no staff room. The three wards, totalling nearly 40 residents occupied this unit for 15 months. The general environment appeared to be bleak and uncomfortable for both residents and staff. Meanwhile the three original wards were intensively modernised based on careful planning. They were extended in size and more attractively furnished. The bathroom and toileting areas were refurbished and considerable thought seemed to have gone into an attempt to create a more pleasant and manageable environment. The residents had access to a comfortable quiet room and the

homes backed onto a large enclosed playing field where they had swings and larger outside toys. Because there was a more manageable ward routine there were more toys and games available on the wards that were simply not practical on the decanting unit where overcrowding caused problems of supervision and safety.

This study attempts to compare the frequency of urinary incontinence in both environments for the group as a whole, and also to examine individual incontinence behaviour over the two situations to investigate any individual variation.

METHOD

Data were collected over a period of four weeks on both the decanting unit (phase 1) and later on the original wards (phase 2). Hourly pants checks were carried out over an eight hour day (9 a.m. - 4 p.m.) Monday to Friday. Any additional wetting accidents were also recorded. Note was made of any special circumstances such as sickness, fits, fire drills, etc.

From the 40 residents, 24 who were known either to be incontinent or who had been incontinent at least occasionally in recent years were observed. From this group 9 individuals never wet once during the study, one wet once in each phase, and one had to be excluded due to prolonged illness. The final count of 13 included 6 females and 7 males.

Recording for phase 2 was not begun until the residents had been settled into their new wards for six weeks, thus assuring that we did not simply pick up any 'honeymoon' effect.

RESULTS

1. GROUP RESULTS

(a) General Comparisons

Table 1

Weekly wetting totals Phases 1 and 2.

Week	*Phase 1*	*Phase 2*	*% Reduction*
1	95	69	27
2	87	61	30
3	110	60	45
4	87	70	20
	379	260	32

As can be seen from Table 1 there was a substantial reduction in wetting accidents after the move back to the original wards. Analysis of variance, (one-factor, repeated measures, two levels), on the two sets of scores from all subjects in both conditions revealed a significant difference between the two sets of scores at the 1% level. It was also consistent with the belief that there was a significant difference between individual people ($p = 0.1\%$). See Table 2.

Table 2

Analysis of variance-source of variability table.

Source of Variability	*Sums of Squares*	*df.*	*Mean Squares*	*f*
Stimulus effect	553.7	1	553.7	12.4
Subject effect	9847.4	12	820.6	18.4
Error	535.1	12	44.6	

(b) Distribution of wetting accidents during day

In order to investigate any possible patterns of daily distribution of wetting accidents, the data were plotted by time of day. Totals of hourly checks and accidents occurring during each hour of the day were totalled and plotted for each of the two ward situations. Figure 1 shows the total wetting frequencies separately for the 2 phases, smoothed using an unweighted 3 point moving average. An increasing trend in both phases for incontinence, over the daytime period, can be clearly seen. The variance is reduced here by smoothing, but the trends are still evident in the raw data and for the separate weeks within the study. There also appears to be a sex difference in this trend for both phases. Inspection of the data for males and females separately shows a distinct difference between the peak wetting times. Females' wetting accidents seem to steadily increase through the day with a peak on the last check, at 4 p.m., whereas the males tend to peak during mid-afternoon, around 2-3 p.m., (see Figures 2(a) and (b)).

Fig. 1: Frequencies of wetting accidents (smoothed) for time of day

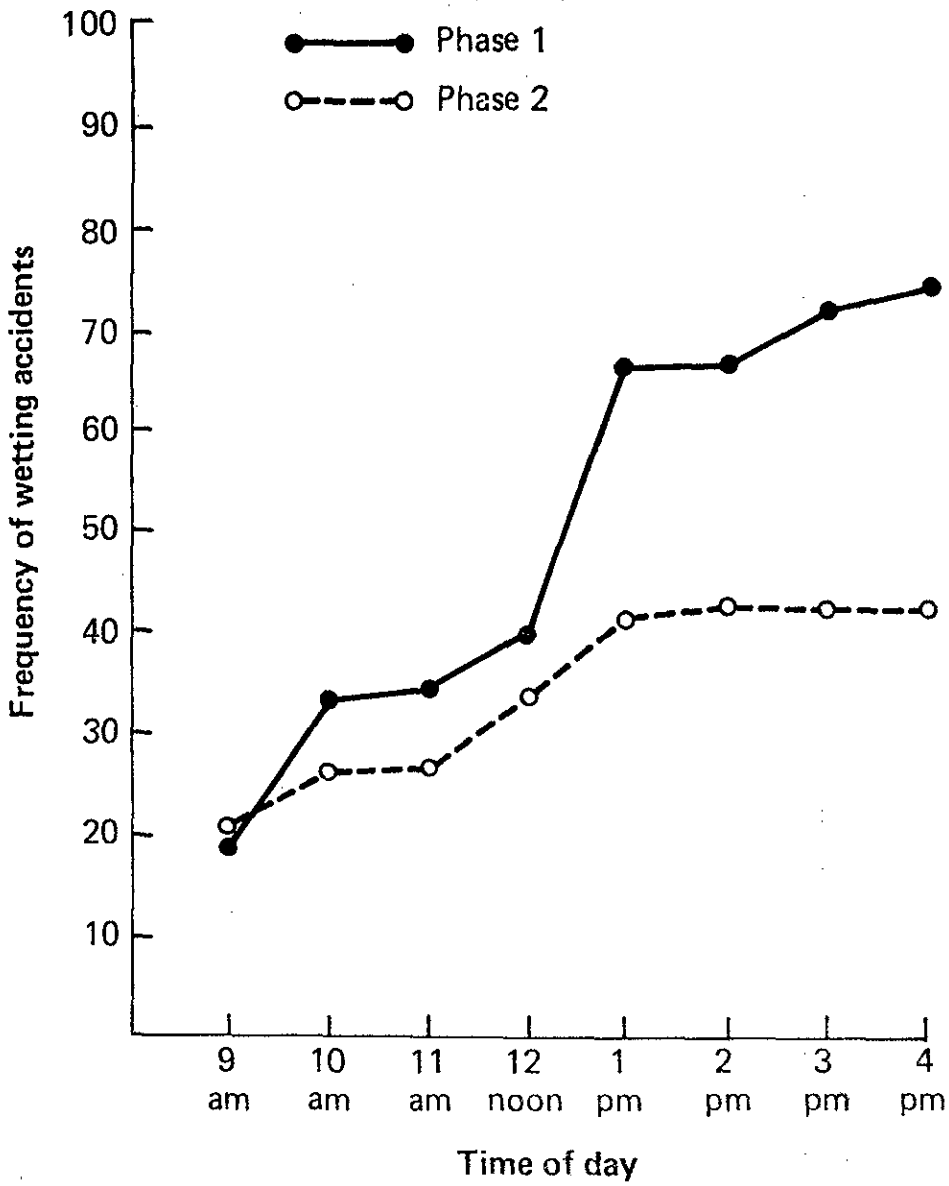
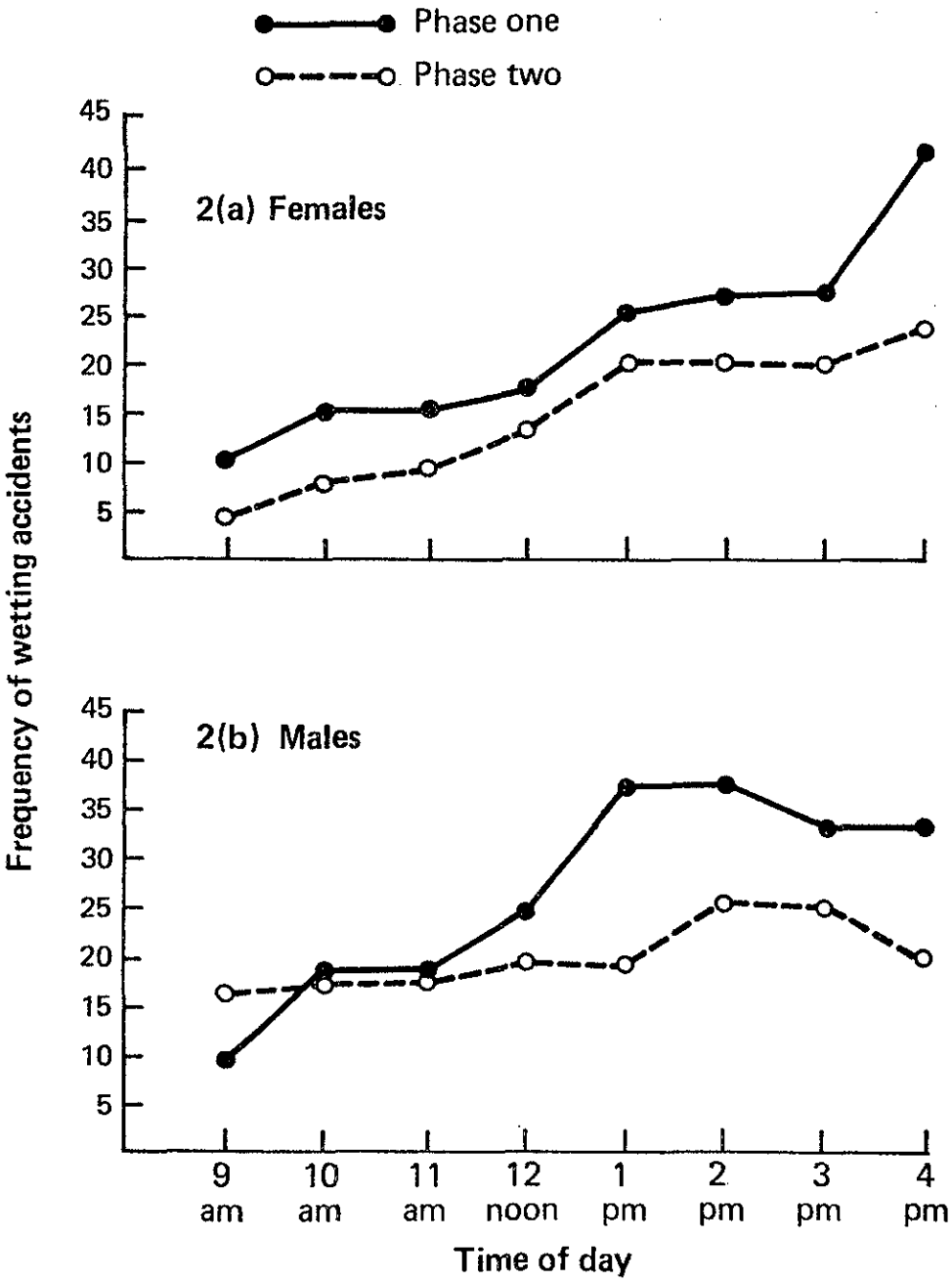


Fig. 2: Frequencies of wetting accidents (smoothed) for time of day for males and females separately.



2. INDIVIDUAL RESULTS

It is evident from a closer examination of the data that firstly, there may be individuals who contribute to the overall pattern of results more than others and secondly, that there may be interesting variations for individuals that are not apparent in the group data.

Table 3 is a comparison of the total group scores with those of two individuals, one male and one female, whose total wetting scores are substantially higher than the others in their group.

Table 3

Proportions of two individual scores to respective groups.

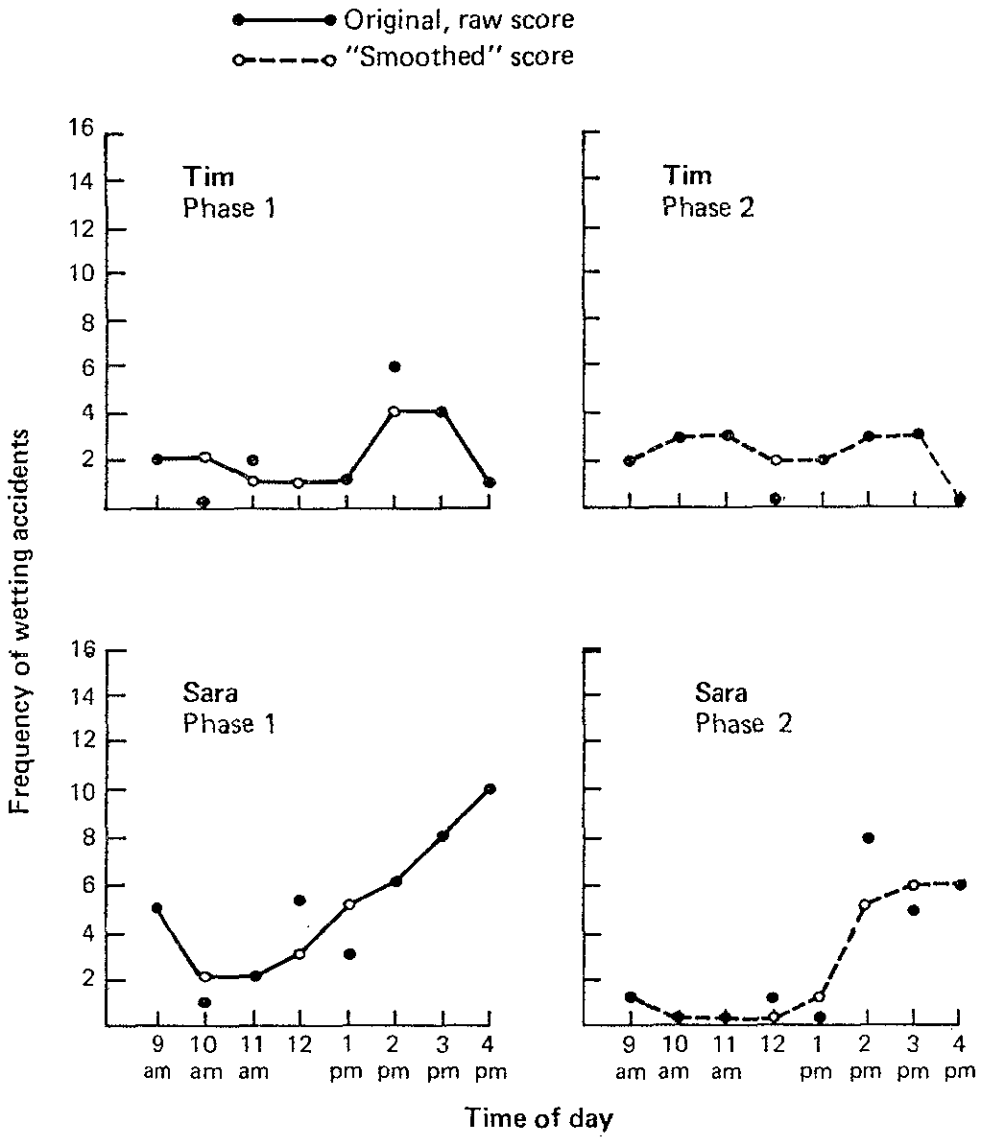
	PHASE 1		PHASE 2		TOTAL	
	Score	%	*Score*	%	*Score*	%
Sylvia	68		47		115	
		39.3		40.5		39.7
Females	173		116		289	
Jack	75		67		142	
		36.4		46.5		40.5
Males	206		144		350	

Sylvia and Jack are wetting at a similar rate and are both contributing to over one-third of their group's scores. They both showed a decrease in wetting frequency in phase 2 but do not appear to be distorting the trend overall. Jack only shows the male trend in the second phase and Sylvia only shows the female trend in the first phase.

On examination of the individual scores it was noted that when these curves were smoothed and plotted over time of day, the total curve made quite distinct patterns for individuals which tended to be repeated, though at a lower level, on phase 2. Figure 3 illustrates this for two individuals, one male and one female. Over the whole group, four *out of seven males and five out of six females show the respective trends. In phase 2 it is* evident in four out of each group.

One female became continent quite spontaneously on moving back to the original ward, although she had started wetting rather suddenly while on the decanting unit about six weeks before they moved.

Fig. 3: Frequencies of wetting accidents for two individuals



DISCUSSION

The observed results in this study fall broadly into two main categories — those directly related to the two ward environments and those that are associated with individuals and are not direct consequences of one or other environment. Both categories are relevant to the planning of toilet training programmes generally and raise important questions regarding the issues of group versus individual training and also different methods of training, e.g. regular potting schedules or timing techniques.

Timing techniques, based on the method of training outlined by Ellis (1963), involves determining the time at which an incontinent event is likely to happen and toileting around that time; whereas regular potting schedules are based on toileting the individual at regular, arbitrarily set intervals of time. In a small study comparing these methods Smith (1979(b)) found no significant difference between intensive regular potting and timing methods.

Some findings from the present study, however, may indicate that timing techniques make sense in terms of making use of what appears to be a pattern of incontinence already present in the individual and that this cycle varies considerably from one person to another. Naturally, this has implications for the question of group or individual training. Clearly such a method would be preferable in an individual training situation. Although Smith found no significant difference between timing and regular potting techniques in the individual training he did not base the programmes on established patterns of incontinence for each individual such as those in Figure 3. Nor does there appear to be, in any of the published papers that purport to use such a timing approach, any data that demonstrates how incontinence was predicted and, of equal importance, with what accuracy. This does seem to be an important consideration in any evaluation of the two techniques. It can be seen however, that while there do appear to be some replicable patterns of incontinence the probability of it occurring at a particular time is still relatively low. For example, for the two individuals in Figure 3, the highest frequency of incontinence in a 20 day period recorded at the hourly checks is 10 for Sara and 6 for Tim. This gives probabilities of .5 and .3 respectively, at their highest. It is questionable whether such a likelihood is useful in learning terms for a mentally handicapped person, apart from the issue of immediacy with the hour long time interval involved! In this instance the main finding of interest is simply that incontinence is more frequent in afternoons than in mornings. Where staff and time are limited for training programmes it may be more useful to concentrate more heavily on training in the afternoons.

Relatively little account has been taken in the past of the effects of a poor environment on the mentally handicapped. This study set out to observe the effects of change of environment on one behaviour — that of urinary incontinence. Two assumptions are included here: the first is that level of incontinence may be, in part, an indicator of a person's well being or an expression of anxiety/distress; the second is that this behaviour may be affected by general ward environment. If we look at the results of this study in terms of these assumptions then it becomes clear that even profoundly mentally handicapped adults who have been living in an institution for an average of 23 years, are responding to an environment in an observable and measurable way.

It would be a mistake, however, to see this change in behaviour in over-simplified terms. There may be, and probably are, all kinds of possible contributing factors: increased efficiency in ward management; improved staff morale resulting in increased interaction with residents of a nature other than simply caring for basic needs; less boredom due to availability of toys and pastimes; and generally less noise and more space. As a purely subjective observation the residents seemed much calmer and less withdrawn during phase two.

Although this study was carried out within a large hospital setting, and the findings are consistent with the view that improving ward conditions leads to measurable improve-

ments with respect to continence, this study need not logically be interpreted as lending support to the view that profoundly mentally handicapped adults are necessarily best cared for in large hospitals. Felce *et al.* (1980) have used measures of engagement to study the quality of life for severely mentally handicapped people living in different types of residential facility. Engagement is defined as the percentage of time spent on specific activities or interacting with people, materials, and so on. Higher levels of engagement are reported in locally-based residential units than in traditional mental handicap hospital settings. Engagement has also been used in a variety of settings to measure the effects of activity periods and training programmes implemented under the room manager procedure (e.g. Porterfield *et al.* (1980)). Thus more general aspects of behaviour (engagement) and very specific behaviours (incontinence) in the mentally handicapped may be improved both by general changes in living conditions, and the introduction of structured teaching programmes.

The study does, however, leave other important questions unanswered and requires further investigation. The intriguing trends that emerged such as frequency of incontinence increasing during the day, need verifying and preferably should involve 24-hour recording and monitoring of fluid intake. There seems to be no adequate explanation for the sex difference in this trend at present; the difference cannot be accounted for in terms of different toileting schedules, as similar toileting times were adhered to for both males and females. Also the sexes were integrated on the ward in phase one but on separate wards in phase two. Gender difference is well established in nocturnal enuresis and is cited as evidence commonly used to support a maturational view of the disorder. The time-of-day trend from this study, however, is a rather different issue (Kolvin and Taunch, 1973). Alternatively, a possible avenue of investigation may involve studying bladder function in males and females independently.

In conclusion, the evidence presented here on the effect of a different environment on daytime incontinence rate is consistent with the view that incontinence is a behaviour that is open to manipulation by the environment. This is sufficiently well established in one sense by the increasing use of operantly based toilet training programmes. However, in hospitals and other residential facilities for the mentally handicapped it is important to know how much improvement can be attributed to general changes or improvements in environment alone, and how much can be attributed to, or is appropriately dealt with by, specific training programmes.

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