Rapid forgetting, rapid remembering and the questions of: reliability, mood and anxiety

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Abstract

Objective: Bowden et al (1999), Tulsky and Price (2003) and Bowden et al (2001) have highlighted the possible limited value of distinguishing between immediate and delayed components of commonly used measures of memory. These researchers argue for a one factor solution to these memory measures. Others, e.g. Delis et al (2003), argue that clinical populations differ from the normal population. Despite poor factor analytic support distinguishing immediate and delayed memory should be considered useful in clinical practice, e.g. for patients with classical amnesia or suspected of suffering from Alzheimer's disease (Butters et al, 1995; Delis and Kramer, 2000, Graf et al, 1984 and Squire, 1987). What remains to be determined, however, is the clinical utility of distinguishing between immediate and delayed recall in other clinical populations.

Participants and Methods: The relationship between immediate and delayed recall for both verbal and visual information was evaluated in a large (n=76) group of neurological patients not suffering from amnesia or AD. The frequency of differences in memory performance at immediate and delayed recall was recorded, both in the direction of rapid-forgetting (RF) and 'rapid-remembering' (RR). The relationship between these differences and anxiety and mood was determined, correlating difference scores with self-report anxiety and mood measures.

Results: The results indicate an equal frequency of both RF and RR. Further, no meaningful relationship between differences in memory performance at immediate and delayed recall and anxiety or mood were found.

Conclusions: The results suggest there may be limited value in distinguishing between memory performance at immediate and delayed recall in patients other than those with AD or amnesia. Differences observed between memory performance at immediate and delayed recall in other groups may be the product of measurement unreliability. Clinicians should therefore collapse these measures, as per Tulsky et al, to increase measurement reliability.

Introduction

The recent work of Bowden et al (1999), Tulsky and Price (2003) and Bowden et al (2001) has highlighted the possible limited value of distinguishing between the immediate and delayed recall components of commonly used measures of new learning and memory. Their factor analytic work in normal and clinical subjects indicates a high correlation between immediate and delayed recall components of memory measures, compared with a relatively low inter-measure correlation. These results raise doubts about the validity of distinguishing between the immediate and delayed recall elements of memory tests. These results suggest instead that immediate and delayed recall should, from a psychometric perspective at least, be considered to be measuring the same construct, namely new learning/memory. Conversely others, for example Delis et al (2003), argue that clinical populations differ from the normal population and that despite the poor support from factor analytic evidence the *two* measures, namely immediate recall and delayed recall should be considered useful in clinical practice, e.g when evaluating patients with classical amnesia, or in patients suspected of suffering from Alzheimer's disease (Butters et al, 1995; Delis and Kramer, 2000, Graf et al, 1984 and Squire, 1987).

Clearly more data is required from a variety of clinical groups to establish whether the evidence of Bowden, Tulsky and Delis and colleagues can be reconciled. An additional, perhaps informative, approach to reconciling these data would be to examine the possible mediating role of other non-memory variables in the likelihood of an individual demonstrating either RF or RR in their performance. For example within clinical practice a number of heuristics have been entertained regarding the *meaning* of differences between an individual's performance on the immediate and delayed components of memory recall, e.g. RF is often considered more indicative of a memory difficulty with an organic basis whereas RR, performing relatively better after a delay than at immediate recall, is sometimes considered the product of a more psychological aspect of test performance, perhaps test anxiety. In this way hypotheses such as the patient feels overwhelmed after the initial presentation of test material or the patient experiences anxiety in relation to the unfamiliarity of the task demands are sometimes evoked to account for the apparent RR of test material, i.e. performing comparatively better after a delay. An alternate consideration, is the effect of test reliability in both the genesis and meaning of differences in memory test performance across the immediate recall and delayed recall components of memory tasks.

Method & Results

In the present study a heterogeneous retrospective sample of 76 patients seen for neuropsychological assessment at the Burden Centre, Frenchay Hospital were analysed. The group is composed in approximately equal numbers of patients with Parkinson's disease seen prior to interventional-surgery (principally deep-brain stimulation) and patients referred from a neuropsychiatry service for assessment. This group consisted of patients complaining of difficulties with memory function. This group was composed of patients with a variety of possible organic (TBI, epilepsy, cerebro-vascular disorders) and non-organic (principally somatisation disorder) factors that may have contributed to their memory performances. None of the patients had received the diagnosis of probable Alzheimer's disease. Likewise none had a clear biologically mediated classic amnesia presentation. Some of the patients did, however, perform poorly on formal measures of memory function. In order to reduce the risk of 'contaminating' the sample with possible Alzheimer's cases and classic amnesia cases two analyses were performed and compared. In the first analysis all of the patients were considered together as one heterogeneous group. In the second analysis the group was split in two; one group with intact memory performances, i.e. age scaled scores greater than 7 and another group with relatively speaking poor memory performance, i.e. age scaled scores less than 7. For each patient in both analyses measures of immediate and delayed recall of both verbal and visual information from the Wechsler Memory Scale – III (Logical Memory subtests and Family Pictures subtest) and measures of mood (the Beck Depression Inventory) and anxiety (the Speilberger State Trait Anxiety Inventory) were available.

In the first instance the immediate and delayed recall memory performances for both the logical memory and family pictures subtests were correlated. Scores for the immediate and delayed recall of both the logical memory and family pictures subtests were highly correlated (Logical memory r = 0.88, p<0.05; Family pictures r = 0.85, p<0.05). These correlations are represented graphically in Figure 1 below.

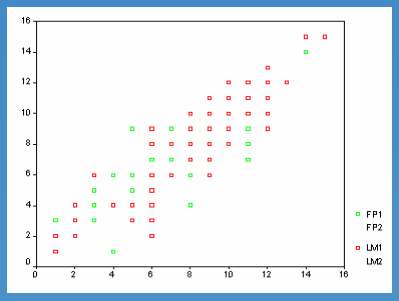
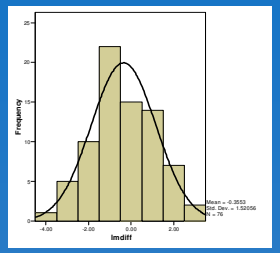
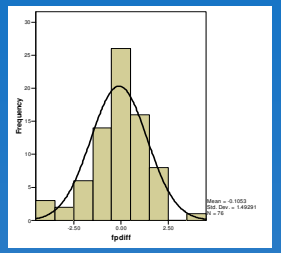


Figure 1 Scatter plot showing scores on the immediate and delayed recall components of both the logical memory subtests (LM1 & LM2) and family pictures subtests (FP1 & FP2).

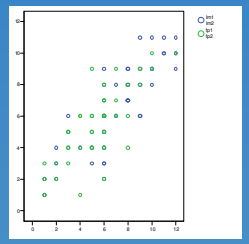
Further analysis plotted the difference scores for both the logical memory and family pictures subtests as histograms. One sample Kolmogorov-Smirnof tests were undertaken to determine the normality of the resultant distributions (logical memory test differences Z = 1.43, family pictures test differences Z = 1.74). For each distribution the mean approximated 0, LM mean difference = -0.36 and FP mean difference = -0.11



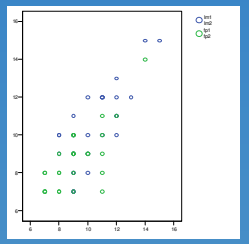


Comparable analytic steps were also undertaken for the 'normal' and 'impaired' memory sub-groups. Normal memory was defined as no single memory score falling below an age scale score value of 7. Impaired memory was defined as at least one score falling below an age scaled score value of 7. The normal memory group had a sample size of n = 29 and the impaired group n = 47. Correlations between immediate and delayed recall of the verbal and visual memory tests for the impaired memory group were r = 0.85 for LM and r = 0.76 for FP and for the normal memory group they were r = 0.78 for LM and r = 0.72 for FP. These correlations are represented graphically below.

Impaired Memory Group



Normal Memory Group



As before further analysis examined the difference scores for both the logical memory and family pictures subtests for both the normal memory and impaired memory groups. One sample Kolmogorov-Smirnof tests were undertaken to determine the normality of the resultant distributions. All distributions of scores were normal (normal memory group LM difference Z = 1.03, FP difference Z = 1.3; impaired memory group LM difference Z = 1.12, FP difference Z = 1.28). For all distributions the mean value approximated zero: normal memory group mean LM difference = -0.03, mean FP difference = -0.4; impaired memory group mean LM difference = -0.55, FP difference = 0.06.

To determine whether there was a meaningful relationship between self-reported anxiety and mood and memory performance in terms of either RR or RF correlations were calculated for both the group as a whole and for the normal memory and impaired memory groups.

For the group as a whole self-reported state anxiety, trait anxiety and mood were not significantly correlated with memory difference scores. This same pattern of results was evident also in the normal memory and impaired memory subgroups, see table following.

		State Anxiety	Trait Anxiety	Mood
Whole Group	LM difference	r=-0.04; p=0.73	r=-0.02; p=0.89	r=-0.08; p=0.52
	FP difference	r=0.05; p=0.70	r=-0.05; p=0.66	r=0.10; p=0.38
Normal Memory Group	LM difference	r=-0.19; p=0.33	r=-0.01; p=0.94	r=-0.09; p=0.61
	FP difference	r=-0.08; p=0.68	r=-0.18; p=0.35	r=0.01; p=0.98
Impaired Memory Group	LM difference	r=0.07; p=0.62	r=-0.01; p=0.95	r=-0.06; p=0.72
	FP difference	r=0.09; p=0.56	r=0.01; p=0.94	r=0.15; p=0.33

Conclusion

These results suggest, for this clinical sample, there is likely little meaningful variance associated with the difference between immediate memory recall performance and delayed memory recall performance. What variance exists is likely attributable to measurement unreliability.

In clinical practice with similar groups it is therefore likely to be preferable to collapse immediate and delayed recall measures into one composite score to improve reliability.

Mood and anxiety do not appear to have any systematic relationship with patterns of RR or RF in this group.

Further work should attempt to verify these general conclusions in other clinical samples.

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