

A woman with her hair in a ponytail is shown in profile, playing a Steinway & Sons piano. The lighting is dramatic, with strong highlights on her hair and the piano keys, and deep shadows elsewhere. The piano's brand name is visible on the fallboard.

IN MEMORY *of memory*

Reconnecting with lost memories may be as simple as listening to music. It's just one of a number of pioneering areas of research into dementia at Macquarie.

Words Bianca Nogrady
Images Chris Stacey

HAVE YOU EVER HEARD A PARTICULAR SONG ON THE RADIO OR DRIFTING OUT OF A CAFÉ, AND SUDDENLY YOU’RE TRANSPORTED BACK IN TIME AND PLACE INTO A MEMORY SO VIVID YOU CAN TASTE IT?

Music occupies a special place in our hearts and in our memories; so much so that it is being explored as a tool to help people who have lost their map to the past and their ability to remember.

Macquarie University researchers Professor Bill Thompson and Dr Ameer Baird are looking at how music might be used in individuals with dementia, not only to help reduce stress and anxiety, but also to re-engage the parts of the brain affected by degeneration.

Thompson likens music to a kind of neuropsychological Swiss army knife, which can be used to tackle multiple psychological functions.

“It’s tackling attention, it’s interacting with emotion, it’s interacting with language-like processes such as music syntax; how the pieces fit together, how the different notes and chords go together and the sense of an ending, for example,” says Thompson, Director of the Music, Sound and Performance Lab at Macquarie and Chief Investigator of the ARC Centre of Excellence in Cognition and its Disorders (CCD).

“And of course, it’s triggering autobiographical memories at the same time, and often triggering imagery and visual memories.”

LASTING CONNECTIONS

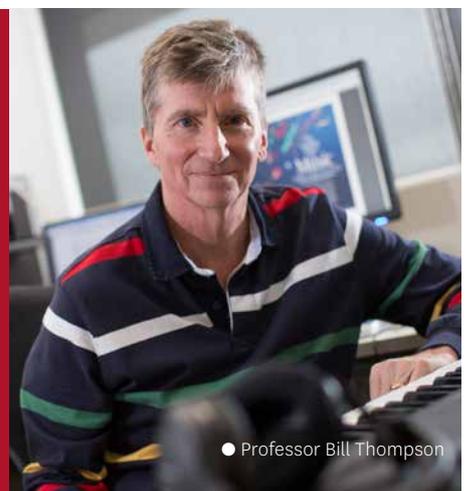
In this way, music uses a large number of effective psychological tools that enhance states of mind and can reconnect people with their past and with cognitive function that has been eroded by dementia.

Baird, a clinical neuropsychologist, NHMRC-ARC Dementia Research Development Fellow and CCD Associate, became interested in the impact of music on dementia after hearing about retired musicians with Alzheimer’s disease who were still able to play their instruments.

“We know that people with dementia enjoy music, they can respond to music, they can sing along, but it’s not really well researched why that is and how it works,” she says.

Baird has been working with an elderly woman with severe dementia who has been able to learn new songs despite the impact of the disease.

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● Professor Bill Thompson

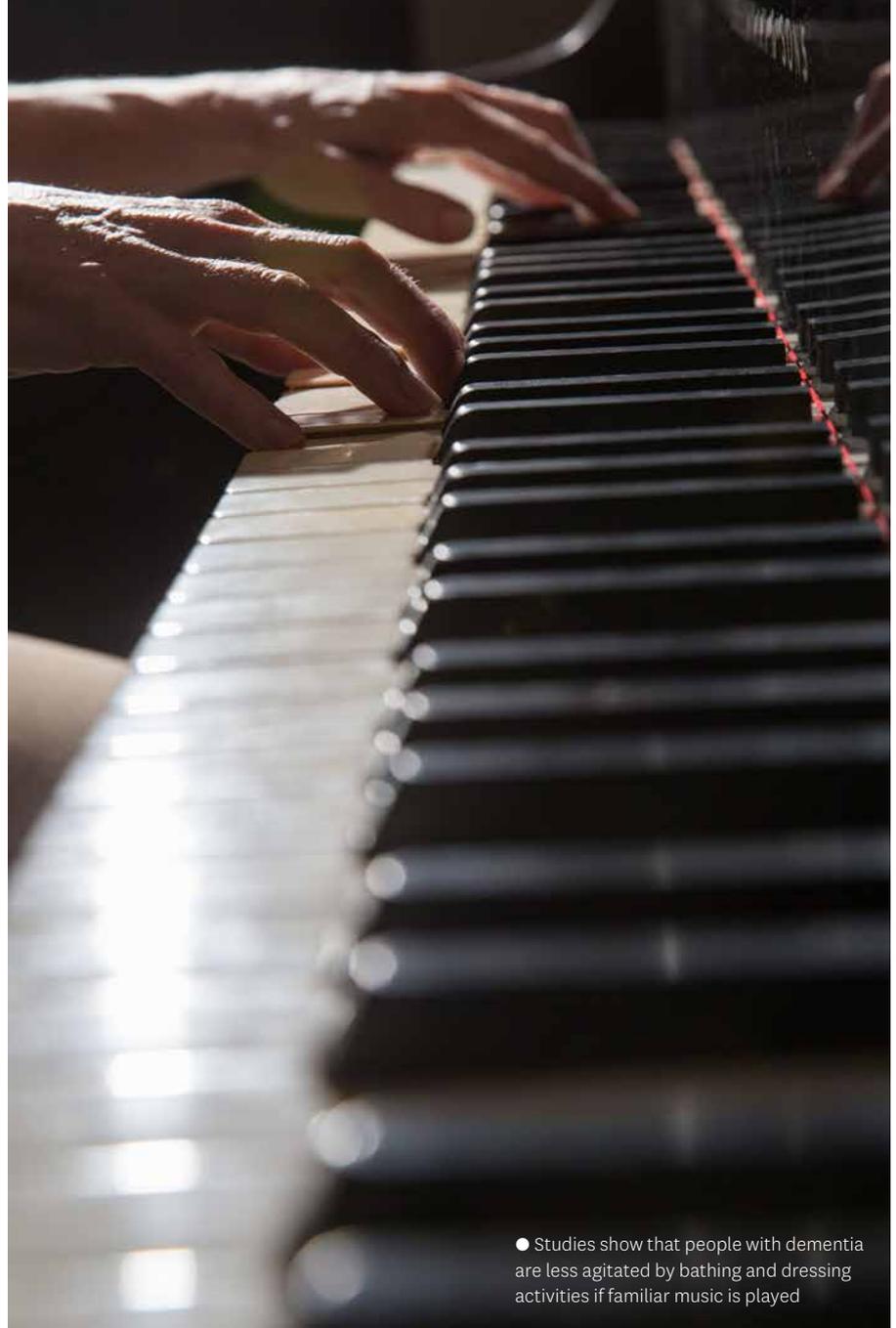
“She didn’t know who I was but if I started to sing the song that I taught her she was able to sing along,” she says. “It shows that the parts of the brain that control memory for music and the ability to sing are not as affected by dementia. Somehow music remains; music abilities can remain preserved.”

Both Baird and Thompson hope that these unique features of music may be harnessed for their therapeutic benefit. There are already studies showing that people with dementia are much less agitated or distressed by standard care activities such as bathing and dressing if familiar music is played to them while these activities are going on. Something as simple as reducing anxiety and agitation could not only have a profound effect on the quality of life of people with dementia and their carers, but could also reduce reliance on medications that come with potential side effects.

But Thompson says there is so much more that music may be able to do.

“Researchers are starting to realise that musical activities are more than just a diversion that reduces anxiety, but can actually help to slow down the progression of the effects of dementia on memory and cognitive function,” he says. “When people with dementia are engaged with music, they can sometimes recover fragments of past memories, and get bursts of awareness and cognitive function.”

Thompson is also collaborating with Chilean musician and Macquarie University researcher Dr Waldo Garrido on a study of the way music is used to evoke nostalgia and a sense of homeland among diaspora and



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refugee populations. As Thompson points out, people with dementia can be thought of as having experienced their own kind of diaspora; a dislocation from memory rather than from geography.

“In the same way that refugees from Chile or Syria have a strong need to connect with their sense of self and homeland when they are relocated in a new country, people with dementia are like refugees in the sense of being disconnected from their former selves,” Thompson says.

“Their experience of isolation is similar to that of diaspora populations, and music can be a valuable tool for helping them reconnect with their identity and personal homeland.”

REMEMBERING TOGETHER

Reconnecting with memory is also the focus of work by Macquarie University’s Dr Celia Harris (PhD, 2010), but instead of music being the trigger for memory, Harris is exploring how couples serve as each other’s memory triggers.

While much of the research in cognitive psychology suggests that group memory is less effective than individual memory, Harris points out that most of this research is done using groups of strangers trying to remember lists. But she is interested in transactive memory theory, which posits that couples working together

are greater than the sum of their parts; meaning they can remember better together than alone.

“They have this rich shared history so they can provide each other with really rich, personalised cues to trigger each other’s memories. That’s something that somebody who doesn’t know the person simply can’t do,” says Harris.

Her research with long-term couples has shown that, in general, this theory holds true, but with one major caveat; how the couples interact with each other dictates whether they help or hinder each other’s memory, in particular, how they speak to each other.

“Things that were helpful were things like cueing each other, rapid turn-taking – switching back and forth between the speakers – and things that were unhelpful were things like correcting each other, and having one person who was the designated

expert on a topic who dominated and shut off the possibility of the other person contributing,” she says.

Harris’ work could help in situations where one half of a couple suffers damage to their memory capacity, for example through brain injury or dementia. Case studies with individuals with an acquired brain injury are showing just how much difference being in a couple can make.

“We found amazing effects in the difference between a person remembering just with an interviewer, where they can remember virtually nothing, and then with their partner, they can remember a great deal more,” Harris says.

The hope is that carers and partners of people with dementia could be taught how to interact in such a way as to give the greatest benefits to the affected person’s memory. Harris says the key is sensitive providing of cues; letting the person speak until they start to taper off then coming in with support and a reminder, and allowing the person to pick up the thread again.

“Some people do it naturally and have learned how to do it, but some people don’t do it, so there’s potential there to teach them how to do it better.”

FIGHTING ON A DIFFERENT FRONT

While dementia most commonly affects people later in life, when those in long-term relationships are most likely to be able to benefit from remembering together, one particularly cruel form of dementia strikes younger individuals in their 50s and 60s. Macquarie University’s Associate Professor Ian Blair is researching frontotemporal dementia, and why this form of the disease can co-occur with the seemingly unrelated motor neurone disease (MND).

Frontotemporal dementia has a strong genetic component, and as Blair and colleagues have discovered, frontotemporal dementia shares genes with MND, also known as amyotrophic lateral sclerosis.

“What’s become increasingly evident over the past ten years is that there is a profound overlap between MND and frontotemporal dementia, and it’s also increasingly recognised that a substantial proportion of MND patients develop frontotemporal dementia and vice versa,” says Blair.

MACQUARIE UNIVERSITY: WORKING TO CURE MND

Motor Neurone Disease (MND) remains one of the most feared diagnoses in neurological practice because of its dismal prognosis. MND causes limb paralysis, leading to an inability to walk, speak and eat.

While MND presently remains unconquered, several encouraging breakthroughs have recently occurred. Macquarie’s Motor Neurone Disease Research Centre works with the University’s Motor Neurone Disease Clinic and the Macquarie University Hospital to build a best-practice program on global standards for translational research from bedside to laboratory bench.

Visit mq.edu.au/mnd for more information and to support groundbreaking research into MND.

Both diseases result from the death of neurons; in the case of frontotemporal dementia, the frontal and temporal lobes of the brain and in the case of motor neurone disease, the motor nerves in the spinal cord and part of the brain.

“We suspect that there are similar biological mechanisms that underlie what triggers the death of those groups of nerve cells in both diseases,” Blair says.

So far, Blair’s research has focused on the inherited forms of both motor neurone and frontotemporal dementia, but now the hope is to identify the causes of the sporadic forms.

“In the sporadic forms (those that occur without a family history), what we’re talking about is an interaction between probably many genetic variants and the environment, so the genetic features put you at risk, but when you couple that with an environmental exposure, then you get the disease.”

“The more we can learn about the triggers, and the influence genes have on how the diseases progress and interact, the more we can understand why these two devastating diseases occur and hopefully, one day, even prevent them,” he says. 🍷

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