The father of British neuropsychology

Barbara A. Wilson on Oliver Zangwill

Oliver Zangwill (1913-1987) brought respectability to British psychology and neuropsychology at a time when American psychology dominated the field. In his exploration of the history of neuropsychology published at the turn of this century, the famous American neuropsychologist Arthur Benton credited Zangwill as the founder of neuropsychology in Britain.

Zangwill's commitment to a more theoretical approach to problems has encouraged less dependence on large test batteries favoured by American psychologists. In his 2006 paper 'An intimate connection: Oliver Zangwill and the emergence of neuropsychology in Britain', Alan Collins argued that Zangwill believed that for 'tests to be useful they were better tailored to a particular purpose and had to have some basis in clinical experience. This was important because otherwise there was a danger that the results the psychologist obtained would lack clinical relevance and, moreover, that the psychologist's task would become that of a glorified technician who simply applied a set of standardized tests'.

There are a number of reasons why Zangwill is of great consequence in the history of psychology, and I will focus on three of them. First, he is important for his views on the rehabilitation of survivors of brain damage; in this, he has had a clear although often unrecognised influence on neuropsychological rehabilitation. Second, he was responsible for making single case studies respectable and therefore acceptable in neuropsychology. Third, he made significant contributions to the understanding of problems resulting from brain damage. Each of these areas is considered below, after a description of the man himself.

Who was Oliver Zangwill?

Oliver was born in 1913 into an interesting and distinguished family that had emigrated to London from Riga, Latvia in the 1860s. Oliver's father, Israel Zangwill, was a novelist and playwright who wrote both comedies and tragedies about the ghettoes. One of his murder mysteries was made into a silent film. A street in the East End of London is called Zangwill Road after Oliver's father. Oliver's grandmother was one of the first women doctors to practice in England, although she had to study in France because women were not allowed to study medicine in England at that time. Her thesis was examined by Paul Broca, famous for documenting the case of an aphasic patient who could only utter one word – 'Tan' – which led to the diagnosis of Broca's aphasia.

In 1932 Oliver went to Cambridge University to study Natural Sciences, and in 1935 he graduated with a starred first degree – an exceptionally good award. From 1954 until 1984 Oliver was to be professor of Psychology at the University of Cambridge but before that he went to work at Bangour Hospital, Edinburgh, helping soldiers wounded in World War Two. For a 2001 Royal Society memoir his old friend Richard

Oliver Zangwill

Gregory recalled that he had told him that this was the most creative period of his life.

It was during these times that he became interested in neuropsychology; indeed Benton said the experience with brain injured soldiers is what turned Zangwill into a neuropsychologist. As a result of working with these soldiers, he became one of the pioneers of brain injury rehabilitation. His papers on this topic are still worth reading today (e.g. Zangwill, 1947). He was a great friend of Luria in the Soviet Union.

In 1946, Zangwill was involved in the founding of the influential Experimental Psychology Society (EPS). A one-time trainee of Zangwill's and later professor of psychology at Oxford University, Larry Weiskrantz, has said that Zangwill was indeed the driving force behind the creation of the society. Between 1958 and 1966 he edited its journal, the *Quarterly Journal of Experimental Psychology*, and he also edited the journal *Neuropsychologia* for 20 years. He was president of the EPS between 1964-65, and of the British Psychological Society in 1974. In 1977, he achieved the rare distinction of being made a fellow of the Royal Society.

Zangwill's first wife was Joy Moult, the daughter of the poet Thomas Moult. They married in 1947. Their only son, David, died in a fire as a baby and later the couple divorced. His second marriage in 1976 was to Shirley, a dentist. Shirley remains a friend to the rehabilitation centre named after her husband, and attends special events at the centre whenever possible. Oliver retired from Cambridge in 1984 and died of a disabling cerebral condition in 1987.

Brain injury rehabilitation

Not only was Zangwill important in bringing theory and respectability to British neuropsychology, he also played a part in the rehabilitation of people who had survived injury to the brain. At The Brain Injuries Unit in Bangour Hospital, he studied and assessed psychological deficits after injuries to the brain. He wrote: 'At the psychological level, brain injury may be expressed either in intellectual or personality changes of a general kind or in the form of relatively specific deficits of a more or less circumscribed nature. Among the latter are defects in various aspects of perception and motor skill, in memory and learning capacity, and in the sphere of language – the aphasias and kindred disorders of speech. It was my job to assess these changes as accurately as I could, where possible by methods somewhat more sophisticated than those of ordinary neurological examination... It will be borne in mind that many of our patients were young Service men and women who could look forward to many years of active life ahead of them' (Zangwill, 1947, p.519).

In that paper, Zangwill referred to three main approaches to re-education: compensation, substitution, and direct retraining. As far as we know, he was the first to categorise approaches to cognitive rehabilitation in this way, although others have since developed, modified and extended this classification system. Primarily working with people with aphasia, Oliver also addressed problems of attention, memory and initiative. The questions he raised are still pertinent today. For example, he wrote 'We wish to know in particular how far the brain injured patient may be expected to compensate for his disabilities and the extent to which the injured human brain is capable of re-education' (Zangwill, 1947, p.62).

Zangwill defined compensation as a 'reorganization of psychological function so as to minimize or circumvent a particular disability' (Zangwill, 1947, p.63). He believed that compensation for the most part took place spontaneously, without explicit intention by the patient, although in some cases it could occur by the patient's own efforts or as a result of instruction and guidance from the psychologist/therapist. The examples of compensation offered by Zangwill include giving a person with aphasia a slate to write on or teaching someone with a right hemiplegia to write with the left hand.

By substitution Zangwill meant 'the building up of a new method of response to replace one damaged irreparably by a cerebral lesion' (Zangwill, 1947, p.64). He recognised that this was a form of compensation but taken much further. Lip reading for people who are deaf and Braille for people who are blind would be examples of substitution. He used the tactile sense as substitution in the rehabilitation of a patient with aphasia who could no longer read through the visual route. The man was taught initially to trace the letters then pretend to write them on his knee with his fingertip and eventually to manage without the tactile sense except when faced with difficult words. I wrote about two cases in which this method was used successfully in my 1999 *Case Studies in Neuropsychological Rehabilitation*.

The third of Zangwill's methods was 'Direct retraining'. He considered this to be training at the highest level. Whereas compensation and substitution were the methods of choice for functions that 'do not genuinely recover' (Zangwill, 1947, p.65), he thought that training could restore some damaged functions. He admitted that some improvement might be due to overcoming the effects of shock or 'diaschisis' (von Monakow, 1914), but that in other cases it was possible for true re-education to occur. The examples provided are relearning of multiplication tables by people with dysphasia and the relearning of some motor skills through physiotherapy.

Zangwill was rather tentative about direct retraining and did not hide the fact that he could not provide real evidence of it. He concluded that 'direct, as opposed to substitutive training has a real though limited part to play in re-education' (Zangwill, 1947, p.66). Robertson and Murre (1999) presented somewhat similar (although less tentative) views when they suggested that compensatory strategies should be the treatment of choice for people who are not expected to recover, while for those who are expected

to recover (for example those without severe lesions), then assisted recovery, akin to direct retraining, can be effective.

Zangwill (1966) said that the brain injuries unit in Edinburgh marked the beginning of scientific interest in the re-education of people with brain injury in the UK. Gregory (2001) believes that just as significant was the value of the unit for showing the importance of the study of brain injury for general psychology.

Oliver continued to be influential in neuropsychology after World War Two and founded the neuropsychology department at the National Hospital Queen Square in London in 1947, appointing Elizabeth Warrington to be the first head of department in 1953. She remained there for many years, contributing greatly to our understanding of neuropsychological disorders. Zangwill moved to Cambridge to become professor of psychology but retained a visiting psychologist appointment at the National Hospital until 1979.

Single case studies

Zangwill realised that if one wants to know, for example, whether there is a difference in capacity of long term and short-term memory, it is of no use carrying out large scale studies – individual scores will be lost when results are averaged. Instead one has to find double dissociations where one person has problems in one area of theoretical interest and not in another, and then one has to find another individual showing the opposite pattern. Single cases became acceptable at meetings of the EPS at a time when this was not the case at a typical meeting of the American Psychological Association. American work dominated experimental psychology at that time and was still strongly neo-behaviourist.

One example of a single case study is the fascinating person reported by Gregory and Wallace (1963). They described a man who had been blind from birth and who was given corneal transplants at the age of 52 years. They found that the man could see almost immediately objects already familiar to him, especially through touch, though he remained blind for a long time to unknown objects. Most striking: he could read upper case letters, with which he had been taught to read by touch in the blind school, but not lower case letters which were not taught in the school. Further, he could tell the time visually, without any help or practice. Here the touch experience was from a large pocket watch, with no glass. He could unhesitatingly tell the time by touch from its hands. The conclusion was that object vision depends on knowledge derived from active exploration, giving meaning to the eyes' images. It showed, also, the importance of cross-modal transfer – knowledge from one sense being available to other senses. These findings, especially extensive cross-modal transfer from touch to vision, were very surprising at that time.

The issue of single case versus group studies continues to the present day (Caramazza & McClosky, 1988; Robertson et al., 1993; Tate & Perdices, 2018). In Zangwill's time, it was accepted by medical practitioners that case studies were the means of extending medical knowledge. Therefore, the case studies produced by psychologists were legitimate in the eyes of the medical community and reinforced psychologists' claims to a form of expertise (Collins, 2006).

With the legitimacy of single cases established, other important cases appeared, including Brenda Milner's influential work with the amnesic patient H.M. Others began to use individual patients to illustrate aspects of memory (Cermak & O'Connor, 1983; Warrington & Shallice, 1984), but it was Zangwill who had begun to make single cases respectable scientific methods in British experimental psychology.

Understanding the effect of cerebral lesions

Zangwill had many interests but is, perhaps, best known for his work on cerebral asymmetry incorporating visual spatial disorders and the importance of the right hemisphere; memory and learning deficits; and language disorders. You can read more detail on this work in the full version of this article, published in The Neuropsychologist.

The concept of cerebral asymmetry has been around since the time of Paul Broca, with the notion that the left hemisphere is dominant for language. It was often referred to as the major hemisphere. According to Benton, the acceptance of the importance of the right hemisphere as crucial for visual perceptual and visual spatial functions had little significance for neuropsychology until the 1940s with the work of Hécaen and Zangwill. As a result of his work in Edinburgh during the second world war, Zangwill, along with colleagues, demonstrated that posterior right hemisphere lesions were associated with visual spatial deficits (Paterson & Zangwill, 1944). At the same time Hécaen and colleagues were drawing similar conclusions in France. Zangwill's work resulted in a major programme of research in the UK after the war, with Zangwill publishing studies looking at the role of the left hemisphere in visual spatial tasks and the right hemisphere in language tasks. He was one of the first to recognise that left hemisphere dominance for language was not invariably true for left handers and also showed that the right hemisphere was involved in speech.

Zangwill's work on memory and learning difficulties probably began in the early 1940s with his realisation that some patients with obvious difficulties in memory and learning had a normal forward digit span (Zangwill, 1943). Observing normal forward digit span in some memory impaired people resulted in Zangwill designing a supra-span test whereby the patient had to learn a sequence of digits longer than his or her forward digit span. He found this test to be a better measure of short term learning. Thus, he

invented a sensitive procedure which was then used by other investigators (e.g. Drachman & Arbit, 1966). His classic 1966 book on amnesia, edited with Whitty, addressed clinical, psychological and medico-legal aspects of amnesia – a wide range of topics. His own chapter on 'the amnesic syndrome' includes a fascinating history of early research into memory disorders.

There is obviously an overlap between Zangwill's work on cerebral asymmetry, memory and learning, and language disorders (e.g. Humphrey & Zangwill, 1952). A summary of the ontogeny of cerebral dominance was later published (Zangwill, 1975). With regard to the overlap with memory abnormalities, Clarke, Wyke and Zangwill (1958) published a case of language disorder in a patient with Korsakoff's syndrome, a syndrome typically associated with amnesia. They were concerned with the type of language difficulties exhibited in people with thought disorders and whether their patient exhibited the same difficulties as someone with a focal dysphasia.

Zangwill was always interested in the treatment of patients, and a 1946 paper with Butfield summarised the re-education of 70 people with aphasia. They described the problems with carrying out controlled studies, as well as the difficulty with spontaneous recovery. Some of their patients were not treated until six months or more after the injury when, they say, spontaneous recovery was expected to have been completed. This seems rather a short period given that recovery may continue for many years (Wilson, 2019). Nevertheless, 30 patients were considered to be much improved, 21 improved and 12 were unchanged. The group with the poorest outcome were those with tumours.

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Bridging the gap

Oliver Zangwill became professor of psychology at Cambridge University at the very young age of 39, when he succeeded Frederic Bartlett. He was one of the most influential figures in British neuropsychology and responsible for ensuring that it was a theoretically-driven discipline.

Zangwill bridged the gap between the medical profession and clinical psychology. He championed the links between psychological theory and patients with neurological or neuropsychological impairments, recognising that psychological tests could help in the diagnoses of an organic disorder. He persuaded the EPS to regard neuropsychology as a respectable area of study and research. He encouraged the National Hospital of Nervous Diseases in London to establish a neuropsychology department. He firmly believed that observation was a legitimate means of producing knowledge and he championed the importance of single case studies as a way of furthering neuropsychology. Zangwill retired in 1984 and died in 1987, ironically of a brain disease which he had spent most of his adult life studying.

How did Zangwill become so important to neuropsychology and beyond? Collins (2006, p.89) argues that a number of conditions conspired to place him 'in a pivotal position for pursuing and promoting neuropsychology in Britain after World War II. In broad terms, these were the background and experience of Zangwill himself, the practical engagement of psychologists with patients with brain damage, neurologists, and psychiatrists, the introduction of medical reform including the establishment of a National Health Service, rekindled interest in cortical localization, and the elite social networks that existed in medicine and university life in postwar Britain.' He goes on to claim 'that the career of Zangwill reveals rather than obscures the importance of these wider conditions and demonstrates an unusually close connection between an individual and the emergence of a sub discipline'.

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Richard Gregory ends his 2001 monograph on Zangwill with the following words: 'It is a pleasure for his friends, and valued more widely, that his clinical work is remembered and continues in an institute named after him, The Oliver Zangwill Centre for Neuropsychological Rehabilitation, in the Princess of Wales Hospital at Ely. It receives support from the Anglia and Oxford NHS Executive and the Medical Research Council. The centre helps brain-injured patients and it performs fundamental research in neurology and psychology. Its aims, procedures and philosophy are set out by Barbara Wilson et al. (2000). Nothing could be more appropriate to the life and memory of Oliver Zangwill.'

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