

## Quality and longevity

Dorothy Bishop celebrates the career of one of her academic heroes, as he reaches 100

Reuben Conrad, like Inspector Morse, was never known by his first name. To his colleagues he has always been just Conrad. He has long been one of my academic heroes, and it is a great pleasure to have this opportunity to celebrate his long and distinguished career as he reaches the grand old age of 100. When he was a mere stripling of 89, Conrad was one of the first people to be interviewed for the Oral History Project of the British Psychological Society, by Evelyn Fenton, and it was a delight to be able to listen to his tales of life as a psychologist after demobilisation in 1946.

Those tapes presented a vivid picture of life as a research psychologist in the second half of the last century – a life remarkably different to that of today. Many changes are for the better: for a start there was a startling lack of women in the psychological world that Conrad inhabited. He would hardly recognise the profession as it is today, where women equal or outnumber men in most subdisciplines. There was also a lack of professionalism, which provided opportunities for an ‘old boy network’ to ensure that jobs and opportunities were given to the ‘right sort’ of person, with a handful of powerful figures able to make or break careers without any accountability. Teaching appears to have been haphazard – often, in the circles in UCL and Cambridge where Conrad trained, inspirational, but at other times inadequate.

But while musing on how things had changed, I also had a sense of nostalgia for an academic environment that could foster someone like Conrad. I wonder if he would have survived as a researcher in the modern age, where success hinges on publications in ‘high impact’ journals and grant income. Conrad is the opposite of flashy and self-promoting: during his time as a researcher, he was far more interested in solving practical problems than in making major theoretical advances. He would take time to get things right, rather than rushing out results. The quality and longevity of his work demonstrates the

value of such an approach – his work on decay and confusions in short-term memory, and on inner speech in the deaf, is still cited today.

Conrad went up to University College London in 1938, when psychology was a new subsidiary subject that was generally regarded as an easy option. He tells how he was completely hooked on psychology by Cyril Burt, who gave vivid and dramatic lectures, at one point arriving with a chimpanzee that he had borrowed from London Zoo. Conrad could not remember what point Burt was trying to illustrate, but he remembered the chimpanzee. In 1939 at the outbreak of war, the UCL Psychology Department was evacuated to Aberystwyth, where Conrad remembers a handful of students enjoying Burt’s engaging seminars as they walked along the promenade. But the war endured and so young men were having to join the Army. Conrad was all set to be shipped off to India as an anti-tank gunner, when he was told that Burt had asked that he should go and work with him in the War Office. But Burt subsequently fell out with the War Office, and Conrad found himself back in the Army, where he ended up with no degree but considerable expertise in artillery.

When the war ended, he wanted to complete his interrupted degree, but realised he was much more interested in occupational psychology than in Burt’s favourite topic, factor analysis. He realised that Cambridge would be the ideal place for him, but he had to persuade them to give him a place as a mature student. Frederick Bartlett, whom Conrad described as excessively talkative, and intimidating – ‘thin and willowy, like a spiral going up into the stratosphere’ – was prepared to give him a place, provided he could find a college who would accept him. That was not easy,

but eventually Conrad won through and found himself in the Psychology Department in Cambridge, with a whole cohort of ex-servicemen, including Donald Broadbent, Malcolm Piercy and Christopher Poulton.

Conrad’s path to a research career was not straightforward. He had done an undergraduate project with Bartlett that had worked out well, and Bartlett had offered him a job at the MRC Applied Psychology Unit on the strength of it. However, when Conrad’s final examination results came out, they were so bad that he felt he should write to Bartlett suggesting he was free to withdraw the job offer. Fortunately for Conrad, Bartlett would hear nothing of this, and so Conrad was launched on a career at the APU.

Conrad’s PhD viva was another unedifying experience. He had the strong impression that neither of his examiners (Alan Welford and James Drever) had actually read the thesis, and he was so discouraged by their lack of interest that he turned away from the topic – how people allocate their attention to simultaneously perform several time-dependent tasks, and moved on to study memory.

The Unit had originally been housed in the Psychology Department, but was eventually relocated to its current premises – a large house in leafy Chaucer Road about a mile from the city centre. There’s a story that

Norman Mackworth, the new Director after Bartlett, saw the house on the market, decided it was perfect for his Unit, made an offer on it, and then wrote to MRC Head Office to tell them they would have to pay for it. And they agreed. It proved to be a wise investment: the accommodation was pleasant and allowed the Unit to expand to become one of the major centres of psychological research in the UK.

A marked feature of Conrad’s research was that he wanted to do things that would be useful, and in particular to apply psychology to problems confronted by civilian workers. He was never all that interested in theory unless it could help him understand everyday problems. The APU had a long tradition of doing research on naval ratings, but Conrad wanted to look at how human factors influenced people working in settings such as factories. For a long time he found this pursuit difficult: he made slow progress, did not publish much and felt it was rather a lonely theme to be working

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on. A breakthrough came when he got together with a small group of like-minded people to found the Ergonomics Society, and met a man who was a consultant to the Post Office. He introduced Conrad to the administrators there, and he persuaded them that they could benefit from psychology. For instance, if a telephone keypad was designed in an optimal way, there would be fewer misdialled numbers, which could lead to a substantial saving for the Post Office. Similarly, with postcodes: what was needed was a code that could accommodate three million addresses, to facilitate automated sorting of letters, but it had to be easy to use, or people would just not use it. The UK postcode system was the result of masses of experiments that confirmed that what worked best was a code that included a letter part that had a clear relationship to the place name, followed by a series of digits and letters that specified the precise address, with letter and digits in a standardised place. Because in a sequence digits are easier to recall than letters, they were put in the middle of the code, and hard-to-recall consonants went at the easier far end. The fact that we have one of the most memorable postcode systems in the world is largely down to Conrad.

Although Conrad was not trying to develop theory, findings of theoretical importance forced themselves upon his attention. He had previously noticed that when people were asked to remember a series of letters, they tended to confuse certain letters, like D and T and E. Conrad initially thought that this was due to poor equipment: the memory lists were played to experimental subjects over a tape-recorder, and it was assumed that poor acoustic quality was responsible for the errors. However, in the 1960s Conrad took a sabbatical at Ann Arbor where there was a much higher level of computational and technical sophistication, and he returned with a piece of equipment that enabled him to test memory in groups of subjects by presenting letter series in a visual array. To his great surprise, the error patterns were just like he had observed when people were listening to letter lists. This led to the insight that verbal information is encoded into an acoustic form in memory regardless of whether it is received visually or acoustically.

Conrad's career took a dramatic turn in 1968 when he was greatly affected by

the death of his wife. By this time he was deputy director of the Unit, but this tragedy devastated him and made him lose all interest in his research. After six months, he felt he had to get away from Cambridge and change what he was doing. Conrad had a boat moored in the middle of a river on an east coast estuary and he decided to go and stay there until he had worked out what to do with his life. He described the experience of going through a set of options and seeing if any of them rang a bell in his head. He found that the idea of working with children elicited a faint tinkling, and helping people with handicaps produced a loud clang. He had the sudden insight that all the work he had done on acoustic processing in memory was enormously relevant: if internal acoustics are important for memory, what happens if



you are deaf and don't have internal acoustics? Conrad emerged from his cabin after a week and went to talk to Sir Harold Himsforth, then head of the Medical Research Council and described his idea. What happened next would astound anyone used to current procedures for grant applications. 'Give me half a page of paper describing your plans,' he was told. He did so, and the plan was approved.

Conrad could be regarded as the father of 'slow science', because having determined what he wanted to do, he realised he needed to find out much more about deaf children. He got himself seconded to the Ear, Nose and Throat Hospital in London where he taught some psychology while learning about deafness. After about three years, he was ready to start a major project, and his friend

Larry Weiskrantz, then head of the Experimental Psychology Department in Oxford, suggested he relocate there. This was a good decision – not only did it get Conrad away from Cambridge, with its sad memories, it also was geographically far more suitable for a project that involved seeing children from all over the country. One thing Conrad was clear about: he would need a very large sample, because there were many variables that could affect results. He decided that with his dedicated team his goal would be to test every deaf school leaver in the country.

It is the body of resulting work, published in 1979 as a book *The Deaf School Child*, which first made me aware of Conrad's seminal contribution. It was very clearly written, and almost like a novel in taking the reader through the different aspects of the study. It was also a beautiful piece of applied psychology, using insights from studies of short-term memory to design tasks for deaf children that would probe 'what was going on in their heads', as Conrad put it in his interview. When he found out, he was horrified at the mismatch between how deaf children processed information and how they were educated. The UK at that time was in the grip of 'oralism' – the idea that deaf children should learn to speak with the help of hearing aids and lip-reading. Sign language was banned because it was thought it would interfere with the acquisition of oral language. Conrad debunked all of these ideas. He showed that oralism simply did not work, but that instead of 'inner speech', deaf children could use 'inner sign'. Thus by depriving deaf children of the opportunity to sign, teachers were hindering rather than helping their education. It took years, but people did eventually listen. Many younger teachers were very ready to act on his message: it was the old establishment who had been promoting oralism for years who resisted. But ultimately, they could not hold out against the overwhelming evidence produced by Conrad: if you want to teach a profoundly deaf child, you need to do so in a medium they can access. Conrad is a quiet and unassuming man, but when describing this part of his life, he says with justifiable pride: 'We really did turn the thing around.'

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