

Cognitive training and cognitive rehabilitation for people with early-stage Alzheimer's disease: A review

Linda Clare and Robert T. Woods

University of Wales, Bangor, Wales

Memory difficulties are a defining feature of Alzheimer's disease (AD), with significant implications for people with AD and family members. Interventions aimed at helping with memory difficulties, therefore, may be important in reducing excess disability and improving well-being. There is a long tradition of cognition-focused intervention in dementia care. In this review we offer broad definitions and descriptions of three approaches to cognition-focused intervention for people with dementia—cognitive stimulation, cognitive training and cognitive rehabilitation—and attempt to clarify the underlying concepts and assumptions associated with each. Cognitive training and cognitive rehabilitation are the main approaches used with people who have early-stage AD. We review a range of studies describing the implementation of these two approaches, and evaluate the evidence for their effectiveness. With regard to cognitive training, the evidence currently available does not provide a strong demonstration of efficacy, but findings must be viewed with caution due to methodological limitations. It is not possible at present to draw firm conclusions about the efficacy of individualised cognitive rehabilitation interventions for people with early-stage dementia, due to the lack of any randomised controlled trials (RCTs) in this area, although indications from single-case designs and small group studies are cautiously positive. Further research is required that takes account of the conceptual and methodological issues outlined here.

INTRODUCTION

Memory difficulties are a defining feature of Alzheimer's disease (AD) and are typically one of the main problems experienced by people with

Correspondence should be addressed to Linda Clare, PhD, School of Psychology, University of Wales, Bangor, Bangor, Gwynedd LL57 2AS, UK. Tel: +44 1248 388178, Fax: +44 1248 382599, E-mail: l.clare@bangor.ac.uk

© 2004 Psychology Press Ltd
<http://www.tandf.co.uk/journals/pp/09602011.html> DOI:10.1080/09602010443000074

Alzheimer's disease in its early stages (Brandt & Rich, 1995). The possible value of interventions to improve memory functioning is indicated by studies of memory and learning which show that, despite the severity of memory difficulties, many aspects of memory remain relatively intact in the early stages of AD (Brandt & Rich, 1995; Morris, 1996). In the context of a systems model of long-term memory (Squire & Knowlton, 1995), people with early-stage AD display significant impairments in the episodic memory sub-system, while semantic and procedural memory are either intact or only very mildly affected. In the context of a process model, people with early-stage dementia have particular difficulty in taking in new information and forming new memories (Christensen et al., 1998), but rates of forgetting are not elevated. Within this profile of retained and compromised abilities, and given appropriate conditions, support, and sufficient time, people with dementia still have the ability to learn and retain some information and skills despite their memory difficulties (Bäckman, 1992, 1996; Kopelman, 1985; Little, Volans, Hemsley, & Levy, 1986).

For the person with AD, memory difficulties can have a major impact on self-confidence and can lead to withdrawal from activities, anxiety and depression (Ballard, Bannister, & Oyeboode, 1996; Ballard, Boyle, Bowler, & Lindsay, 1996) which in turn can result in the memory difficulties seeming worse. This is an example of what has been termed "excess disability" (Reifler & Larson, 1990). Family caregivers are also affected due to the practical impact of memory problems on everyday life and to the strain and frustration that can result (Zarit & Edwards, 1996). Thus, interventions aimed at helping with memory difficulties may have the potential to reduce secondary problems and improve well-being for both the person with AD and the family member. This has long been recognised by psychosocially-oriented clinicians and researchers, and there is a considerable tradition of cognition-focused intervention within dementia care (Woods, 1996). The potential benefits of general cognitive stimulation for people with more advanced dementia were initially demonstrated through the adaptation of reality orientation (Woods, 2002). Interest in the possibilities offered by cognition-focused interventions has continued to develop in recent years in response to the trend for earlier detection and diagnosis of dementia. Progress in modelling the operation of memory and related cognitive functions has encouraged the development of specific cognitive training (sometimes termed "retraining" or "remediation") approaches designed to help maintain or enhance cognitive functioning for people with early-stage AD. More recently, the parameters of a cognitive rehabilitation approach for people with early-stage dementia have begun to be outlined.

The literature in this area is rather confusing since the terms "stimulation", "training" and "rehabilitation" are applied somewhat interchangeably. This tends to obscure some important differences in concept and application. In

this review we aim to offer broad definitions and descriptions of these three approaches and to clarify the underlying concepts and assumptions. We also aim to review the literature describing the implementation of cognitive training and cognitive rehabilitation methods with people who have early-stage AD, and to evaluate the evidence for the effectiveness of these approaches.

COGNITIVE STIMULATION

General cognitive stimulation and reality orientation approaches involve engagement in a range of group activities and discussions aimed at general enhancement of cognitive and social functioning. The potential benefits of this kind of approach for people with dementia are reflected in the demonstrated efficacy of general cognitive stimulation and reality orientation approaches in producing improvements in cognition and, in some cases, behaviour (Spector, Orrell, Davies, & Woods, 1998; Spector, Davies, Woods, & Orrell, 2000; Spector et al., 2003). Although some reports indicate that global cognitive stimulation interventions in group format can have positive effects on cognition for people in the earlier stages of AD (Breuil et al., 1994), this method has been used primarily for people with a moderate degree of dementia, and will therefore be discussed only briefly here. The improvements in cognition and quality of life identified by Spector et al. (2003) in the largest randomised controlled trial (RCT) in this field to date were shown by people with dementia with an average cognitive level in the moderate range, although a proportion were more mildly impaired. Most were residents of care homes.

The rationale for the use of a global method of cognitive stimulation, as opposed to a focus on specific functions, for people with early-stage AD rests on the argument that cognitive functions such as memory are not used in isolation. Instead, their operation requires a sophisticated integration with other functions such as attention, language, problem-solving and so on. For this reason, the effectiveness of general cognitive stimulation interventions can only be explored in relation to the whole package, and it is not possible to tease out which particular elements among the various components are the “active ingredients” (Bird, 2000). Perhaps more importantly, it remains to be determined whether the benefits derive mainly, or partly, from the social interaction that is an integral part of the intervention, rather than from the cognition-focused components per se. That is to say, these interventions may be beneficial because they tackle aspects of under-functioning resulting from social environments that are insufficiently stimulating and rewarding, and not because their content focuses on cognition. Although this in itself is a worthwhile goal, it would be useful to know the precise contribution of the focus on cognition. An evaluation of the specific impact of cognition-focused elements of intervention can more readily be made in relation to cognitive training.

COGNITIVE TRAINING

Cognitive training typically involves guided practice on a set of standard tasks designed to reflect particular cognitive functions, such as memory, attention, language or executive function. Cognitive training may be offered through individual (Davis, Massman, & Doody, 2001; De Vreese et al., 1998; Farina et al., 2002; Koltai, Welsh-Bohmer, & Schmechel, 2001) or group (Bernhardt, Maurer, & Froelich, 2002; Ermini-Fuenfschilling & Meier, 1995; Kesslak, Nackoul, & Sandman, 1997; Koltai et al., 2001; Moore, Sandman, McGrady, & Kesslak, 2001) sessions, or facilitated by family members (Quayhagen et al., 1995, 2000) with therapist support. Tasks may be presented in paper-and-pencil (Davis et al., 2001; De Vreese et al., 1998; Quayhagen et al., 1995, 2000) or computerised (Heiss et al., 1994; Hofmann, Hock, Kuhler, & Muller-Spahn, 1996; Schreiber et al., 1999) form, or may involve analogues of activities of daily living (Farina et al., 2002; Zanetti et al., 1994, 1997, 2001). Usually a range of difficulty levels is available within a standardised set of tasks, to allow for selection of the level of difficulty that is most appropriate for a given individual. In accordance with the suggestion that cognitive training may enhance the effects of anti-dementia drug therapy (Newhouse, Potter, & Levin, 1997), some studies have evaluated the efficacy of cognitive training in combination with acetylcholinesterase-inhibiting (De Vreese et al., 1998) or other (Heiss et al., 1994; Yesavage, Westphal, & Rush, 1981) medications. In addition, memory training for persons with dementia has sometimes been included as a component of supportive interventions for caregivers (Brodaty & Gresham, 1989; Brodaty, Gresham, & Luscombe, 1997).

Cognitive training methods appear to rest on an underlying assumption that regular or routine practice has the potential to improve or at least maintain functioning in a given domain, and that any effects of practice will generalise beyond the immediate training context. Consistent with this, outcomes are most commonly assessed through performance on cognitive or neuropsychological tests, with an expectation of improvement or at least maintenance of performance in the treatment group that is not seen in the control group. That is to say, these approaches appear to be focusing primarily on reducing underlying impairment or arresting its progression, which is a challenging goal. Some studies do also consider effects on the mood or behaviour of the person with AD, and the impact on the family carer. There are few reports of any long-term follow up to assess maintenance of any gains achieved.

Early studies led to the view that interventions based on these methods lack efficacy and even result in frustration or depression for carers (Zarit, Zarit, & Reever, 1982) and people with AD (Small et al., 1997), although a more recent comprehensive review concluded that cognitive training interventions are "probably efficacious" in slowing decline in dementia (Gatz

et al., 1998). A Cochrane systematic review of randomised controlled trials (RCTs) of cognitive training (Clare et al., 2003b) found six RCTs that could be included; these are summarised in Table 1. Within the Cochrane meta-analysis framework, in which a fixed effects model was applied in calculating weighted mean differences and 95% confidence intervals, the six studies, taken individually, all failed to demonstrate any significant differences between cognitive training and comparison conditions on any outcome measure. As the studies used diverse methods, comparison conditions, and outcome measures, the possibilities for pooling of data across studies were extremely limited, and few direct cross-study comparisons could be made. It was possible to explore the impact on global measures of dementia severity (three studies), memory test scores (five studies), verbal fluency scores (three studies), self-ratings of depression (two studies), and behaviour ratings (two studies). In no cases did the observed effects reach statistical significance.

These non-significant findings must, however, be interpreted in the context of methodological limitations. Although the key finding was one of no statistically significant effects, modest non-significant benefits in some domains of cognitive functioning were evident in some studies. The use of neuropsychological tests as outcome measures effectively means that what is being assessed is usually generalisation of the training, rather than specific effects on target tasks. This may mean that some significant effects, indicative of the potential of cognition-focused intervention to make a practical difference to functioning in everyday life, are missed. For example, Davis et al. (2001) noted improvement on target tasks during training, but this was not captured by the outcome measures selected. Use of standardised neuropsychological tests as outcome measures in repeat testing sessions at relatively short intervals fails to take account of the possibility that the results are contaminated by general practice effects, thus obscuring possible effects of specific treatments. Furthermore, in some studies (e.g., Quayhagen et al., 2000) cognitive training may have been compared with other active treatments rather than placebo, thus masking potentially beneficial effects. It remains unclear what constitutes the most appropriate format for a comparison condition; Quayhagen et al. (1995) note the difficulty of designing a placebo condition that has face validity without activating and stimulating participants' cognitive resources. Also relevant are the issues of limited statistical power due to small numbers (perhaps particularly relevant in the case of De Vreese et al., 1998), the possible choice of an insufficient "dose" (frequency, intensity, and duration) of intervention, and the impact of heterogeneity among the participant group. Koltai et al. (2001) retrospectively classified participants' level of awareness of their own impairments and found that a higher level of awareness was a predictor of more successful outcome, a finding that has recently been demonstrated in a prospective study of cognitive rehabilitation outcome for a small group of people with early-stage Alzheimer's disease (Clare et al.,

TABLE 1
RCTs of cognitive training interventions: Overview and summary

<i>Study</i>	<i>Methods</i>	<i>Participants</i>	<i>Interventions</i>	<i>Outcomes assessed</i>
Davis et al., 2001	RCT comparing intervention and placebo in crossover design—participants in placebo condition crossed over to receive intervention.	37 patients (16 men, 21 women) with probable AD.	<ol style="list-style-type: none"> 1. Intervention condition: 1 hour of individual training weekly for 5 weeks on face–name associations and recall using spaced retrieval, plus home practice (0.5 hr/day for 6 days/week) on attention training exercises. 2. Placebo condition: “Mock” intervention consisting of one hour clinic visit weekly for unstructured conversation and questioning with examiner and viewing health-related videos. 	Outcomes for person with dementia: general cognitive functioning; performance on tests of memory, working memory and attention, verbal fluency, tapping; depression; quality of life (rated by carer).
De Vreese et al., 1998	RCT comparing three intervention groups with placebo control.	24 patients with AD according to NINCDS-ADRDA criteria.	<ol style="list-style-type: none"> 1. Acetylcholinesterase inhibitor (AChE-I) alone. 2. Cognitive training in twice weekly sessions lasting 45 mins and targeting memory, language and executive function, with home practice facilitated by carer, for 3 months. 3. AChE-I plus cognitive training (introduced after three months on drug). 4. Placebo medication. 	Outcomes for person with dementia: general cognitive functioning; behaviour; activities of daily living.
Heiss et al., 1994	RCT comparing four intervention conditions.	80 patients meeting NINCDS-ADRDA criteria for probable AD. Data available for 70 of these.	<ol style="list-style-type: none"> 1. Social support only (n = 17). 2. Computerised cognitive training covering memory, perceptual and motor tasks in twice-weekly sessions (n = 18). 3. Cognitive training plus pyritinol 2 × 600 mg/day (n = 17). 4. Cognitive training plus phosphatidylserine 2 × 200 mg/day (n = 18). 6 months' duration of treatment.	Outcomes for person with dementia: general cognitive functioning; performance on tests of memory, verbal fluency, orientation, reaction time, attention and concentration, psychomotor speed; electrophysiological activity and cerebral glucose metabolism.

Quayhagen et al., 1995	RCT comparing cognitive training with placebo and wait-list control.	79 community-resident persons with AD and their family caregiver. Data available for 78 of these (51 male and 27 female patients; 18 male and 60 female carers).	<ol style="list-style-type: none"> 1. Experimental condition: 1 hour daily of cognitive training facilitated by carer, using tasks covering memory, problem-solving and conversational fluency, and weekly home visits by therapist (n = 25). 2. Placebo condition: passive observation of activities similar to tasks used in experimental condition (n = 28). 3. Wait-list control: (n = 25). 	Outcomes for person with dementia: scores on tests of memory, verbal fluency, problem-solving and attention; ratings of memory problems and behaviour problems made by carer.
Quayhagen et al., 2000	RCT comparing four treatment conditions with a wait-list control.	103 persons (65 men, 38 women) with dementia (AD, vascular dementia, or Parkinson's dementia) and in the mild or moderate stage, together with their spouse caregivers.	<ol style="list-style-type: none"> 1. Cognitive training (n = 21). Training on memory, problem-solving and conversational fluency for 1 hour daily, 5 days a week, facilitated by spouse, with support from therapist. 2. Dyadic counselling (n = 29), focused on problem/conflict identification, stress reduction, anger/frustration management, communication enhancement, and conflict resolution. 3. Dual supportive seminar groups (n = 22). Initial meeting for both partners (1.5 hrs), followed by seven sessions including both separate (1hr) and joint (0.5 hr) meetings for patients and spouses, with discussion of specified topics. 4. Early-stage day care (n = 16). Patients met for 4 hours per week to engage in stimulating activities. Monthly support group for carers. 5. Wait list control (n = 15). 	<p>Outcomes for person with dementia: scores on tests of immediate and delayed memory, verbal fluency and problem-solving.</p> <p>Outcomes for carer: ratings on measures of marital satisfaction, emotional status, morale, physical health status, perceived stress, coping, social support, satisfaction with intervention.</p>

(continued overleaf)

TABLE 1 (continued)

<i>Study</i>	<i>Methods</i>	<i>Participants</i>	<i>Interventions</i>	<i>Outcomes assessed</i>
Koltai et al., 2001	RCT comparing two intervention conditions and wait-list control.	24 participants with mild/moderate dementia (22 completed the study).	<ol style="list-style-type: none"> 1. Memory and coping programme in individual sessions, with a mean of six sessions (n=8). 2. Memory and coping programme in group sessions (n=8). Five 1-hour, weekly sessions in groups of four. 3. Wait-list control (n=8). <p>The memory and coping programme included training and practice in strategies of spaced retrieval, face-name recall, verbal elaboration, concentration/overt repetition, use of external memory aids, and ways of coping. Carers joined the last 10–15 mins of each session where available. As no differences in outcome were found between individual and group formats, the results for these two conditions were pooled.</p>	<p>Outcomes for person with dementia:</p> <ol style="list-style-type: none"> 1. Measures of cognitive functioning: MMSE, word-list learning (immediate and delayed recall). 2. Subjective ratings of memory functioning and level of depression, both self-rated and carer-rated.

2004); this highlights the need to consider the range of factors that may impact on outcome for a given individual, thus potentially confounding the results of group studies.

It is worth noting that the Cochrane review found no evidence to suggest that cognitive training results in significant increases in depression for people with dementia or their carers, as has sometimes been proposed (Small et al., 1997; Zarit et al., 1982). Negative outcomes in cognitive training studies might be attributable, at least in part, to the way in which interventions are conducted, and in particular to insufficient sensitivity regarding individual needs and responses. Even in the absence of negative outcomes, the rather standardised nature of cognitive training interventions may render them inherently unmotivating for people with dementia, and some may be reluctant to engage because they fear their deficits will be highlighted. Person-centred models in dementia care emphasise the importance of addressing individual needs and emotional reactions (Kitwood, 1997). A contemporary definition of person-centred care (Brooker, in press) outlines four key elements: valuing people with dementia and those who care for them, treating people as individuals, looking at the world from the perspective of the person with dementia, and providing a positive social environment in which the person living with dementia can experience relative well-being. This implies a need for a more individualised approach that takes into account the perspective of the person with dementia.

COGNITIVE REHABILITATION

A biopsychosocial approach to understanding dementia has important implications. It acknowledges that AD involves changes and needs at the biological, psychological and social levels. It recognises AD as being experienced within the context of social and cultural beliefs and practices, it accepts that the perspective of the person with dementia is of central importance, and it points to the relevance of considering AD in the context of a disability model. Distinguishing neurological impairment from disability and handicap (World Health Organisation, 1980) or, in more recent terminology, activity limitation and participation restriction (World Health Organisation, 1998) opens significant possibilities for intervention, in a way that is consistent with principles of person-centred care. The goals of enhancing or maximising activity and participation can be translated within service provision into an emphasis on rehabilitation. The relevance of a rehabilitation model for dementia care was noted by Cohen & Eisdorfer (1986), and people with a diagnosis of dementia have themselves begun to advocate for a rehabilitation-oriented approach (Friedell, 2002).

Rehabilitation aims to help people achieve or maintain an “optimal level of physical, psychological and social functioning” in the context of specific

impairments arising from illness or injury (McLellan, 1991), thus facilitating participation in preferred activities and valued social roles (World Health Organisation, 1998). Rehabilitation is conducted in the context of a natural trajectory of change over time, which varies according to the individual, the nature of the impairment, and the social context. In a condition such as AD with a trajectory of progressive impairment, rehabilitation goals will necessarily change over time in a way that reflects this trajectory (Clare, 2003). In the early stages, cognitive functioning may be a valuable focus for rehabilitation endeavours.

Cognitive rehabilitation is an individualised approach to helping people with cognitive impairments in which those affected, and their families, work together with health care professionals to identify personally-relevant goals and devise strategies for addressing these (Wilson, 2002). The emphasis is not on enhancing performance on cognitive tasks as such, but on improving functioning in the everyday context (Wilson, 1997). Comprehensive models of cognitive rehabilitation emphasise the need to address cognitive difficulties and emotional responses in an integrated, holistic way, and to take account of the person's life experience and social context (Prigatano, 1999). The cognitive rehabilitation approach, developed mainly through work with younger brain-injured people, is now increasingly being discussed in relation to dementia (Camp, Bird, & Cherry, 2000; Clare & Woods, 2001), although a comprehensive model comparable to those developed in the brain injury field remains to be fully elaborated.

The cognitive profile observed in people with early-stage AD suggests that interventions may aim to build on the areas of relative strength reflected in preserved aspects of memory, and develop ways of compensating for impairments in those aspects of memory that are significantly affected, in order to enhance or maintain everyday functioning and well-being, and reduce excess disability, for the person with dementia, and to reduce strain for family caregivers.

Individualised cognitive rehabilitation interventions aim to tackle directly those difficulties considered most relevant by the person with dementia and his or her family members or supporters. They target everyday situations in the real-life context, since there is no implicit assumption that changes instituted in one setting would necessarily be expected to generalise to another. Where neuropsychological tests are used as outcome measures, this is done not with the expectation of demonstrating generalised improvement, but in order to document the impact of any changes resulting from the trajectory of the disorder and thus assist in the evaluation of behavioural changes observed in the specific domains targeted in the intervention. Goals for intervention are selected collaboratively, and interventions are usually conducted on an individual basis.

In relation to memory difficulties, an individualised cognitive rehabilitation approach aims to help people with early-stage AD and their families in two main ways:

1. Making the most of remaining memory ability, for example by identifying the best ways of taking in important information (Anderson, Arens, Johnson, & Coppens, 2001; Bäckman et al., 1991; Camp, 1989; Camp et al., 2000; Clare, Wilson, Breen, & Hodges, 1999; Clare et al., 2000, 2002; Clare, Wilson, Carter, & Hodges, 2003a; Clare, Wilson, Carter, Hodges, & Adams, 2001; Hill, Evankovich, Sheikh, & Yesavage, 1987) or carrying out important, real-life practical skills (Josephsson et al., 1993).
2. Finding ways of compensating for difficulties, such as using memory aids or adjusting the environment so that the demands on memory are reduced (Bourgeois, 1990; Clare et al., 2000; Kurlychek, 1983). This involves the application of methods and techniques that support learning or facilitate changes in behaviour (Bird, 2001).

This is accompanied by provision of information aimed at facilitating an understanding of cognitive strengths and difficulties and by supportive discussion relating to individual emotional reactions or other needs, where appropriate drawing on psychotherapeutic methods. Links are also made with other possible sources of support (Clare, 2003).

Elements of cognitive rehabilitation have been incorporated into broader psychosocial early intervention programmes (Moniz-Cook et al., 1998). It is also worth noting that methods derived from cognitive rehabilitation have been applied in the care of people with more advanced dementia to facilitate enhancement of basic skills (Camp et al., 1997), communication (McPherson et al., 2001), or reduction in behaviours regarded as problematic (Bird, 2000, 2001).

A comprehensive recent review (De Vreese et al., 2001) supports the efficacy of memory rehabilitation approaches for people with early-stage Alzheimer's disease, emphasising that interventions must be of sufficient duration and supported by caregiver involvement, and highlighting the importance of flexibility to allow for individual needs. A Cochrane systematic review, however, found no RCTs of individualised cognitive rehabilitation for people with early-stage AD (Clare et al., 2003b). Therefore at present this approach can only be evaluated on the basis of currently-available evidence from reports of single case experimental designs and controlled group studies. These studies have demonstrated that people with early-stage dementia can to some extent, given appropriate support, learn or re-learn important and personally-relevant information, maintain this learning over time, and apply it in the everyday context (Anderson et al., 2001; Camp et al., 2000; Clare et al.,

1999, 2001), that they can develop compensatory strategies such as using a memory aid (Clare et al., 2000), and that they can maintain or enhance their functional skills in activities of daily living (Josephsson et al., 1993). Thus, indications from this evidence are cautiously positive.

DISCUSSION

With a growing emphasis on early detection and intervention in dementia care (Woods et al., 2003), the need for a clear evidence base for cognitive training and cognitive rehabilitation interventions is becoming increasingly apparent. We conclude that the currently-available evidence does not provide strong support for the use of cognitive training interventions for people with early-stage AD (e.g., Clare et al., 2003b). These findings must, however, be viewed with caution due to the methodological limitations that are evident in reports of existing studies, and there are suggestions that these interventions may sometimes produce modest benefits in certain domains of cognitive functioning. Further well-designed RCTs of cognitive training might help to provide more definitive evidence regarding efficacy. It is not possible at present to draw firm conclusions about the efficacy of individualised cognitive rehabilitation interventions for people with early-stage dementia, due to the lack of any RCTs in this area (Clare et al., 2003b), although indications from single-case designs and small group studies are cautiously positive. RCTs of individualised cognitive rehabilitation are needed in order to allow a comprehensive evaluation of the efficacy and potential of this approach.

While further research is indicated, this should take account of the conceptual and methodological issues outlined above. There is a strong rationale for cognition-focused intervention, derived from neuropsychological investigations and experimental studies of learning and behaviour change. However, there is a good deal of conceptual confusion about the appropriate parameters and goals for such interventions, and this is increased by the interchangeable use of terms such as “stimulation”, “training” and “rehabilitation”. We have attempted to address this through clear definition and description of different categories of intervention. We acknowledge that the identified categories represent broad definitions and that in some cases there may be a degree of overlap between cognitive “stimulation”, cognitive “training”, and cognitive “rehabilitation”; while these categories seem an appropriate way of classifying the current literature, they may require refinement in the future. Nevertheless we would argue that the distinctions do have validity, in that they relate to different underlying theoretical and conceptual assumptions, and therefore may have utility in helping to clarify future directions within this important area of research. Such increased clarity may assist in achieving a

clear consensus, both about the appropriate goals of such interventions in the context of a progressive disorder of later life, and about the ways in which progress towards achieving these goals should be measured. Aiming to reduce functional disability and increase well-being is likely to be a more realistic and helpful goal than aiming to reduce underlying impairment, at least given our current state of knowledge. Evaluations of outcome need to be consistent with this goal, and measures used must be such as to offer the chance of demonstrating that the goal has been met. Taking account of individual differences and needs presents a further challenge, as methods are required which allow an individualised approach to intervention alongside the possibility of group comparison of outcomes.

We have focused here primarily on interventions for memory difficulties, reflecting the main emphasis in the literature to date. Although both cognitive training and cognitive rehabilitation may be applied to difficulties arising from impairments in a range of cognitive functions, cognitive rehabilitation in particular has so far mainly been directed at working with memory difficulties, and there is certainly scope for further development in this respect.

Finally, the possibility that a combination of cognition-focused intervention and medication could be more effective than medication alone (Newhouse et al., 1997) highlights the need to explore the potential of these approaches. The evidence to date is not strong: two RCTs included in this review had a medication-plus-training condition (De Vreese et al., 1998; Heiss et al., 1994), but only De Vreese et al. (1998) used the currently-licensed acetylcholinesterase inhibitors (AChEIs). The results of this latter study did suggest that the combination of cognitive training and AChEIs was more effective than either treatment alone, but the authors acknowledge that it was a small, preliminary investigation. In the study by Clare et al. (2002), it was possible to compare the effects of cognitive rehabilitation for participants who were, or were not, receiving concurrent AChEI medication; no differences were found in outcome for these two groups, although numbers were small and the authors acknowledged that it was therefore difficult to draw firm conclusions. Arguably, the combination of cognitive rehabilitation, with its goal-directed approach, and medication, with its presumably more general effect of enhancing cognitive processes, should be particularly powerful. Further comparative research is needed to address this issue. Ultimately, it is possible to speculate that progress in the provision of effective cognition-focused interventions could provide possibilities for the future development of preventive approaches for those who are experiencing mild cognitive impairment or otherwise at risk of developing dementia. The lack of adverse effects of these approaches makes them ideal for application in a situation where diagnosis of dementia is uncertain; they have the potential to empower the person to maximise his or her cognitive strengths and to continue to find ways of reaching goals which are personally meaningful and important.

REFERENCES

- Anderson, J., Arens, K., Johnson, R., & Coppens, P. (2001). Spaced retrieval vs memory tape therapy in memory rehabilitation for dementia of the Alzheimer's type. *Clinical Gerontologist, 24*, 123–139.
- Bäckman, L. (1992). Memory training and memory improvement in Alzheimer's disease: Rules and exceptions. *Acta Neurologica Scandinavica, Supplement 139*, 84–89.
- Bäckman, L. (1996). Utilizing compensatory task conditions for episodic memory in Alzheimer's disease. *Acta Neurologica Scandinavica, Supplement 165*, 109–113.
- Bäckman, L., Josephsson, S., Herlitz, A., Stigsdotter, A., & Viitanen, M. (1991). The generalisability of training gains in dementia: Effects of an imagery-based mnemonic on face-name retention duration. *Psychology and Aging, 6*(3), 489–492.
- Ballard, C. G., Bannister, C., & Oyebode, F. (1996). Depression in dementia sufferers. *International Journal of Geriatric Psychiatry, 11*, 507–515.
- Ballard, C. G., Boyle, A., Bowler, C., & Lindesay, J. (1996). Anxiety disorders in dementia sufferers. *International Journal of Geriatric Psychiatry, 11*, 987–990.
- Bernhardt, T., Maurer, K., & Froelich, L. (2002). Der Einfluss eines alltagsbezogenen kognitiven Trainings auf die Aufmerksamkeits- und Gedächtnisleistung von Personen mit Demenz. *Zeitschrift fuer Gerontologie und Geriatrie, 35*, 32–38.
- Bird, M. J. (2000). Psychosocial rehabilitation for problems arising from cognitive deficits in dementia. In R. D. Hill, L. Bäckman, & A. S. Neely (Eds.), *Cognitive rehabilitation in old age*. Oxford: Oxford University Press.
- Bird, M. J. (2001). Behavioural difficulties and cued recall of adaptive behaviour in dementia: Experimental and clinical evidence. *Neuropsychological Rehabilitation, 11*, 357–375.
- Bourgeois, M. S. (1990). Enhancing conversation skills in patients with Alzheimer's disease using a prosthetic memory aid. *Journal of Applied Behavior Analysis, 23*, 29–42.
- Brandt, J., & Rich, J. B. (1995). Memory disorders in the dementias. In A. D. Baddeley, B. A. Wilson, & F. N. Watts (Eds.), *Handbook of memory disorders* (pp. 243–270). Chichester, UK: John Wiley & Sons Ltd.
- Breuil, V., de Rotrou, J., Forette, F., Tortrat, D., Ganasia-Ganem, A., Frambourt, A., Moulin, F., & Boller, F. (1994). Cognitive stimulation of patients with dementia: Preliminary results. *International Journal of Geriatric Psychiatry, 9*, 211–217.
- Brodsky, H., & Gresham, M. (1989). Effect of a training programme to reduce stress in carers of patients with dementia. *British Medical Journal, 299*, 1375–1379.
- Brodsky, H., Gresham, M., & Luscombe, G. (1997). The Prince Henry Hospital dementia caregivers' training programme. *International Journal of Geriatric Psychiatry, 12*, 183–192.
- Brooker, D. (in press). What is person-centred care in dementia? *Reviews in Clinical Gerontology*.
- Camp, C. J. (1989). Facilitation of new learning in Alzheimer's disease. In G. Gilmore, P. Whitehouse, & M. Wykle (Eds.), *Memory and aging: Theory, research and practice* (pp. 212–225). New York: Springer.
- Camp, C. J., Bird, M. J., & Cherry, K. E. (2000). Retrieval strategies as a rehabilitation aid for cognitive loss in pathological aging. In R. D. Hill, L. Bäckman, & A. S. Neely (Eds.), *Cognitive rehabilitation in old age* (pp. 224–248). Oxford: Oxford University Press.
- Camp, C. J., Judge, K. S., Bye, C., Fox, K., Bowden, J., Bell, M., Valencic, K., & Mattern, J. (1997). An intergenerational program for persons with dementia using Montessori methods. *The Gerontologist, 37*, 688–692.
- Christensen, H., Kopelman, M. D., Stanhope, N., Lorentz, L., & Owen, P. (1998). Rates of forgetting in Alzheimer dementia. *Neuropsychologia, 36*, 547–557.
- Clare, L. (2003). Rehabilitation for people with dementia. In B. A. Wilson (Ed.), *Neuropsychological rehabilitation: Theory and practice* (pp. 197–215). Lisse, NL: Swets & Zeitlinger.

- Clare, L., Wilson, B. A., Breen, K., & Hodges, J. R. (1999). Errorless learning of face–name associations in early Alzheimer’s disease. *Neurocase*, *5*, 37–46.
- Clare, L., Wilson, B. A., Carter, G., Gosses, A., Breen, K., & Hodges, J. R. (2000). Intervening with everyday memory problems in early Alzheimer’s disease: An errorless learning approach. *Journal of Clinical and Experimental Neuropsychology*, *22*, 132–146.
- Clare, L., Wilson, B. A., Carter, G., & Hodges, J. R. (2003a). Cognitive rehabilitation as a component of early intervention in dementia: A single case study. *Aging and Mental Health*, *7*, 15–21.
- Clare, L., Wilson, B. A., Carter, G., Hodges, J. R., & Adams, M. (2001). Long-term maintenance of treatment gains following a cognitive rehabilitation intervention in early dementia of Alzheimer type: A single case study. *Neuropsychological Rehabilitation*, *11*, 477–494.
- Clare, L., Wilson, B. A., Carter, G., Roth, I., & Hodges, J. R. (2002). Relearning of face–name associations in early-stage Alzheimer’s disease. *Neuropsychology*, *16*, 538–547.
- Clare, L., Wilson, B. A., Carter, G., Roth, I., & Hodges, J. R. (2004). Awareness in early-stage Alzheimer’s disease: Relationship to the outcome of cognitive rehabilitation. *Journal of Clinical and Experimental Neuropsychology*, *26*, 215–226.
- Clare, L., & Woods, R. T. (Eds.). (2001). *Cognitive rehabilitation in dementia*. Hove, UK: Psychology Press.
- Clare, L., Woods, B., Moniz-Cook, E., Orrell, M., & Spector, A. (2003b). Cognitive rehabilitation and cognitive training interventions targeting memory functioning in early-stage Alzheimer’s disease and vascular dementia (Cochrane Review). In *The Cochrane Library*, Issue 4. Chichester, UK: John Wiley & Sons Ltd.
- Cohen, D., & Eisdorfer, C. (1986). *The loss of self: A family resource for the care of Alzheimer’s disease and related disorders*. New York: W W Norton & Company.
- Davis, R. N., Massman, P. J., & Doody, R. S. (2001). Cognitive intervention in Alzheimer Disease: A randomized placebo-controlled study. *Alzheimer Disease and Associated Disorders*, *15*, 1–9.
- De Vreese, L. P., Neri, M., Fioravanti, M., Belloi, L., & Zanetti, O. (2001). Memory rehabilitation in Alzheimer’s disease: A review of progress. *International Journal of Geriatric Psychiatry*, *16*, 794–809.
- De Vreese, L. P., Verlato, C., Emiliani, S., Schioppa, S., Belloi, L., Salvioli, G., & Neri, M. (1998). Effect size of a three-month drug treatment in AD when combined with individual cognitive retraining: Preliminary results of a pilot study. [Abstract.] *Neurobiology of Aging*, *19*(4S), S213.
- Ermini-Fuenfschilling, D., & Meier, D. (1995). Gedächtnistraining: wichtiger Bestandteil der Milieutherapie bei seniler Demenz. *Zeitschrift fuer Gerontologie und Geriatrie*, *28*, 190–194.
- Farina, E., Fioravanti, R., Chiavari, L., Imbornone, E., Alberoni, M., Pomati, S., Pinardi, G., Pignatti, R., & Mariani, C. (2002). Comparing two programs of cognitive training in Alzheimer’s disease: A pilot study. *Acta Neurologica Scandinavica*, *105*, 365–371.
- Friedell, M. (2002). Awareness: A personal memoir on the changing quality of life in Alzheimer’s. *Dementia*, *1*, 359–366.
- Gatz, M., Fiske, A., Fox, L., Kaskie, B., Kasl-Godley, J. E., McCallum, T. J., & Wetherell, J. L. (1998). Empirically validated psychological treatments for older adults. *Journal of Mental Health and Aging*, *4*(1), 9–45.
- Heiss, W.-D., Kessler, J., Mielke, R., Szelies, B., & Herholz, K. (1994). Long-term effects of phosphatidylserine, pyritinol and cognitive training in Alzheimer’s disease. *Dementia*, *5*, 88–98.
- Hill, R. D., Evankovich, K. D., Sheikh, J. I., & Yesavage, J. A. (1987). Imagery mnemonic training in a patient with primary degenerative dementia. *Psychology and Aging*, *2*, 204–205.
- Hofmann, M., Hock, C., Kuhler, A., & Muller-Spahn, F. (1996). Interactive computer-based cognitive training in patients with Alzheimer’s disease. *Journal of Psychiatric Research*, *30*, 493–501.

- Josephsson, S., Bäckman, L., Borell, L., Bernspang, B., Nygard, L., & Ronnberg, L. (1993). Supporting everyday activities in dementia: An intervention study. *International Journal of Geriatric Psychiatry, 8*, 395–400.
- Kesslak, J. P., Nackoul, K., & Sandman, C. A. (1997). Memory training for individuals with Alzheimer's disease improves name recall. *Behavioural Neurology, 10*, 137–142.
- Kitwood, T. (1997). *Dementia reconsidered: The person comes first*. Buckingham, UK: Open University Press.
- Koltai, D. C., Welsh-Bohmer, K. A., & Schmechel, D. E. (2001). Influence of anosognosia on treatment outcome among dementia patients. *Neuropsychological Rehabilitation, 11*, 455–475.
- Kopelman, M. D. (1985). Rates of forgetting in Alzheimer-type dementia and Korsakoff's syndrome. *Neuropsychologia, 23*, 623–638.
- Kurlychek, R. T. (1983). Use of a digital alarm chronograph as a memory aid in early dementia. *Clinical Gerontologist, 1*, 93–94.
- Little, A. G., Volans, P. J., Hemsley, D. R., & Levy, R. (1986). The retention of new information in senile dementia. *British Journal of Clinical Psychology, 25*, 71–72.
- McLellan, D. L. (1991). Functional recovery and the principles of disability medicine. In M. Swash & J. Oxbury (Eds.), *Clinical Neurology* (Vol. 1, pp. 768–790). London: Churchill Livingstone.
- McPherson, A., Furniss, F. G., Sdogati, C., Cesaroni, F., Tartaglini, B., & Lindsay, J. (2001). Effects of individualised memory aids on the conversation of patients with severe dementia: A pilot study. *Aging and Mental Health, 5*(3), 289–294.
- Moniz-Cook, E., Agar, S., Gibson, G., Win, T., & Wang, M. (1998). A preliminary study of the effects of early intervention with people with dementia and their families in a memory clinic. *Aging and Mental Health, 2*, 199–211.
- Moore, S., Sandman, C. A., McGrady, K., & Kesslak, J. P. (2001). Memory training improves cognitive ability in patients with dementia. *Neuropsychological Rehabilitation, 11*, 245–261.
- Morris, R. G. (1996). The neuropsychology of Alzheimer's disease and related dementias. In R. T. Woods (Ed.), *Handbook of the clinical psychology of ageing*. Chichester, UK: John Wiley & Sons Ltd.
- Newhouse, P. A., Potter, A., & Levin, E. D. (1997). Nicotinic system involvement in Alzheimer's and Parkinson's diseases: Implications for therapeutics. *Drugs and Aging, 11*, 206–228.
- Prigatano, G. P. (1999). *Principles of neuropsychological rehabilitation*. New York: Oxford University Press.
- Quayhagen, M. P., Quayhagen, M., Corbeil, R. R., Hendrix, R. C., Jackson, J. E., Snyder, L., & Bower, D. (2000). Coping with dementia: Evaluation of four nonpharmacologic interventions. *International Psychogeriatrics, 12*, 249–265.
- Quayhagen, M. P., Quayhagen, M., Corbeil, R. R., Roth, P. A., & Rodgers, J. A. (1995). A dyadic remediation program for care recipients with dementia. *Nursing Research, 44*, 153–159.
- Reifler, B. V., & Larson, E. (1990). Excess disability in dementia of the Alzheimer's type. In E. Light & B. D. Lebowitz (Eds.), *Alzheimer's disease treatment and family stress*. New York: Hemisphere.
- Schreiber, M., Schweizer, A., Lutz, K., Kalveram, K. T., & Jaencke, L. (1999). Potential of an interactive computer-based training in the rehabilitation of dementia: An initial study. *Neuropsychological Rehabilitation, 9*, 155–167.
- Small, G. W., Rabins, P. V., Barry, P. P., Buckholtz, N. S., DeKosky, S. T., Ferris, S. H., Finkel, S. I., Gwyther, L. P., Khachaturian, Z. S., Lebowitz, B. D., McRae, T. D., Morris, J. C., Oakley, F., Schneider, L. S., Streim, J. E., Sunderland, T., Teri, L. A., & Tune, L. E. (1997). Diagnosis and treatment of Alzheimer disease and related disorders: Consensus statement of the American Association for Geriatric Psychiatry, the Alzheimer's Association and the American Geriatric Society. *Journal of the American Medical Association, 278*, 1363–1371.

- Spector, A., Davies, S., Woods, B., & Orrell, M. (2000). Reality orientation for dementia: A systematic review of the evidence for its effectiveness. *Gerontologist, 40*, 206–212.
- Spector, A., Orrell, M., Davies, S., & Woods, R. T. (1998). *Reality orientation for dementia: A review of the evidence for its effectiveness* (Issue 4). Oxford: Update Software.
- Spector, A., Thorgrimsen, L., Woods, B., Royan, L., Davies, S., Butterworth, M., & Orrell, M. (2003). Efficacy of an evidence-based cognitive stimulation therapy programme for people with dementia: Randomised controlled trial. *British Journal of Psychiatry, 183*, 248–254.
- Squire, L. R., & Knowlton, B. J. (1995). Memory, hippocampus, and brain systems. In M. Gazzaniga (Ed.), *The cognitive neurosciences*. Boston: MIT Press.
- Wilson, B. A. (1997). Cognitive rehabilitation: How it is and how it might be. *Journal of the International Neuropsychological Society, 3*, 487–496.
- Wilson, B. A. (2002). Towards a comprehensive model of cognitive rehabilitation. *Neuropsychological Rehabilitation, 12*, 97–110.
- Woods, R. T. (1996). Psychological “therapies” in dementia. In R. T. Woods (Ed.), *Handbook of the clinical psychology of ageing* (pp. 575–600). Chichester, UK: John Wiley & Sons Ltd.
- Woods, R. T. (2002). Reality orientation: A welcome return? Editorial. *Age and Ageing, 31*, 1–2.
- Woods, R. T., Moniz-Cook, E., Iliffe, S., Campion, P., Vernooij-Dassen, M., Zanetti, O., & Franco, M. (2003). Dementia: Issues in early recognition and intervention in primary care. *Journal of the Royal Society of Medicine, 96*, 320–324.
- World Health Organisation (1980). *International classification of impairments, disabilities, and handicaps*. Geneva: World Health Organisation.
- World Health Organisation (1998). *International classification of impairments, disabilities, and handicaps* (2nd ed.). Geneva: World Health Organisation.
- Yesavage, J. A., Westphal, J., & Rush, L. (1981). Senile dementia: Combined pharmacologic and psychologic treatment. *Journal of the American Geriatrics Society, 29*, 164–171.
- Zanetti, O., Binetti, G., Magni, E., Rozzini, L., Bianchetti, A., & Trabucchi, M. (1997). Procedural memory stimulation in Alzheimer’s disease: Impact of a training programme. *Acta Neurologica Scandinavica, 95*, 152–157.
- Zanetti, O., Magni, E., Binetti, G., Bianchetti, A., & Trabucchi, M. (1994). Is procedural memory stimulation effective in Alzheimer’s disease? *International Journal of Geriatric Psychiatry, 9*, 1006–1007.
- Zanetti, O., Zanieri, G., Giovanni, G. D., Vreese, L. P. D., Pezzini, A., Metitieri, T., & Trabucchi, M. (2001). Effectiveness of procedural memory stimulation in mild Alzheimer’s disease patients: A controlled study. *Neuropsychological Rehabilitation, 11*, 263–272.
- Zarit, S. H., & Edwards, A. B. (1996). Family caregiving: Research and clinical intervention. In R. T. Woods (Ed.), *Handbook of the clinical psychology of aging*. Chichester, UK: John Wiley & Sons Ltd.
- Zarit, S. H., Zarit, J. M., & Reeve, K. E. (1982). Memory training for severe memory loss: Effects on senile dementia patients and their families. *The Gerontologist, 22*, 373–377.

Manuscript received November 2003

Revised manuscript received February 2004