Getting the gist

JACK NISSAN, *winner in the undergraduate category of our Student Writer Competition, on surprising findings surrounding the memory of people with Alzheimer's.*

REMEMBERING is not simply a matter of freezing particular pieces of information in our minds so that we can return to them at a later date, like a series of photographs. The brain actually filters out most of what it receives; memory is a reconstructive process, the creation of a coherent framework for the information available to our senses.

There are various memory processes which help us achieve this goal – one is the ability to put things into a semantic context if we intend to create an appropriate framework for them. This ability has been described as a capacity to 'gist' (Gallo, 2006). It is a crucial element in healthy memory, but there is controversy about its condition in people who suffer from amnesic disorders, such as Alzheimer's.

One method of examining gist memory is through false memories. As their name suggests, these are inaccurate memories or memories of events that never actually occurred (Schacter, 1995). There is evidence that even healthy individuals regularly acquire false memories, both experimental (Loftus, 1991) and through some extremely striking real-life cases (Clifasefi *et al*., in press). One such example is the 'Satanic ritual abuse' panic that affected certain areas of America in the 1980s. During this time, numerous adults claimed to have recovered memories of being sexually and physically abused as children, and many of the accused received long jail sentences. However, a lot of these memories were the result of a highly controversial psychological therapy called 'recovered memory therapy', which used various techniques to 'recover' repressed memories from patients. This type of therapy has since been heavily criticised, and it is now suggested that the memories of child abuse were actually implanted rather than recovered. As a result, many of the jail sentences were overturned and many of the therapists responsible were sued.

It is perhaps counterintuitive that false memories can exist in a healthy mind, but if we look at them in the context of memory as a reconstructive process, and particularly in relation to the ability to gist, it becomes more understandable. Since the ultimate goal of memory, in this view, is to make sense of our experience rather than to remember it exactly as it occurred, it would be reasonable for our memory to endorse inaccurate or false interpretations of events, if these interpretations would assist us in making sense of our experience. In addition, it is likely that these false memories would be semantically related to the experience itself, since they exist to make sense of it, and hence their occurrence might well be linked with the ability to gist effectively.

This process has been demonstrated in a series of experiments that asked healthy participants to study semantically related word lists, which converged on certain target words, sometimes called related lures. For example, one list from an experimental paradigm called the DRM (Roediger & McDermott, 1995) contains the words *hot*, *snow*, *warm*, *winter*, *ice*, *wet*, *frigid*, *chilly*, *heat*, *weather*, *freeze*, *air*, *shiver*, *arctic* and *frost*, but not the related lure *cold*. Participants then completed a recall or recognition phase, and the results showed that people consistently produced or recognised the related lures that were not actually on the original lists.

These experiments using related word lists have been modified and extended to study patterns of false recognition across different groups. For instance, it has been found that younger adults recognise fewer related lures than older adults (Balota *et al*., 1999; Norman & Schacter, 1997; Schacter *et al*., 1997). In one way this result might seem surprising, as it could imply that old adults have a better gist memory than young adults, but further experiments reveal this is not the case (Dehon & Bredart, 2004). It appears instead that younger adults simply have a better item-specific memory and use this to exclude some of the related lures that our gist might endorse (Balota *et al.*, 1999; Budson *et al*., 2000; Kensinger & Schacter, 1999).

When false recognitions are studied in people suffering from memory disorders such as Alzheimer's disease (AD), the results are quite striking. Given that their memory for specific items is so poor, we might expect AD patients to show a substantial increase in the number of related lures they falsely recognise. However, the results indicate the complete opposite – they falsely recognise even fewer related lures than healthy young adults (Schacter *et al*., 1996; Budson *et al*., 2000, 2001).

A large body of literature explains this result by inferring that AD patients have an impaired gist memory (Budson *et al*., 2000, 2001, 2006; Gallo *et al*., 2006; Schacter *et al*., 1996). This certainly seems like a rational explanation, but there may be another way of looking at the results that would lead to a different conclusion. It could be that in order to gist, we need a certain amount of information to gist from. Whilst it may not have been tested, it seems common sense that we would get a clearer gist from a list of 20 related items than we would from a list of two. Hence an

Judges' report

This was the ninth annual Student Writer Competition, sponsored by **The Psychologist**, the Research Board and the Professional Practice Board. The number of entries was disappointing this year, particularly from postgraduates; however, we think we have still ended up with worthy winners.

Articles were rated blind on quality of writing; clarity of argument; and accessibility, relevance and interest for **The Psychologist's** audience. We thought that both winners showed originality in choice of topic and approach, that would be likely to engage our wide-ranging audience.

The winners get an expenses-paid trip to the Society's London Lectures or Annual Conference. We look forward to all your entries next year.

Jon Sutton (Editor, The Psychologist)
Paul Redford (Chair, Psychologist Policy Committee)

increased item-specific memory, whilst being able to oppose gist memory in one sense, might at the same time enhance it, since the more items one has available, the better the gisting resources.

An experiment in which the entire study-test procedure was repeated across five trials (Budson *et al*., 2000) found that false recognition in AD patients actually increased over trials, in sharp contrast with young adults, whose false recognition decreased (due to an improved memory for specific items), and old adults whose false recognition remained fairly stable. While the authors explain this result in terms of an impaired gist memory in the AD patients that improves with repetition, it could instead be that their impaired item-specific memory improves, which in turn enables their intact gist memory to come into play. However, unlike healthy adults, they may still be unable to remember enough specific items to suppress the gist representations now available to them.

There is some evidence that supports this theory, notably from studies conducted by Balota and colleagues (Balota *et al*., 1999; Watson *et al*., 2001) which analyse the number of false recognitions of related lures with respect to the number of true recognitions of studied items. They matched AD patients who performed well on true recognition of studied words with healthy older adults who performed poorly on this measure, and found that under these conditions AD patients did not produce fewer false recognitions than older adults. Since true recognition of studied items can be seen as a measure of item-specific memory, this seems to imply that the reduced number of false recognitions commonly found in AD patients is more a result of their poor item-specific memory than of a damaged gist memory.

Some support for this theory also comes from the literature on semantic memory in AD. There is a debate over whether AD damages semantic memory itself (e.g. Gollan *et al*., 2006) or whether it damages other functions which interfere with the access to semantic memory (Balota *et al*., 1999; Watson *et al*., 2001). In a similar way, the false recognition results of amnesic patients could imply either damage to their gist memory itself or an inability to access it, perhaps due to the poor item-specific memory caused by the amnesia.

Another observation that questions the assumption that gist memory is damaged in AD patients is that this reduction in false recognitions has been found in patients suffering a variety of amnesias and amnesic syndromes, in addition to those suffering from AD. Examples include Korsakoff's syndrome (Schacter *et al*., 1996), semantic dementia (Simons *et al*., 2005), frontal lobe and medial temporal lobe lesions (Verfaellie *et al*., 2004), and mixed etiologies including anoxia and encephalitis (Verfaellie *et al*., 2002). These disorders all affect different areas of the brain, so it seems unlikely that they would all damage the same function. However, it is more feasible that gist memory, as a particular memory function, could be accessed in various ways, and thus it seems likely that each disorder prevents access to this function in some way as opposed to damaging it directly.

It would seem, then, that the study of false recognitions does not provide adequate evidence of an impaired gist memory in AD patients. We need to rule out the possibility that it is the deficit in item-specific memory which is causing the apparent lack of gisting, as opposed to damage to the actual gist memory itself. It is still possible that AD patients *do* get the gist, and therefore that it might be possible to help them gain a better understanding of their environment, even though they struggle to remember specific items. Using Balota's theory as a basis, finding ways to bypass item-specific memory might offer a useful direction for future clinical research in AD.

WEBLINKS

A short version of the DRM:
www.msnbc.com/onair/nbc/nightlynews/memory

A similar false recognition memory test:
tinyurl.com/2mmt8f

British False Memory Society: *www.bfms.org.uk*

Description of general memory processes (including gist memory): *tinyurl.com/2kybkc*

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A balancing act?

Samuel R. Nyman, *winner in the postgraduate category, on ways of preventing falls in older people without creating a stigma.*

ON 24 November 2004, Nana, my wife's grandmother, fell over in her front garden. She was picking up litter when her neighbour called to her, and when she turned to answer she found herself lying half across her drive and half across her lawn. She couldn't walk on her right leg, and later found out in the accident and emergency department that she had fractured her right knee.

The fracture meant not only two weeks in hospital, but also an operation to insert a metal plate into her knee, with her leg in a cast for three weeks. She can now walk, but she initially needed a commode and a stairlift fitted in her home.

Nana is aged 76 and is not alone in having this traumatic experience. In 1999, UK accident and emergency departments had to deal with almost 650,000 instances of people over 60 having similar experiences, of which over 200,000 resulted in hospital admissions. The economic cost of treating older people who have fallen is estimated at almost £1 billion (Scuffham *et al*., 2003).

Beyond this economic cost and the medical implications of fractures and treatment, older people can develop a fear of falling that leads them to unnecessarily restrict their lifestyle and diminish their quality of life (Howland *et al*., 1993). For instance, Nana is able to walk without a stick, but uses it because it makes her feel safer: 'It's nerves more or less…without the stick I could trip over a matchstick.'

Preventing falls

Contrary to popular belief, falls are not an inevitable part of ageing. Falls can be prevented, especially with balance training (Gardner *et al*., 2000). This is some form of physical activity that improves balance, coordination, and lower-leg muscle strength, such as walking, jogging, playing tennis, or tai chi

For an older person to accept that they could benefit from receiving falls-prevention advice, they must first accept that they are at risk of a fall. The problem with accepting that they are at risk of a fall is the stigma attached to being labelled 'a faller'. A faller is someone who is old, frail, dependent, and usually living in a residential home (Health Education Board for Scotland, 2001). In their study, the Health Education Board for Scotland concluded that 'health education campaigns to prevent "falls in older people" are unlikely to succeed' (2001, p.44).

It is likely this stigma of falls has contributed to the fact that many older people are not readily taking up falls-prevention advice. Falls clinics led by consultant physicians see an average of only five older people a week – representing just 3 per cent of fallers in the average-sized primary care trust (Royal College of Physicians, 2006). Studies that include balance training in their interventions have reported participation rates as low as 10 per cent (Day *et al*., 2002).

What can falls-prevention interventionists do? They want to prevent falls, but to do this they need older people to talk about it. It is like falls-prevention interventionists are playing the board game Taboo, where the objective is to describe a word without mentioning it or five associated words/phrases. Is there a way out of this game? Recent research suggests there is.

Not what you say but how you say it

It appears that older people are willing to discuss falls prevention when it is part of advice that stresses the benefits of balance training. Lucy Yardley and colleagues at the

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University of Southampton, along with Chris Todd at the University of Manchester, conducted a survey with over 700 older people (Yardley *et al*., 2007), seeking their views on different versions of balance-training advice. One version contained advice stressing their risk of falls and the need to prevent them to avoid broken bones. They found that when comparing the version containing advice stressing the risk of falls to versions that only discussed the benefits of balance training, mentioning falls did not produce a fear of falling or make older people reject the advice.

Why, then, did the Health Education Board of Scotland find that older people do not want to talk about falls? Yardley and colleagues measured the link between older people's intention to perform balance training and other measures. They found that the older people who wanted to take up balance training were more likely to believe that the advice was suitable for someone like themselves; that other people think they should do it; and that balance training would be enjoyable, improve their ability to do daily tasks, and not be harmful. In contrast, intention to undertake balance training was not linked with perceived falls risk, fear of the consequences of falls, or having health conditions that increased their falls risk.

Taken together, it's not what you say in falls prevention, it's how you say it. Trying to get older people to see themselves at risk of a fall does not work. However, presenting positive advice that is suitable for them should encourage older people to do balance training to prevent falls. You can talk to older people about falls once you've stressed the benefits of balance training. Falls prevention can be a secondary benefit to meeting new people and taking up a new hobby, which are more of an incentive for older people to take up physical activities (Stead *et al*., 1997). To illustrate, I will turn to a recent study to show how falls-prevention advice can be successfully communicated to older people.

A tailored approach

We developed an online intervention to encourage older people to take up balance training for the prevention of falls (Yardley & Nyman, in press). The intervention uses tailoring, a technique that makes the advice more personally relevant to the individual. This is achieved by taking the individual's answers to questions and using them to match the advice to the individual's needs and preferences (Kreuter *et al*., 2000).

We invited 16 older people into one of our laboratories and asked them to comment on our balance-training website, *www.balancetraining.org.uk* (Nyman & Yardley, 2006). The participants provided comments whilst accessing the website, and gave general feedback at the end.

The participants found the website to be usable – older people with minimal experience in using computers could use the website: 'It was quick and easy to use because it was kept simple' (64-year-old woman). Comments were generally positive: 'I would say it's very very good, extremely good, because I think there's a lot of practical information on there which could benefit a lot of people' (64-year-old man).

Perhaps the response was positive for two reasons. First, we did not focus on falls or falls risk, but on the benefits of balance training. Second, the tailoring made the advice more relevant to the older person: they had control over what balance training advice they selected, enabling them to select advice on the activities they wanted to know about and decide which activities to start.

Conclusion

Older people frequently fall and the results can be traumatic. Falls can be prevented, but current uptake to interventions can be low. Means of increasing motivation such as balance training websites may help bridge the gap between the older person and the intervention. They can do so because 'falls' is not a taboo: it's not what you say but how you say it.

Falls-prevention advice that is positive and relevant can include a discussion on falls, and can be effective in encouraging older people to prevent falls. People like Nana will then be able to be independent for longer, and enjoy more life in her years as well as more years in her life.

WEBLINKS

Our balance training website: *www.balancetraining.org.uk*

Prevention of Falls Network Europe (ProFaNE): *www.profane.eu.org*

Help the Aged: *www.helptheaged.org.uk*

Advice to 'Stay active! Stay independent! Stay on your feet!': *www.stayactive.qut.edu.au*

Later life training: *www.laterlifetraining.co.uk*

Extend – Movement to music for the over 60s and less able people: *www.extend.org.uk*

Active Independent Ageing: *www.falls-chutes.com*

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