

TEACHING DRESSING SKILLS TO THE SEVERELY MENTALLY HANDICAPPED: A COMPARISON OF INTENSIVE AND NON-INTENSIVE STRATEGIES.

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A recent review of the literature on operant approaches to self-help skill training (Westling and Murden 1978) indicates that the teaching of dressing skills to the mentally handicapped has received comparatively little attention in the literature. A number of critical variables have not been subjected to experimental scrutiny and there is such a wide variation between studies in terms of target behaviours, training techniques and assessment measures that few conclusions have been reached as to the most effective approach to establishing this complex group of skills.

One of a number of important issues which merit investigation and upon which studies differ, concerns the intensity with which self-dressing skills should be taught, that is the length and temporal distribution of training sessions. This issue has potentially important implications for the rapidity with which the skills are learned and for the amount and availability of manpower required to undertake the training.

A number of studies (Bensberg, *et al.* 1965, Minge and Ball 1967, Ball *et al.* 1971, Martin *et al.* 1971) suggest the use of short training sessions, fifteen to thirty minutes in duration, once or twice daily, over periods of several weeks or even months. Watson (1972) has suggested that eight to twelve months of training may be required to attain full competence in self-dressing skills. In these studies training is as a rule undertaken at those times of day when dressing and undressing usually occurs. Backward and forward chaining strategies are used together with subject determined response contingent reinforcements.

The study by Minge and Ball (1967) for example describes the training of six profoundly mentally handicapped subjects. During a two month training period each subject underwent two fifteen-minute training sessions daily, receiving approximately thirty hours of training in all. Significant improvement in dressing skills was reported when compared with baseline levels of performance and the performance of an untreated control group.

In contrast to these studies Azrin *et al.* (1976) describe a programme of more intensive training involving sessions of between two and three hours in duration several times daily. An average of twelve hours distributed over three or four training days was required to teach each of seven profoundly mentally handicapped adults to dress and undress themselves. By the end of the training period they achieved 90% success on a 'standard test' compared to a baseline measure of 7%.

The time taken to establish dressing skills in this study is impressive when compared with previous work. However there are a number of procedural differences between this and previous studies which make it hazardous to attribute its results to the intensity of the training alone. The aim of this study is then to investigate the role of intensity of training that is the temporal distribution of training sessions in the teaching of self-dressing skills.

The following hypotheses were investigated:

1. That significant improvements in target dressing skills will be made following both intensive and non-intensive modes of treatment.

2. That there will be no significant difference between intensive and non-intensive training as measured by improvement scores on an assessment of dressing skills.

A further aim of the study was to investigate the extent of generalisation of training from trained to untrained steps within an item of clothing and from one item of clothing to another, although no specific hypotheses were made in this connection.

METHOD

Subjects

Twelve people, residents of a mental handicap hospital participated in the study. Their mean chronological age was 21.1 years (range 9.3-29.4 years). Average length of institutionalization was 14.3 years (range 1.5-28 years). Their social ages on the Vineland Social Maturity Scale (Doll 1965) ranged from 1.3 to 3.2 years and mental ages on the Merrill-Palmer Scale (Stutsman 1965) ranged from 1.5 to 2.6 years. All were ambulant. None had physical handicaps which would have hindered progress in training. None were able to dress or undress themselves independently.

Familiarisation Period

Prior to training, each person was seen by the trainer for five 'familiarisation' sessions of one hour's duration, over five days. During this time reward preference ratings and attention assessments were carried out, and time was spent playing with the people in the training area, to gain their confidence and provide a positive social environment in which training could take place.

Reward ranking followed a similar procedure to that used by Kiernan and Riddick (1973) using five types of edible reinforcement in a partitioned tray. Ten trials were given to each person and a latin square design was used to balance the order of item presentation. Since all people were able to establish eye contact on at least four out of five assessments there was no need for any to undergo attention training.

Design and Training Procedure

Each person received training in two out of three dressing skills, the utilisation of a within-subject multiple baseline design ensuring that one skill was always acting as a control. The three skills involved in the training programme were 'putting on and taking off pants (B1), vest (B2), and socks (B3)'. Training utilised a programme of backward chaining associated with prompting and fading, and the administration of positive reinforcement and 'time out' (where necessary). Training was undertaken on an intensive and a non-intensive schedule. Intensive training was undertaken over three days involving ten 10-minute sessions per day, running consecutively, with a five minute interval between each one. Non-intensive training was executed over a period of fifteen days, comprising two 10-minute sessions per day, one in the morning and the other in the late afternoon. The total training time was then the same for each of the schedules utilised.

The intensive/non-intensive training variable was applied sequentially to the teaching of each skill within the same person. Each person was randomly assigned to one of the twelve experimental designs. The choice of skills, i.e. allocation to be trained 'first' or 'second', gave six possible combinations, i.e. B1-B2; B2-B1; B1-3 etc. Six of the people received 'intensive' training for the first behaviour, and 'non-intensive' for the second whilst the remaining six people, using the same skill combinations, received the training schedules in reverse order.

Dressing-Undressing Assessment

Ten assessments were made throughout the pre-training, training and follow-up periods; A1 — Baseline 1; A2 — Baseline 2 (Post 'Familiarisation' Period/Pre-Treatment 1); A3 — After 10 sessions of Treatment 1; A4 — After 20 sessions of Treatment 1; A5 — After 30 sessions of Treatment 1 (Post-Treatment 1/Pre-Treatment 2); A6 — After 10 sessions of Treatment 2; A7 — After 20 sessions of Treatment 2; A8 — After 30 sessions of Treatment 2 (Post-Treatment 2); A9 — Follow-up 1 (six weeks after Treatment 1); A10 — Follow-up 2 (six weeks after Treatment 2).

The person was taken to his bed in the dormitory, and a chair provided. He was helped to undress until only his pants, vest and socks remained. An assessment was then carried out on each of the three target skills. Undressing was assessed first in the following order:

Pants (B1), vest (B2) and socks (B3). Each item of clothing was then laid on the bed, and the person instructed to pick up and put on (separate commands) each in turn, in the reverse order to the undressing sequence.

Undressing was subdivided into five steps. Dressing into six steps. Each step received a score of 0-5. 5 points for a verbal prompt only; 4 points if it was necessary to point at or touch the garment; 3 points for a physical prompt at shoulder level; 2 points for one at elbow level; 1 point for one at wrist level and no points if a full physical prompt was needed. The person's performance would then be allocated six scores, i.e. one for each item in the undressing sequence (maximum score/item = 25) and a score for each item in the dressing sequence (maximum score/item = 30), giving a total score of 165.

Special Features of the Training Programme

Training sessions were undertaken by one of the authors. The two 'most preferred' reinforcers were used throughout training with each person, and were alternated to avoid satiation. Initially a garment two sizes larger than the one usually worn was used. When a person had mastered the necessary skills for taking off or putting on this garment, it was replaced by one a size smaller so that there was a gradual approximation to the correct size. Sessions consisted of 20 trials and was always carried out by the person's own bed to provide consistent environmental stimulus conditions and maximise positive transfer of training. Before each training session the person was always required to perform the step prior to the one about to be taught, at which he had previously been successful. This enabled the trainer to reward him immediately before the session, to provide encouragement and motivation.

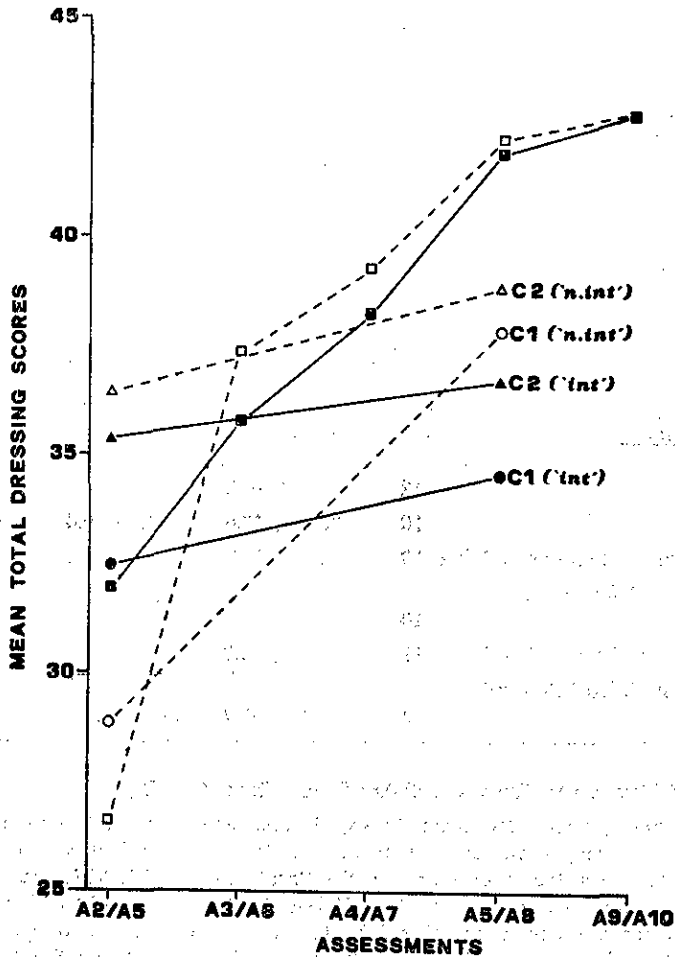
On the first trial in any session the trainer demonstrated the step and issued the relevant command. The content of subsequent trials was based on the subject's initial response. If successful, the same procedure was repeated in subsequent trials, until the person had obtained five consecutive successes. The trainer then proceeded to the next step. If the person failed the trainer gradually introduced prompting until a level of prompt was reached at which he was successful. When five consecutive successes were obtained at any level of prompting, the trainer commenced fading out to the next level of prompting, continuing training at this level. In each of the twenty trials the person was always required to perform the steps he had already mastered.

RESULTS

Competence in dressing skills was evaluated throughout both training schedules (A2-A8) and during a six-week follow-up period (A9/A10) (See Figure 1). In some cases, where further progress was not possible, i.e. where the people had achieved maximum scores of 55

on an item of clothing prior to the end of training, these results were excluded and the number of people upon which data was evaluated has been specified. For the purposes of analysis, control items were divided into two categories, i.e. 'true' controls (C1) which received no training at all and 'false' controls (C2) which acted as a control during one treatment period, but had previously or subsequently received training.

Figure 1



Level of Competence Attained in Total Dressing Scores During 'Treatment' (A2/A5-A5/A8) and 'Follow-up' (A9/A10) Phases of 'Intensive' (■—■) and 'Non-Intensive' (□-----□) Training. Progress made in Control Items (C1 and C2) specifies the Period of Training ('Int./'N.Int.') during which they acted in this capacity. Follow-up data for controls (C1,C2) was excluded due to its contamination by the sequential application of 'Treatments'.

The Familiarisation Period (A1-A2)

This period of non-intervention produced an average 'improvement' score of 2.25 points. Four people showed no changes in dressing skills at all, while a further six showed slight fluctuations of up to 10 points, which represented reasonable stability of baseline measurements. However one person showed an increase of 53 points on the second assessment, while another demonstrated a decrease of 42 points. The significance of these changes will be explored in the 'Discussion'.

The Relative Efficacy of 'Intensive' versus 'Non-intensive' Training

Statistical analysis using dependent t-tests showed that significant improvements were made in the target skills between pre and post training measurements, following both types of training. (See Table 1). An evaluation of the relative efficacy of the two schedules, in terms of 'improvement' scores, yielded non-significant results, although there was a positive trend in terms of the non-intensive schedule. Both hypotheses were then confirmed.

Table 1

Mean \pm standard deviation values of pre- and post-training dressing and undressing scores and the levels of significance (P) of progress achieved during training.

| Type of Training Applied to Behaviours | Number of Subjects (n=x) | Pre-Training Assessment (A2/A5) Mean \pm S.D. | Post-Training Assessment (A5/A8) Mean \pm S.D. | Significance of Change P |
|--|--------------------------|---|--|--------------------------|
| 'Intensive' | 12 | 31.9 \pm 14.2 | 41.9 \pm 10.8 | <0.01 |
| 'Non-Intensive' | 10 | 26.6 \pm 13.6 | 42.2 \pm 9.4 | <0.001 |
| Control (C1) during 'Intensive' training | 10 | 32.4 \pm 15.3 | 34.5 \pm 13.6 | N.S. |
| Control (C1) during 'Non Intensive' training | 10 | 28.8 \pm 17.3 | 37.0 \pm 12.6 | <0.05 |
| Control (C2) during 'Intensive' training | 11 | 35.3 \pm 13.7 | 36.7 \pm 13.3 | N.S. |
| Control (C2) during 'Non Intensive' training | 12 | 36.4 \pm 12.7 | 38.8 \pm 11.2 | N.S. |

Generalisation of Training to 'True' and 'False' Control Items (C1, C2)

Statistical analysis, using dependent t-tests, demonstrated that both treatments were more effective in bringing about positive changes in the target skill at which they were 'aimed' than in the item that was acting as the 'true' control (C1). This was significant at the 1% level for 'intensive' training and the 2% level for 'non-intensive' training. Although there was a trend for the 'non-intensive' training to show a greater degree of generalisation to the control item than 'intensive' training (t=1.45) this was not significant. However 'true' control items showed a mean (pre-post treatment) increase of 8.2 points, during 'non-intensive' training which was significant at the 5% level, while the changes brought about by 'intensive' training failed to reach significance. A three-way analysis of variance also showed that 'true' controls tended to show greater improvement than 'false' controls, although the F-ratio first failed to reach significance at the 5% level (this was presumably due to the size of the 'within-group' error term caused by the large amount of subject

variability). However, these results did indicate that there was no cumulative effect of the two treatments when applied sequentially.

Generalisation of Training within an Individual Skill

The progress made within a skill was divided into two categories, i.e. improvement made in the step(s) that had received formal training ('trained'), and the generalisation of training to other steps in the dressing or undressing sequence of that skill ('generalised'). Dependent t-tests indicated that behaviour that had undergone 'intensive' training showed significantly more improvement (P. 0.01) on trained steps. In contrast, 'non-intensive' training was not at all specific in terms of its efficacy, and improvements were evenly distributed between 'trained' and 'generalised' items. In fact there was a slight trend towards more improvements ($t = -0.73$) in those steps that had not received formal training.

Maintenance of Skills after Training

Dependent t-tests were carried out to assess whether any changes had taken place between post-training measures (A5/A8) and the six-week follow-up measures (A9/A10). In each comparison, within the separate treatment groups, the appropriate follow-up measure was used depending on the positioning of the treatment, i.e. first or second. Thus, a post-training measure at A5 would be compared with A9, and A8 with A10, giving a six-week period between the two measures in all individuals. No significant changes were found in the persons' level of competence in dressing skills indicating that, although the people showed no further progress during this period, the level of competence that they had attained by the end of each training schedule was maintained.

Other Experimental Variables

Statistical analysis, using dependent t-tests revealed that both treatments were effective regardless of the order in which they were applied, although the value of 't' (0.9) demonstrated slightly greater improvements during the 'first' training period. All dressing skills showed significant improvements (P. 0.01) during the periods in which they received training, irrespective of the type of 'treatment' (Intensive/Non-intensive) that was applied. B1 and B2 showed similar mean pre-training scores, while that obtained with B3 was significantly lower. However, it would appear that the initial assumption of the comparability of these skills, in terms of their level of complexity, is borne out, as a consequence of the similar levels of improvement attained in all three.

DISCUSSION

1. Intensive and Non-intensive approaches compared

This study was designed in order to allow single cases to be used, acting as their own control, whilst enabling results to be evaluated using group analysis. This approach effectively reduces the variability encountered in those group designs where matching of subjects cannot allow for the many variables which may influence the comparability of individual results. (Stanley 1967).

The study does however treat intensity of training as a dichotomous variable, the labels "intensive" and "non-intensive" used in an arbitrary manner. Intensity of training should ideally be considered as a continuous variable such that the behaviour serving as the dependent variable is observed as a function of its systematic variation. The levels of intensity compared in this study were chosen, within the limits of manpower and other resources, to approximate approaches used in previous work.

The results indicate that both intensive and non-intensive training approaches were effective. Each of the twelve persons demonstrated improvement in their level of competence in all three dressing skills, there being significantly greater improvement in the two skills trained than the skill acting as a control.

When intensive and non-intensive approaches are compared however, the non-intensive approach is seen to make the more substantial gains. The learning scores are higher and the effects show greater generalisation to control items. The effects of intensive training appear to be specific to the target skill at which it is aimed. Again within a target skill, non-intensive training is seen to be more effective in bringing about changes in steps that had received no formal training.

It should be noted that these results cannot be attributed to relatively more trainer time being devoted to intensive training. Each subject received ten hours of training, this time being divided equally between the intensive and non-intensive approaches.

This suggests then that the superiority of "intensive" training as advocated by Azrin and his co-workers (Azrin *et al.*, 1976) is questionable.

2. Generalization

In this study generalization was treated in a passive manner, that is no specific steps were taken to programme generalization between garments. However it was predicted that generalization would occur, in that newly established dressing behaviours would be elicited not only by the garments used in teaching but by other garments resembling them. Furthermore behaviours not directly taught but resembling those that were established, were anticipated to appear as a result of teaching. The results indicate that generalization both within and between skills did occur. It is not clear why non-intensive training should have been more successful than intensive training in this respect. Systematic replication (Sidman 1960) would be valuable in this instance to ensure that the outcome was not a function of minor teaching or situational variables.

3. Inter-individual differences in performance

Most of the baseline measurements (A1, A2) remained comparatively stable between recordings. The intervening "familiarisation" period did however have a marked effect on two of the persons. These people suffered from frequent epileptic fits and exhibited similar fluctuations in performance throughout training. The impact of frequent epileptic seizures and associated medication upon performance has not received the attention it deserves from researchers. However in a longitudinal study of the performance of profoundly severely and moderately handicapped children on object concept tasks, Wohlhueter and Sindberg (1975) reported that a number of their children, ten in all out of a total of 49, presented with variable performance. Substage levels appeared to rise and fall from session to session, ranging over as many as three or four substages, during the twelve or more sessions. The distinguishing feature of the variable group was that the majority of children had EEG abnormalities, especially dysrhythmias or a history of seizures. Clearly the presence of a history of seizures should be taken into consideration in selection procedures in future work.

The average improvement score of 2.25 points during the "familiarisation" period approximates the 3% improvement in "handling garments" reported by Azrin. This period was also useful for making general observations of individual persons. Many exhibited idiosyncratic dressing skills and it seemed inadvisable to change a particular behaviour sequence for the sake of programme uniformity. In consequence training programmes were sometimes modified to accommodate individual needs. An instance of this was the use of

modified garments. Modified garments were very useful during the undressing sequences, but the large apertures in oversized pants and vests caused confusion in the dressing sequence, e.g. attempts to insert heads into armholes and both legs into one side of a pair of pants. These difficulties necessitated a revision to normal sized garments for the dressing sequences.

There was marked inter-subject variability in results, tending to reflect the presence of epilepsy, difference in attention span and eye-hand coordination. In the absence of attention-span training it seems a remarkable achievement to have maintained each person's interest and attention for up to three hours at a time, without a break, as has been reported in the study by Azrin and his co-workers (Azrin *et al*, 1976) for instance.

Other studies in contrast limited training sessions to between fifteen and thirty minutes duration (Minge and Ball 1967, Martin *et al*. 1971). The utilization of ten minute sessions in the present investigation with five-minute breaks during "intensive" training, seemed to fall narrowly within the persons tolerance limits, as judged by the decrease in attentiveness which sometimes occurred toward the end of a training session.

Postscript

Approximately one year after the completion of the training programme, the dressing and undressing skills of the residents who participated have been re-assessed. Again no significant change has been found in either group. Four of the original group of twelve residents have now left the hospital to live in community houses, partly as a consequence of this and other habilitation efforts.

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