# Doctor of Clinical Psychology Degree

* **This volume was submitted in partial fulfillment of the degree of Doctor of Clinical Psychology**

# Examining the efficacy of sequencing cognitive rehabilitation: Towards a more theoretical grounding of treatment

and Research Portfolio

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Submitted in partial fulfilment towards the degree of Doctorate in Clinical Psychology.

Complete research case studies held separately within the University of Glasgow to protect patient confidentiality.

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August 1998.



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# Acknowledgements

I am very grateful to Mr Paul Flemming and Dr Ruth Gillham for their help in the early stages of designing, structuring, re-designing and generally tweaking my major research project. Other members of the Department of Psychological Medicine made helpful suggestions in the design phase for which I am also grateful. Many thanks are due to Ms Lesley Kraght, Manager of the Brain Injury Vocational Unit, and her staff for allowing me the space and facilities to run the study along with access to their clients. Ms Analise Stoddart from Glasgow Royal Infirmary and Ms Susan Crighton of Headway also gave invaluable assistance in identifying potential subjects for the study. Of course, the study could not have been run without the clients of the BIVU and Headway, to whom I am most indebted. Finally, thanks again to Paul for helping with the analysis when you were trying to get your PhD finished.

Numerous people have helped with other aspects of the research portfolio. Thank you to Mrs Lyndia Green and Professor Colin Espie for their supervision throughout the small scale service related project. Also I would like to gratefully acknowledge the contributions of my clinical supervisors to the respective single case research studies; Ms Susan Cross and Ms Maggie Aughton (twice).

Over the three years of the course I have received formal and informal help, advice and support from so many people that it is difficult to bring them all to mind now. A heartfelt, generic "thank you" to everyone. I would particularly like to thank Mrs Shiela Neilson (truly a legend in her own time!) for knowing absolutely everything, instantly whenever asked.

Finally Mum and Dad whose unconditional, unfailing love and support never ceases to amaze me. Thank you.

# Small Scale Service Related Project
# The Utility of an Individual Clinical Audit

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Prepared for submission to *Health Bulletin*

(see *Appendix 1.1* for contributors' notes)

# The Utility of an Individual Clinical Audit

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# The Utility of an Individual Clinical Audit


## Abstract

The utility of a systematic review of an individual clinician's data is compared with that of large-scale audits. It is suggested that, while large audits may inform the working practice of geographical regions, institutions or departments, only the individual $n$=1 audit can provide appropriate information to enable service planning and development at the individual level. The argument is illustrated through the $n$=1 audit of specific aspects of the yearly statistics of a Clinical Psychologist practising in the Lansdowne Clinic, Glasgow. The implications of discrepancies between clinical trends from large studies reported in the literature and those observed in the current audit are considered. Problems inherent in standardising small audits to permit comparison are examined, along with a call for publications of individual audits to reveal small or idiosyncratic trends in clinical practice that may be lost in large studies.

# Introduction

Evaluation of healthcare services in order to optimise the efficacy of resources is an increasingly important issue within the NHS. The strategic objectives and priorities of the NHS in Scotland[1] include improving the health of the people of Scotland by assessing need and improving the clinical and cost effectiveness of health care interventions. It is essential to assess and evaluate existing services to facilitate their appropriate development.

Assessment of service, or audit, is typically a sizeable project associated with the evaluation of geographical regions, institutions or departments - there being a noticeable lack of individual audit methodology or research in the available literature. However, a thorough $n$=1 audit should always be of benefit to the individual clinician. It could provide a clear picture of the particular needs of their own clinical population, enabling identification of specific areas of practice suitable for development.

A parallel may be drawn here between the viability of conducting group research or individual case studies. On the one hand, group research may amplify a relatively unimportant effect through sheer sample size or obscure significant changes in an individual. Whilst on the other hand, single-case studies may be decried as anecdotal. Newcombe and Marshall[2] suggest that the most important factor in determining what type of study to embark upon is, quite simply, the question you are trying to answer. In relation to clinical audit, an individual clinician wishing to assess and develop their own service would obtain the most valid information from evaluation of their own distinct patient population.

The current paper establishes the efficacy and presents a framework for an individual audit through a review of the yearly statistics of one Clinical Psychologist. While such a project produces large quantities of information, specific questions are highlighted in accordance with the interests and needs of the clinician. The appropriateness of the referral and patterns of initial and in-treatment non-attendance are considered in light of potentially improving these areas of the service.

An important issue in clinical practice for the referrer, the patient and the clinician is accuracy and appropriateness of referrals. While this has often been considered in relation to Psychiatrists in the research literature, it has been neglected in relation to Clinical Psychologists. Jones *et al*[3] noted that GPs consistently misinterpret psychiatric aspects of symptoms among a majority of patients. Brown and Trotter[4] noted that there may often be discrepancies between General Practitioners' (GP) referral and Psychiatrists' diagnosis. In particular they found, in an elderly population, that a substantial number of depressive illnesses were misdiagnosed as anxiety disorders or other functional illnesses by GPs. They recommended producing clearer guidelines for referral procedures and continuing efforts to improve communication with GPs. While a general survey of referrals to Clinical Psychologists may be useful, only the $n$=1 audit can elucidate the characteristics of the individual clinician's particular referring agents.

It is also of value to understand why patients do not attend (DNA) for their first appointments with initial DNA rates ranging from 15% to 75%[5]. Relationships between DNAs and younger age[6], Psychiatric as opposed to a GP referral[6], longer waiting times[7,8], urgency of referral, different geographical locations or GP practices will be examined. If it is possible to identify groups who have an increased chance of not arriving for their first appointment, it may be prudent to intervene early to facilitate attendance[9,10]. Attendance compliance may be increased through the use of reminder letters[11], pre-appointment telephone calls[12] or the provision of more pre-intake patient information[13,14]. Again, while a general review is informative, it cannot take into account the specific nature of the individual clinician's patients.

It is generally held that specific psychological disorders are associated with different levels of attendance when in treatment. For example, Sparr, Moffitt and Ward[15] noted that patients with post-traumatic stress disorder (PTSD) and/or substance abuse are significantly more likely than others to miss in-treatment appointments, while those with major depression are somewhat less likely to do so. However, general observations of large sample groups, possibly from different social and demographic environments, can have only limited utility in

informing the practice policy of the individual clinician. Sparr, Moffitt and Ward's sample group were from a military veterans hospital in America, a group quite distinct from the West Coast of Scotland civilian population in the present audit. If a relationship between diagnostic category and attendance pattern is observed, this may highlight the need for more time to be spent educating the patient about their particular disorder and treatment plan as well as anticipating potential difficulties.

## Objectives

To establish the efficacy of individual clinical audits. Particular questions pertaining to service provision - such as whether referrals are appropriate and whether patterns of initial and in-treatment non-attendance can be established - will be used to determine whether information from large-scale research studies can be generalised to the individual clinician's caseload.

## Design

The auditor and Clinical Psychologist derived the research questions from a semi-structured procedure. Broad potential areas of interest were outlined including: referring agent, referral, DNAs, description of caseload and treatment outcome. At this point rough research questions were suggested based on clinical observations and "gut feelings". These included such proposals as: whether high referrers are more or less accurate in their referrals than low referrers, whether demographic factors influence attendance, whether psychological problem affects attendance, what proportions of diagnosed problems were seen, whether certain problems took more treatment sessions on average than others, if there was a need for more group treatments *etc.* This led to a literature search to formalise research questions and place them in the context of previous findings. The literature search took into account: communication between referrer and service provider, accuracy of referral, DNAs, variable in-treatment attendance, efficacy of group treatment and issues around mental health promotion.

The referred problems and actual International Classification of Diseases[16] (ICD-10) diagnoses were coded according to the Effective Purchasing and Providing In the Community[17] (EPPIC, see *Appendix 1.2*) project formulatory categories to obtain a workable degree of uniformity.

These categories encompass the most commonly presented psychological dysfunctions, regardless of cause or contributory factors. One modification was made to this scheme, namely dividing the 'problems of emotion' category into 'anxiety disorders', 'depression' and 'other problems of emotion' categories. This is based on Brown and Trotter's[4] observation that there may often be a discrepancy between referral and diagnosis of particular affective disorders.

*Validation of Allocation of EPPIC Categories*

The allocation of GP referral and clinical diagnoses to the modified EPPIC formulatory categories was subjected to a test of inter-rater reliability. Every fourth to seventh (depending upon availability) referral letter and subsequent ICD-10 diagnosis was selected and rendered anonymous. They were presented to one Consultant Clinical Psychologist and one Trainee Clinical Psychologist, to balance for any bias introduced through experience or its lack, along with the EPPIC categories and a standard set of instructions to allocate the referrals and diagnoses to the categories they felt most appropriate. There was only an average degree of concordance between the different comparative pairs (see *Table 1* below) with concordance being higher for the allocation of EPPIC categories to the ICD-10 diagnoses.

| | Concordance on | | | | |
|---|---|---|---|---|---|
| | Referred Problem | | ICD-10 Diagnosis | | |
| Concordance between | Primary | Secondary | Primary | Secondary | Average |
| Auditor and Trainee | 60% | 37% | 87% | 40% | 56% |
| Auditor and Consultant | 63% | 30% | 60% | 73% | 56.5% |
| Trainee and Consultant | 50% | 40% | 67% | 73% | 57.5% |
| Average | 58% | 36% | 71% | 62% | 57.25% |

*Table 1: Inter-rater reliability concordance levels for allocation of EPPIC categories*

The discrepancies arose through differing clinical perceptions of the problems; for example of whether an eating disorder is an emotional or behavioural problem or should fall under the "other" category. Also, a number of instances of non-concordance arose through discrepancies as to whether or not a separate secondary referred or diagnosed problem actually existed.

Therefore, while this has implications for the analysis and interpretation of the coded categories no alterations were made to the original coding as, without clear guidelines for the use of the categories, it would be impossible to determine which interpretation was most valid. Also, categorisations were consistent within raters and so, while comparisons with other individual audits may not be reliable they may be so on the individual level.

### *Setting*

The Lansdowne Clinic is a Clinical Psychology out-patient department serving the North-East of Glasgow. It has five full-time and three half-time Clinical Psychologists and books around 6,400 patient appointments a year for approximately 1,200 patients. The catchment area in the current audit is in the extreme North-East of the city, an area of noted high unemployment.

### *Subjects*

All patients ($n$=155) referred to one Clinical Psychologist during 1995 were retrospectively included in the study. Patient details were obtained from the records of the Clinical Psychologist. Every fourth to seventh (depending upon availability) case record was consulted to verify the information obtained (there was 96.77% concordance). Sixteen case records were also obtained to fill-in missing information. The patients had a mean age of 36.65 years (SD=12.49, range 16.03 to 70.26 years). Of these, 59.35% were female (mean age=36.90, SD=13.10) and 40.65% were male (mean age=36.28, SD=11.60). The average length of time between referral and first appointment was 96.73 days (SD=44.06) with a range of 1 to 178 days. Referrals were either "routine" (mean=114.87 days, SD=32.51 range 1 to 178) "soon" (mean=46.5 days, SD=23.87, range 17 to 98) or "urgent" (mean=36.43 days, SD=29.19, range 1 to 109). Specific patient information in terms of marital status, number of dependants, highest educational and employment attainment, current employment status, socio-economic status (SES) *etc.* were not consistently available and, therefore, cannot be reported here.

While the total number of patients in the study was 155; initial non-attendance, referral for a variety of problems and subsequent diagnosis of a number of problems has resulted in a fluctuating number of patients within different analyses.

# Results

*Comparing the referral and the diagnosis*

Several referral letters contained more than one referred problem and a number of patients subsequently were diagnosed with more than one type of condition. These primary and secondary referred and diagnosed problems (see *Appendix 1.3*) were combined for clarity. As can be seen from *Figures 1 and 2*, while the proportion of referred and diagnosed depressive illnesses appears consistent, there is a discrepancy between referred and diagnosed anxiety disorders. The overall distribution differences were found to be highly significant ($p<0.01$, $df=12$, $\chi^2=29.222$).

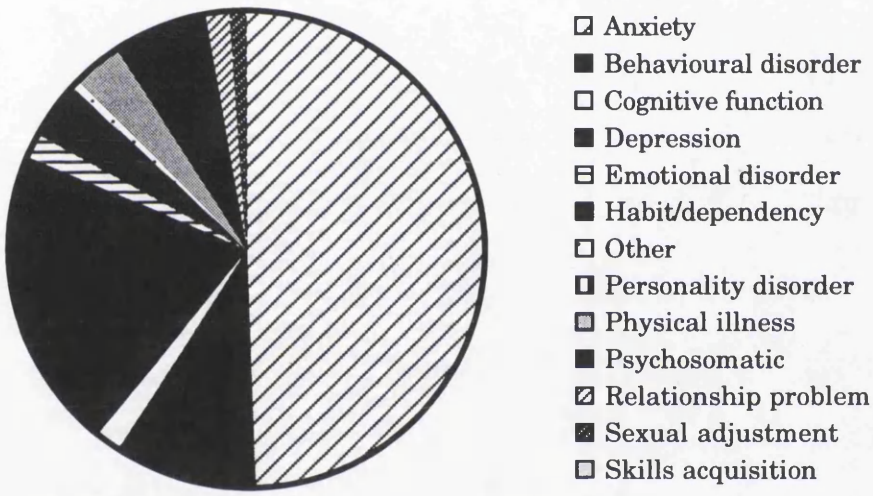


*Figure 1: Proportions of all referred problems coded in EPPIC categories (n=186)*

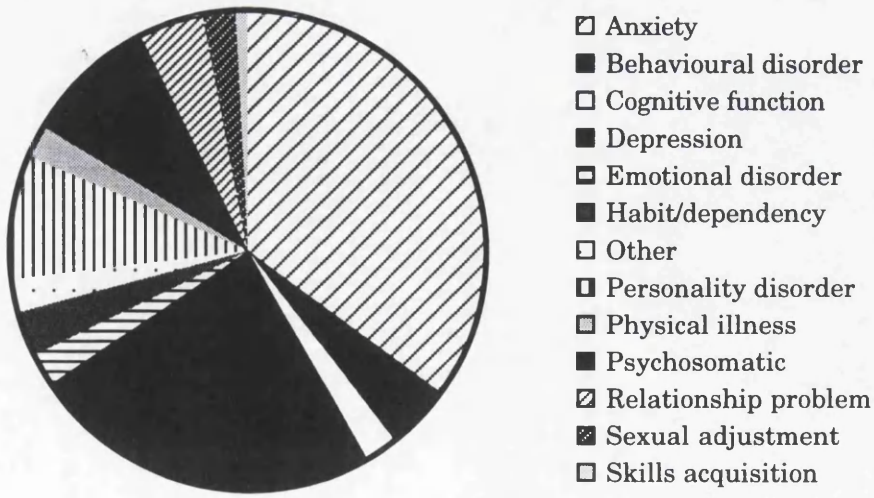


*Figure 2: Proportions of all diagnosed problems coded in EPPIC categories (n=134)*

More specifically, focusing on the relationship between each patient's referred and diagnosed problems 46% of matches achieved perfect concordance using the EPPIC categories and there was no concordance for 34% of referrals and diagnoses. The remaining 20% were accounted for by accurate matches with additional confounding secondary referrals or diagnoses, or by matches where there was some confusion between primary and secondary referrals and diagnoses. Whether or not this latter group are considered to be concordant, that there was disagreement between referrer and Clinical Psychologist over the diagnosis of a full third of referrals is worthy of further investigation.

*Table 2* below presents the precise relationship between each referred and diagnosed category with shaded areas indicating concordance. Nearly half the cases referred as anxiety disorders were diagnosed differently by the Clinical Psychologist, the most frequent alternative diagnoses being of depression. This would support Brown and Trotter's[4] observation that depressive illnesses may often be misreferred as anxiety by GPs. However, there were a variety of additional mismatches between anxiety and other referrals and their subsequent diagnoses. The range and frequency of misreferrals was not anticipated in the literature.

| Number of cases diagnosed | Number of cases referred | | | | | | | | | | | | | Diagnosed Total |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | A | B | C | D | E | H | O | Pe | Ph | Ps | R | Se | Sk | |
| Anxiety (A) | 40 | | 1 | 5 | 1 | | 1 | | | 1 | | | | 49 |
| Behavioural disorder (B) | 1 | 3 | | 1 | | 1 | | | | | | | | 6 |
| Cognitive function (C) | 2 | | 1 | | | | | | | | | | | 3 |
| Depression (D) | 10 | | 1 | 22 | 1 | | | | 1 | 2 | 1 | 1 | | 39 |
| Emotional disorder (E) | 1 | 1 | | 1 | 1 | | | | | | | | | 4 |
| Habit/dependency (H) | 2 | 1 | | 1 | | | | | | | | | | 4 |
| Other (O) | 3 | 1 | | | | | | | | | | | | 4 |
| Personality disorder (Pe) | 6 | 3 | | 1 | | | | | | | 1 | | | 11 |
| Physical illness (Ph) | 1 | | | | | | | | 1 | | 1 | | | 3 |
| Psychosomatic (Ps) | 5 | | | | | | | | 2 | 6 | | | | 13 |
| Relationship problem (R) | 2 | | | | | | | | 1 | | 3 | 1 | | 7 |
| Sexual adjustment (Se) | 2 | 1 | | 1 | | | | | | 1 | | | | 5 |
| Skills acquisition (Sk) | 1 | | | 1 | | | | | | | | | | 2 |
| Referred Total | 76 | 10 | 3 | 33 | 3 | 1 | 1 | 0 | 5 | 10 | 6 | 2 | 0 | 150 |

*Table 2: Relationship between referrals and diagnoses. While the total number of patients in the study=115 there are a number of instances where there was more than one referred or diagnosed problem (total n of category entries=150).*

The information gained is invaluable in assessing the use of future referral letters to prepare for initial interview sessions. It is also relevant to the consideration of communication with referring agents pointing, perhaps, towards the need for interdisciplinary workshops on recognising and diagnosing psychological conditions.

*Patterns of first appointment DNAs*

It may be possible to minimise clinical time lost through first appointment DNAs by identifying groups who are more likely to miss a first appointment and notifying referring agents to enable them to increase their initial input with these patients. In this study 26.5% of patients failed to attend for their first appointment (see *Appendix 1.4*). Comparisons, using chi-squared or analysis of variance tests where appropriate, were made between patients who DNA for their first appointment and those who completed and were still in treatment at the time of analysis.

There was no significant difference between proportions of female and male patients who DNA for their first appointment and those who had completed or were still in treatment at time of analysis. Nor was there a significant difference between these groups in terms of age, length of waiting time to first appointment, urgency of referral, geographical location in terms of postal regions or referral source. However, there was a significant difference between these three groups as referred from different GP practices ($p<0.01$, $df=48$, $\chi^2=51.51$). This suggests the need for further investigation to understand why patients from certain practices were more likely to DNA than others. Following this, it could be possible to target these specific practices to provide more information to referred patients prior to initial appointment, or to implement an opt-in or reminder system[10,11] in order to facilitate attendance.

Finally, there was no significant difference between the proportion of patients who DNA for their first appointment and those who had completed or were still in treatment in relation to their referred problem. However, general trends in the data would suggest that patients referred for depressive or psychosomatic illnesses were more likely to attend than to DNA for

their first appointment, while patients referred for problems of habit or dependency were more likely to DNA.

*In-treatment non-attendance*

Again, being able to identify patients with an increased probability of dropping out of treatment or missing in-treatment appointments may allow the clinician to anticipate the problem and intervene early. In this study while 28% of patients dropped out of treatment prematurely, 11% of all appointments offered were cancelled and 13% of in-treatment appointments were not attended (see *Appendix 1.4*). Comparisons, using chi-squared or T-tests where appropriate, were made between patients who dropped out of and those who completed treatment. Also all patients, except for those who DNA for their first appointment, were included in the investigation of in-treatment appointment DNA and cancellation patterns.

There was no significant difference between proportions of female and male patients who dropped out of and those who completed treatment. Nor was there a significant difference between these groups in terms of age, longer waiting time to first appointment, urgency of referral, geographical location in terms of postal regions, referral source or referrals from different GP practices.

There was no significant difference between the proportion of patients who dropped out of treatment and those who had completed treatment in relation to their referred or diagnosed problems. However, the proportion of diagnosed depressed patients remaining in treatment was more than double that of those who dropped out of treatment, lending some support to Sparr, Moffitt and Ward's[15] findings. Also, as predicted by Sparr, Moffitt and Ward, patients with a problem of habit or dependency were more likely to drop out of treatment than remain in it and, additionally, patients diagnosed as having a personality disorder or relationship problem were less likely to complete treatment. Sparr, Moffitt and Ward also noted that patients diagnosed as having PTSD had increased probability of dropping out of treatment; examining the uncoded diagnostic categories revealed that, out of eight diagnosed cases of

PTSD, one was still in treatment at the time of analysis while the other seven had dropped out prematurely.

Also of interest were patterns of DNAs and cancellations while patients remained in treatment. While these numbers were too small to analyse statistically, there were a number of interesting relationships with diagnostic categories. For example, patients diagnosed with behavioural and personality disorders demonstrated noticeably high rates of in-treatment DNAs, while those with psychosomatic disorders were more likely to cancel appointments. There were no unusually high rates of in-treatment cancellations or DNAs for patients diagnosed with problems of habit or dependency as predicted by Sparr, Moffitt and Ward[15]. Breaking down the large anxiety category revealed that diagnoses of agoraphobia (both with and without panic) were, perhaps unsurprisingly, associated with high levels of both in-treatment DNAs and cancellations. Therefore, even though the sample group was perhaps too small to yield statistically significant results, specific patterns of non-attendance were identified which could inform proposals aimed at reducing non-attendance and drop-out rates.

## Discussion

In addition to the clarification of certain aspects of current working practice, the presented audit revealed a number of instances where generalisations from large research studies were inapplicable to the specific instance of an individual caseload. Such instances included the range of discord between referred and diagnosed problems: while the literature anticipated that many patients referred for anxiety disorders may be suffering from depressive illnesses, a number of anxiety, psychosomatic and personality disorders were also incorrectly referred. It is possible that the dispersal of mismatches was statistically obscured in the larger studies, it could simply be that the patient population in the current audit were not representative of "general" patient populations - whoever they may be. The existing literature also indicated relationships between younger age, longer waiting time, source of referral and first appointment DNAs which were not substantiated in the present study. These relationships could possibly be have been amplified through larger sample numbers or may simply not hold true for distinct patient populations. Neither was it anticipated that referral from different GP

practices could impact upon initial appointment attendance rates. Even if this had been identified as an influential factor, an individual investigation would still be necessary to identify the specific GP practices that yielded non-attending patients. Also, while previous observations regarding the in-treatment attendance trends of patients diagnosed as having PTSD, substance abuse and depressive illnesses were substantiated, the greater treatment attendance patterns of patients with psychosomatic disorders and the lesser attendance of patients with behavioural and personality disorders was not predicted. The richness of this information, with its practical utility in designing and implementing services changes could not have been obtained from a large-scale audit.

Certain problems have been realised within this study which may inform those wishing to undertake an audit of $n$=1. In order to make analysis of small data sets in individual audits feasible, it may be necessary to summarise information and employ categories. While the EPPIC categories, the product of a collaborative effort to arrive at summarised diagnostic groupings, appeared to be a reasonable choice for use within this project they were found not to be reliable. If the individual audit, like the individual case study, is to be of wider interest it is vital to arrive at a coding system which has a high degree of consensus and is demonstrably reliable and valid for comparison across studies. This is an area which is worthy of further investigation. In addition, the need for standardised presentation of the demographic characteristics of the patient population being described was recognised. A consensus for providing certain kinds of demographic information should ideally be reached and adhered to in future work.

Overall, Newcombe and Marshall's[2] recommendation - to consider the question being asked when determining the type of study to be conducted - was vindicated. Previous large-scale research identified issues of general relevance and importance, but it was only analysis of the individual caseload data that could provide accurate enough information to enable planning of specific service developments. It is hoped that the contribution of such individual audits to the understanding of general clinical evaluation is recognised in future research.

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# Major Research Project Literature Review Examining the efficacy of sequencing cognitive rehabilitation: Towards a more theoretical grounding of treatment

Helen C. Payne

Prepared for submission to *Brain Injury*

(see Appendix 2.1 for contributors' notes)

# Examining the efficacy of sequencing cognitive rehabilitation: Towards a more theoretical grounding of treatment

Running Head: Sequencing cognitive rehabilitation.

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*Abstract*

While memory disorders are a common sequelae of brain injury there are few consistent guidelines as to the most appropriate, effective forms of their treatment. Following a review of the literature it is suggested that this may be related to the widespread use of methods of classifying and treating memory dysfunction which are based on an inappropriately simplistic model of memory as a unitary construct. In contrast a consideration of the academic literature emphasises the essentially modular nature of the formation of a memory. Perceptual, attentional, encoding, storage and retrieval mechanisms, amongst others, are thought to be important. It is suggested that it is essential to examine the stage of processing underlying a memory deficit in order to appropriately sequence cognitive treatments. Recommendations for future work in this area are proposed.

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# Introduction

Increased optimism regarding recovery of cognitive function and plasticity in patients who survive brain insult, and a corresponding increase in neuro-psychological knowledge [1, 2, 3, 4] has led to the recognition of the need for specialist rehabilitation services [5, 6, 7]. The evaluation of such services and their rehabilitative techniques is important for both ethical [8] and economic reasons [9]. Memory dysfunction is a common problem in individuals with brain injury. Yet there are few concrete guidelines as to the most appropriate and effective forms of treatment for this difficulty [10, 11, 12]. Often it has seemed as though researchers and clinicians have been searching for the one memory treatment that will universally "cure" all memory problems in all patients. However, it is now widely recognised [*e.g.* 1, 13, 14] that single strategies to improve general memory functioning are unlikely to be devised; instead more specific deficit-treatment compatabilities need to be investigated.

The current review will initially consider approaches to classifying memory, treatment methods and treatment outcome studies in the literature. It will be argued that the conceptualisation and definition of memory have implications for subsequent treatment models. The problem of successfully classifying patients' memory problems and identifying consistently successful strategies will be viewed in the light of a clinical over-simplification of the concept of memory. An academic model of memory will be reviewed as a framework for future rehabilitation models with the need for more empirical work in this area being outlined.

# Approaches to classifying memory

Memory helps us to bind our sense of identity, what it means "to be me". Numerous accounts of individuals whose memory is seriously impaired show both the practical and existential importance of this cohesive cognitive function. Yet, while the concept is so easy to invoke in everyday parlance, it is far from a discrete, easily classifiable entity. The most common clinical presentation of disordered memory, anterograde dysmnesia, has been described in a variety of ways including aetiology and pathology, severity and overall clinical profile on a battery of neuropsychological tests (covering memory, language, visuospatial, cognitive and

discourse skills). These categorisations are of varying utility in informing rehabilitation practice.

Diller and Gordon [15] note that the effectiveness of cognitive rehabilitation may differ according to the aetiology and pathology of the brain damage. Accordingly there exist lengthy and ongoing debates about the precise localisation of memory, seen as a unitary function, within the brain. The frontal lobes [*e.g.* 16, 17, 18], cortical temporal lobe structures [*e.g.* 19, 20, 21] and mesial temporal lobe structures [*e.g.* 22, 23] have all been implicated. However, few memory disordered patients have damage so localised that a precise pathology can be distinguished; the distinction therefore being of little utility as a criterion for informing rehabilitation procedures.

As a result, a quantitative rather than qualitative approach was adopted towards the neuropathology of memory. Again with memory being treated as a singular function. Coppens [24] noted that, intuitively, greater severity of structural damage indicates more serious brain dysfunction. Measurements of early severity of insult such as the Glasgow Coma Scale [25] and length of post-traumatic amnesia [26] along with measurements of severity following stabilisation such as the Disability Rating Scale [27] were developed in an attempt to standardise this classification. Coppens [24] reviews a number of studies which demonstrate the unpredictability of recovery in relation to severity ratings. He notes that "patients in the same acute severity category may reach widely discrepant recovery levels" [24: p.195]. Any group of patients defined by severity of brain insult is still very heterogeneous. This may be accounted for in the high individual variability, particularly in clinical profiles [28], within the closed head injury population. Severity, ultimately, is a poor tool for predicting the type of difficulties a patient will encounter or their rehabilitation needs [24]. Therefore, as a means of assessment for rehabilitation purposes, severity measures are not particularly useful, being unable to explain the wide variability among brain injured patients.

The recognition of high variability in patients' clinical profiles has resulted in unfruitful attempts to arrive at a standardised classification system; individual variability being too great [24]. A general trend seems to be to make a distinction between patients who have mainly language or spatial difficulties in addition to memory problems [*e.g.* 29]. This has resulted in a dualistic approach, patients being taught compensation strategies focusing on the relatively spared verbal or spatial skills [*e.g.* 30, 31, 32]. Coppens [24] further developed this classification, assessing the overall performance of a group of brain injured patients on a battery of tests covering memory, attention, conceptualisation, visuospatial, language and discourse skills. Principal-component analysis of these profiles revealed two main factors; language and spatial-cognition. However, memory disordered patients' brain damage is rarely hemisphere specific as this would seem to suggest. Essentially, this dualistic system of classification remains very generalised and therefore of limited utility in terms of rehabilitation.

## Treatment outcome literature

There are a variety of treatment methods indicated for memory rehabilitation including direct retraining, alternative functional systems and behavioural prosthetics, all of which invoke memory as a unitary, or dualistic function.

Direct retraining or task repetition has long been held as a successful means of rehabilitating memory difficulties [33]. However, its rationale - where memory is a unitary system likened to a muscle that needs exercise to strengthen it - is inappropriate in the face of evidence that practice effects eventually plateau and has limited therapeutic utility [1]. Correspondingly studies such as Kovner *et al.* [34] have been unable to demonstrate clinically effective improvements in memory performance using this method. Other studies note the incredibly high input costs, in terms of personnel and practice time and effort, as compared to relatively small returns [35]. Dolan and Norton [33] state that the treatment may not be easily generalised; learning a set of information does not necessarily lead to an ability to apply the skill to another set of information. Boyd [36] and Kail [37] note that it is the spontaneous

development of new and improved strategies rather than repetition which leads to improvements in memory performance. It appears, therefore, that direct retraining is of limited utility. When the technique is used in isolation its success appears to rest upon the secondary development of new memory strategies.

Originally based on the work of Luria [29, 38], another popular treatment method has been training individuals in the use of alternative functional systems. This involves substituting spared skill areas for impaired skill areas, for example substituting impaired auditory memory with new techniques to encode information in visual memory. This has led to a degree of compensation of function in some patients [30, 31, 32]. While this has obvious attractions for rehabilitation purposes, other studies [*e.g.* 39, 40] have been unable to demonstrate any interaction between laterality of lesion and method of training, the dualistic view of verbal versus spatial memory perhaps being too simplistic. More recent ways of conceptualising memory and, therefore, substituting intact systems for damaged ones include a distinction between implicit and explicit memory processes and internal and external memory storage sites [41]. Some researchers have claimed it is possible to use implicit memory systems as alternative functional systems with, for example, an implicit, external technique such as Montessori Maps [41] or an implicit, internal technique such as priming or spaced retrieval [42]. Other studies, however, have been unable to find an improvement in memory performance using such techniques [*e.g.* 43, 44]. The ambiguous and contradictory evidence available is indicative of methodological differences within these studies, but may also point to the fact that memory still has not been well analysed in terms of its component skills. If alternative functional systems are to be utilised in memory rehabilitation there needs to be more research into the specificity of different modular units in functional systems. Those studies with relatively more clinical success appear to have selected patient samples based on their suitability for the treatment presented; saying less, then, about the universality of alternative functional systems than about the benefits of patient-treatment matching.

A final group of treatments are behavioural prosthetics methods which involve teaching new behaviours to compensate for the deficient behaviour. The idea is to improve functional memory - a unitary construct - externally with the use of diaries, or internally with the Preview, Question, Read, State and Test (PQRST) technique [45], elaboration techniques [*e.g.* 46] *etc.* Overall, the behavioural prosthetic treatments appear to have met with more consistent empirical success than either direct retraining or the use of alternative functional systems. Sohlberg and Mateer [47] report a successful application of diary use in a case study, noting the importance of motivation as part of the treatment. Wilson [48] demonstrated the effectiveness of the PQRST technique over simple rehearsal with a group of head-injured patients. Elaboration techniques such as the link system have been deemed to be significantly more effective than no strategy, visual imagery and cueing for delayed recall testing of patients with brain injuries [48]. Both external and internal behavioural prosthetic treatments have been shown to generalise in individuals receiving them [49, 50]. However, many of these small studies appear to be taking the specific needs of the individual into account when designing their rehabilitation, again saying more about patient-treatment matching than the overall benefits of behavioural prosthetics. It also appears that these treatments go beyond the simplistic behavioural prosthetic theory and actually implicitly recognise different stages or levels of memory processing. I will argue that the recognition and targeting of these stages of memory processing are essential components of a rehabilitation package.

## Cognitive model of rehabilitation

The success of any of the treatment methods reviewed above appears limited without researchers always being clear as to the reasons for these limitations. A common difficulty with these studies could be said to lie in their conceptualisation of memory as a simple unitary or dualistic system. As a result, patients are classified according to their pathology or the severity of their insult - occasionally by their clinical profile - and are provided with a single treatment which is evaluated in the study. Rather than focusing on pathology, severity or asymmetry of dysfunction it may be more useful to examine the variety of causal cognitive

processes underlying a memory deficit [51] when considering an individual's rehabilitation needs. In doing so the definition of memory is brought under close scrutiny. As Baddeley [13] noted, the use of a single term - "memory" - does appear to suggest that this is a unitary function. However, memory involves not one cognitive system but is a sequence of processes or modules [52] the boundaries of which are indistinct. A memory, after all, can last a lifetime. More perplexingly, where does the process begin?

The academic literature acknowledges the early stages of memory processing at the sensory level with the description of iconic and echoic memory stores [53] (see *Figure 1*). Form here information is believed to pass through the primary memory [54], short term store [55] or central processor [56], each of which describes a limited capacity memory system of a few seconds duration that equates with our span of awareness or attention. In line with this, Craik and Lockhart's [56] levels-of-processing theory states unambiguously that perception and attention are vital features in determining what information is learned and subsequently stored. The extent to which information is attended to, the level of processing, determines the subsequent meaningfulness of that information and has a substantial effect on its memorability. Reason [57] and Norman [58] also draw a close link between attention and memory demonstrating that many everyday "action slips", the result of inattention, may lead to a failure to lay down a memory. Parkin and Leng [20] distinguish this immediate memory span from short-term memory which, they note, is an atheoretical term. Information passes out of attention from the primary memory and is consolidated in the long-term store or permanent memory, the process of consolidation being notably susceptible to disruption [20]. Theoreticians have further sub-divided the long term store into a number of separate components each storing different kinds of information [6]. It is the encoding and retrieval elements of this stage of memory processing that are generally the focus of clinical efforts [*e.g.* 29, 59, 61]. It appears that many behavioural prosthetic treatments facilitate both the encoding and retrieval processes.

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Insert Figure 1 about here

---

*Figure 1: Model of stages of memory processing*

The traditional classification and rehabilitation approach of many clinicians disregards the importance of perceptual and attentional mechanisms in memory processing. Some researchers have stated quite explicitly their disregard for early cognitive mechanisms, attention in particular, in the memory process [*e.g.* 20, 61, 62]. This is due to their assertion that densely amnesic patients often have intact attentional and short-term memory capacities. Other workers in the field have expressed scepticism about the prevalence of attentional deficits following head injury, although have acknowledged the importance of attention as an early processing stage of memory [63]. In contrast, another section of researchers support the importance of attentional mechanisms in memory processing [64, 65, 66, 67]. Waugh and Barr [68] assert that "it is impossible to dissociate memory from ... attention since we experience what we attend to, and we can remember only what we have experienced" [68: p. 252]. Lezak [51] suggests that neurological patients with attentional deficits often inappropriately interpret their problems as due to a failure in memory. Additionally, a number of workers in the field have identified the limitations of their memory rehabilitation packages as lying in patients' early processing problems. They noted that patients in their studies who failed to demonstrate significant improvements after memory training techniques had significant attentional difficulties [69, 70, 71].

In designing a suitable treatment package for individuals who complain of memory difficulties it appears essential to work within a valid cognitive framework. This could be achieved by examining the stages of processing underlying a memory deficit in order to appropriately sequence cognitive treatments [51, 69, 72]. If attentional difficulties are impeding memory performance, as has been noted by various researchers, treatment should be targeted at this stage of the problem. While such difficulties remain unaddressed, it is possible that strategies

focusing on later learning or retrieval mechanisms will remain ineffective. Such a view is supported by Trexler [73] who strongly advocates the inclusion of attentional retraining for individuals suffering from memory disorders following severe head injury. To date only one empirical study has investigated the importance of this theory. Yesavage and Rose [72] found that the sequencing of cognitive therapies *is* important, demonstrating that elderly patients benefited most from memory training which was preceded by concentration training. They concluded that memory rehabilitation techniques result in greater gains when supported by additional cognitive training in appropriate sequences.

## Recommendations for further research

The need for a closer alignment of clinical practice and research theory, for the grounding of memory rehabilitation within a valid cognitive framework, has been noted. Memory dysfunction is not always the result of a single processing failure and, therefore, it would be appropriate to investigate the utility of treatments targeted at the various stages at which memory develops. There is a notable shortfall of empirical studies investigating the importance of the contribution of attention to memory processing and, indeed, of the utility of sequencing memory rehabilitation techniques. It would be of benefit to both academic and clinical theory and practice to formally investigate these issues in future research.

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Figure 1

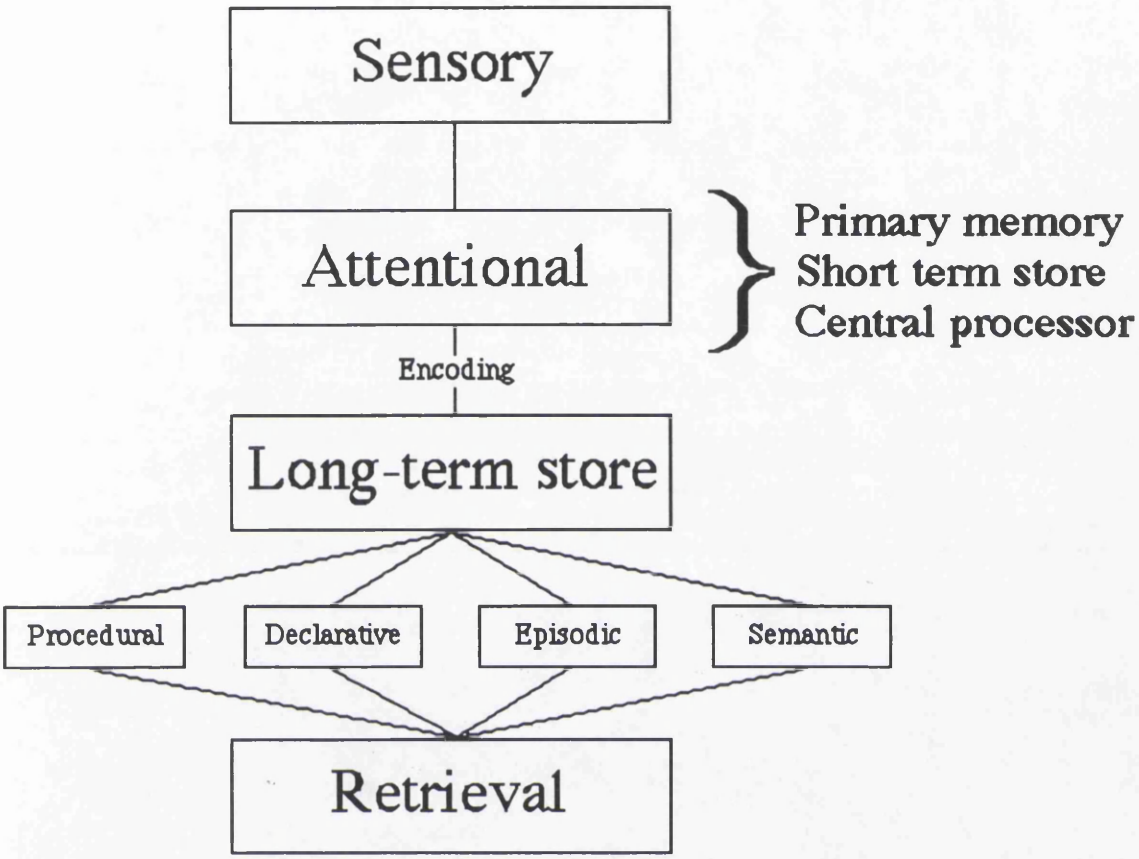


*Figure 1: Model of stages of memory processing*

# Major Research Project Proposal
# Examining the efficacy of sequencing cognitive rehabilitation: Towards a more theoretical grounding of treatment

Helen C. Payne

Submitted to the Southern General Hospital Ethics Committee

(see Appendix 3.1 - 3.2 for submission and permission)

# Examining the efficacy of sequencing cognitive rehabilitation: Towards a more theoretical grounding of treatment

*Summary*

It is observed that there are few unequivocal guidelines regarding effective forms of memory rehabilitation following brain insult in the literature. The academic literature has long supported the notion of different stages of processing involved in memory. A limited number of clinical studies has also substantiated the importance of considering these levels of processing in treating patients with memory difficulties. Therefore, the current proposal aims to investigate the efficacy of sequencing cognitive treatments in terms of stages of processing in order to move towards more empirically based memory rehabilitation. A single-case series design will involve between six and eight screened and matched subjects who will be assigned to one of two experimental groups. While both groups will receive the same standardised attentional and memory treatments, group 1 will receive attentional work prior to memory treatment and group 2 will receive these treatments in the opposite sequence. It is hypothesised that the group receiving appropriately sequenced cognitive treatments will derive the most benefit from the programme. A range of objective and subjective neuropsychological and self-report measures will be taken.

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# Introduction

It is important to assess the success of any clinical therapy for both ethical and economic reasons. Memory dysfunction is a common problem in individuals with brain injury. Yet there are few concrete guidelines as to the most appropriate and effective forms of treatment for this difficulty (Brooks, 1991; Brooks *et al.*, 1986; McMillan *et al.*, 1988). Often it has seemed as though researchers and clinicians have been searching for the one memory treatment that will universally "cure" all memory problems in all patients. However, it is now widely recognised (*e.g.* Baddeley, 1984; Franzen and Haut, 1991; Miller, 1992) that single strategies to improve general memory functioning are unlikely to be devised; instead more specific deficit-treatment compatabilities need to be investigated.

Although it is often referred to as a unitary construct, memory dysfunction is not always the result of a single processing failure and could be due to attentional, encoding, storage or retrieval difficulties, amongst others (Crosson and Buenning, 1984; Fussey and Tyerman, 1985; Grafman, 1984). In designing a memory treatment package it appears essential to examine the levels of processing underlying a memory deficit in order to appropriately sequence cognitive treatments (Cancelliere *et al.*, 1991; Lezak, 1995; Yesavage and Rose, 1983). Waugh and Barr (1980; p.252) assert that "it is impossible to dissociate memory from ... attention since we experience what we attend to, and we can remember only what we have experienced". Lezak (1995) suggests that neurological patients with attentional deficits often inappropriately interpret their problems as due to a failure in memory. A number of researchers noted that patients in their studies who failed to demonstrate significant improvements after memory training techniques had significant attentional difficulties (Cancelliere *et al.*, 1991; Oakley, 1983; Wood and Eames, 1981). If attentional difficulties are impeding memory performance, treatment should be targeted at this stage of the problem; otherwise, while such difficulties remain unaddressed, it is possible that strategies focusing on learning or retrieval mechanisms will remain ineffective. Yesavage and Rose (1983) supported the hypothesis that the sequencing of cognitive therapies is important, demonstrating that elderly patients benefited most from mnemonic training which was preceded by concentration training. Surprisingly no formal studies have been reported

which examine the efficacy of sequencing cognitive treatments in patients with acquired brain damage.

## Proposal

The need for the sequencing of cognitive treatments for attention and memory problems has been noted. It is proposed that a study be conducted which will compare the effect on patients of appropriately sequenced attention and memory treatments with that on patients who receive the same treatments in reverse sequence. It is hypothesised that patients receiving attentional retraining prior to memory retraining will demonstrate greater improvement in memory functioning than patients receiving the treatments in reverse sequence treatments.

In order to address this question the increasingly prevalent (Seron, 1985) single-case series design will be employed. While Newcombe and Marshall (1988) and Wilson (1987) note that there has been considerable debate as to the merits of both group and single-case studies in neuropsychology, Caramazza and McCloskey (1988) argue that only single-case studies allow valid inferences about cognitive processes in populations of patients with brain insult. The heterogeneity of brain-injured populations in terms of pre-morbid, injury (mechanism, location, severity) and outcome characteristics renders the interpretation of experimental group differences difficult. A single-case treatment design allows detailed analysis of the individual behavioural repertoire, adaptation of the treatment content to the patients' interests and generalisation of the treatment to ecological settings (Seron, 1985). Additionally, the single-patient case series would allow each individual to act as their own control as well as being viewed in the light of the other subjects on a qualitative basis.

## Methodology

### *Subjects*

It is proposed to obtain a sample of 6-8 patients who present with attentional and memory difficulties and who are at twelve months or more post-insult, thereby minimising spontaneous compensation of function. These patients will be roughly matched for age and years of education. Patients with noted current psychiatric and substance abuse problems will be excluded from the research sample as this may complicate their presentation

(Malamud, 1975; Ryan and Butters, 1986; Strub and Wise, 1992). Matched subjects will be entered into one of two experimental groups. Group 1 will receive attentional retraining followed by memory retraining, group 2 will receive the same treatments in reverse sequence.

*Measures*

There would be three separate assessment phases. Additionally, a self-report cognitive checklist introduced during the initial assessment would be completed by each patient on a weekly basis to provide an ongoing measure of progress.

The first assessment phase would be a short **screening process** to determine whether patients were experiencing attentional problems in addition to their reported memory difficulties. This would consist of a semi-structured clinical interview along with the Stroop Test (Stroop, 1935), Trail-Making Test (Spreen and Straus, 1991) and the Arithmetic, Digit Symbol and Digit Span subtests of the revised Wechsler Adult Intelligence Scale (WAIS-R; Wechsler, 1981). If attentional obstacles were apparent following this assessment patients would be included in the study.

All patients entered into the study would receive an **initial assessment** which would complete the neuropsychological examination. In the absence of any measures specific to brain-injured individuals, the National Adult Reading Test (NART; Nelson, 1982) would be administered to each subject to provide an estimate of premorbid functioning. The full Adult Memory and Information Processing Battery (AMIPB; Coughlan and Hollows, 1985) which has two forms, making it suitable for re-administration on follow-up, would be used to provide additional measures of attention and a full memory profile.

As there may often be discrepancies between neuropsychological profiles and actual daily memory performance (Neisser, 1978) it is important to obtain a measure of "real life" memory skills using a cognitive checklist. Self-assessment of memory is believed to be important as metamemory - which includes knowledge of one's own memory - plays a critical role in remembering (Flavell, 1971). A cognitive checklist would be introduced to the patient during the initial assessment. This would begin the process of recording the types

and frequencies of memory and attentional problems experienced on a weekly basis, along with the types and frequencies of any memory strategies used. Due to the absence of any one standardised cognitive checklist questionnaire in the literature which comprises all these elements, one was designed specifically for the study. This was based on elements of existing checklists; notably the Cognitive Failures Questionnaire (Broadbent, Cooper, Fitzgerald and Parkes, 1982), Perlmutter's Memory Questionnaire (Perlmutter, 1978) and the Subjective Memory Questionnaire (Bennett-Levy and Powell, 1980).

All subjects will receive a **final assessment** immediately following their last treatment session. The final assessment will consist of a short semi-structured clinical interview to ascertain whether any perceived change in function has taken place. The second form of the AMIPB will then be administered to each subject, along with the Stroop, Trail-Making, WAIS-R Arithmetic, Digit Span and Digit Symbol Tests. All patients will be encouraged to continue weekly cognitive checklist recordings until approximately six months after initial contact with the study in order to ascertain the durability of any treatment gains.

*Setting*

I hope to obtain subjects from the Scottish Headway Association and also from the Brain Injury Vocational Unit at Rehab Scotland. Access to these groups removes ethical questions about delaying the treatment of controls as this particular treatment would not otherwise be offered.

*Design and Procedure*

The basic design of the experiment will be a two-group, single-case series, multiple baseline time-lagged control (see Gottman, 1973), comparing the effects of memory rehabilitation preceded as opposed to followed by attentional retraining.

As may be seen in *Figure 1*, following the screening all patients entered into the study would undergo the initial assessment. Thereafter, matched patients would be assigned to either of the experimental conditions. Treatment onset would be staggered to provide multiple pre-treatment baselines (Barlow and Hersen, 1984), allowing between four and twelve baseline data points (Barlow and Hersen, 1973). All patients would receive a final assessment following treatment and would be asked to continue cognitive checklist recordings up to six

months following the initial screening. The repeated measure during the study would be weekly completion of the cognitive checklist.

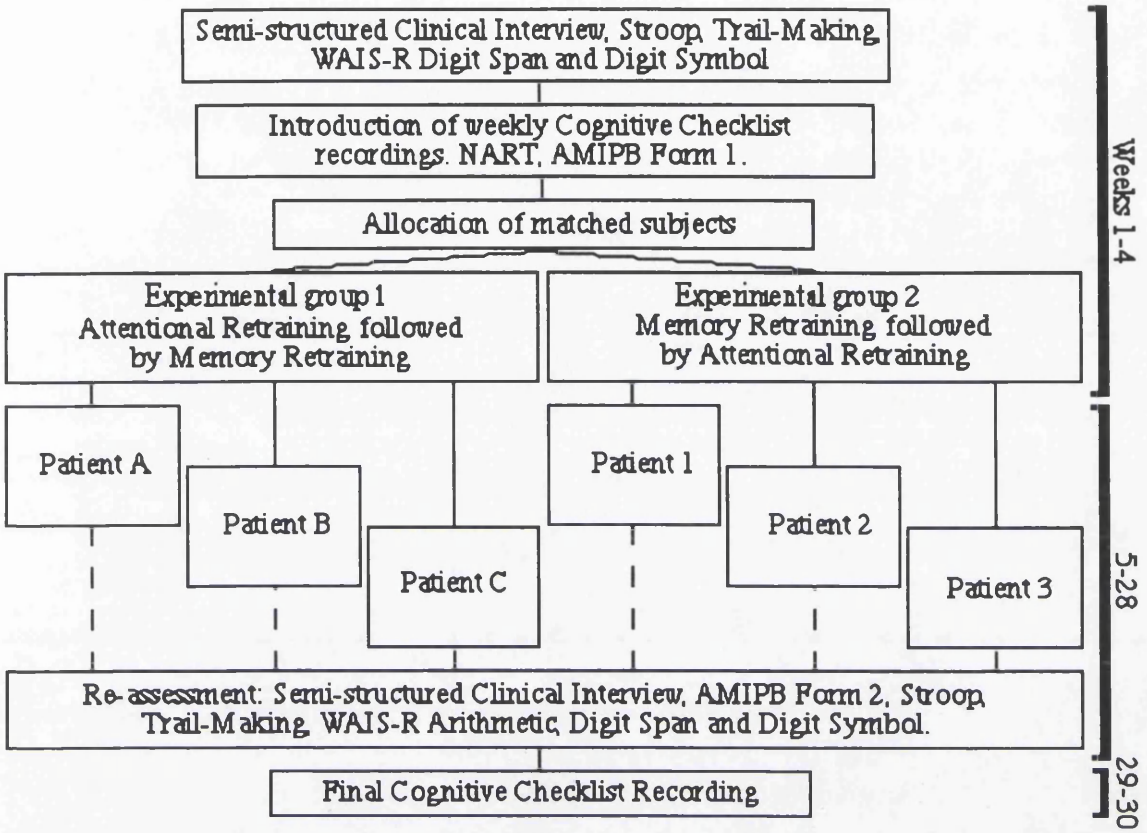


*Figure 1: Flow chart of proposed design*

*Experimental Treatment*

**Attentional problems** can include reduced attentional span or impaired mental tracking, slow processing or an inability to divide attention between competing stimuli (Lezak, 1995). In order to accommodate all these potential difficulties in a standardised treatment package, strategies taught would include progressive muscle relaxation (Bernstein and Borkovec, 1973; Eysenck, 1991), exposure to a model working slowly (Wagner, 1988), the combined demonstration and verbalisation of visual-motor scanning strategies (Wagner, 1988; Yesavage and Rose, 1983) and direct retraining tasks which rely on repetition to improve focused, sustained or selective attention exercises (Sohlberg and Mateer, 1987; Yesavage and Rose, 1983). Performance feedback will be provided throughout the work as this has been noted to be beneficial in attentional training (Staats *et al,* 1964; Webster, McCaffrey and Scott, 1986; Wood, 1983, 1986).

Initial training would involve teaching a relaxation technique along with exposure to a model working through simple, everyday tasks with the patient in an unhurried way (Wagner, 1988). Prompts would be given at regular intervals to remind the patient to relax and slow down and the therapist would gradually reduce the speed at which they were working over the sessions. It is hoped that these techniques would help compensate for slowed processing. Following on from this, the demonstration and verbalisation of visual-motor scanning strategies would be used to increase sensory awareness, provide overt structure for impaired tracking and encourage sustained attention. This would be achieved through the repeated study of landscapes and fine art prints with instructions for selecting an increasing amount of detail after each presentation. Yesavage and Rose (1983) suggest that such an exercise increases interest in and attention to the wealth of detail. The technique would be generalised from works of art to increasingly ecologically relevant stimuli: from photographs of domestic settings, to using the physical environment of the therapy session to scan in more and more of the information available. With regards to direct retraining tasks Sohlberg and Mateer (1987) and Wood (1984) advocate a variety of reaction-time or response tasks with a selection of response requirements of increasing difficulty. The patient would be required to monitor a random series of recorded numbers, presented aurally, and indicate a target of three odd numbers in a row. The speed of the presentation would be gradually increased throughout the training session. Repeated exposure to such programmes should improve both the focused and sustained attention of patients (Sohlberg and Mateer, 1987; Wood, 1986). During the latter stages of this treatment competing stimuli, such as taped background noise, would be played in order to train the patient to discriminate between stimuli (Yesavage and Rose, 1983).

**Memory retraining** would consist of training in diary use, the Preview, Question, Read State and Test (PQRST, Robinson, 1970) technique, the link system and method of loci techniques (Buzan, 1995). To minimise encoding specificity (Baddeley, 1984), techniques will be generalised to a variety of ecologically relevant situations.

Initially, motivational interviewing would be used to help the patient identify a range of possible uses for the diary, thereby encouraging its use. Emphasis would be placed on

employing and increasing physical and spatio-temporal cues, such as watch alarms and tea breaks, to trigger diary use and establish a routine (Harris, 1984; Kurlychek, 1983). Following this patients would be introduced to the PQRST technique. In this they would learn a sequence of previewing, questioning, stating and testing themselves on the content of written material of increasing length. By so doing they would develop a structure for approaching new material, for increasing the depth of its processing (Craik and Lockhart, 1972) and for increasing triggers to cue recall. Once this technique was established it would be generalised to a range of aural situations, such as watching television programmes, preparing for telephone conversations *etc.* Finally patients would be taught two traditional mnemonic techniques, the link system and the method of loci. Initially they would be given help to practice and develop their visualisation skills, then to begin to link concepts and entities together and ultimately to associates these images with a designated, rehearsed location. As such imagery appears to be most effective with lists (Pavio, 1971), patients would receive training in reducing all material to be learned - from instructions to current events - to short steps in a list.

### *Analysis*

Two types of analysis will be conducted; within patient and between matched groups. The majority of within patient analysis will be qualitative and descriptive, although enough data points will be available for within individual subject analysis. The data would be autocorrelated and, if found to be serially dependent, an interrupted time-series analysis (*e.g.* Crosbie, 1993; Gottman, 1981) could be conducted. Additionally, modified versions of t-tests and ANOVAs (Gentile, Roden and Klein, 1972; Kazdin, 1984; Shine and Bower, 1971) or Revusky's $R_n$ rank co-efficient correlation test (Revusky, 1976; Worley and Billingsley, 1982) may be employed. These tests would be used to determine whether there was a statistically significant difference between the changing cognitive functioning of the two groups.

## Practical Application

It is anticipated that patients will benefit from enhanced treatment outcome if memory rehabilitation is preceded by attentional retraining. Ascertaining the appropriateness of

sequencing attention and memory treatments could contribute to the planning and delivery of rehabilitation services for individuals with brain-injury. Additionally, this may be viewed as a pilot study for more extensive research into cognitive rehabilitation sequencing; for example into the efficacy of sequencing encoding and retrieval work.

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# Major Research Project Paper
# Examining the efficacy of sequencing cognitive rehabilitation: Towards a more theoretical grounding of treatment

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Prepared for submission to *Behaviour Research and Therapy*

(see Appendix 4.1 for contributors' notes)

# Examining the efficacy of sequencing cognitive rehabilitation: Towards a more theoretical grounding of treatment

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*Summary*

There are few unequivocal guidelines regarding effective forms of memory rehabilitation following brain insult. While the literature has long supported the notion of different stages of memory processing, few clinical studies have translated the theory into rehabilitation practice. The reported study examined the effects of sequencing cognitive rehabilitation. A two-group, single-case series (n=6), multiple baseline, time-lagged control design was used. The repeated measure was a weekly self-report cognitive checklist. A range of pre- and post-treatment neuropsychological measures were also used. The hypothesis that patients would benefit most from memory retraining preceded ($p>0.1$) as opposed to followed ($p<0.02$) by attentional retraining was not supported. The lack of precision in available cognitive rehabilitation techniques is discussed as are experimental confounds and utility of behavioural analytic methodology in such studies.

Keywords: cognitive, rehabilitation, memory, attention, brain-injury.

# Introduction

Memory dysfunction is a common problem in individuals with brain injury. Yet there are few concrete guidelines as to the most appropriate and effective forms of treatment for this difficulty (Brooks, 1991; Brooks *et al.*, 1986; McMillan *et al.*, 1988). Often it has seemed as though researchers and clinicians have been searching for the one memory treatment that will universally "cure" all memory problems in all patients. However, it is now widely recognised (*e.g.* Baddeley, 1984; Franzen and Haut, 1991; Miller, 1992) that single strategies to improve general memory functioning are unlikely to be devised; instead, more specific deficit-treatment compatabilities need to be investigated.

Although it is often referred to as a unitary construct, memory dysfunction is not always the result of a single processing failure and could be due to attentional, encoding, storage or retrieval difficulties, amongst others (Crosson and Buenning, 1984; Eysenck and Keane, 1990; Fussey and Tyerman, 1985; Grafman, 1984). In designing a memory treatment package it may be essential to examine the levels of processing potentially underlying a memory deficit in order to appropriately sequence treatments (Cancelliere *et al.*, 1991; Lezak, 1995; Yesavage and Rose, 1983). Waugh and Barr (1980; p.252) assert that "it is impossible to dissociate memory from ... attention since we experience what we attend to, and we can remember only what we have experienced". It has also been noted that people with neurological disorders often inappropriately interpret their attentional deficits as due to a failure in memory (Lezak, 1995). A number of researchers have reported that patients in their studies who failed to demonstrate significant improvements after memory training techniques had significant attentional difficulties (Cancelliere *et al.*, 1991; Oakley, 1983; Wood and Eames, 1981). If attentional difficulties are impeding memory performance, treatment might be targeted at this stage of the problem; otherwise, while such difficulties remain unaddressed, it is possible that strategies focusing on learning or retrieval mechanisms will remain ineffective. Yesavage and Rose (1983) supported the hypothesis that the sequencing of cognitive therapies is important, demonstrating that elderly patients benefited most from mnemonic training which was preceded by concentration training. Surprisingly, no formal studies have been reported which examine the efficacy of sequencing cognitive treatments in patients with acquired brain damage.

It was hypothesised that patients receiving attentional retraining prior to memory retraining would demonstrate greater improvement in memory functioning than patients receiving these treatments in the reverse sequence.

In order to examine this hypothesis, which is based on cognitive theories of processing, behavioural retraining techniques and methodology were utilised (see Wilson, 1989). Behavioural intervention techniques and research methodologies have become increasingly important in neuropsychological rehabilitation studies (Seron, 1985), although are not yet widely reported in the mainstream behaviour analysis literature. The single-case treatment design allows detailed analysis of the individual behavioural repertoire, adaptation of the treatment content to the patients' interests and facilitates generalisation of the treatment to ecological settings. Caramazza and McCloskey (1988) argue that only single-case studies allow valid inferences about cognitive processes in populations of patients with brain insult. The heterogeneity of brain-injured populations in terms of pre-morbid, injury (mechanism, location, severity) and outcome characteristics renders the interpretation of experimental group differences difficult. A single-patient case series allows each individual to act as their own control as well as being viewed in the light of the other subjects on a qualitative basis.

## Method

*Overview:* The experiment was a two-group, single-case series, multiple baseline, time-lagged control (see Gottman, 1981) design, comparing the effects of memory rehabilitation preceded as opposed to followed by attentional retraining (see *Figure 1*). Screened and matched patients were clinically and neuropsychologically assessed before and after treatment. The repeated measure during the study was a weekly self-report checklist comprising attention and memory items which patients completed throughout the programme. Treatment consisted of five one-hour sessions each of attentional and memory retraining; these were given approximately on a weekly basis with staggered onset.

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Insert Figure 1 about here

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*Subjects:* Fifteen patients from a brain injury charity and a retraining centre were screened with a semi-structured clinical interview and psychometric tests for attentional problems. Formal testing of memory functions was not included in the screening as patients are generally able to report retrieval failures and provide examples of "poor memory". Screening measures included the Stroop Test (Stroop, 1935), the Trail-Making Test (Spreen and Straus, 1991) and the Digit Symbol and Digit Span subtests of the revised Wechsler Adult Intelligence Scale (WAIS-R; Wechsler, 1981). Eight individuals with reported memory and measured attentional difficulties, and who were without current psychiatric or substance abuse problems, gave informed consent (see *Appendices 4.2 - 4.3*) and were accepted into the study. Of these, two subsequently dropped out of treatment. All of the following information concerns the six male patients who completed the programme. They had a mean age of 32.66 years (range 21.75 to 48.19 years) and were on average 7.17 years post injury (range 1.04 to 18.17 years) and had an average of 11.17 years of education (range 9 to 15 years) at initial screening. They were roughly matched for age and years of education, matched subjects having staggered entry into either experimental group 1 (patients A, B and C), where they received attentional retraining prior to memory retraining, or experimental group 2 (patients 1, 2 and 3), where they received these treatments in reverse sequence.

*Measures:* Following the screening, all subjects completed their initial neuropsychological assessment with the National Adult Reading Test (NART; Nelson, 1982) and the full Adult Memory and Information Processing Battery (AMIPB; Coughlan and Hollows, 1985). These were used to provide an estimate of pre-morbid functioning, additional measures of attention and a memory profile. Additionally, each subject completed a weekly cognitive checklist throughout all phases of the study in order to obtain measures of "real life" memory skills. Due to the absence of any one standardised cognitive checklist in the literature encompassing the types and frequencies of memory and attentional problems, along with the types and frequencies of any memory strategies used, one was designed specifically for the study (see *Appendices 4.4 - 4.5*). This was based on elements of existing checklists; notably the Cognitive Failures Questionnaire (Broadbent *et al.*, 1982), Perlmutter's Memory Questionnaire (Perlmutter, 1978) and the Subjective Memory Questionnaire (Bennett-Levy and Powell, 1980).

All subjects received a final assessment immediately following their last treatment session. This comprised a short semi-structured clinical interview to ascertain any perceived change in function, the alternative form of the AMIPB, the Stroop, Trail-Making, WAIS-R Arithmetic, Digit Span and Digit Symbol tests. All patients were encouraged to continue weekly cognitive checklist recordings until approximately six months after initial contact with the study in order to determine the durability of any treatment gains.

*Experimental Treatments*

The reported treatments were, as far as possible, standardised and scripted. However, personalised examples were used in working with each individual and care was taken to work at the individual patient's pace. A handout summarising the work covered and homework to be done was provided at the end of each treatment session (see *Appendix 4.6*).

*Attentional problems* can include slowed processing, reduced attentional span or impaired mental tracking, or an inability to divide attention between competing stimuli (*e.g.* Lezak, 1995). All these potential difficulties were addressed within a standardised treatment package. Strategies taught included progressive muscular relaxation training (Bernstein and Borkovec, 1973; Eysenck, 1991), exposure to a model working slowly (Wagner, 1988), the combined demonstration and verbalisation of visual-motor scanning strategies (Wagner, 1988; Yesavage and Rose, 1983) and direct retraining tasks relying on repetition to improve focused, sustained or selective attention exercises (Sohlberg and Mateer, 1987; Yesavage and Rose, 1983). Performance feedback has been noted to be beneficial in attentional training (Staats *et al,* 1964; Webster *et al.*, 1986; Wood, 1983, 1986) and was provided throughout the treatment.

Session 1: Initial training involved progressive muscular relaxation training and exposure to a model working slowly through simple, everyday tasks. Prompts were given at regular intervals to remind the patient to relax and slow down and the therapist gradually reduced the speed at which they were working over the sessions. It was hoped that these techniques would help compensate for slowed processing.

Session 2: Demonstration and verbalisation of visual-motor scanning strategies was used to increase sensory awareness, provide overt structure for impaired tracking and to encourage sustained attention. Coloured images of landscapes and fine art prints were presented with directions for selecting an increasing amount of detail after each presentation.

Session 3: The scanning technique was generalised from works of art to more ecologically relevant stimuli such as photographs of domestic settings, to using the physical environment of the therapy session.

Session 4: With regards to direct retraining the patient was required to monitor a random series of recorded numbers, presented aurally, and indicate a target of three odd numbers in a row. The speed of the presentation was gradually increased throughout the training session. Repeated exposure to such programmes is thought to improve both the focused and sustained attention of patients.

Session 5: Competing stimuli, in the form of taped background noise, were played along with the response task in order to train the patient to discriminate between stimuli and divide their attention.

*Memory retraining* consisted of training in diary use, the PQRST technique (Robinson, 1970), the link system and method of loci mnemonic techniques (Buzan, 1995). As it is important to minimise encoding specificity (Baddeley, 1984), emphasis was placed on generalising all techniques to ecologically relevant situations.

Session 1: Treatment began by encouraging the regular use of a diary. Motivational interviewing was used to identify possible uses for the diary. Emphasis was placed on employing and increasing physical and spatio-temporal cues, such as watch alarms and tea-breaks, to trigger diary use and establish a routine (Harris, 1984; Kurlychek, 1983).

Session 2: Patients were introduced to the PQRST technique, learning a sequence of previewing, questioning, stating and testing themselves on the content of written material of increasing length. By so doing it was hoped that they would develop a structure for

approaching new material, for increasing the depth of its processing (Craik and Lockhart, 1972) and for increasing triggers to cue recall.

Session 3: Once the PQRST technique was established it was generalised to a range of aural situations. This was done with role plays of watching television programmes, preparing for telephone conversations *etc.*

Session 4: Patients were given help to practice and develop their visualisation skills and then taught two traditional mnemonic techniques, the link system and the method of loci. Help was given demonstrating how to link concepts and entities together and to associate images with designated, rehearsed locations.

Session 5: As mnemonic imagery appears to be most effective with lists (Pavio, 1971), patients received training in reducing all material to be learned - from instructions to current events - to short steps in a list.

*Analysis*: Analysis was largely descriptive, examining data within subjects and between experimental groups. An autocorrelation function was calculated which showed the cognitive checklist data to possess a significant degree of serial dependency, this precluded the use of standard between-group tests. The checklist data was, therefore, analysed using Interrupted Time Series Analysis correlation (ITSAcorr; Crosbie, 1993) which assessed the significance of changes between experimental phases. Chi-squared analysis was used to examine the relationship between pre- and post-treatment neuropsychological percentile categories.

# Results

*Descriptive statistics: cognitive checklist scores*

The total weekly cognitive checklist scores for each patient are presented graphically in *Figures 2* and *3*. Corresponding information about the slope ($r^2$), level (mean) and standard deviation (SD) of the baseline 1, treatment and baseline 2 phases of these scores and their totals is presented in *Table 1*. Visual inspection of this information shows clearly that the rehabilitation package had little impact on group 1 patients over the treatment period. Patient A's perception of his cognitive ability decreased over the study from a baseline 1 mean of 73.5 to a baseline 2 mean of 64.6. Patient B did evince improvement throughout and

following the treatment phases (treatment 1 mean=71 to baseline 2 mean=80.8), but clear interpretation of this is difficult given the initial drop in scores following the baseline 1 period (mean=75.6). Conversely, patient C made rapid gains following a baseline 1 mean of 73.4 to a treatment 1 mean of 80. These gains were lost following a drop in reported checklist scores during the second treatment phase to a mean of 76.7. In contrast, group 2 patients, who received memory retraining prior to the attentional retraining, appeared to benefit more from the treatment. Patient 1 had the most variable results in this group; improving initially after baseline 1 (means=60.5 to 64.3), experiencing a decrease in performance through phase two of treatment (mean=61.6) and then picking up again during baseline 2 (mean=66.7). Patients 2 and 3 demonstrated a steady improvement in their checklist scores between baselines 1 and 2 (patient 2 means=62.5 to 98.8, patient 3 means=58.3 to 90.8), with patient 3 making most gains early on and patient 2 appearing to consolidate his grasp of the techniques during baseline 2.

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Insert Figures 2 and 3 about here

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Insert Table 1 about here

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It was also possible to examine the four subscales of the cognitive checklist; memory, attention, memory aids and meta-memory in this fashion (see *Appendices 4.7* and *4.8*). The memory subscale trends were similar to those for the total checklist scores in that patient A's scores decreased while those of patients' 2 and 3 steadily improved through the study. The attention subscale scores did not reflect overall trends. Patient B recorded improvements in concentration only during baseline 2, long after the attentional retraining, while patients 2 and 3 reported improvements on this subscale prior to receiving attentional retraining. On the memory aids subscale, group 1 patients showed marked fluctuation across study phases, while all group 2 patients made steady gains on this subscale. There were no clear or

noteworthy trends from the meta-memory data. Due to the lack of clarity and consistency, no further analysis was carried out on these subscales.

*Interrupted time series analysis*

Cognitive checklist scores were autocorrelated in (see *Table 2*). At a lag of 1 three subjects' data was found to be significantly serially dependent (patients A, 2 and 3). A fourth patient's data was also close to significant serial dependency (patient B). Therefore, standard group measures were not used for analysis.

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Insert Table 2 about here

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Interrupted time series analysis was carried out between baseline 1 and treatment 1, treatments 1 and 2, treatment 2 and baseline 2, and baselines 1 and 2 total cognitive checklist scores for each patient (see *Table 3*). While visual inspection of this data had shown the trends described above, only two of the twenty-four groupings were significantly different statistically. The consistent improvements demonstrated by patients 2 and 3 were revealed to be significant between the two baselines at the $p<0.05$ and $p=0.01$ levels respectively.

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Insert Table 3 about here

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*Descriptive statistics: cognitive checklist scores and neuropsychological assessment data*

All six patients' pre- and post-treatment neuropsychological test percentiles can be viewed in *Tables 4* and *5*. In general, the trend of cognitive checklist scores was mirrored by that of the more objective neuropsychological assessment data. Group 1 patient's scores were mixed. Only 14% of patient A's scores increased between the two test periods, while 38% remained within the same percentile grouping and 48% decreased. Most of patient A's decreasing scores were within the memory tests. Patient B had a specific difficulty with story recall and delayed recall on re-testing, outwith this 62% of his scores increased, 10% remained within the same percentile grouping and 29% decreased. This reflects the increasing trend of his

checklist scores if the initial high baseline 1 scores are discounted. There was minor improvement (33%) in patient C's scores, although most tended to remain within the same percentile grouping (48% (19% decreased)). Group 2 patients again demonstrated clear improvement in their cognitive profiles. Patient 1 had the clearest and largest neuropsychological percentile increase of all six subjects (71% (23% remained the same, 5% decreased)) despite only mild improvement evident in his checklist scores. Patient 2 presented an equally encouraging picture with 62% of his scores improving (29% remained the same, 10% decreased). As patient 3 had reported such large and consistent gains in his cognitive checklist scores it would have been anticipated that his formal assessment would also have substantially improved. However, he fell below not only patients 1 and 2 but patient B as well in terms of the proportion of his scores which improved over the assessment period.

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Insert Tables 4 and 5 about here

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*Chi-squared analysis*

Both groups' pre- and post-treatment neuropsychological percentiles were placed into seven categories (see *Appendix 4.9*) and analysed using the chi-squared statistic. Corresponding to patterns observed in the cognitive checklist data, there was no significant change between assessment periods in group 1's scores ($p>0.1$, $df=6$, $\chi^2=1.371$) and a significant difference between group 2's scores ($p<0.02$, $df=6$, $\chi^2=15.396$).

# Discussion

The hypothesis that patients will benefit most from memory retraining preceded by attentional retraining was not supported by analysis of either the checklist or neuropsychological data. The opposite effect was observed in two cases. In interpreting this finding it may be important to consider the nature of the cognitive rehabilitation offered. Problems with the execution of the study which may have confounded the results are discussed. Also, the value of the single case series methodology in this type of research is emphasised.

There was much individual variability in patients' response to treatments with self-reported cognitive checklist scores worsening (patient A), fluctuating (patients B, C and 1), and improving to different degrees and in different phases of the study (patients 2 and 3). Essentially, these checklist scores appear to have been valid markers of patient's abilities as their patterns of change were mirrored by the more objective neuropsychological assessment data taken before and after treatment. Therefore, previous assertions that there may often be discrepancies between neuropsychological profiles and self-perception of memory performance (*e.g.* Neisser, 1978) were generally not supported. The self-report measure used in this study appears to provide a useful measure of clinical change as well as patients' perceptions of the level of meaningful improvement (or otherwise) in their daily lives. The only anomaly here was patient 1 whose neuropsychological assessment revealed him to have improved far more than was anticipated by his self-report.

The variation in patient responding and the inability of this study to support the experimental hypothesis may be due, in part at least, to the nature of the treatments offered. Little consideration has been given to clearly defining and understanding the mechanisms of remedial cognitive treatments; precisely which levels of processing they are targeting. It is possible that the combination of memory treatments used in this study were more generic in their scope than the group of attentional treatments as the former may have subsumed some of the latter's constructs. Examining the individual treatments does reveal some commonalties between the two supposedly distinct packages. For example, the attentional scanning technique involved developing the patients' sensory awareness to increase their attentional capacity and span while the visualisation strategies which preceded mnemonic training also relied on developing sensory awareness. In attempting to develop a more theoretically based rehabilitation system for cognitively impaired individuals it may be important to return to investigating the distinct treatments more thoroughly.

The absence of clear patterns within the cognitive checklist's subscales may also attest to underlying commonalties between treatment packages. Attention and memory subscales of the checklist did not appear to improve independently of each other in response to the corresponding treatments. Treatment effects were cumulative rather than specific.

It is not possible, however, to attribute the current findings to any exclusive explanation. This is due to three confounding factors in the experiment. While patients were initially screened for current psychiatric problems, patient A developed major depression during the course of the study. This is likely to account for his perceived and actual decline in cognitive ability over the six month period.

The main confounding factors in this study were, however, patient motivation and homework compliance, noted to be important factors in the therapeutic process (Burns and Nolen-Hoeksema, 1991). The two patients with the greatest self-reported treatment gains (patients 2 and 3) were enthusiastic collaborators in treatment and reported completing the majority of their homework assignments, providing anecdotal accounts of their experiences. For example, patient 3 remarked of the structured sensory development of the visualisation and scanning strategies that "they have given me a new way of looking at the world. Everything seems clearer and more interesting now". In contrast, all other participants in the study received treatment passively and rarely attempted practising the new techniques outwith treatment sessions. That motivation and treatment compliance appeared to be so important precludes a total rejection of the working hypothesis. Rather, it is hoped that this work will be developed further by conducting a study which controls for patient motivation/homework compliance as well as manipulating stages of cognitive rehabilitation.

Working closely with individual patients who acted as their own controls as well as having membership of experimental groups has allowed detailed examination of some of the many factors in operation within the study. The behavioural methodology employed here is surely deserving of development and more mainstream attention in the behavioural analysis literature.

Conclusively ascertaining the appropriateness of sequencing attentional and memory retraining is an important step along the, as yet, fairly untrodden road of theoretically grounded cognitive rehabilitation. It is vital that more work is undertaken in this field, understanding the nature of the treatments offered and rigorously testing their application in order to expand and improve the planning and delivery of rehabilitation services for individuals with brain-injury.

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# Figure 1

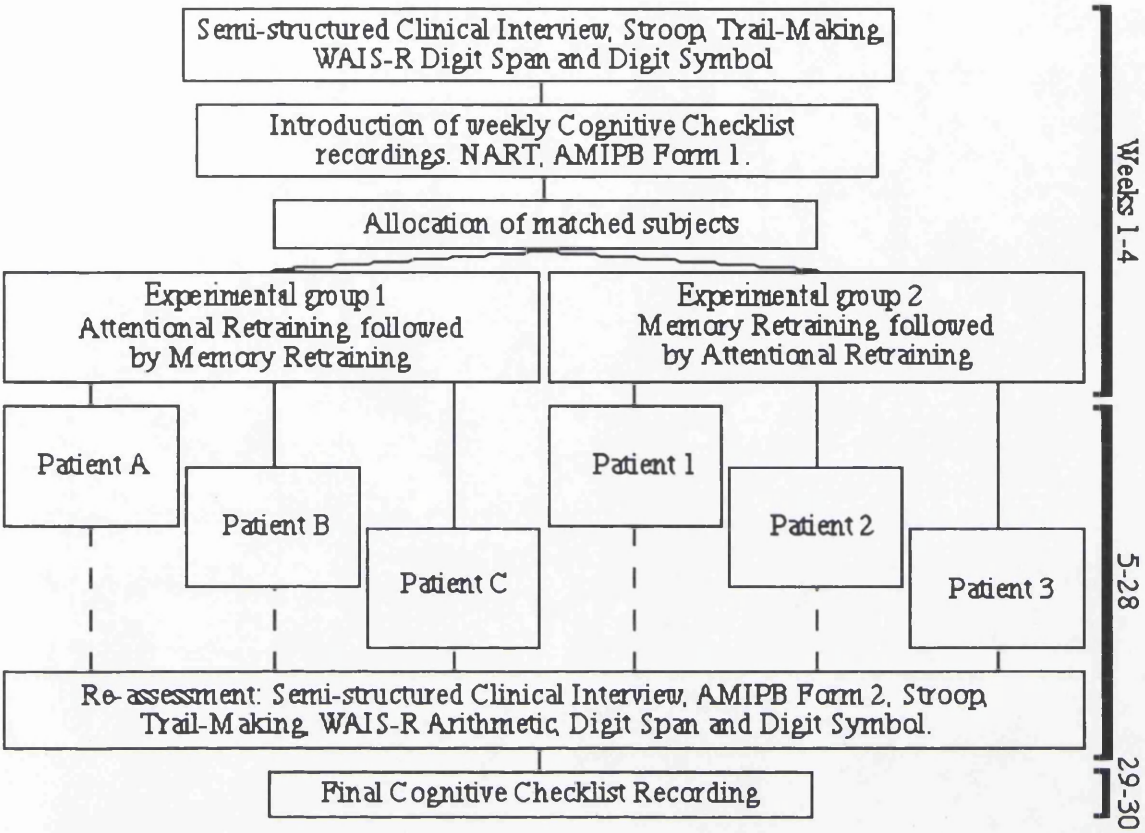


*Figure 1: Flow chart of design*

Figures 2 and 3

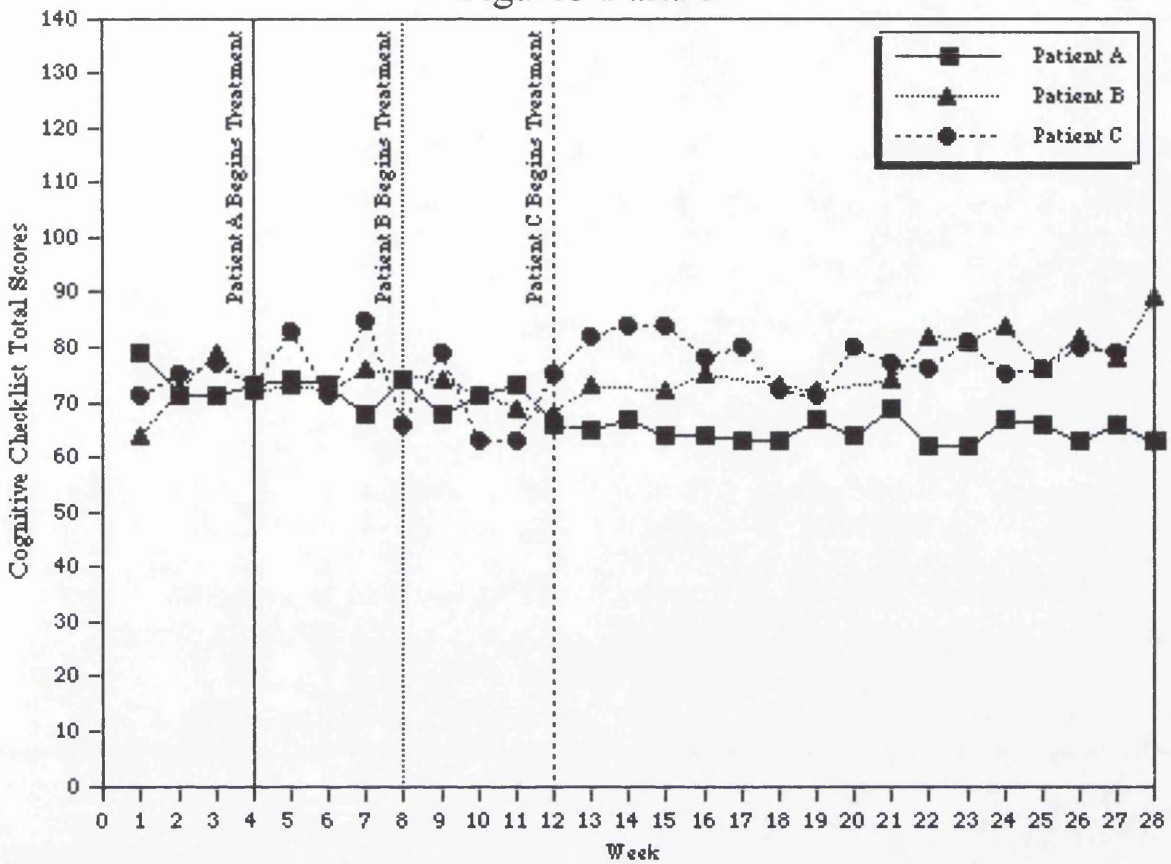


*Figure 2: Total weekly cognitive checklist scores for patients A, B and C receiving Attentional retraining followed by Memory treatment*

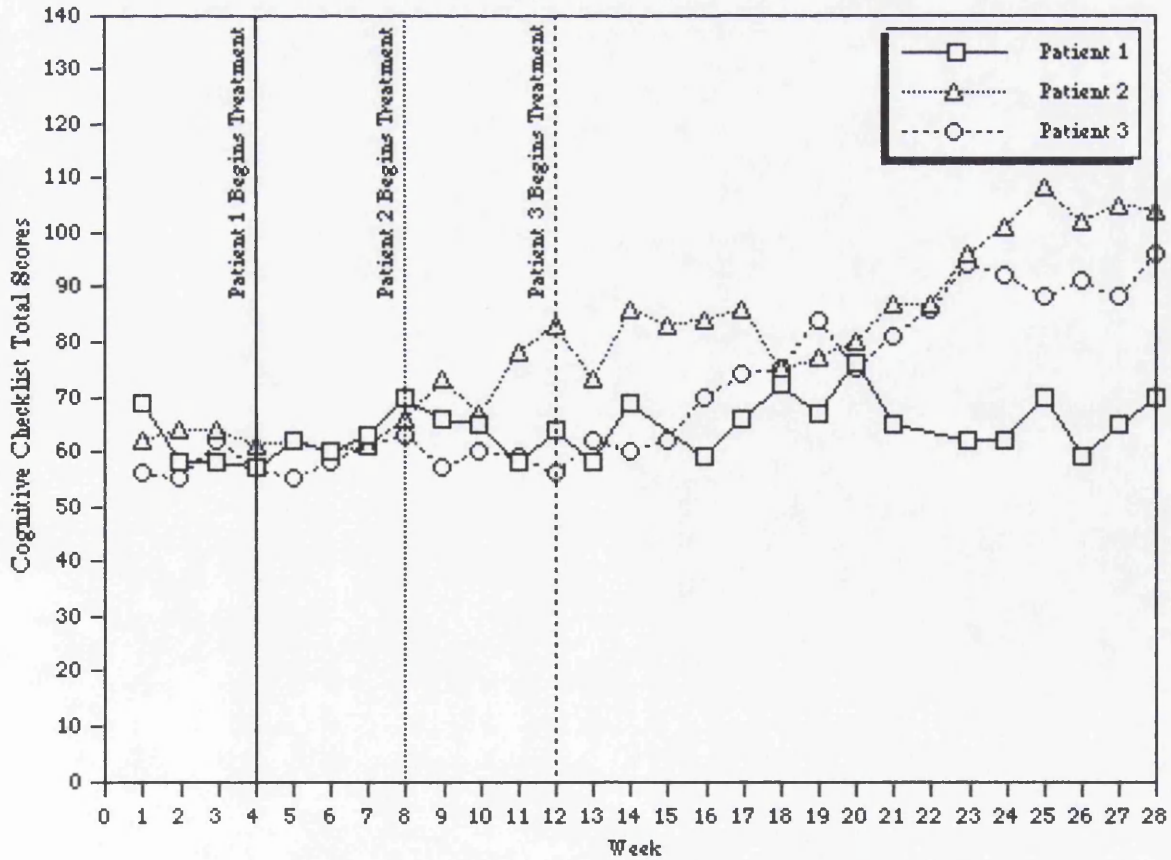


*Figure 3: Total weekly cognitive checklist scores for patients 1, 2 and 3 receiving Memory treatment followed by Attentional retraining*

Table 1

| Phase | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **1** | **2** | **3** |
| **Baseline 1 $r^2$** | **0.377** | **0.252** | **0.089** | **0.668** | **0.001** | **0.051** |
| mean | 73.5 | 75.571 | 73.417 | 60.5 | 62.5 | 58.25 |
| *SD* | *3.786* | *4.614* | *7.128* | *5.686* | *2* | *2.735* |
| **Intervention 1 $r^2$** | **0.209** | **0.110** | **0.635** | **0.373** | **0.444** | **0.925** |
| mean | 71.333 | 71 | 80 | 64.333 | 76.667 | 67.167 |
| *SD* | *2.805* | *2.944* | *4.561* | *3.502* | *7.062* | *6.646* |
| **Intervention 2 $r^2$** | **0.597** | **0.067** | **0.106** | **0.014** | **0.347** | **0.601** |
| mean | 66.5 | 73 | 76.667 | 61.6 | 80.833 | 85.333 |
| *SD* | *3.391* | *1.414* | *3.615* | *4.827* | *4.262* | *7.033* |
| **Baseline 2 $r^2$** | **0.000** | **0.242** | **0.519** | **0.100** | **0.722** | **0.516** |
| mean | 64.583 | 80.75 | 78.333 | 66.727 | 98.75 | 90.75 |
| *SD* | *2.314* | *4.743* | *2.082* | *4.962* | *8.031* | *3.775* |
| **Total $r^2$** | **0.599** | **0.443** | **0.051** | **0.112** | **0.862** | **0.846** |
| mean | 67.714 | 75.217 | 76.148 | 64.231 | 79.821 | 70.607 |
| *SD* | *4.463* | *5.649* | *5.985* | *5.125* | *15.095* | *14.169* |

*Table 1: Total Cognitive Questionnaire slopes, means and standard deviations for the four phases of the study (and overall total).*

# Tables 2 and 3

| | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **1** | **2** | **3** |
| Autocorrelation (lag 1) | 0.493 | 0.373 | 0.051 | 0.093 | 0.850 | 0.859 |
| Standard error | 0.179 | 0.196 | 0.182 | 0.185 | 0.179 | 0.179 |
| Box-Ljung statistic | 7.552 | 3.628 | 0.077 | 0.252 | 22.484 | 22.959 |
| Probability | 0.006 | 0.057 | 0.781 | 0.616 | 0.000 | 0.000 |

*Table 2: Autocorrelation statistics*

| | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| | **A** | **B** | **C** | **1** | **2** | **3** |
| Baseline 1 / Intervention 1 **F**= | 0.95 | 0.20 | 3.15 | 0.41 | 1.18 | 1.49 |
| **p**= | 0.448 | 0.827 | 0.077 | 0.682 | 0.351 | 0.261 |
| Interventions 1 and 2 **F**= | 1.34 | 1.01 | 1.61 | 2.20 | 1.37 | 0.42 |
| **p**= | 0.321 | 0.461 | 0.266 | 0.192 | 0.315 | 0.675 |
| Intervention 2 / Baseline 2 **F**= | 0.43 | 0.61 | 1.54 | 1.34 | 1.07 | 2.60 |
| **p**= | 0.658 | 0.568 | 0.320 | 0.301 | 0.348 | 0.168 |
| Baselines 1 and 2 **F**= | 3.67 | 0.48 | 2.17 | 2.53 | 5.35 | 7.11 |
| **p**= | 0.057 | 0.630 | 0.165 | 0.129 | *0.024* | *0.010* |

*Table 3: ITSAcorr overall tests of change and intercept in slope*

Tables 4 and 5

| | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| | A | B | C | 1 | 2 | 3 |
| Stroop C | 100 | 100 | 100 | 100 | 8-9 | 100 |
| Stroop CW | 2-3 | 35 | 8-9 | 78 | <2 | <2 |
| Trails A | 10-25 | 25-50 | 10-25 | 10-25 | 10-25 | 10-25 |
| Trails B | 10-25 | <10 | 10-25 | 10-25 | <10 | 25-50 |
| WAIS-R Arithmetic | 16 | 25 | 25 | 50 | 9 | 37 |
| WAIS-R Digit Span | 16 | 25 | 37 | 16 | 9 | 75 |
| WAIS-R Digit Symbol | 5 | 9 | 63 | 37 | 2 | 9 |
| * Info. Processing | 10-25 | <10 | 25-50 | <10 | < cut off | < cut off |
| * Story (Immediate) | 10 | 50-75 | >90 | < cut off | 25-50 | 25-50 |
| * Story (Delay) | 10-25 | 75 | 75-90 | < cut off | 50-75 | 25-50 |
| * Story (Retained) | 50-75 | 25-50 | 10-25 | 25-50 | >90 | 25-50 |
| * Lists (Total) | < cut off | < cut off | < cut off | < cut off | 10-25 | 10-25 |
| * Lists (Interference) | 25-50 | 10 | 10 | 10 | 75 | 25-50 |
| * Lists (Recall) | < cut off | < cut off | < cut off | < cut off | 50 | 10-25 |
| * Figure (Copy) | 50-75 | <10 | >90 | 10-25 | >90 | <10 |
| * Figure (Immediate) | 10-25 | < cut off | 50-75 | < cut off | <10 | 90 |
| * Figure (Delay) | 10-25 | cut off | 75-90 | < cut off | 10-25 | 50-75 |
| * Figure (retained) | 25-50 | >90 | >90 | < cut off | >90 | 10-25 |
| * Design (Total) | 10-25 | 25 | 75 | 25-50 | < cut off | >90 |
| * Design (Interference) | 50-75 | <10 | 75-90 | < cut off | 10 | >90 |
| * Design (Recall) | 25-50 | 10-25 | 50 | 90 | 10-25 | 75 |

* *Denotes AMIPB Form 1 Subtest*

*Table 4: Pre-Treatment Neuropsychological Test Percentiles*

| | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| | A | B | C | 1 | 2 | 3 |
| Stroop C | 78 | 76 | 100 | 100 | 100 | 100 |
| Stroop CW | 14-16 | 50-52 | 70 | 78 | 20-24 | 20-24 |
| Trails A | 10-25 | 25-50 | 25-50 | 50-75 | 25-50 | 10-25 |
| Trails B | 10-25 | 10-25 | 10-25 | 25-50 | 10-25 | 25-50 |
| WAIS-R Arithmetic | 25 | 50 | 37 | 75 | 16 | 25 |
| WAIS-R Digit Span | 16 | 50 | 63 | 16 | 5 | 63 |
| WAIS-R Digit Symbol | 5 | 9 | 84 | 91 | 5 | 16 |
| * Info. Processing | 50-75 | 10-25 | 50-75 | 50-75 | < cut off | 25-50 |
| * Story (Immediate) | <10 | 25-50 | >90 | <10 | 50 | >90 |
| * Story (Delay) | <10 | 10 | 75-90 | <10 | 50-75 | 75-90 |
| * Story (Retained) | 10-25 | < cut off | 10-25 | >90 | >90 | 25-50 |
| * Lists (Total) | < cut off | 25-50 | < cut off | 10-25 | 75-90 | 50 |
| * Lists (Interference) | 10 | <10 | 25 | < cut off | <10 | 25 |
| * Lists (Recall) | < cut off | 10-25 | < cut off | cut off | >90 | 90 |
| * Figure (Copy) | < cut off | >90 | >90 | >90 | >90 | >90 |
| * Figure (Immediate) | 10-25 | 10-25 | 25-50 | 50 | 25-50 | 75-90 |
| * Figure (Delay) | < cut off | 10-25 | 50-75 | 50-75 | 25-50 | 50-75 |
| * Figure (retained) | <10 | 75 | >90 | >90 | 25-50 | 10-25 |
| * Design (Total) | 10-25 | 75 | 50 | 25-50 | 25-50 | 50-75 |
| * Design (Interference) | 25 | 50 | 25 | 25 | 25-50 | 25 |
| * Design (Recall) | 10 | 25-50 | >90 | 90 | >90 | >90 |

* *Denotes AMIPB Form 2 Subtest*

*Table 5: Post-Treatment Neuropsychological Test Percentiles*

# Single Case Series Research Study I
# Psychological Treatment of Post-Stroke Emotional Lability: A Three Case Study Series

Helen C. Payne

Prepared for submission to the *Journal of Consulting and Clinical Psychology*

(full article held separately within the University for patient confidentiality)

# Psychological Treatment of Post-Stroke Emotional Lability: A Three Case Study Series

Helen C. Payne. Department of Psychological Medicine, University of Glasgow.

*Abstract*

Emotional lability is a common psychological sequelae of stroke with a prevalence of around 15% at one month rising to 41% up to five years post stroke (House *et al.*, 1989; Hütter, Gilsbach and Kreitschmann, 1995; Morris, Robinson, and Raphael, 1993). However, this disorder has not received much theoretical or clinical attention. There is much confusion as to its definition and mechanisms, with correspondingly few treatment guidelines. Published studies reporting on treatments for this disorder have generally focused only on the use of anti-depressant medication. The current paper reviews the organic and functional aspects of emotional lability and identifies the importance of anxiety as a cause and modulating feature potentially accessible to treatment. Three patients with post-stroke emotional lability are described and their effective treatment with behavioural anxiety management techniques reported.

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# Single Case Research Study II
# Traumatic brain injury, depression and cannabis use - assessing their effects on a cognitive performance. A single case study

Helen C. Payne

Prepared for submission to *Brain Injury*

(full article held separately within the University for patient confidentiality)

# Traumatic brain injury, depression and cannabis use - assessing their effects on a cognitive performance. A single case study

Running Head: TBI, depression and cannabis.

Helen C. Payne. Department of Psychological Medicine, University of Glasgow.

*Abstract*

It is often the case that patients present for assessment or treatment with a variety of factors which are potentially important in their pathology. In working with an individual patient, RB, who presented with a history of traumatic brain injury along with current depression and cannabis use, it was unclear initially whether or not his cognitive impairment was a permanent result of the brain injury, or a temporary effect of his mood and/or drug use. The literature offers few guidelines or precedents for understanding such complex cases or suggesting at which level it may be most appropriate to intervene. Treating RB's mood disorder resulted in larger neuropsychological gains than would have been anticipated in the literature. RB, is presented here as a single case study demonstrating the importance of developing a more thorough understanding of the interactions of patient variables and also of the impact of mood disorder on cognitive performance.

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# Single Case Research Study III
# Treatment failure in chronic disordered eating. A single case study.

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Prepared for submission to *Addiction*

(full article held separately within the University for patient confidentiality)

# Treatment failure in chronic disordered eating. A single case study.

Running Head: Treatment failure in chronic ED

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*Abstract*

The case is presented of patient EW, a consideration of whose chronic pattern of disordered eating may help to broaden the conception and definition of what constitutes an eating disorder. Current definitions of disordered eating focus on relatively fixed patterns of anorexic or bulimic behaviours. Little attention is paid to the presence of any regular fluctuations or cycles of behaviour and the implications these have for the understanding and treatment of patients. Treatment failure in patient EW is discussed in terms of a pathology not previously described in the literature, but amenable to Prochaska and DiClemente's (1984) transtheoretical model.

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# Appendix 1
# Smale Scale Service Related Project

# Appendix 1.1: Selected Journal and Contributor's Notes

**Notes for Contributors**

Papers, articles and other contributions should be sent to the Editor, Health Bulletin, Scottish Office Department of Health, Room 143, St Andrew's House, Edinburgh EH1 3DE. They must be submitted exclusively for Health Bulletin. Acceptance is on the understanding that editorial revision may be necessary. All papers are reviewed by the Editor and by peer review, referees being drawn from a panel of appropriate professionals in the NHS in Scotland. No correspondence can be entered into about articles found unsuitable and returned to authors.

Material submitted for publication must be typewritten on one side of the paper only, in double spacing and with adequate margins and each page should be numbered. The top typed copy should be submitted, with four other copies. All papers should be prefaced by a structured Abstract, of about 250 words in length. It should normally contain 6 clearly headed sections entitled Objective, Design, Setting, Subjects, Results and Conclusion. The name, appointment and place of work of the authors should be supplied on a separate title page. This same page should include the full postal address of one author, to whom correspondence and reprints will be directed. There should be adequate references to any relevant previous work on the subject; these references should appear at the end of the material on a separate page or pages, using the Vancouver style, which in the case of papers in journals includes:

Surname and initials of author(s)
Title of paper
Full name of Journal
Year published
Volume number
Opening and closing page numbers

Reference to books should similarly include author's name and initials, full title, edition (if necessary), place of publication, publisher's name, year, and if required volume number, chapter number or page number.

**Short Communications.** The Bulletin now publishes short communications (not exceeding three pages in length) as a separate section, and we aim to offer speedier publication for these. Material intended for this section should be submitted in the above form, and the covering letter should state the intention.



**Proofs**

Contributors will receive one set of proofs. It should be read carefully for printer's errors, and any tables, figures and legends should be checked. Alterations should be kept to a minimum, and the proofs should be promptly returned.

**Reprints**

One hundred reprints will be supplied free of charge. A limited extra number (for which a charge will be made) may be ordered from the Editor when the proofs are returned.

# Appendix 1.2: EPPIC Formulatory Categories

Problems/Disorders of:

Adjustment to physical illness

Behaviour/conduct

Cognitive function

Emotion

Habit/dependency

Personality disorder

Psychosomatic biological functioning

Relationships

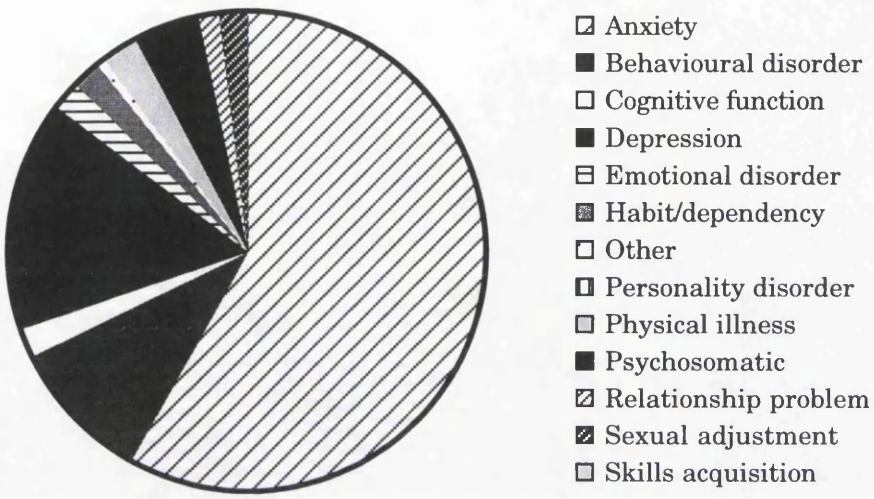
Sexual adjustment

Skills acquisition

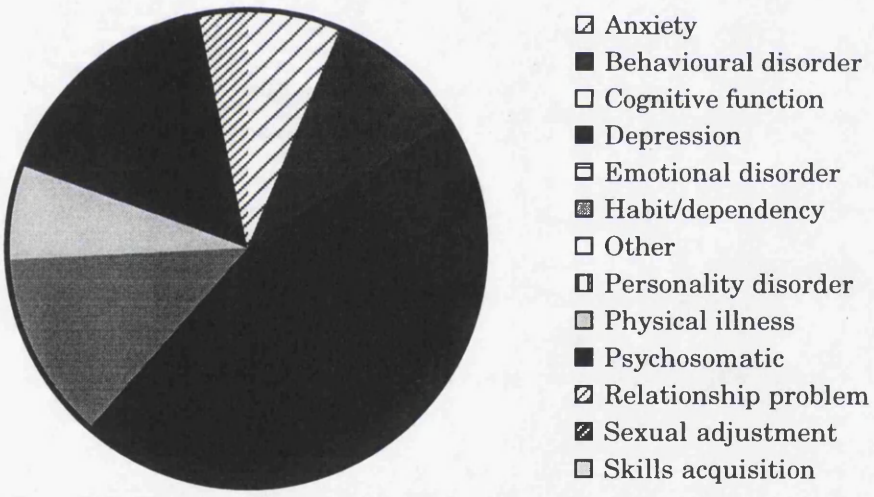
(Other)

# Appendix 1.3: Referred and Diagnosed Problem Frequencies

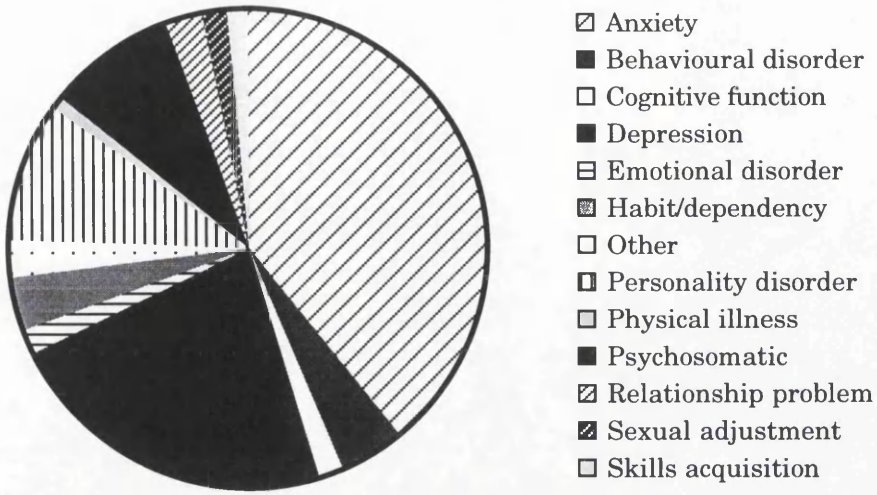
Pictorial and numerical representations of primary and secondary referred and diagnosed problems. Additionally, *table A2* presents the distribution of concordance rates between referred and diagnosed problems and the outlines the various categories of non-concordance.



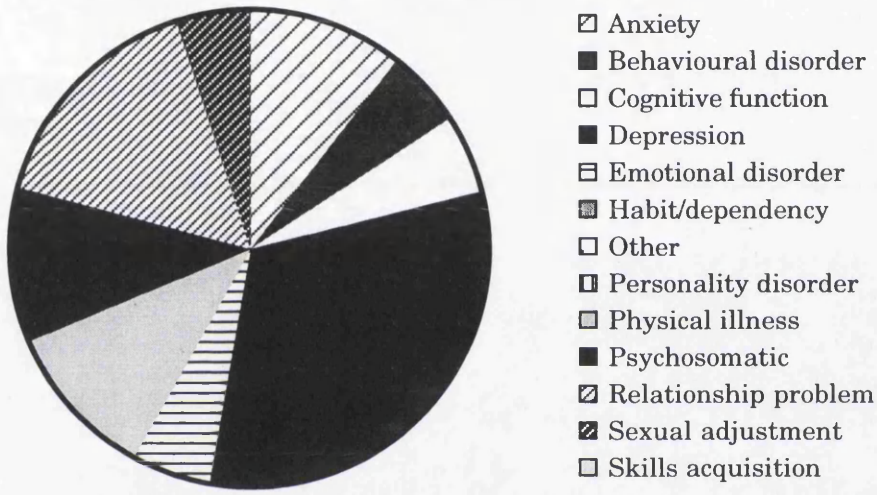

*Appendix 1 Figure 1: Proportions of referred primary problems coded in EPPIC (n=155)*




*Appendix 1 Figure 2: Proportions of referred secondary problems coded in EPPIC (n=31)*




*Appendix 1 Figure 3: Proportions of diagnosed primary problems coded in EPPIC (n=115)*




*Appendix 1 Figure 4: Proportions of diagnosed secondary problems coded in EPPIC (n=19)*

| EPPIC Category | Referred primary problem *n*=155 | Referred secondary problem *n*=31 | Overall referrals *n*=186 | Diagnosed primary problem *n*=115 | Diagnosed secondary problem *n*=19 | Overall diagnoses *n*=134 |
|---|---|---|---|---|---|---|
| Anxiety | 58 | 6.5 | 49.5 | 39 | 10.5 | 35 |
| Behavioural disorder | 10 | 10 | 10 | 4 | 5 | 4.5 |
| Cognitive function | 2 | 0 | 1.5 | 2 | 5 | 2.5 |
| Depression | 15 | 45 | 20.5 | 22.5 | 32 | 23 |
| Emotional disorder | 2 | 0 | 1.5 | 2 | 5 | 2.5 |
| Habit/dependency | 2 | 13 | 4 | 3.5 | 0 | 3 |
| Other | 1 | 0 | 0.5 | 2 | 0 | 2.5 |
| Personality disorder | 0 | 0 | 0 | 9.5 | 0 | 8 |
| Physical illness | 2.5 | 6.5 | 3 | 1 | 10.5 | 2.5 |
| Psychosomatic | 4.5 | 16 | 6.5 | 9 | 10.5 | 9 |
| Relationship problem | 1 | 3 | 1.5 | 2.5 | 16.5 | 4.5 |
| Sexual adjustment | 2 | 0 | 1.5 | 2 | 5 | 2.5 |
| Skills acquisition | 0 | 0 | 0 | 1 | 0 | 0.5 |

*Appendix 1 Table 1: Frequency distribution of percentages of referred and diagnosed problems*

| Category of concordance | Number | Percentage |
|---|---|---|
| Perfect | 53 | 47 |
| Referral matched, but secondary diagnosis not anticipated in referral | 6 | 5 |
| Primary referral matched, but additional unmatched secondary referral | 5 | 4 |
| Primary referral matched, secondary referral incorrect | 1 | 1 |
| Primary referral matched the secondary diagnoses | 4 | 3.5 |
| Secondary referral matched the primary diagnoses | 6 | 5 |
| Secondary referral matched the primary diagnoses, secondary diagnosis not anticipated in referral | 1 | 1 |
| None | 39 | 34 |

*Appendix 1 Table 2: Degree of concordance between primary referred and diagnosed problems (n=115)*

# Appendix 1.4: Patterns of Initial and In-Treatment Non-Attendance

A variety of tables presenting, where appropriate, the means and standard deviations and/or percentages of patients in each of the six different treatment categories. While, for the purposes of analysis, only the "first appointment DNA", "dropped out of treatment", "still in treatment" and "completed treatment" categories were used, the complete data set is presented for accuracy.

| Category | Number | | |
|---|---|---|---|
| | **Total (overall %)** | **Female** | **Male** |
| First appointment DNA (%) | 41 (27) | 24 (58.5) | 17 (41.5) |
| Referred on early in treatment (%) | 13 (8) | 2 (15) | 11 (85) |
| Treatment not appropriate (%) | 3 (2) | 1 (33) | 2 (67) |
| Dropped out of treatment (%) | 43 (28) | 28 (65) | 15 (35) |
| Still in treatment (%) | 23 (15) | 15 (65) | 8 (35) |
| Treatment complete (%) | 32 (20) | 22 (69) | 10 (31) |

*Appendix 1 Table 3: Distribution of gender according to attendance categories (n=155)*

| Category | **Mean Age, Years (SD)** | **Mean Waiting Time, Days (SD)** |
|---|---|---|
| First appointment DNA | 35.29 (11) | 100.8 (42) |
| Referred on early in treatment | 29.805 (5) | 99.6 (44.4) |
| Treatment not appropriate | 48.793 (19.8) | 101.667 (13.6) |
| Dropped out of treatment | 34.474 (11.5) | 85.442 (45.3) |
| Still in treatment | 40.705 (13) | 104.87 (42.9) |
| Treatment complete | 39.363 (14.5) | 99.594 (47.3) |

*Appendix 1 Table 4: Mean age and waiting times (and standard deviations) of different attendance groups (n=155)*

| Category | **Routine** | **Soon** | **Urgent** |
|---|---|---|---|
| First appointment DNA (%) | 30 (81) | 4 (11) | 3 (8) |
| Referred on early in treatment (%) | 9 (70) | 2 (15) | 2 (15) |
| Treatment not appropriate (%) | 3 (100) | 0 | 0 |
| Dropped out of treatment (%) | 29 (62) | 11 (23) | 7 (15) |
| Still in treatment (%) | 20 (87) | 3 (13) | 0 |
| Treatment complete (%) | 25 (78) | 4 (12.5) | 3 (9.5) |

*Appendix 1 Table 5: Urgency of referrals of different attendance groups (n=155)*

| Category | **Number in Post Code Group (%)** | | | |
|---|---|---|---|---|
| | **Postal Area 1** | **Postal Area 2** | **Postal Area 3** | **Postal Area 4** |
| First appointment DNA | 1 (0.5) | 16 (10.5) | 24 (16) | 0 |
| Referred on early in treatment | 0 | 4 (2.5) | 8 (5) | 1 (0.5) |
| Treatment not appropriate | 0 | 2 (1) | 1 (0.5) | 0 |
| Dropped out of treatment | 0 | 20 (13.5) | 23 (15) | 0 |
| Still in treatment | 1 (0.5) | 11 (7) | 11 (7) | 0 |
| Treatment complete | 0 | 16 (10.5) | 15 (9.5) | 1 (0.5) |

*Appendix 1 Table 6: Distribution of attendance categories based on geographical location (n=155)*

| Category | Number in Group | | | |
|---|---|---|---|---|
| | GP | Psychiatrist | Medic | Other |
| First appointment DNA (%) | 33 (80.5) | 5 (12) | 3 (7.5) | 0 |
| Referred on early in treatment (%) | 10 (77) | 3 (23) | 0 | 0 |
| Treatment not appropriate (%) | 1 (33) | 2 (67) | 0 | 0 |
| Dropped out of treatment (%) | 35 (81.5) | 7 (16.5) | 1 (2) | 0 |
| Still in treatment (%) | 18 (78) | 4 (17) | 0 | 1 (5) |
| Treatment complete (%) | 26 (81) | 5 (16) | 1 (3) | 0 |

*Appendix 1 Table 7: Distribution of attendance categories based on referral source (n=155)*

| GP Practice | Number in Category (%) | | | | | |
|---|---|---|---|---|---|---|
| | First DNA | Referred on | Not appropriate | Dropped out | In treatment | Complete |
| 1 | | | | | | 1 (4) |
| 2 | | 1 (10) | | | | 1 (4) |
| 3 | | 1 (10) | | | | |
| 4 | 1 (3) | 1 (10) | | 4 (11) | 5 (28.5) | 1 (4) |
| 5 | | | | | 1 (5.5) | 1 (4) |
| 6 | | | 1 (100) | | | 1 (4) |
| 7 | 5 (15) | | | 7 (20) | 2 (11) | 2 (7) |
| 8 | | | | 1 (3) | | |
| 9 | 1 (3) | | | 1 (3) | 1 (5.5) | 2 (7) |
| 10 | | | | 1 (3) | | 2 (7) |
| 11 | | 1 (10) | | | | |
| 12 | 2 (6) | | | | | |
| 13 | | 1 (10) | | | | |
| 14 | 1 (3) | | | 1 (3) | 1 (5.5) | 1 (4) |
| 15 | | | | | | 1 (4) |
| 16 | 1 (3) | | | | | 1 (4) |
| 17 | 1 (3) | | | 2 (5.5) | | |
| 18 | 1 (3) | | | | | |
| 19 | 3 (9) | 2 (20) | | 5 (14) | 2 (11) | 3 (11.5) |
| 20 | 1 (3) | | | 2 (5.5) | 1 (5.5) | 3 (11.5) |
| 21 | 2 (6) | 1 (10) | | | | 1 (4) |
| 22 | 5 (15) | | | 1 (3) | 1 (5.5) | |
| 23 | 7 (22) | 2 (20) | | 8 (23) | 2 (11) | 3 (11.5) |
| 24 | 1 (3) | | | | | |
| 25 | | | | | 1 (5.5) | |
| 26 | | | | | | 1 (4) |
| 27 | | | | | | 1 (4) |
| 28 | 1 (3) | | | | | |
| 29 | | | | 1 (3) | | |
| 30 | | | | 1 (3) | 1 (5.5) | |
| Total | 33 | 10 | 1 | 35 | 18 | 26 |

*Appendix 1 Table 8: Distribution of referrals from GP practices amongst attendance categories (n=123)*

| EPPIC Category | Number in Category (%) | | | | | |
|---|---|---|---|---|---|---|
| | First DNA | Referred on | Not approp. | Dropped out | In treatment | Complete |
| Anxiety | 25 (46) | 7 (46) | 3 (75) | 30 (61) | 12 (41) | 15 (42) |
| Behavioural disorder | 7 (13) | 4 (27) | 0 | 4 (8) | 3 (10) | 0 |
| Cognitive function | 1 (2) | 0 | 0 | 1 (2) | 0 | 1 (3) |
| Depression | 10 (18) | 0 | 0 | 9 (19) | 6 (21) | 11 (36) |
| Emotional disorder | 1 (2) | 0 | 0 | 0 | 1 (3.5) | 1 (3) |
| Habit/dependency | 4 (7) | 2 (13) | 0 | 0 | 1 (3.5) | 0 |
| Other | 0 | 0 | 0 | 0 | 1 (3.5) | 0 |
| Personality disorder | 0 | 0 | 0 | 0 | 0 | 0 |
| Physical illness | 2 (4) | 0 | 0 | 2 (4) | 0 | 2 (5) |
| Psychosomatic | 2 (4) | 1 (7) | 1 (25) | 2 (4) | 3 (10.5) | 3 (8) |
| Relationship problem | 1 (2) | 0 | 0 | 1 (2) | 1 (3.5) | 1 (3) |
| Sexual adjustment | 1 (2) | 1 (7) | 0 | 0 | 1 (3.5) | 0 |
| Skills acquisition | 0 | 0 | 0 | 0 | 0 | 0 |

*Appendix 1 Table 9: Distribution of all EPPIC referred problems amongst attendance categories (n=186)*

| EPPIC Category | Number in Category (%) | | | | | |
|---|---|---|---|---|---|---|
| | First DNA | Referred on | Not approp. | Dropped out | In treatment | Complete |
| Anxiety | 0 | 2 (20) | 0 | 18 (33) | 12 (39.5) | 15 (42) |
| Behavioural disorder | 0 | 1 (10) | 0 | 3 (5.5) | 2 (6.5) | 0 |
| Cognitive function | 0 | 1 (10) | 0 | 1 (2) | 1 (3) | 0 |
| Depression | 0 | 0 | 1 (33) | 11 (20) | 5 (16) | 15 (42) |
| Emotional disorder | 0 | 0 | 0 | 1 (2) | 2 (6.5) | 0 |
| Habit/dependency | 0 | 0 | 0 | 3 (5.5) | 1 (3) | 0 |
| Other | 0 | 0 | 0 | 3 (5.5) | 0 | 0 |
| Personality disorder | 0 | 5 (50) | 1 (33) | 3 (5.5) | 2 (6.5) | 0 |
| Physical illness | 0 | 0 | 0 | 2 (4) | 1 (3) | 0 |
| Psychosomatic | 0 | 1 (10) | 0 | 4 (7.5) | 2 (6.5) | 5 (13) |
| Relationship problem | 0 | 0 | 0 | 3 (5.5) | 2 (6.5) | 1 (3) |
| Sexual adjustment | 0 | 0 | 1 (33) | 1 (2) | 1 (3) | 0 |
| Skills acquisition | 0 | 0 | 0 | 1 (2) | 0 | 0 |

*Appendix 1 Table 10: Distribution of all EPPIC diagnosed problems amongst attendance categories (n=134)*

| EPPIC Category | Number of DNAs | | | | | |
|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 |
| Anxiety (%) | 23 (51) | 13 (29) | 6 (14) | 1 (2) | 1 (2) | 1 (2) |
| Behavioural disorder (%) | 0 | 3 (60) | 1 (20) | 1 (20) | 0 | 0 |
| Cognitive function (%) | 1 (50) | 1 (50) | 0 | 0 | 0 | 0 |
| Depression (%) | 12 (46) | 8 (31) | 6 (23) | 0 | 0 | 0 |
| Emotional disorder (%) | 1 (50) | 0 | 0 | 1 (50) | 0 | 0 |
| Habit/dependency (%) | 1 (25) | 2 (50) | 1 (25) | 0 | 0 | 0 |
| Other (%) | 0 | 2 (67) | 1 (33) | 0 | 0 | 0 |
| Personality disorder (%) | 6 (55) | 3 (27) | 1 (9) | 1 (9) | 0 | 0 |
| Physical illness (%) | 1 (100) | 0 | 0 | 0 | 0 | 0 |
| Psychosomatic (%) | 5 (50) | 3 (30) | 0 | 2 (20) | 0 | 0 |
| Relationship problem (%) | 1 (33) | 2 (67) | 0 | 0 | 0 | 0 |
| Sexual adjustment (%) | 1 (50) | 0 | 1 (50) | 0 | 0 | 0 |
| Skills acquisition (%) | 1 (100) | 0 | 0 | 0 | 0 | 0 |

*Appendix 1 Table 11: Distribution of in-treatment DNA's between primary EPPIC diagnostic categories (n=115)*

| EPPIC Category | Number of Cancellations | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
| Anxiety (%) | 25 (56) | 11 (24) | 5 (11) | 0 | 4 (9) | 0 | 0 | 0 |
| Behavioural disorder (%) | 3 (60) | 1 (20) | 1 (20) | 0 | 0 | 0 | 0 | 0 |
| Cognitive function (%) | 2 (100) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Depression (%) | 16 (62) | 7 (27) | 3 (11) | 0 | 0 | 0 | 0 | 0 |
| Emotional disorder (%) | 1 (50) | 1 (50) | 0 | 0 | 0 | 0 | 0 | 0 |
| Habit/dependency (%) | 3 (75) | 0 | 1 (25) | 0 | 0 | 0 | 0 | 0 |
| Other (%) | 2 (67) | 0 | 1 (33) | 0 | 0 | 0 | 0 | 0 |
| Personality disorder (%) | 10 (90) | 1 (10) | 0 | 0 | 0 | 0 | 0 | 0 |
| Physical illness (%) | 1 (100) | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Psychosomatic (%) | 4 (40) | 2 (20) | 2 (20) | 0 | 0 | 0 | 1 (10) | 1 (10) |
| Relationship problem (%) | 2 (67) | 0 | 1 (33) | 0 | 0 | 0 | 0 | 0 |
| Sexual adjustment (%) | 1 (50) | 1 (50) | 0 | 0 | 0 | 0 | 0 | 0 |
| Skills acquisition (%) | 0 | 0 | 1 (100) | 0 | 0 | 0 | 0 | 0 |

*Appendix 1 Table 12: Distribution of in-treatment cancellations between primary EPPIC diagnostic categories (n=115)*

# Appendix 2
# Major Research Project Literature Review

# Appendix 2.1: Selected Journal and Contributor's Notes

**BRAIN INJURY: Instructions for authors**

*Submission*

Contributions, which may be in the form of reviews, original papers, case studies, programme developments or letters to the Editors, should be sent to Henry H. Stonnington (Medical Director, Rehabilitation Center of Memorial Medical Center, Provident Office Building, 4750 Waters Avenue, Suite 307, Savannah, GA 31404, USA), Nathan Cope (Paradigm Health Corporation, 1001 Galaxy Way, Suite 400, Concord, California 94520, USA), William W. McKinlay (Case Management Services Ltd, 17a Main Street, Balerno, Edinburgh EH14 7EQ, UK) or to one of the regional editors listed on the inside front cover.

Two complete copies should be submitted, typed double-spaced on standard $8\frac{1}{2} \times 11$ in paper with ample margins. Manuscripts are accepted on the understanding that they are not already under consideration for publication by another journal.

*Style and presentation*

Manuscripts should be in English, typed or printed out, double-spaced, on A4 or $8\frac{1}{2} \times 11$ in paper, and the pages numbered. Pages should include a separate title page with a clear, specific, but brief title and a suggestion for a shortened title (40 characters or less) for running heads should be included. The names and present affiliations of each author should be given. One author should be designated as the corresponding author to whom proofs and offprint requests should be addressed, and a full correspondence address, including telephone and fax numbers, given as a footnote.

All papers must have an abstract, not exceeding 200 words, and including a statement of purpose, methods used, results obtained and conclusions reached. No keywords are necessary.

The text should be divided into sections; original papers should use headings in the order: Introductory paragraph(s), Methods, Results, Discussion. All terms to be abbreviated should be spelled out at first mention with the abbreviation following immediately in parentheses. Avoid obscure abbreviation, slang, jargon, and other usage that decreases clarity. CITE REFERENCES CONSECUTIVELY BY NUMBER. ALL references must be cited in the text. Personal communications and unpublished data should be placed in parentheses in the text, not in the list of references. Also cite each figure and table in the text and indicate clearly where these are to be positioned. Use Arabic numbers for both figures and tables.

*Tables*

Tables should be cited in the text. Each table should be given a number and a brief informative title and should appear on a separate page. Omit vertical rules and use extra space to delineate sections of a table. Explain in footnotes all abbreviations used in the table. For footnotes, use the following symbols in this sequence, †, ‡, §, ‖, ¶, and then double symbols as necessary.

*Illustrations*

Use only those illustrations that clarify and augment the text. Authors are asked to provide glossy prints or good photocopies; computer printouts should be re-drawn wherever possible. Each figure should have a label pasted on its back indicating the figure number and the top of the figure. Legends should be on a separate sheet. Specific permission for facial photographs of patients is required. A letter of consent must accompany the photographs of patients in which a possibility of identification exists. It is not sufficient to cover the eyes to mask identity.

*References*

References must be cited in the text CONSECUTIVELY BY NUMBER, and listed at the end of the paper in the following styles (provide all authors' names for three or fewer; when there are more than three, add '*et al.*'):

1. BROOKS, N., MCKINLAY, W., SYMINGTON, K. *et al.*: Return to work within the first seven years of severe head injury. *Brain Injury*, 1: 5–19, 1987.

for a book:

2. RIMEL, R. W. and JANE, J. A.: Characteristics of the head-injured patients. In M. Rosenthal E. R. Griffith, M. R. Bond and J. D. Miller (editors) *Rehabilitation of the Head Injured Adult* (Philadelphia: F. A. Davis Company), pp. 9–21, 1983.

*Guidelines for animal and human research*

When experimental animals are used, state the species, strain, number used, and other pertinent descriptive characteristics. For human subjects or patients, describe their characteristics. When describing surgical procedures on animals, identify the preanaesthetic and anaesthetic agents used and state the amount of concentration and the route and frequency of administration for each. The use of paralytic agents, such as curare or succinylcholine, is not an acceptable substitute for anaesthetics. For other invasive procedures on animals, report the analgesic or tranquilizing drugs used; if none were used, provide justification for such exclusion. When reporting studies on unanaesthetized animals or on humans, indicate that the procedures followed were in accordance with institutional guidelines.

*Proofs*

Proofs are sent to the principal author who must return them to the Publisher within 3 days of receipt. Printers' errors may be corrected but any changes from the original manuscript will be charged to the author(s).

*Offprints*

Fifty (50) offprints will be sent to the principal author of each paper. An order form for additional offprints will accompany the proofs. There are no page charges in '*Brain Injury*'.

# Appendix 3
# Major Research Project Proposal

# Appendix 3.1: Ethics Application

Application Ref_____

SOUTHERN GENERAL HOSPITAL NHS TRUST

ETHICS COMMITTEE

APPLICATION FOR APPROVAL OF A CLINICAL RESEARCH PROJECT

To: The Secretary
Medical Ethics Committee

Notes: i) All applications should be on this form

ii) This form should be typed

iii) "See protocol" is not an acceptable answer to any question. A summary sheet must be provided and other questions answered in full. One copy of any protocol should be provided for reference when necessary.

iv) Separate patient consent forms and information sheets should be provided with the application. In some cases these may not be applicable or necessary in which case a reason for not providing them should be given.

1. Title of Project:

**Examining the efficacy of sequencing attentional and memory rehabilitation.**

2. Date of Submission:

**Friday 13 June 1997**

3. Name, Personal Qualifications, Status of Principal Investigator(s):

Paul F. J. Fleming, BA, MSc,
Lecturer in Clinical Psychology, University of Glasgow

Dr Ruth Gilham, BA, MSc, PhD,
Consultant Clinical Psychologist, Southern General Hospital

4. Other Personnel Involved:

Helen C. Payne, MA
Trainee Clinical Psychologist, University of Glasgow

5. Department(s):

Department of Psychological Medicine, University of Glasgow, Academic Centre, Gartnavel Royal Hospital, Glasgow G12 0HX.

Department of Clinical Psychology, Institute of Neurosciences, Southern General Hospital, Glasgow G51 4TF.

6. Date discussed and approved by Department or Division:

Commencing September 1997

7 (a) Has the proposed research been submitted to any other Ethics Committee?

Yes ___ No /

If "Yes", give details:

| |
|---|
| |

(b) Has the proposed research been approved by any other Ethics Committee?

Yes ___ No / Not submitted elsewhere

If "Yes", give details:

| |
|---|
| |

8. Has any similar research been carried out in any other Centres?
Give details:

| |
|---|
| Cancelliere, A. E. B., Moncada, C. and Reid, D. T. (1991) Memory retraining to support educational reintegration. Department of Rehabilitation Medicine, Toronto Hospital, Toronto, Canada.<br><br>Wilson, B. A. *et al* (1992) Prompting and Memory. Rehabilitation Centre, Applied Research Unit, Cambridge.<br><br>Yesavage, J. A. and Rose, T. L. (1983) Concentration and mnemonic training in elderly subjects with memory complaints: A study of combined therapy and order effects. Veterans Administration Medical Centre, Palo Alto, California, USA. |

9. Describe the purpose, medical and scientific value of the investigation:

| |
|---|
| This proposal seeks to investigate the therapeutic effects of sequencing attentional and memory rehabilitation on general cognitive performance following closed head injury. It is hoped that this will not only enhance our theoretical understanding of the neuropsychology of closed head injury, but also lead to improved therapeutic programmes. |

10. Number of patients involved and duration of project:

| | |
|---|---|
| No. of patients (this Hospital): | 8 |
| Duration of Project: | 1 hour per person, once a week over 10 weeks for intervention. There will also be initial assessment and brief follow-up at six months. |

11. Methods - Non-invasive:

| |
|---|
| The principle assessment tools will consist of a clinical interview and neuropsychometric measures of attention and memory performance.<br>The intervention methods will include attentional retraining (*i.e.* modelling of processing strategies, direct retraining) and memory retraining (*i.e.* instruction in diary use, PQRST technique, Method of Loci). |

12. Methods - Invasive (Indicate where these are over and above the normal treatment of the patient, e.g. venepuncture, endoscopy etc.):

N/A

13. List any drugs or non-standard products which are to be given for experimental purposes. Indicate whether or not a product licence has been obtained for the purpose for which the preparation is to be used. If a Clinical Trials Exemption Certificate has been obtained from the Committee of Safety of Medicine, please indicate:

N/A

a) Product Licence Obtained: Yes ___ No N/A

b) Clinical Trials Exemption Certificate: Yes ___ No N/A

14. If the project involves the administration of radioactive materials to human subjects, please indicate the material and the name of the certificate holder:

N/A

15. List any hazards to the patients:

There are no known hazards for patients in the use of these procedures. On the contrary, it is hoped that participants will gain a considerable therapeutic benefit from these procedures.

16. Is the work being funded from any source?

a) A grant distributing body, e.g. Research Support Group

Yes ___ No /

State the Body:

N/A

b) A Drug or Scientific Material manufacturers

Yes ___ No /

c) State the fee provided and to whom it is paid:

N/A

17. Are the products used being provided by the manufacturer?

Yes ___ No N/A

18. If any of the following departments are providing resources, has the Departmental Head been asked and do they agree to the use of their facilities, resources and expertise?

| | | | |
|---|---|---|---|
| Biochemistry | N/A | Pathology | N/A |
| Microbiology | N/A | Haematology | N/A |
| Diagnostic Radiology | N/A | Pharmacy | N/A |
| Medical Records | N/A | Secretarial Services | N/A |
| Neurophysiology | N/A | Others (Specify) | |

19 (a) Is any non-standard product or unusual use being made of a product or an investigation?

Yes ___ No /

(b) Is the investigator or the hospital authority indemnified in the event of an accident?

Yes / No ___

20. Please state who will have access to the data and what steps will be taken to keep the data confidential:

The named investigators will process the data which will be stored in locked filing cabinets in the named departments. No data will be used in any other setting without the prior consent of the participants.

21. In research involving the extraction of data from records, please indicate whether or not patients will be identified and associated with any specific information obtained:

| |
|---|
| N/A |

22. Where the research is epidemiological, please state what steps are being taken to inform patients of their rights not to participate or if it is thought that this is not necessary, state why. This could include research by questionnaire or by extracting information from records:

| |
|---|
| N/A |

23. Consent

(a) Is a Patient Consent Form enclosed and a separate Patient Information Sheet?

Yes / No ___

If "No", please state why:

| |
|---|
| |

(b) If "Yes", is the investigator satisfied that the sheet contains all the relevant information that enables the patient to properly consent:

Yes / No ___

24. Layman's Summary (About 100 words):

It is hypothesised that the sequence in which individuals who have sustained a head injury receive attentional and memory rehabilitation may enhance the effectiveness of these therapeutic procedures. Thus, these procedures will be presented to two groups of participants - each group receiving both attentional and memory input in a different sequence. We would hope that the study will not only enhance our theoretical understanding of head injury but lead to further improvements in treatment practices.

I am familiar with the Declaration of Helsinki and I am satisfied that the work fits the criteria embodied within that declaration.

Signed:

Date:

# Appendix 3.2: Acceptance Letter

Southern General Hospital
NHS Trust

1345 Govan Road Glasgow G51 4TF
Tel 0141-201 1100 Fax 0141-201 2998

Our Ref: LETJUNEFMCG.LC
Enquiries to: Mr Frank McGuire - Secretary
0141-201-1150

27 June 1997

Dr R Gilham,
Consultant Neuropsychologist,
Southern General Hospital

Dear Dr Gillham,,

EXAMINING THE EFFICACY OF SEQUENCING ATTENTIONAL AND MEMORY REHABILITATION.
H PAYNE, TRAINEE CLINICAL PSYCHOLOGIST, UNIVERSITY OF GLASGOW. EC/97/S/66

Further to your recent application for approval of the above study, I am pleased to advise that full ethical approval has been granted.

On behalf of the Committee may I take this opportunity to wish you every success with your trial and request that on the conclusion of this study, a full report is forwarded to the Ethics Committee.

Yours sincerely,

**FRANK McGUIRE**
**SECRETARY - ETHICS COMMITTEE**

# Appendix 4
# Major Research Project Paper

# Appendix 4.1: Selected Journal and Contributor's Notes

## BEHAVIOUR RESEARCH AND THERAPY

incorporating ADVANCES IN BEHAVIOUR RESEARCH AND THERAPY

## *Information for Contributors*

*Behaviour Research and Therapy* incorporating *Advances in Behaviour Research and Therapy* will be published monthly.

Neither the Editors nor the publisher accept responsibility for the views or statements expressed by authors.

This journal should be cited in lists of references as *Behaviour Research and Therapy*.

*Manuscripts*

All manuscripts submitted for publication for the regular section of the journal and all scientific correspondence should be sent to the Editor: Dr S. RACHMAN, Department of Psychology, University of British Columbia, Vancouver, British Columbia, Canada V6T 1Z4. Manuscripts for the Behavioral Assessment Section should be sent to Dr S. TAYLOR, Department of Psychiatry, 2255 Wesbrook Mall, Vancouver, British Columbia, Canada V6T 2A1.

Manuscripts should be typewritten on *one side* of the paper, *double spaced* and in triplicate (one original and two carbon copies). The original manuscript and diagrams will be discarded one month after publication unless the publisher is requested to return original material to the author.

Manuscripts must be carefully checked and proof alterations—except printer's errors—should be minimal.

*Disks*

Authors are encouraged to submit a computer disk (5.25" or 3.5" HD/DD disk) containing the **final** version of the paper along with the **final** manuscript to the editorial office. Please observe the following criteria:

1. Send only hard copy when first submitting your paper.
2. When your paper has been refereed, revised if necessary and accepted, send a disk containing the final version with the final hard copy. **Make sure that the disk and the hard copy match exactly.**
3. Specify what software was used, including which release, e.g. WordPerfect 5.1.
4. Specify what computer was used (either IBM-compatible PC or Apple Macintosh).
5. Include the text file and separate table and illustration files, if available.
6. The file should follow the general instructions on style/arrangement and, in particular, the reference style of this journal as given below.
7. The file should be single-spaced and should use the wrap-around end-of-line feature, i.e. no returns at the end of each line. All textual elements should begin flush left; no paragraph indents. Place two returns after every element such as title, headings, paragraphs, figure and table call-outs.
8. Keep a back-up disk for reference and safety.

The articles submitted must contain original material which has not been published and which is not being considered for publication elsewhere. Papers accepted by *Behaviour Research and Therapy* may not be published elsewhere in any language without the consent of the Editor.

The title of the paper, the author's name and surname and the name and address of the institute, hospital etc. where the work was carried out, should be indicated at the top of the paper. Where possible, the Fax number of the **corresponding author** should be supplied with the manuscript, for use by the publisher.

*Summaries.* A summary, not exceeding 200 words, should be submitted on a separate sheet in duplicate. The summary will appear at the beginning of the article.

*Keywords.* Authors should include up to six keywords with their article. The controlled list of keywords is based on the APA list of index descriptors, however, authors may include one or two additional 'free' keywords if they wish to do so.

*References* should be prepared carefully using the *Publication Manual of the American Psychological Association* for style. They should be placed on a separate sheet at the end of the paper, double-spaced, and in alphabetical order.

References should be quoted in the text by giving the author's name, followed by the year, e.g. (Hersen and Barlow, 1976) or Hersen and Barlow (1976).

For *more than two* authors, the name of the first author is given followed by the words "et al." as for example—Nau et al. (1974).

*[continued opposite*

BEHAVIOUR RESEARCH AND THERAPY
incorporating BEHAVIORAL ASSESSMENT

*Information for Contributors—continued]*

References to journals should include the author's name followed by initials, year, paper title, journal title, volume number and page numbers, e.g.

Singh, N. N. (1980). The effects of facial screening on infant self-injury. *Journal of Experimental Therapy and Experimental Psychiatry, 11*, 131–134.

or

Beck, A. T., Ward, C. H., Mendelson, M., Mock, J., & Erbaugh, J. (1961). An inventory for measuring depression. *Archives of General Psychiatry, 4*, 561–565.

References to books should include the author's name followed by initials, year, paper title, editors, book title, volume and page numbers, place of publication, publisher, e.g.

Brownell, K. D. (1984). Behavioural medicine. In C. M. Franks, G. T. Wilson, P. C. Kendall, & K. D. Brownell (Eds.), *Annual review of behavior therapy* (Vol. 10, pp. 11–20). New York: Guilford Press.

*Footnotes*, as distinct from literature references, should be indicated by the following symbols: *, †, ‡, §, ‖, ¶, commencing anew on each page.

*Illustrations and diagrams* should be kept to a minimum: they should be numbered and marked on the back with the author's name. Captions accompanying illustrations should be typewritten on separate sheets. Diagrams and graphs must be drawn with Indian ink on stout paper or tracing linen.

Photographs and photomicrographs should be submitted unmounted and on glossy paper.

The following standard symbols should be used in line drawings since they are easily available to the printers:

△ ▽ ▲ ▼ ○ ● □ ■ ⊙ ⊕ ⊗ ⊖

Tables and figures should be constructed so as to be intelligible without reference to the text, each table and column being provided with a heading.

*Tables*. Captions should be typewritten together on a separate sheet. The same information should not be reproduced in both tables and figures.

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*Reprints*. Reprints and copies of the issue (at a specially reduced rate) may be obtained at a reasonable cost, provided that they are ordered when the proofs are returned and using the reprint order form which will accompany the author's proofs.

# Appendix 4.2: Patient Information Handout

Dear Volunteer,

I am a trainee Clinical Psychologist on the University of Glasgow doctoral course. I have a number of years experience in working with people who have sustained a head injury.

Some people who have sustained a head injury experience a variety of problems after the event. Two commonly reported problems are poor concentration and memory. I am interested in helping people manage these problems more effectively.

I hope to find eight individuals who have both concentration and memory difficulties following a head injury to participate in a research study. I anticipate that the study will begin in September this year. Each participant will be interviewed about their injury and symptoms for about 1 hour. A relative will also be asked to complete a questionnaire about these symptoms. Each participant will then be required to complete some tests of concentration and memory at the start of the programme, half-way through and at the end following treatment. These tests will take between 1 and $1^1/_2$ hours. Also, a short memory questionnaire will be provided for completion on a weekly basis throughout assessment and treatment. Individual treatment will be given for 1 hour a week over a 10 week period, with homework tasks set in between treatment sessions.

This programme is intended to be of direct clinical benefit to all those who are accepted to participate. Additionally, while the information obtained from this study will remain confidential, it will be used to further knowledge about treatments for attention and memory problems generally. If you do not wish to take part in the study your current and future medical care will not be affected.

I would appreciate your help on this project. Please complete the attached slip if you are interested in participating or if you would like more information prior to deciding whether or not you would like to participate. If you return it to myself or to the Headway staff I will contact you over the next few weeks to discuss the programme with you in more detail.

Kind Regards

Helen Payne
Trainee Clinical Psychologist

# Appendix 4.3: Patient Consent Form

## SOUTHERN GENERAL HOSPITAL NHS TRUST
## CONSENT FORM

PATIENT NAME..... DATE OF BIRTH.....

To be completed by the Patient

| | Please Tick Yes | No |
|---|---|---|
| . Have you read the Patient Information? | — | — |
| . Have you had an opportunity to ask questions and discuss this study? | — | — |
| . Have you received satisfactory answers to all your questions? | — | — |
| . Have you received enough information about the study? | — | — |
| . Have you spoken to Ms Payne? | — | — |

Do you understand that you are free to withdraw from the study -

| | | |
|---|---|---|
| . at any time | — | — |
| . without having to give a reason | — | — |
| . and without affecting your future medical care? | — | — |
| . Do you agree to take part in this study? | — | — |

Do you have any reason to believe you are or may be pregnant?

YES, I may be pregnant —

NO, I am not pregnant —

Signed..... Date.....

Name in Block Letters.....

Signature of Witness..... Date.....

Name in Block Letters.....

# Appendix 4.4: Cognitive Checklist

This is a questionnaire looking at the things which people customarily remember and forget. Thinking about *the last week* please could you answer *all* questions and circle the answer which you consider to be most appropriate.

## During the last week how often did you .....

1 Need to rely on your memory?
Never Rarely Occasionally Quite often Very Often

2 Particularly notice your memory?
Never Rarely Occasionally Quite often Very Often

3 Forget things?
Never Rarely Occasionally Quite often Very Often

4 Experience difficulty remembering things?
Never Rarely Occasionally Quite often Very Often

5 Remember things well - were you a good rememberer?
Very bad Bad Average Good Very good

6 When you have not been able to remember things in the last week how upsetting did you find it?
Very upsetting A little upsetting Somewhat upsetting Not very upsetting Not at all upsetting

## During the last week how good was your memory for .....

7 People's names?
Very bad Bad Average Good Very good

8 Facts about people (*i.e.* where you met them, what they do)?
Very bad Bad Average Good Very good

9 Telephone numbers?
Very bad Bad Average Good Very good

10 Things you needed at the shops?
Very bad Bad Average Good Very good

11 Train or bus times?
Very bad Bad Average Good Very good

12 Appointments?
Very bad Bad Average Good Very good

13 Directions to get somewhere?
Very bad Bad Average Good Very good

14 Where you put things (like a newspaper or keys)?
Very bad Bad Average Good Very good

15 When you last did things (*e.g.* water house plants)?
Very bad Bad Average Good Very good

16 Everyday times (*e.g.* time of ITV/BBC News, dinner-time)?
Very bad Bad Average Good Very good

17 Things you should do?
Very bad Bad Average Good Very good

18 Whether you'd turned off a light or a fire or locked the door?
Very bad Bad Average Good Very good

19 Why you went from one part of the house to another?
Very bad Bad Average Good Very good

20 What was "on the tip of your tongue"?
Very bad Bad Average Good Very good

## During the last week how often did you .....

21 Start doing one thing at home and get distracted into doing something else (unintentionally)?
Never Rarely Occasionally Quite often Very often

22 Not see what you wanted in a supermarket (although it was there?)
Never Rarely Occasionally Quite often Very often

23 Find it difficult to concentrate on something because your attention wandered from one thing to another?
Never Rarely Occasionally Quite often Very often

24 Read something and find you hadn't been thinking about it and had to read it again?
Never Rarely Occasionally Quite often Very often

## During the last week how often did you .....

25 Write a shopping list?
Never Rarely Occasionally Quite often Very often

26 Write appointments in a calendar or diary to help you remember them?
Never Rarely Occasionally Quite often Very often

27 Write reminder notes?
Never Rarely Occasionally Quite often Very often

28 Ask other people to remind you of something?
Never Rarely Occasionally Quite often Very often

29 Mentally repeat something you were trying to remember?
Never Rarely Occasionally Quite often Very often

30 Particularly try to concentrate on something you wanted to remember?
Never Rarely Occasionally Quite often Very often

31 Deliberately try to fix something in memory by relating it to other information?
Never Rarely Occasionally Quite often Very often

32 Try to think of things that related to something you forgot, hoping it would bring it to mind?
Never Rarely Occasionally Quite often Very often

33 Use any other memory tricks to help you remember?
Never Rarely Occasionally Quite often Very often

## During the last week .....

34 Did you use memory aids more often than you previously did?
Never use memory aids Less than before Same as before A little more A lot more than before

35 Did you consciously try to memorise things more than you used to?
Never try to memorise things Less than before Same as before A little more A lot more than before

# Appendix 4.5: Cognitive Checklist Scoring

A score of 4 indicates the best possible situation.

| Question number | Score | | | | |
|---|---|---|---|---|---|
| 1 | 0 | 1 | 2 | 3 | 4 |
| 2 | 4 | 3 | 2 | 1 | 0 |
| 3 | 4 | 3 | 2 | 1 | 0 |
| 4 | 4 | 3 | 2 | 1 | 0 |
| 5 | 0 | 1 | 2 | 3 | 4 |
| 6 | 0 | 1 | 2 | 3 | 4 |
| **Metamemory (/24)** | | | | | |
| 7 | 0 | 1 | 2 | 3 | 4 |
| 8 | 0 | 1 | 2 | 3 | 4 |
| 9 | 0 | 1 | 2 | 3 | 4 |
| 10 | 0 | 1 | 2 | 3 | 4 |
| 11 | 0 | 1 | 2 | 3 | 4 |
| 12 | 0 | 1 | 2 | 3 | 4 |
| 13 | 0 | 1 | 2 | 3 | 4 |
| 14 | 0 | 1 | 2 | 3 | 4 |
| 15 | 0 | 1 | 2 | 3 | 4 |
| 16 | 0 | 1 | 2 | 3 | 4 |
| 17 | 0 | 1 | 2 | 3 | 4 |
| 18 | 0 | 1 | 2 | 3 | 4 |
| 19 | 0 | 1 | 2 | 3 | 4 |
| 20 | 0 | 1 | 2 | 3 | 4 |
| **Memory (/56)** | | | | | |
| 21 | 4 | 3 | 2 | 1 | 0 |
| 22 | 4 | 3 | 2 | 1 | 0 |
| 23 | 4 | 3 | 2 | 1 | 0 |
| 24 | 4 | 3 | 2 | 1 | 0 |
| **Attention (/16)** | | | | | |
| 25 | 0 | 1 | 2 | 3 | 4 |
| 26 | 0 | 1 | 2 | 3 | 4 |
| 27 | 0 | 1 | 2 | 3 | 4 |
| 28 | 0 | 1 | 2 | 3 | 4 |
| 29 | 0 | 1 | 2 | 3 | 4 |
| 30 | 0 | 1 | 2 | 3 | 4 |
| 31 | 0 | 1 | 2 | 3 | 4 |
| 32 | 0 | 1 | 2 | 3 | 4 |
| 33 | 0 | 1 | 2 | 3 | 4 |
| 34 | 0 | 1 | 2 | 3 | 4 |
| 35 | 0 | 1 | 2 | 3 | 4 |
| **Memory aids (/44)** | | | | | |
| **Total (/140)** | | | | | |

# Appendix 4.6: Session summaries and homework

## Attention Session Summary (1)

Slowing

This was the first of five sessions looking at ways of increasing your concentration.

After a head injury the brain can be slowed down. Unfortunately the rest of the world still runs at the same pace. As a result, some people notice that it is more difficult to keep up when trying to think about things, for example trying to concentrate on or remember information. This can lead to frustration and tension. If you are tense and feeling rushed your brain will not be able to work as well as is possible.

Therefore, during this session we practised a relaxation technique. The sequence of relaxation was hands, arms, shoulders, neck, face, back, stomach, legs and feet. The idea is to tense each muscle group and then let it go, concentrating on the feelings of relaxation when you let go. Afterwards sit quietly and mentally work through your body checking for any left over feelings of tension. We also discussed the importance of slowing down in as many tasks as possible. Both in allowing yourself more time to complete tasks and in asking others not to rush when giving you information or working with you. We practised slowing down ordinary tasks such as checking the TV listings and taking a telephone message.

Homework: Set aside time each day when you relax and also when you consciously slow down. This might be at a particularly busy time of day for you or for a task which you find difficult. It is important to slow down as often as possible. Only by doing this consciously on a *regular* basis will your behaviour begin to change unconsciously.

# Attention Session Summary (2)

Scanning (part 1)

This was the second of five sessions looking at ways of increasing your concentration.

One of the main difficulties with poor concentration is that your attention wanders when you don't want it to. This is very common after a head injury and many people have difficulty keeping their attention going. A technique to help with this is scanning. I introduced the basics of scanning today, in the next session I will show how this can be used in your day-to-day life. The idea is that it will be easier to concentrate on something if you become more interested in it. Slowing down and spending more time looking at a picture and asking yourself questions about it is likely to increase your interest in it. This should make it easier to concentrate on the same picture for a longer period of time. We looked at several pictures today and noticed how much detail we miss when we first look at things. We spent time slowly studying each picture and then describing it in as much detail as possible thinking about all the senses (sight sound, smell, taste and touch) and emotions.

Homework: Set aside time each day to practise describing images in more and more detail. Use all your senses, sight, sound, touch, smell, taste and motion. Also think about emotions. It might help to start with if you can do this with someone else - turn it into a game or competition to see who can be the most descriptive! You have been given some pictures to practise with but you will need to find many more of your own. Look in magazines, at photographs *etc.* Also continue with your relaxation and slowing exercises from the last session. Remember, doing the homework is very important. Simply knowing about a technique will not improve your concentration. You need to practise it regularly.

# Attention Session Summary (3)

Scanning (part 2)

This was the third of five sessions looking at ways of increasing your concentration.

In the last session we looked at the basics of scanning. You should be well practised in describing pictures in great detail by now! This session focused on using the technique in everyday life. It is easier to concentrate on something if you become more interested in it. During this session we practised slowing down and scanning our surroundings. We began by scanning photographs of everyday surroundings such as kitchens and living rooms. Then we scanned a real room, remembering to concentrate on all the sensory details possible including sight, sound, smell, taste and touch.

Homework: Set aside time each day to practise describing your environment in more and more detail. Try and use as many different senses in the descriptions as you can: sight, hearing, smell, taste and touch. Don't just stick to the obvious, use your imagination as well. Also remember to think about movement and the way a place makes you feel. You may wish to do this quietly in your head, say it out loud, or write it down. Again, as with the last homework, it might help to if you can do this with someone else. Whatever helps you most. Spend time describing familiar surroundings such as your kitchen or living room as well as places you see less often such as a Supermarket aisle or bus shelter. Also continue with your slowing exercises from the first session.

# Attention Session Summary (4)

Response tasks (part 1)

This was the fourth of five sessions looking at ways of increasing your concentration.

Another difficulty after head injury is not being able to concentrate when there are distractions such as a TV, other people talking, traffic *etc.* You need to be able to concentrate on one thing and ignore others at the same time. While you may be able to turn the TV off or ask others to speak more quietly, it is not always possible to remove all distractions. A technique to help with this is practising focusing and sustaining your attention using response tasks. In the response task we used today you were asked to listen to tape-recorded numbers for fifteen minutes and tap the desk when you heard three odd numbers in a row. The idea here is that repeated practise of a response task should help you become more able to focus your attention. Next week we will build on this skill by bringing in distractions.

Homework: You have been given a tape with four recordings of response tasks on each side. Set aside time each day to practise at least one response task (each is about fifteen minutes long). Practise in a quiet place that is free from distractions. Do not forget to practise your slowing and scanning exercises from the first three sessions as well.

# Attention Session Summary (5)

Response tasks (part 2)

This was the last of five sessions looking at ways of increasing your concentration.

During the last session (and for homework over the last week) you practised focusing your attention during a fairly dull task. During this week's session we made this task more difficult by having a radio playing at the same time. By practising the response task with this extra distraction you will begin to re-develop the skill to selectively attend to the information you want. You will re-develop the ability to divide your attention.

Homework: Using the tape recorded response tasks from the last session, set aside time each day to practise them while playing music or the radio in the background. Also continue with your slowing and scanning exercises.

This is the end of the work we will do together to improve your concentration. In order for these techniques to be effective they *must* be practised regularly. By investing time and effort into them now you will eventually be able to use them without thinking. They should make it much easier for you to concentrate, even when there is a lot of noise or other distractions around you.

# Memory Session Summary (1)

Diary

This was the first of five sessions looking at ways of improving your memory.

One common strategy suggested to people after a head injury is to use a diary. A diary can be a record of past events as well as a reminder of future appointments or things to do. The process of writing things down in a diary can also help memory by allowing the brain more time to think about the thing to be remembered. During the session we looked at potential uses for your own personal diary. We practised specific situations, such as phone conversations, to work out how a diary might be useful. However, when memory is a problem, remembering to use the diary is not always easy. Therefore, during the session we also worked out a strategy for helping you to use your diary regularly. Watch alarms or timers, notes in prominent places, natural breaks in the day (getting up/going to bed, coffee and meal times, prompts from a carer) may help you to check your diary at regular intervals and record new events.

Homework: If you do not already have a diary please buy a small one as soon as possible. This time of year they are really quite reasonable. Follow the individual strategy discussed within the session for using your diary. Remember to check your diary *regularly* for things you must remember to do and also to record the things you have been doing as a future reminder. For this first week I would like you to make a small note on the appropriate day each time you check your diary (*e.g.* 8:05 am, 12:30 pm, 1:30 pm, 3:30 pm, 9:25 pm). Bring this along to the next session so we can see how effective this has been and see if any further help is needed. Only by using your diary on a regular basis will you begin to feel the benefits.

# Memory Session Summary (2)

PQRST (part 1)

This was the second of five sessions looking at ways of improving your memory.

Often there is so much information to take in that it is too overwhelming to be able tc remember any part of it. Having a structure to make sense of such information can be a greal help. It can break the information down into smaller pieces and make it easier to learn. This week you were introduced to a technique which can provide such structure or framework tc help you remember written information - the PQRST technique. The letters PQRST stand for: **P**reviewing, **Q**uestioning, **R**eading, **S**tating and **T**esting. Today we used short articles from newspapers and magazines to practise the technique. Before you read any information, you were asked to take time to preview the text; noticing any key headings, darkened print, lead sentences in a paragraph *etc.* You used this information to form questions about the text. We wrote these down before you went on to read the article. When reading you were asked to keep checking on the questions you had come up with. Afterwards you stated your questions and answered them based on your reading. Finally you were asked to test yourself to see if you could remember the content of the article. The PQRST framework should have helped you tc do this. It also helps you to think more about the article which makes it easier to remember.

Homework: Schedule time into your diary each day to practise the PQRST technique. You have been given a few paragraphs of text to start you off. However, you should also begin tc use everyday information from your own newspapers, magazines, manuals, cookbooks or novels *etc.* Only by practising this technique on a *regular* basis will it begin to be of benefit tc you.

# Memory Session Summary (3)

PQRST (part 2)

This was the third of five sessions looking at ways of improving your memory.

In the last session we looked at the basics of the PQRST technique. You should have had a lot of practise in reading and remembering pieces of text by now. This session focused on using the PQRST technique in everyday life. Firstly we thought of a number of ways in which this technique might help structure situations that you have to remember information from (*e.g.* watching television programmes, preparing for telephone conversations *etc.*). Next we practised previewing and preparing questions for such situations and role played conversations which might be helped with the use of this technique.

Homework: Practise the PQRST technique each day in a range of different situations. Make a note of these in your diary so that we can discuss them next time. Also remember to continue to practise the other techniques we have looked at to date - using your diary and using the basic PQRST skills for written material.

# Memory Session Summary (4)

Method of Loci

This was the fourth of five sessions looking at ways of improving your memory.

During this session you were introduced to the method of loci. We began with visualisation exercises - imagining pictures and then describing them in more and more detail. To help with this I suggested you use all your senses (sight, sound, touch, smell and taste) to build a really detailed picture. For example, when visualising a car you were asked to think about its colour, size, the feel of the different materials it was made of, how it might sound when it moves, any smells *etc.*

In the method of loci system new information is remembered by associating it with well-known locations. Therefore you spent time describing a well-known place in more and more detail. This might have been a room in your house or a well-used route. You were asked to name objects in the room or landmarks on the route in a set order. For example the first piece of furniture to the left of the door, then continuing around the room in a clockwise direction. We wrote the sequence down. When you had practised this sequence a few times you were asked to link items in a list to objects or locations in your sequence. This was done by mentally "hanging" the list item onto the object or location in your sequence. Each time you "hung" a list item somewhere you were asked to use all your visualisation skills to imagine the list item on your sequence object. To remember the list items later on you were asked to follow your sequence of objects or locations which would jog your memory.

Homework: Schedule time into your diary each day to practise the method of loci. You will need to practise the sequence of your objects or locations often to start with. When you are confident you have learnt this you can begin to practise remembering lists of information. You have been given a few lists to start you off. However, you should also begin to use everyday information of your own such as shopping lists, lists of things to do *etc.* Practise this technique *regularly* along with the others we have worked on so far .

# Memory Session Summary (5)

Link System

This was the last of five sessions looking at ways of improving your memory.

This week we looked at another memory technique that uses visualisation, the link system. In the link system you need to create a bizarre story out of the information you have to remember. Again, you do this using all your senses (sight, sound, touch, smell and taste) - the more detail you include the easier it will be to remember. You have been given two visualisation techniques so you can either choose the one you prefer or use both together. However you choose to use these techniques, they seem to work best when you need to remember a list of information. Unfortunately not everything we need to remember comes in a convenient list form. Therefore, we spent time during this session practising turning different types of information - from instructions to current events - into short steps in a list.

Homework: Schedule time into your diary each day to practise the link system and also to make lists out of important information so that it is easier to learn. Remember to keep practising the other techniques we have used so far .

This is the end of the work we will do together to improve your memory. In order for these techniques to be effective they *must* be practised regularly. By investing time and effort into them now you will eventually be able to use them without thinking. They should make it much easier for you to remember many different kinds of information.

# Appendix 4.7: Cognitive Checklist Subscale Figures

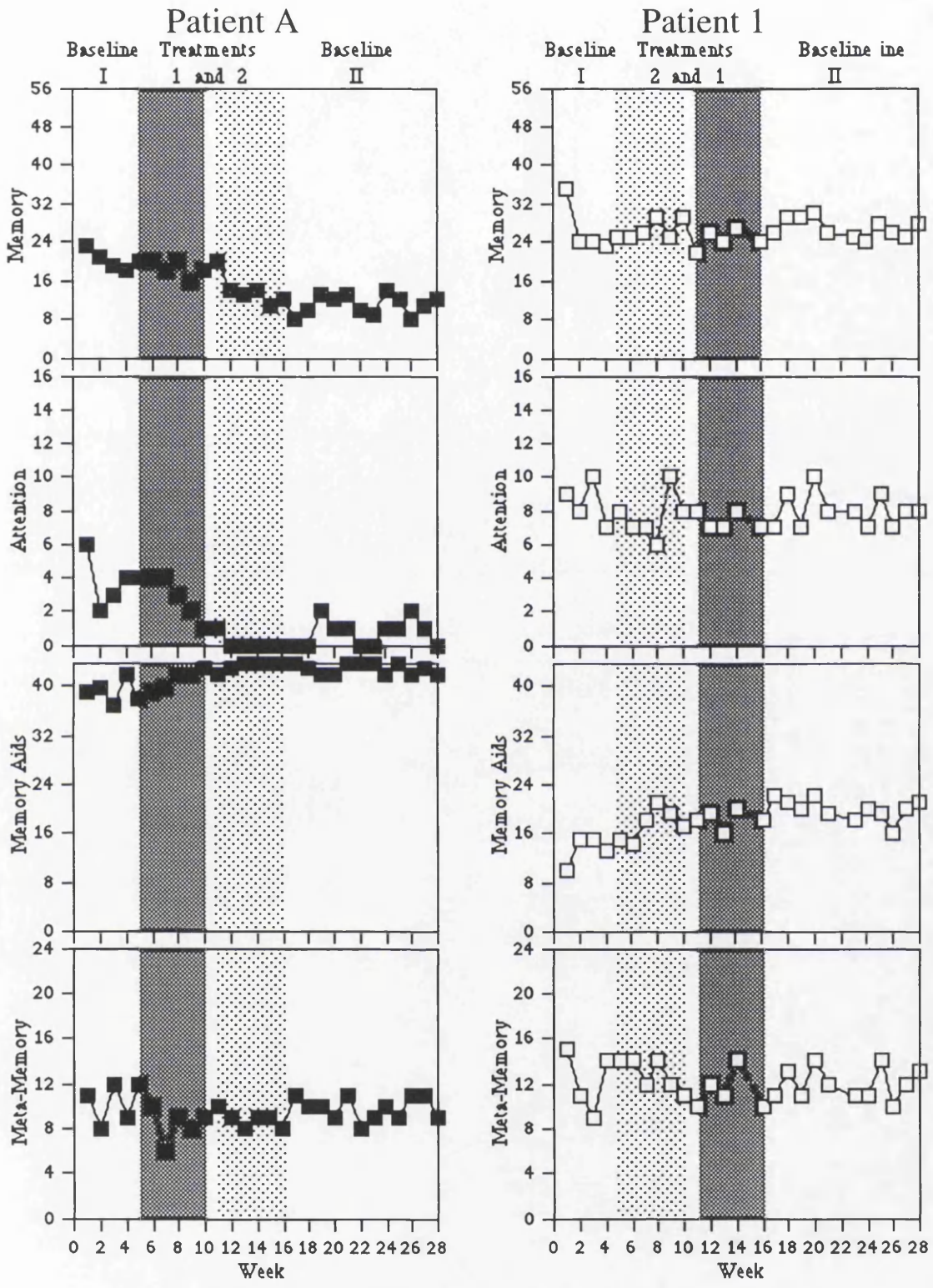


*Figure 1: Cognitive checklist subscale graphs for patients A and 1*

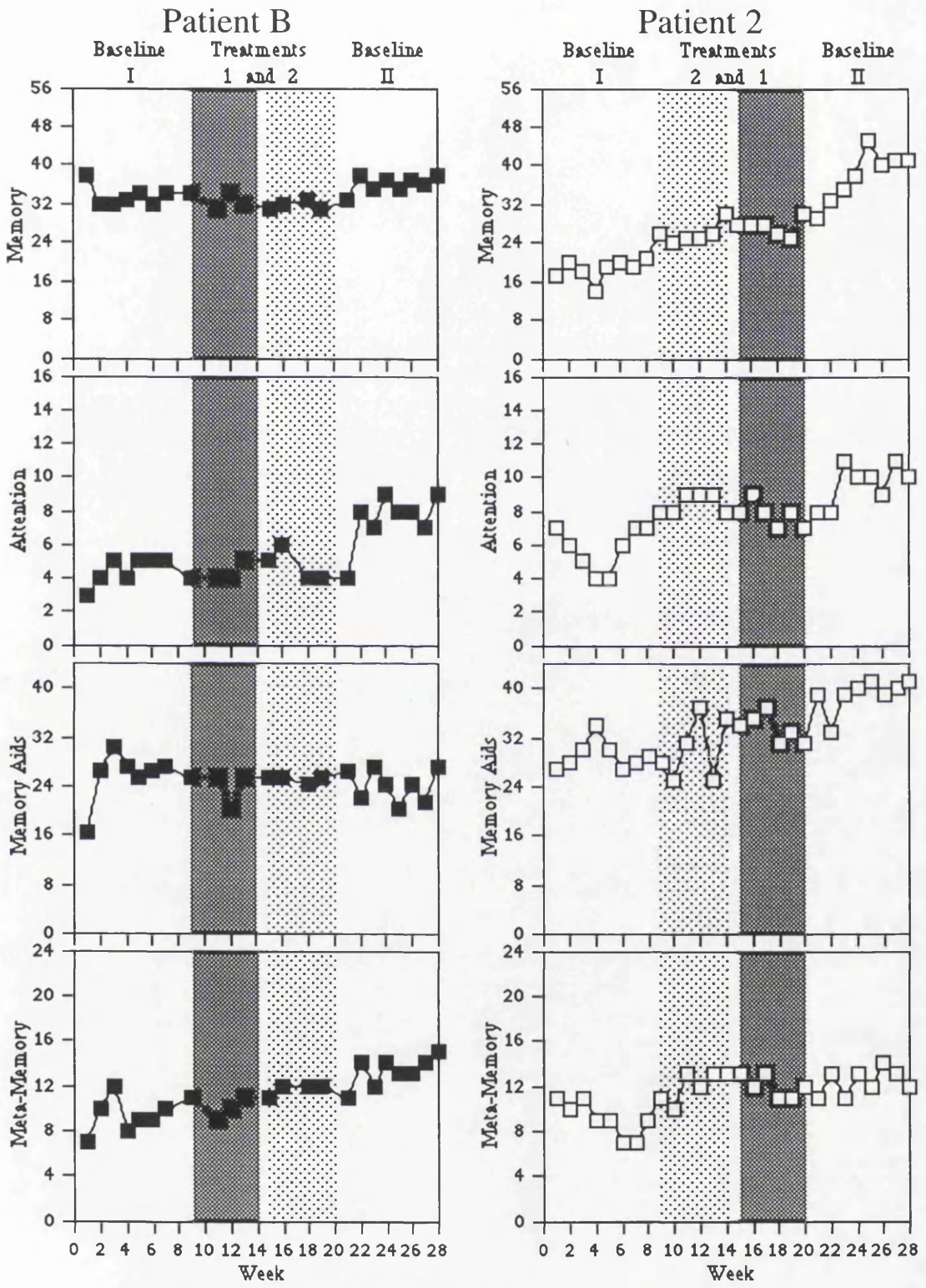


*Figure 2: Cognitive checklist subscale graphs for patients B and 2*

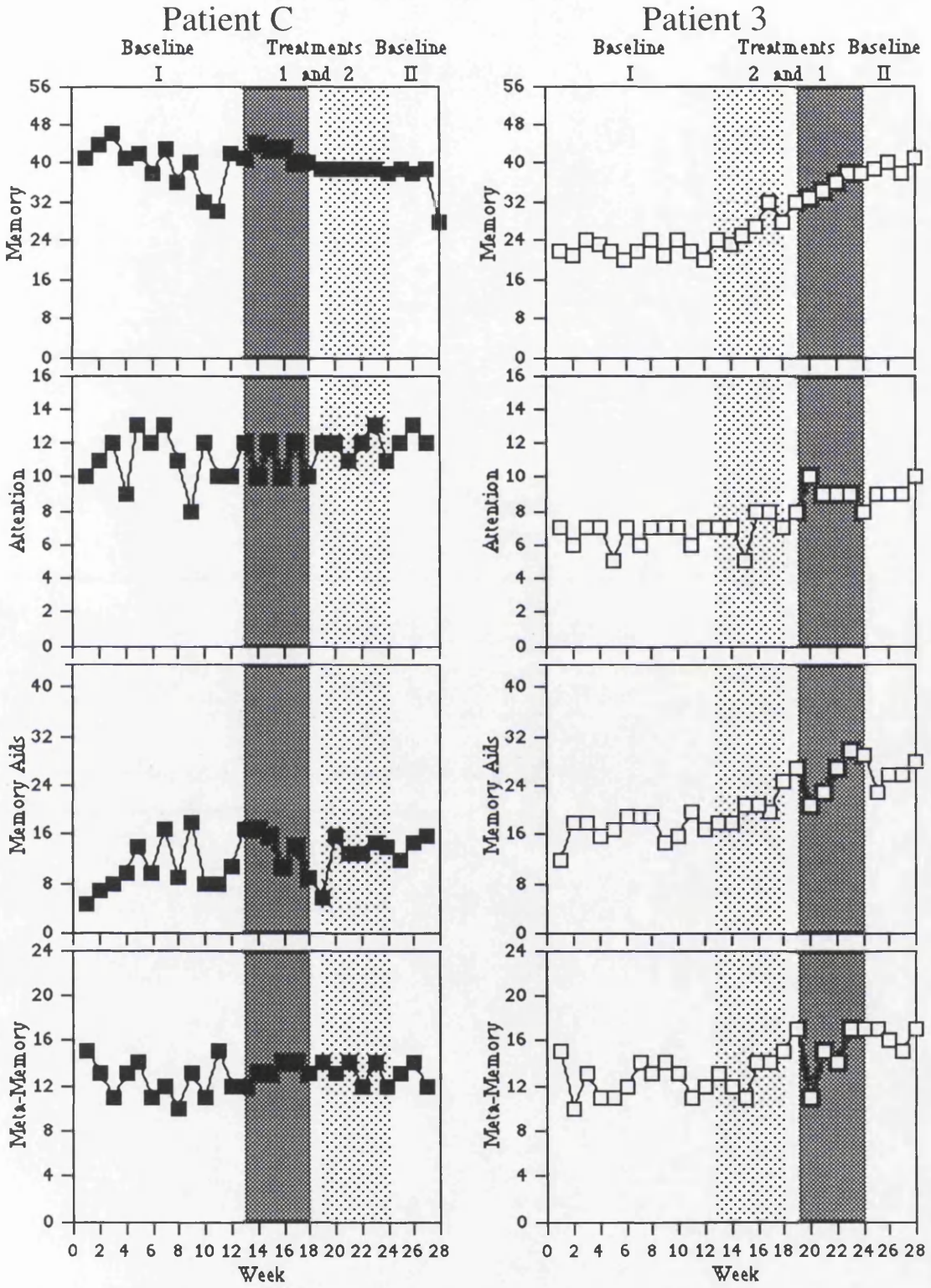


*Figure 3: Cognitive checklist subscale graphs for patients C and 3*

# Appendix 4.8: Cognitive Checklist Subscale Tables

| | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| **Phase** | **A** | **B** | **C** | **1** | **2** | **3** |
| **Baseline 1 $r^2$** | **0.980** | **0.129** | **0.369** | **0.668** | **0.202** | **0.017** |
| mean | 20.25 | 33.571 | 39.583 | 26.5 | 18.5 | 22.083 |
| *SD* | *2.217* | *2.149* | *4.795* | *5.686* | *2.204* | *1.443* |
| **Intervention 1 $r^2$** | **0.429** | **0.128** | **0.278** | **0.388** | **0.439** | **0.641** |
| mean | 18.667 | 32.75 | 41.833 | 26.5 | 26 | 26.5 |
| *SD* | *1.633* | *1.5* | *1.722* | *1.975* | *2.098* | *3.271* |
| **Intervention 2 $r^2$** | **0.658** | **0.036** | **0.429** | **0.086** | **0.001** | **0.961** |
| mean | 14 | 31.75 | 38.833 | 24.6 | 27.5 | 35.167 |
| *SD* | *3.162* | *0.957* | *0.408* | *1.949* | *1.761* | *2.563* |
| **Baseline 2 $r^2$** | **0.016** | **0.240** | **0.595** | **0.126** | **0.684** | **0.160** |
| mean | 11 | 36.125 | 38.667 | 26.909 | 37.75 | 39.5 |
| *SD* | *2* | *1.727* | *0.577* | *1.973* | *5.148* | *1.291* |
| **Total $r^2$** | **0.720** | **0.186** | **0.186** | **0.001** | **0.867** | **0.838** |
| mean | 14.607 | 34 | 39.815 | 26.308 | 27.536 | 28.321 |
| *SD* | *4.332* | *2.355* | *3.420* | *2.754* | *8.071* | *7.155* |

*Table 1: Memory sub-scale slopes, means and standard deviations for each phase of the study and cumulative scores. (and totals).*

| | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| **Phase** | **A** | **B** | **C** | **1** | **2** | **3** |
| **Baseline 1 $r^2$** | **0.143** | **0.615** | **0.023** | **0.160** | **0.033** | **0.009** |
| mean | 3.751 | 4.429 | 10.917 | 8.5 | 5.75 | 6.583 |
| *SD* | *1.701* | *0.787* | *1.564* | *1.291* | *1.282* | *0.699* |
| **Intervention 1 $r^2$** | **0.864** | **0.467** | **0.086** | **0.098** | **0.086** | **0.086** |
| mean | 3 | 4.25 | 11 | 7.667 | 8.5 | 7 |
| *SD* | *1.265* | *0.5* | *1.095* | *1.366* | *0.548* | *1.095* |
| **Intervention 2 $r^2$** | **0.429** | **0.582** | **0.005** | **0.110** | **0.408** | **0.045** |
| mean | 0.167 | 4.75 | 11.833 | 7.4 | 7.833 | 8.833 |
| *SD* | *0.408* | *0.957* | *0.753* | *0.548* | *0.753* | *0.753* |
| **Baseline 2 $r^2$** | **0.023** | **0.339** | **0.000** | **0.006** | **0.319** | **0.600** |
| mean | 0.75 | 7.5 | 12.333 | 8 | 9.625 | 9.25 |
| *SD* | *0.754* | *1.604* | *0.577* | *1* | *1.188* | *0.5* |
| **Total $r^2$** | **0.444** | **0.569** | **0.090** | **0.002** | **0.595** | **0.594** |
| mean | 1.536 | 5.522 | 11.296 | 7.885 | 7.893 | 7.536 |
| *SD* | *1.666* | *1.831* | 1.295 | *1.071* | *1.812* | *1.347* |

*Table 2: Attention sub-scale slopes, means and standard deviations for each phase of the study and cumulative scores (and totals).*

| Phase | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| | A | B | C | 1 | 2 | 3 |
| **Baseline 1 $r^2$** | **0.138** | **0.243** | **0.114** | **0.242** | **0.000** | **0.117** |
| mean | 39.5 | 25.286 | 10.417 | 13.25 | 29.125 | 17.167 |
| *SD* | *2.08* | *4.4.386* | *3.988* | *2.363* | *2.295* | *2.209* |
| **Intervention 1 $r^2$** | **0.958** | **0.086** | **0.744** | **0.336** | **0.186** | **0.717** |
| mean | 40.667 | 23.75 | 14 | 17.333 | 30.167 | 20.5 |
| *SD* | *1.966* | *2.5* | *3.347* | *2.582* | *5.076* | *2.588* |
| **Intervention 2 $r^2$** | **0.690** | **0.133** | **0.311** | **0.005** | **0.379** | **0.395** |
| mean | 43.5 | 24.75 | 12.833 | 18.2 | 33.5 | 26.167 |
| *SD* | *0.837* | *0.5* | *3.545* | *1.483* | *2.345* | *3.488* |
| **Baseline 2 $r^2$** | **0.057** | **0.014** | **0.923** | **0.212** | **0.323** | **0.882** |
| mean | 43 | 23.875 | 14.333 | 19.818 | 39 | 25.75 |
| *SD* | *0.954* | *2.696* | *2.082* | *1.779* | *2.563* | *2.062* |
| **Total $r^2$** | **0.407** | **0.018** | **0.178** | **0.419** | **0.612** | **0.734** |
| mean | 42.107 | 24.435 | 12.185 | 17.923 | 33.107 | 21.036 |
| *SD* | *1.988* | *2.982* | *3.803* | *2.965* | *5.080* | *4.671* |

*Table 3: Memory Aids sub-scale slopes, means and standard deviations for each phase of the study and cumulative scores (and totals).*

| Phase | Attention-Memory Patients | | | Memory-Attention Patients | | |
|---|---|---|---|---|---|---|
| | A | B | C | 1 | 2 | 3 |
| **Baseline 1 $r^2$** | **0.020** | **0.037** | **0.041** | **0.055** | **0.593** | **0.000** |
| mean | 10 | 9.286 | 12.5 | 12.25 | 9.125 | 12.471 |
| *SD* | *1.826* | *1.604* | *1.624* | *2.754* | *1.553* | *1.505* |
| **Intervention 1 $r^2$** | **0.231** | **0.003** | **0.408** | **0.584** | **0.579** | **0.476** |
| mean | 9 | 10.25 | 13.167 | 12.833 | 12 | 13.167 |
| *SD* | *2* | *0.957* | *0.753* | *1.329* | *1.265* | *1.472* |
| **Intervention 2 $r^2$** | **0.408** | **0.533** | **0.239** | **0.002** | **0.357** | **0.143** |
| mean | 8.833 | 11.75 | 13.167 | 11.4 | 12 | 15.167 |
| *SD* | *0.753* | *0.5* | *0.983* | *1.673* | *0.894* | *2.401* |
| **Baseline 2 $r^2$** | **0.010** | **0.466** | **0.250** | **0.000** | **0.170** | **0.018** |
| mean | 9.833 | 13.25 | 13 | 12 | 12.375 | 16.25 |
| *SD* | *1.030* | *1.282* | *1* | *1.342* | *1.061* | *0.957* |
| **Total $r^2$** | **0.002** | **0.722** | **0.024** | **0.023** | **0.384** | **0.442** |
| mean | 9.464 | 11.261 | 12.852 | 12.115 | 11.286 | 13.714 |
| *SD* | *1.374* | *2.072* | *1.262* | *1.635* | *1.823* | *2.175* |

*Table 4: Meta-Memory sub-scale slopes, means and standard deviations for each phase of the study and cumulative scores (and totals).*

# Appendix 4.9: Chi-Squared Categories

| Category | Percentile grouping |
|---|---|
| 1 | less than 2nd |
| 2 | 2nd - 9th |
| 3 | 10th -24th |
| 4 | 25th - 49th |
| 5 | 50th - 74th |
| 6 | 75th - 89th |
| 7 | 90th or greater |

*Table 1: Chi-squared categories*