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Psychological Changes in Chronic Schizophrenics Following Differential Activity Programmes: A Repeat Study

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Introduction

The present investigation was carried out in order to check on the reliability of the findings reported in a previous publication by Hamilton and Salmon (1962). In this first experiment objective assessments were made of the effects on male chronic schizophrenic patients of three activity programmes: Industrial Workshop Therapy, Occupational Therapy and a control situation in which patients did not receive any specific activity therapy. The effects of these therapeutic approaches were assessed in terms of test scores and ratings, as well as output and earnings for those patients receiving Workshop Therapy. For patients undergoing Workshop Therapy a separate assessment was made of the effects of payment by result compared with flat-rate payment, and of co-operative work compared with working as individuals. The major findings of this study were that Industrial Workshop Therapy led to greater improvement than Occupational Therapy, that the greatest changes in behaviour occurred while patients were working individually and receiving a weekly flat-rate payment, that the behavioural changes in the Workshop group continued in the second, piecework, phase of the investigation, that piecework payments did not result in greater output than flat-rate payment, and that patients working in small teams compared with patients working as individuals, both under piecework conditions, showed greater all-round improvement on the indices used to measure it.

Procedure

Subjects

Compared with the first study the upper age limit for subjects was raised from 40 to 47, but retaining the lower age limit of 20, and somewhat greater care was taken to exclude paranoid schizophrenics. The patients chosen had to satisfy the criteria of at least two years' chronicity, and they had to be testable on the Mill Hill Vocabulary and Progressive Matrices Tests. Mentally subnormal, epileptic, or otherwise organically impaired patients were excluded, as were patients who were not educated in an English school, who were aggressive or unco-operative, or had other disqualifying social or clinical difficulties. The 27 subjects thus selected were significantly older and more chronic, and subjectively speaking more "deteriorated" than the patients who took part in the first study, and statistical comparison of the initial behavioural test scores of the two groups who took part in the first and the present, second, investigation showed that the Occupational Therapy and Workshop groups with which we are concerned here were both worse on 10 behavioural measures (significantly so on 4 and 5 tests respectively).

Design

The 27 patients were randomly divided into three equal groups, one subgroup being assigned to Occupational Therapy and the two remaining subgroups to Industrial Workshop Therapy. The degree of success in equating groups and subgroups for age, chronicity and the 13 behavioural measures is indicated in Table I. As in the first study, both Workshop subgroups were paid on a flat-rate basis during the first half of the investigation and on a piecework basis in the second half, and in the latter half the two Workshop subgroups worked as individuals and small teams respectively.

The design was thus almost identical with that of the previous study (Hamilton and Salmon, op. cit.) except for the omission of a control group, a shorter piecework phase of

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the investigation, necessitated by an unexpected reduction in the supply of work, and a different and more complex industrial task paid at an appropriately different rate. The task consisted of dismantling small Telephone Switchboards discarded by the Post Office, and of salvaging intact certain electrical units.

Tests

With the exception of the Bender Gestalt Test, the battery of tests and scales was the same as used in the previous study, i.e. Mill Hill Vocabulary, Progressive Matrices, the Similarities sub-test of the Wechsler Bellevue Intelligence Scale Form I, the Mutilated Pictures (Year VI) and Picture Absurdities I and II (Years VII and X) tests of the Terman-Merrill Binet Scale Form L (termed "Picture Absurdities"), modified versions of the Manual and Finger Dexterity sub-tests of the U.S.E.S. General Aptitude Test Battery, Visual and Auditory Reaction Time, the Cambridge Triple Tester yielding performance and goal discrepancy scores, Venables' Activity-Withdrawal Scale, Wing's Clinical Rating Scale, and a modified version of the Vineland Social Maturity Scale. All patients were assessed on three occasions: before allocation to groups, at the end of 12 weeks and after a further 9 weeks.

Discussion of Results

Most of the statistical calculations were carried out by means of CHLF 3 AUTOCODE programmes developed for the University of London's Ferranti "Mercury" computer. The test means and the changes during treatment for the experimental groups are shown in Table I.

1. *Comparison of Industrial Workshop Therapy and Occupational Therapy*

The only significant improvement occurred in the Workshop group, as compared with four significant improvements following this treatment in the first study. It is possible that a single significant difference may have occurred by chance, but the statistical probability of this event cannot be estimated because the comparisons are not all independent. It is also possible that the greater N alone of the Workshop group may have been responsible for obtaining the significant results for that group. Considering the trends of the changes for the two experimental groups on all the measures, it was found that the Occupational Therapy group improved on 10 of the 13 tests between initial and final assessments, while the Workshop group improved on all 13 tests. The statistical significance of these trends cannot be estimated, however, because, as before, we are dealing with results that are not all independent. A further possibility must be considered: that more significant and non-significant improvements occurred in the Workshop group because it started off at a lower level than the Occupational Therapy group. This contention can be

TABLE I

Test Means and Changes of Experimental Groups for 3 Test Occasions

Test Occasions	M.H.	P.M.	Sim.	P.A.	M.D.	F.D.	R T v	R T a	T T	G D	A/W	C R	Vine.	Age	Chron-icity	N's
Workshop (All)																
1	82·29	81·35	5·00	3·12	23·94	15·47	84·19	62·95	21·29	19·41	2·48	2·35	7·96			17
2	84·47	84·12	5·47	3·87	25·35	16·91	77·16	58·51	20·02	16·41	2·44	2·15	8·99	44·56	12·89	17
3	87·24	84·00	5·94	3·82	24·47	17·62	72·51	56·00	20·56	16·47	2·51	2·28	9·24*			17
Workshop (Individual Piecework)																
1	86·22	83·0	5·78	3·33	23·33	15·94	84·79	67·90	22·24	18·89	2·41	2·38	8·13			9
2	87·44	86·44	6·56	3·44	25·33	15·67	81·78	63·96	18·36	12·11	2·35	2·14	9·29	40·00	14·56	9
3	88·56	85·67	7·78	3·44	24·33	17·50	80·74	63·26	19·21	15·44	2·44	2·33	9·62			9
Workshop (Team Piecework)																
1	77·87	79·50	4·12	2·87	24·62	14·94	83·52	57·39	20·22	20·00	2·55	2·32	7·76			8
2	81·12	81·50	4·25	4·35	25·37	18·31	71·97	53·02	21·90	21·25	2·54	2·16	8·65	41·11	11·22	8
3	85·75	82·12	3·87	4·25	24·62	17·75	63·24	47·84	22·07	17·62	2·59	2·22	8·82			8
Occupational Therapy																
1	93·89	88·22	5·11	4·11	23·89	16·83	64·47	53·10	24·98	24·00	2·82	2·13	10·03			9
2	90·33	92·89	6·44	3·71	25·44	17·50	53·90	44·87	21·02	22·33	2·63	1·82	11·40	44·00	12·89	9
3	95·56	97·00	7·67	4·40	25·78	16·72	46·90	41·41	21·82	33·89	2·83	1·96	9·04			9

The better score is the larger score except in the case of Clinical Ratings, Visual and Auditory Reaction Times and Goal Discrepancy.
* Occasion 1–3 difference $p<0.05$, 2-tail tests throughout.

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raised because the negatively accelerated form of any learning curve describes greater changes at the lower than at the higher points of the curve for equal time intervals. This argument is difficult to support in the present context for two reasons. Firstly, the learning curves of chronic schizophrenics have generally a low gradient reflecting the lower speed of learning of this group of subjects, so that equal intercepts on the abscissa would be more likely to cut off insignificantly different increments. Secondly, this argument would predict smaller changes for the better of the two Workshop and the two Occupational Therapy groups in the two studies in terms of within-group improvements. The empirical findings, however, do not support such a prediction. While the present improvement trends are slight, they have now been found in two separate studies. When taken in conjunction with the direction of the significant differences in both studies they may be said to weight the available evidence in favour of the superiority of Workshop therapy.

The greatest improvements, considering all groups in both studies, were shown by the Workshop group of the first study. A closer analysis of the data indicates that the main differences between this group and the others are its lower age and chronicity, its greater social competence and its faster auditory reaction time. It is possible that the less marked degree of improvement in the Workshop group of the present study is partly a function of the length of the assessment period, in that improvements in a more "deteriorated" sample may proceed by smaller increments and thus take longer to reach statistically acceptable significance level, but this contention remains to be tested experimentally. An additional factor influencing the results of the present Workshop group is probably to be found in the more difficult work task undertaken by this group.

2. *Effects of Payment by Results and of Team Work*

In order to show a positive effect of payment by results the Workshop subgroup working as individuals during the second, piecework phase of the investigation should show greater output while on piecework than while working on flat-rate payment. This finding was obtained at a statistically acceptable level of confidence ($p<0\cdot02$) when output was calculated by correcting for absenteeism. Significant increases in actual earnings were, however, not obtained, because the piecework rate had to be made artificially low to prevent any patient—for administrative reasons—from earning more than £1 per week, and by comparison the flat-rate payment of 10s. per week was probably unrealistically high for most patients.

It is pertinent to argue that practice effect may have determined at least in part the significantly greater output under piecework conditions of the individuals subgroup. The reverse result was obtained, however, in the first study, in that the individuals subgroup had a lower output in the second compared with the first phase of Workshop activity. While practice effects could not be controlled in this study by a counter-balanced design, for reasons given elsewhere (Hamilton and Salmon, op. cit.), it would seem more plausible at present to explain changes in output in any subgroup in terms of specific and general behavioural and motivational variables.

On the assumption that both Workshop subgroups would be equally responsive to the introduction of piecework, the positive effect of team work should be shown by greater output by the subgroup of patients working as teams during the second, piecework phase of the investigation, compared with the subgroup on individual piecework. In this case, however, the opposite result was obtained in that the individuals subgroup produced significantly more than the teams subgroup ($p<0\cdot02$) with and without correction for absenteeism.

The results of the previous study were thus unsupported and in fact reversed: group work *did not* increase output, and financial incentive *did* increase it. Part of the explanation of this reversal of findings may lie in the behavioural test scores. In the first study the two Workshop subgroups were closely equated for behavioural levels and significantly better than the patients of the present investigation. In the present study the teams subgroup scored (non-significantly) lower on 8 of the 13 tests at the beginning of the study than the individuals subgroup, and clinically appeared more "deteriorated". This

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difference in initial levels is demonstrated by the significantly greater output ($p<0\cdot02$) during the first, flat-rate period of payment by the individuals subgroup. Considering the trends of behavioural changes in the absence of significant differences, it is seen that the teams subgroup scored worse on only 6 measures at the end of the investigation, and had thus drawn about level with the previously better group. Since both subgroups experienced equal incentive conditions, a small group effect may be hidden here after all.

The significant response, in the present study, to piecework incentive by the individuals subgroup only is more difficult to explain without citing one and possibly two individual patients in this group who responded exceedingly well to the procedure. The above argument appears, however, equally relevant here: that the availability of increased earnings (just as of social co-operation) has a smaller and slower effect on the more "deteriorated" patients. It is clear, however, that the general problem of the relationship between functional level of patients and the speed of re-learning any kind of skills as well as the appropriateness of different motivating and/or activating incentives urgently requires further experimental studies.

Conclusions

The results of the present replication study of the behavioural effects of Workshop activation as against the effects of Occupational Therapy were in the main consistent with the results of the first study, and it was possible to repeat the findings of trends favouring Workshop Therapy. On the other hand, as distinct from the first study, incentive responsiveness, when opportunity for increased earnings was made available was found in one Workshop subgroup though not in another. The present study did not show the previously found effect arising from team work. The findings, despite their replication, must be interpreted with caution because of the smallness of the groups and the brevity of the experimental investigation. The practical implication of the series of studies undertaken seems to be that it is well worth while to continue introducing industrial work into mental hospitals so that its effects may be assessed over a number of years on groups of differential clinical status, with a variety of incentive conditions over varying periods of time.

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