Neuropsychology

15

The Early History

J.A.M. Frederiks

What is neuropsychology? Neither a precise and exact nor a generally accepted definition is to be found in the pertinent literature. In the editorial of number one, volume , of the new journal *Neuropsychologia* ( ), the following definition was given: "Under the term 'neuropsychology', we have in mind a particular area of neurology of common interest to neurologists, psychiatrists, psychologists and neurophysiologists."

In fact, neuropsychology studies clinical phenomena that arise from disorders of the central nervous system, in so far as these affect the sphere of consciousness and behaviour. Accordingly, neuropsychology does not lie within the confines of neurology and psychiatry, but in between neurology and psychology, or, more correctly, between the domain of the neurosciences and that of the behavioural sciences. In short, neuropsychology is the study of normal and pathological relationships between the brain and behaviour (Frederiks). It includes topics such as aphasia, apraxia, agnosia, amnesia, hallucination, reading and writing disorders, learning disabilities, disorders of the body schema, disorders of consciousness and attention, and disorders of higher nervous activity in old age.

Initially, until about , neuropsychological topics were studied mainly by a few talented clinical neurologists, including Broca, Wernicke, Meynert, Kleist, Goldstein and Head; thus, neuropsychology was born and had its cradle in the neurological clinic (Hécaen). World Wars I and II, in particular, supplied a vast amount of material for research, and psychologists studied groups of these war casualties with brain lesions with the aid of numerous psychological tests. This had the extra advantage of excluding diseased or aged patients from the study, but including a more homogenous category of young healthy males in whom localised brain injury had been inflicted by bullets, shrapnell or stabs. Within that context, reference should be made to Goldstein, Zangwill, Teuber, Milner, Hécaen, and Luria.

In a foreword to Henri Hécaen's *Human Neuropsychology* ( ), Geschwind pointedly summarised the early history of neuropsychology:

> Before World War I this field occupied a central position in neurology, and nearly all the great figures who created the discipline made contributions to the understanding of the more advanced functions of the human brain. After the Great War, however, there was a sharp decline in interest, and only a corporal's guard of isolated and courageous scholars maintained the fragile thread of the great tradition. At the end of World War II only a handful of investigators were devoting themselves to this area. Henri Hécaen was one of the new pioneers who revived the field.

The present chapter surveys the origins and development of neuropsychology in the Netherlands up to the s. In view of the framework of this book, most attention will be paid to the contributions by neurologists. Since the mid- s neuropsychology has become mainly the remit of psychologists specialised in that field and accordingly denoted as neuropsychologists.

In considering this history, one is struck by its parallels with the historical developments in neuropsychology abroad. Both in the Netherlands and in foreign countries, virtually all early contributions to neuropsychology stemmed from neurologists. The development of an interdisciplinary neuropsychology, essentially participated in by psychologists, is of a relatively recent date (Hécaen , Hagner). At present, it is self-evident to everyone that neuropsychology is practised by neurologists, neuropsychologists, neurophysiologists, neurolinguists, perception and behaviour scientists, often in close collaboration.

Compared to other European countries and the United States, the situation in the Netherlands differed, however, in some respects. In some other countries the interest in neuropsychological topics exceeded ours, their neuropsychological publications outnumbering ours. In addition, the Dutch did not harvest such extensive experience with patients with brain injuries from World War I (in which we stayed neutral bystanders) and World War II.

The term 'neuropsychology' came into current use in the early s, especially through the work of one of its founding fathers, the French neurologist Henri Hécaen (-), who named his Paris laboratory 'Groupe de Neuropsychologie et de Neurolinguistique', and who, with others, founded the 'International Neuropsychological Symposium' (Boller).

Four different authors should be given credit for the initial use of the term 'neuropsychology': Sir William Osler (-) in , Kurt Goldstein (-) in , Karl Lashley (-) in , and Donald Hebb (-) in . The discussion on this topic seems to be decided in favour of Osler (Bruce ; Benton ; Finger). In the present author's opinion there are good reasons to single out Goldstein; the choice depends on the emphasis and context by which the word was used by the different authors. Initially, the term 'disorders of higher nervous activity' was also in use. This term disappeared without further comment: until that time nobody had defined the interpretation of 'disorders of highest activity'!

The foundation of two new journals, *Neuropsychologia. An International Journal* (Oxford) in (by Henri Hécaen et al.) and of *Cortex. A Journal Devoted to the Study of the Nervous System and Behavior* (Milan) in (by Ennio de Renzi and others), clearly marked the start of international cooperation during these years.

Early contributions by psychologists, to what would later be called neuropsychology, originated mainly from experimental psychologists. In the Netherlands, the first psychologist to be mentioned in this respect is Gerard Heymans (-), professor of psychology and philosophy at the University of Groningen from - . This 'founder of psychology in the Netherlands' (Van Strien) established, in imitation of the physiologist Wilhelm Wundt (-) in Leipzig, his nationally well-

known Psychological Laboratory in . This 'laboratory for the soul' (Draaisma) marked the beginning of experimental psychology in the Netherlands.

In an oration entitled 'The coming century of psychology' (Groningen,), Heymans sketched the nineteenth century as the century of the natural sciences, and the 'coming' (twentieth) century as the century of psychology. It is remarkable that, a further years later – in – the just started st century was named the 'century of cognitive neuroscience' by Peter Hagoort, in an oration on the occasion of his inauguration as professor of Neuropsychology in Nijmegen (Hagoort). Things have changed rather quickly indeed! And in fact, in the late s, early s one occasionally heard the term 'cognitive revolution' (Halligan and Marshall).

Other precursors of Dutch neuropsychology were the physiologist F.C. Donders (-), the psychologists G. Révèsz (-) and Abraham Grünbaum (-), the physician, physiologist and psychologist F.J.J. Buytendijk (-), and the physiologist G. van Rijnberk (-).

'Clinical psychology' may be regarded as another early historical step towards (clinical) neuropsychology. The development of this sector of psychology was gradual and took place in the s and s (van Strien). Workers in the field of psychiatry strove for collaboration with psychologists. Initiator was Prof. Prick in Nijmegen, soon followed by Prof. Rümke in Utrecht, Prof. L. Bouman (Vrije Universiteit Amsterdam, later Utrecht) and Prof. Grewel (University of Amsterdam) (Prick ; Van Strien).

In the s and s, the practice of neuropsychology by a small number of psychologists gradually came into being. Psychologists were no longer content with the attainments of introspection and behaviourism and turned to the neurosciences, and the natural scientific-basis of cognitive functions. An abundance of neuropsychological activities by psychologists gradually arose in the s (e.g., D.J. Bakker, A. Bouma, B.G. Deelman, H.R. van Dongen, A.H. van Zomeren, H. van der Vlugt).

The relatively late Dutch emergence of neuropsychology by psychologists is reflected by the publication, in the s, of books on the history of Dutch psychology without treating the subject of neuropsychology; the word neuropsychology was not even mentioned (Verbeek ; Eisenga). Even a recent book on the history of Dutch psychology ignores the field of neuropsychology completely (Van Strien). The quickening of activities of psychologists in this field is of a relatively recent date.

There is another way to demonstrate this transition. In , the Dutch journal of psychology (*Nederlands Tijdschrift voor Psychologie*) published a thematic issue on neuropsychology. The authors were almost exclusively neurologists. Twelve years later, in , the same journal published another thematic issue on neuropsychology, but now exclusively written by psychologists.

Publications

The early contributions to neuropsychology by Dutch neurologists were quite different from those by psychologists. Their writing on topics such as aphasia, apraxia, agnosia, dyslexia, agraphia and cerebral localisation was inspired by their experience with neurological patients. In their days, examining patients with disorders of higher nervous activity was part of a thorough clinical examination of patients with diseases of the central nervous system.

The publications by Dutch neurologists on neuropsychological topics reflect much of the development of their contribution to neuropsychology in the Netherlands. Table I gives a list of theses up to . The very few early theses by Dutch neurologists on neuropsychological topics differ quite a bit from actual theses. The thesis of Van Rhijn on aphasia (Leiden,), for example, contains only a brief description of three case histories, but rather extensive discursive considerations without engagement. Of course, the quality of theses evolved later with the growing knowledge of that time. And of course, during the first years of the th century many papers on neuropsychological themes were published in Dutch and foreign journals. Of the Dutch journals we mention the Dutch medical weekly (*Nederlands Tijdschrift voor Geneeskunde*) and the Dutch journal of Psychiatry and Neurology (see also chapter).

In the first half of the twentieth century (up to), one frequently notes papers by the following authors (in alphabetical order, but as a matter of course, without being complete): A. Biemond (visual agnosia, see also chapter), L. Bouman (aphasia, apraxia), J.G. Dusser de Barenne (cerebral localisation, see also chapter), A. Gans (apraxia, aphasia, astereognosia), F. Grewel (aphasia, neurolinguistics, acalculia, see also chapter), K. Heilbronner (aphasia, apraxia, asymbolia, agraphia, stammer), L. van der Horst (constructional apraxia), G. Jelgersma (aphasia, apraxia, see also chapter), D. Moffie (aphasia, parietal lobe pathology), J.J.G. Prick (aphasia), V.W.D. Schenk (dyslexia and dysgraphia in children, aphasia, neurolinguistics), H.W. Stenvers (aphasia, alexia, agraphia, see also chapter), C.T. van Valkenburg (cerebral localisation, aphasia, apraxia, central sensory representation, body image, see also chapter), C. Winkler (cerebral localisation, aphasia, see also chapter), and W. van Woerkom (aphasia).

Up to the s a few books on neuropsychological topics were published. The neurologist A. Verjaal wrote *Agnosia Aphasia Apraxia* ( ), a small introductory guide to neuropsychological examination. During the s a small introductory book on neuropsychology, written by the neurologist A. Welman, was popular in the Netherlands: *Hoofdstukken uit de klinische neuropsychologie. Afasie, apraxie, agnosie* ['Chapters from clinical neuropsychology. Aphasia, apraxia, agnosia'] (first edition , second edition).

The multi-volume *Handbook of Clinical Neurology* (editors: P.J. Vinken & G.W. Bruyn; Elsevier, Amsterdam) includes four volumes implicitly or explicitly dealing with neuropsychological topics (editor: J.A.M. Frederiks) : Disorders of Higher Nervous Activity (volume ,), Disorders of Speech, Perception, and Symbolic Behav-

iour (volume ,), Clinical Neuropsychology (volume / ,), and Neurobehavioural Disorders (volume /)

Table I. Theses by Dutch physicians/neurologists on neuropsychological subjects up to (in chronological order).

A. van Rhijn: Aphasie (promotor: prof. Dr J.A. Bogaard) Leiden, 1868.
[thesis on aphasia]

Aletta Jacobs (physician): Over lokalisatie van physiologische en pathologische verschijnselen in de groote hersenen (promotor: Prof. H. Kooyker), 1879.
[thesis on cerebral localisation]

J.K.A. Wertheim Salomonson: Stereognosis (promotor: ?) Leiden, 1888.
[thesis on astereognosia]

M.A. van Melle (physician and philosopher): Over aphasie (promotor: Prof. Dr C. Winkler) Amsterdam, 1900.
[thesis on aphasia]

D.M. van Londen: Onderzoek naar den duur der eenvoudige psychische processen v.n. bij de psychosen (promotor: Prof. Dr C. Winkler) Amsterdam, 1905.
[thesis on duration of elementary psychical processes]

A. Gans: Over tastblindheid en over de stoornissen van de ruimtelijke waarnemingen der sensibiliteit (promotor: Prof. Dr C. Winkler) Amsterdam, 1915.
[thesis on astereognosia]

M. van der Reis: De omvang van het bewustzijn bij gezonden en geesteszieken (promotor: prof. Dr E.D. Wiersma) Groningen, 1924.
[thesis on consciousness in health and disease]

H.G. van der Waals: Optische schijnbewegingen (promotor: Prof. Dr K.H. Bouman) Amsterdam, 1927.
[thesis on optic illusionary movements]

W.J. Smit: Phantoombelevingen (promotor: Prof. Dr L. Bouman) Utrecht, 1933.
[thesis on phantom limb]

A. Verjaal: Amnesie na trauma capitis. Een klinisch-psychologische bijdrage tot de kennis der omschreven geheugenstoornissen (promotor: Prof. Dr H.C. Rümke) Utrecht, 1938.
[thesis on posttraumatic amnesia]

R. Vedder: Over het copieeren van eenvoudige geometrische figuren door oligophrenen en jonge kinderen (promotor: Prof. Dr H.C. Rümke) Utrecht, 1939.
[thesis on constructional apraxia]

W. Noordenbos (neurosurgeon): Pain (promotor: Prof. Dr A. Biemond) Amsterdam, 1959.
[thesis on pain]

A.J. Welman: Psychodiagnostisch onderzoek bij patiënten met een hersengezwel (promotor: Prof. Dr E.A.D.E. Carp) Leiden, 1961.
[thesis on psychodiagnostic examination of patients with brain tumour]

J.A.M. Frederiks: Het lichaamsschema. Een klinisch-theortische studie (promotor: Prof. Dr A. Biemond). Amsterdam, 1961.
[thesis on the body scheme and its disorders]

H.J.A. Verhagen: Dyslexie en dyscalculie (promotor: Prof. Dr W.G. Sillevis Smitt) Utrecht, 1968.
[thesis on dyslexia and dyscalculia]

Organisation

In the Netherlands, the interdisciplinary character of neuropsychology came of age at the time when, at a clinical level, neurologists and other neuroscientists developed an intense cooperation with psychologists. As in other countries, this occurred at first timidly in the s, but at a higher and intense level and at a rapid pace in the s. At present, neuropsychology is an established discipline, practised chiefly by trained (neuro)psychologists.

Dutch neuropsychology has been organised in different ways. Local and international activities can be summarised as follows.

In , the neurologist F. Grewel was the local organiser of the th Meeting of the International Neuropsychological Symposium in Amsterdam.

In November , F. Grewel and A.J. Welman founded an interdisciplinary 'Study and Work-group for Neuropsychology'. Membership was open to neurologists, psychologists, psychiatrists and speech therapists. From an international point of view, the Netherlands was certainly not late with this establishment.

In October , this work-group was converted into a definite interdisciplinary 'Netherlands Society of Neuropsychology'. Its board consisted of J.A.M. Frederiks (chairman), A.J. Welman (secretary), and the psychologist B.G. Deelman (treasurer). This society grew steadily into a large interdisciplinary association (Eling ,) with members at present (;information of the secretary of the society). Foreign contacts were maintained for example via visits to the 'International Neuropsy-

chological Symposium' and to the 'International Neuropsychological Society' founded in (Rourke and Murji). During the first years of its existence, Eberhard Bay from Düsseldorf and Henri Hécaen from Paris were stimulating visiting speakers.

It was felt that there was a need to improve and enlarge the basis of scientific training, and so a special section of neuropsychology was founded as part ('section') of the Netherlands Society of Psychiatry and Neurology, a section that would facilitate the inclusion of neuropsychological information in the training and practice of neurologists and psychiatrists. The section was founded on May , . The first board consisted of J.A.M. Frederiks (chairman), A.J. Welman (secretary), and F. van Harskamp (member). The section maintained, by its very nature, close contacts with the Netherlands Society of Neuropsychology.

Behavioural neurology

After , neuropsychology gradually became mainly a topic for (neuro-)psychologists, although its interdisciplinary pillars have never been lost. With their validated and standardised tests neuropsychologists offered a substantial contribution to clinical problems. In the same period, a new, 'robust, powerful' sub-speciality of neurology gradually emerged: behavioural neurology (Benson ,). The need for this speciality became evident in the mid- s, after the practice of psychiatry and neurology became separated. "Whether an independent position can be retained for neuropsychiatry is open to question"; the position of behavioural neurology is stronger (Benson).

Taken together, it looks as if, in the short term, neuropsychology will remain the domain of (neuro-)psychologists and behavioural neurology that of neurologists (Benson).

Concluding remarks

The contemporary period again shows an intense interdisciplinary collaboration with neurologists and other neuroscientists. The advanced techniques of imaging such as CT, MRI, fMRI, PET, and rCBF are central to this concerted action (Hagoort).

It is perhaps under these circumstances that the words of D.O. Hebb ( ) promise to be a new reality: ."... the neuropsychologist of the future must be psychologist as much as neurologist." In other words, an intense collaboration of the two disciplines will become more necessary than ever. And, if the science of neural networking, information theory, and 'cognitive electronics' pursues its present path, one can imagine that by the st century, both psychiatry and neuropsychology will have been re- absorbed by neurology.

References

Benson, D.F.: The history of behavioral neurology. Neurol. Clinics ( ) nr. , - .

Benson, D.F.: Neuropsychiatry and behavioral neurology: Past, present, and future. J. Neuropsychiatr. ( ) - .

Benton, A.: Neuropsychology: past, present and future. In: F. Boller and J. Grafman (eds.): Handbook of Neuropsychology, Vol. , Amsterdam, Elsevier ( ) - .

Boller, F.: History of the International Neuropsychological Symposium: a reflection of the evolution of a discipline. Neuropsychologia ( ) - .

Bruce, D.: On the origins of the term "Neuropsychology." Neuropsychologia ( ) - .

Draaisma, D.: Een Laboratorium voor de Ziel. Gerard Heymans en het Begin van de Experimentele Psychologie. Groningen, Historische Uitgeverij ( ).

Eisenga, L.K.A.: Geschiedenis van de Nederlandse Psychologie. Deventer, Van Loghum Slaterus ( ).

Eling, P.A.T.M.: Wordingsgeschiedenis van de Nederlandse Vereniging voor Neuropsychologie. Nieuwsbrief Nederlandse Vereniging voor Neuropsychologie ( ) nr. , - .

Eling, P.A.T.M.: Nederlandse Vereniging voor Neuropsychologie: een medisch-wetenschapppelijke vereniging? Mediator ( ) - .

Finger, S.: History of neuropsychology. In: D.W. Zaidel (ed.), Neuropsychology (Handbook of Perception and Cognition, nd edition), San Diego, Academic Press ( ) - .

Frederiks, J.A.M.: Clinical neuropsychology. The neuropsychological symptom. In: P.J. Vinken, G.W. Bruyn and H.L. Klawans (eds.): Handbook of Clinical Neurology, volume ( ) J.A.M. Frederiks (ed.): Clinical Neuropsychology, Amsterdam, Elsevier Science Publishers ( ) - .

Geschwind, N.: Foreword. In: H. Hécaen and M.L. Albert, Human Neuropsychology. New York, John Wiley & Sons ( ) v-vii.

Goldstein, K.: Der Aufbau des Organismus. Den Haag, Martinus Nijhoff ( ) .

Hagner, M.: Zur Geschichte und Vorgeschichte der Neuropsychologie. In: H.J. Markowitsch: Grundlagen der Neuropsychologie. Göttingen, Hogrefe-Verlag für Psychologie ( ) - .

Hagoort, P.: De Toekomstige Eeuw der Cognitieve Neurowetenschap (oration, Katholieke Universiteit Nijmegen). Nijmegen, Drukkerij SSN ( ).

Halligan, P.W. and J.C. Marshall: Cognitive neuropsychology. The good, the bad and the bizarre. In: R. Fuller, P.N. Walsh and P. McGinley (eds.): A Century of Psychology. Progress, Paradigms and Prospects for the New Millennium. London, Routledge ( ) - .

Hebb, D.O.: The Organisation of Behavior. A Neuropsychological Theory. New York, John Wiley & Sons ( ).

Hebb, D.O.: Neuropsychology: Retrospect and prospect. Canad. J. Psychol. ( ) - .

Hécaen, H.: L'évolution et les perspectives de la neuropsychologie. Acta Neurol. Latinoamer. ( ) - .

Heymans, G.: De Toekomstige Eeuw der Psychologie (oration). Groningen, J.B. Wolters ( ).

Lashley, K.S.: Functional determinants of cerebral localisation. [Read before the Boston Society of Psychiatry and Neurology, March ,] Arch. Neurol. Psychiatr. (Chic.) ( ) - .

Osler, W.: Specialism in the general hospital. Bull. Johns Hopkins Hosp. ( ) - .

Prick, J.J.G.: De samenwerking tussen psycholoog en psychiater. Maandbl. geest. Volksgezondh. ( ) - .

Rourke, B.P. and S. Murji: A history of the International Neuropsychological Society: The early years (-). J. Int. Neuropsychol. Soc. ( ) - .

Strien, P.J. van: Nederlandse Psychologen en hun Publiek. Een contextuele Geschiedenis. Assen, Van Gorcum ( ).

Verbeek, T.: Inleiding tot de Geschiedenis van de Psychologie. Utrecht, Het Spectrum ( ).