Introduction: toward a historical/anthropological approach in neuropsychology

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Anthropology has striven to adequately understand what human living conditions were like 10 000, 20 000 or 100 000 years ago. Stone Age (usually divided into the Old Stone or Paleolithic Age, and New Stone or Neolithic Age) extended until some 6000–7000 years ago (Hours, 1982). Agriculture appeared some 10 000 years ago; the first cities some 6000 years ago; the first civilizations about 5000 years ago; writing has only five or six thousand years' history; and arithmetical abilities, about 6000 years (Childe, 1936; Sampson, 1985). However, contemporary man (*Homo sapiens sapiens*) has lived on earth for at least 50 000 years (and perhaps, according to current evidence, for 100 000 years). We can state with a certain level of security that during this time his brain structural changes have been minimal (Harris, 1983; Kochetkova, 1973). Human brain adaptation was accomplished to survive more appropriately in Stone Age living conditions (existing for about 90% of this time span on earth) than in those conditions existing today. Only by starting with an analysis of these original conditions, can we understand the specific characteristics and idiosyncracies of human brain adaptation. It would seem reasonable for any neuroscientist to raise the question: to process what type of information did the human brain become adapted for? And consequently, which are the basic cognitive abilities of humans?

The search for universal characteristics has guided an important proportion of the anthropological and linguistic activity during the last decades. Anthropology and linguistics have utilized three different approaches, attempting to reconstruct the way of life and the languages spoken by prehistoric man.

(1) Archeological findings are used as elements to reconstruct prehistoric ways of life.

(2) Comparing existing human groups, it is possible to find some common social, behavioral, and linguistic characteristics. These common characteristics most likely already existed in prehistoric times, and are probably the result of specific human biological adaptation. Several thousands of different cultures have been described (Bernatzik, 1957), and contemporary man speaks over 3500

different languages (Swadesh, 1967). Comparing all these cultures and all these languages, some universal characteristics can be discovered (Greenberg, 1978; Wilson, 1975).

(3) Taking existing cultures and/or living languages, similar in specific parameters to prehistoric cultures and/or languages, it is possible to propose how prehistoric living forms and language characteristics could have been with regard to that particular parameter. The validity of this last approach is highly questionable, but it is still used due to the lack of alternative methods.

Anthropology and linguistics have attempted to find basic and universal ways of social organization in different human groups (Van den Berghe, 1979) and fundamental language characteristics (Greenberg, 1978; Hagège 1982). Attempts are made to understand the social organization of prehistoric man and languages existing before living languages. An excellent example of this last point is the reconstruction obtained for the Indo-European language (Anderson, 1973; Lehmann, 1974; Martinet, 1975) whose last speaker passed away several thousand of years ago; and efforts are currently being made to reconstruct even older proto-languages (Shevoroshkin, 1990).

All three approaches (to use archeological findings, to find common characteristics when comparing different human groups, and to use an existing human group, similar in a certain parameter to the prehistoric groups) are potentially useful, and, in fact, have been used in neuropsychological research, although in a restricted way:

(1) We can attempt to reconstruct how some neuropsychological characteristics may have been several thousand years ago, with the help of archeological findings. For instance, we may study handedness in Neolithic humans (Spennemann, 1984).

(2) We may search for commonality among existing groups. For example, we may study aphasic language disturbances throughout different world languages, looking for common characteristics and consequently basic brain language organization (Bates *et al.*, 1987a, b, 1988; Menn and Obler, 1990).

(3) We may study neuropsychological variables in living human groups, similar in a specific parameter to

prehistoric humans. For instance, we may analyze illiteracy in order to attempt to figure out how linguistic or praxic abilities were in pre-writing societies (e.g. Ardila *et al.*, 1989b; Lecours *et al.*, 1987, 1988; Rosselli *et al.*, 1990); or we may analyze constructional abilities among Stone Age-like Amazonian Indians (Pontius, 1989).

Undoubtedly, neuropsychology has advanced tremendously in some specific areas; for instance, in the assessment of the sequelae of brain pathology, or in the establishment of clinical/anatomical correlations. However, our fundamental and basic knowledge about the brain organization of cognitive activity under normal and pathological conditions is still limited. Theorization is evidently poor. We do not yet understand sufficiently well what can be understood and what can be considered as "basic cognitive ability". Thus, for instance, classification of spatial cognition disturbances is still very confusing and partially contradictory (see "Historical evolution of spatial abilities", pp. 83-87, this volume). Strong mathematical procedures have not yet been applied to the analysis of cognitive activity in neuropsychology, even though psychology in this regard has done better (e.g. Cattell, 1971; Guilford, 1967, 1968; Guilford and Hoepfner, 1971; Matarazzo, 1972). We have barely dealt with individual differences in neuropsychological performance (e.g. Hartlage and Telzrow, 1985), and our understanding of cultural differences is also very limited (Helm, 1992; Ardila, 1993). Matthews (1992), in his International Neuropsychological Society presidential address, stated that "... a very limited kind of neuropsychology, appropriate to only a fraction of the world's population, is presented to the rest of the world as if there could be no other kind of neuropsychology, and as if the education and cultural assumptions on which ... neuropsychology is based were obviously universals that applied everywhere in the world" (p. 421).

Historical/anthropological analysis may represent a potentially important approach for neuropsychology. This analysis may provide behavioral neurosciences with a better and more accurate understanding of brain organization of cognitive processes under normal and abnormal conditions.

An interest in cultural and historical issues has recently been observed in neuropsychology. This interest in obtaining a better understanding of cultural and historical issues in the neuropsychology sphere is not, however, completely new: some precursor attempts are found in the literature. For instance, A.R. Luria is well known in neuropsychology for his contributions to the analysis of brain organization of language, and for his research on the prefrontal syndrome. However, his cultural approach to neuropsychology is less recognized. Nonetheless, in a certain way, Luria departed from the analysis of cultural issues (Luria, 1934, 1976) and moved further towards neuropsychology. Unfortunately, most of his cross-cultural

research proposals in neuropsychology (i.e. the analysis of hemi-neglect syndrome in different cultural groups, the cross-linguistic analysis of aphasias, the comparison of alexias in different writing systems, etc.) never became concrete research programs, but his great interest and emphasis on cultural and historical variables in neuropsychology was always reflected in his writing.

During the last few years a small but significant number of papers devoted directly or indirectly to the analysis of cultural variables in neuropsychological performance have been recorded in the literature, for example: bilingualism research (e.g. Albert and Obler, 1978; Vaid, 1986; Paradis, 1987; Dupont *et al.*, 1992); studies on illiteracy (e.g. Lecours *et al.*, 1987, 1988; Matute, 1988; Ardila *et al.*, 1989b; Rosselli *et al.*, 1990); the cross-linguistic analysis of aphasia (e.g. Bates *et al.*, 1987a, b, 1988; Menn and Obler, 1990); research about the influence of socio-educational factors in neuropsychological performance (e.g. Ostrosky *et al.*, 1985; Rosselli and Ardila, 1990; Ardila *et al.*, 1992); and studies on cultural variables in handedness (e.g. Bryden, 1987; Ardila *et al.*, 1989a; Harris, 1990; Bryden *et al.*, 1993).

The need for a strong cross-cultural neuropsychology study is evident. This collection of papers attempts to direct the attention of behavioral neuroscience toward some potentially relevant historical and cultural variables in neuropsychological performance. The purpose of this monograph issue is, in consequence, multiple:

(1) To integrate some information regarding cross-cultural differences in neuropsychological performance.

(2) To review some evidence about the historical origins of cognitive activity.

(3) To analyze how the inclusion of a historical and cultural perspective in behavioral neurosciences can contribute to a better understanding about the brain organization of cognition.

(4) To present some general guidelines for future research in the area.

Different problems are analyzed.

In the first paper ("Prefrontal abilities") D.F. Benson proposes that the neuroanatomical region that has most prominently altered with the advancing cognitive competency of the human brain is the prefrontal cortex. Despite the fact that the prefrontal cortex does not appear to contain the neural networks that carry out cognitive activities, the management and control of cognitive activities ("metacognition"), so uniquely characteristic of the human, appears dependent upon the prefrontal cortex.

The paper "Historical evolution of spatial abilities" analyzes the development and cross-cultural differences of spatial cognition. It is proposed that: (1) spatial abilities are found to be significantly associated with the complexity of geographical conditions and survival demands; and (2) spatial cognition has evolved in a parallel way with

cultural evolution and ecological demands. Contemporary city man may be using those spatial abilities in some new, conceptual tasks that did not exist in prehistoric times (mathematics, reading, writing, mechanics, music, etc.).

In the paper "On the origins of calculation abilities" it is pointed out that counting, starting with finger sequencing, is observed in different, both ancient and contemporary, cultures, whereas number representation and arithmetic abilities are found only during the last 5000–6000 years. The paper analyzes the rationale of selecting a base of ten in most numerical systems, and the clinical association between acalculia and finger agnosia. Finger agnosia, right-left discrimination disturbances, semantic aphasia, and acalculia are proposed to comprise a single neuropsychological syndrome associated with left angular gyrus damage. It is hypothesized that acalculia, finger agnosia and disorders in right-left discrimination (as in general, in the use of spatial concepts) result from the disruption of common cognitive mechanisms.

The question of how other individuals are recognized is also analyzed ("People recognition: a historical anthropological perspective"). It is emphasized that not only visual, but also auditory and even olfactory information may be involved in people recognition. Visual information is proposed to include not only the perception of faces, but also the perception of whole body and gait, clothes, emotional expressions, and individual marks. Departing from clinical observation, a model for people recognition is presented. It is hypothesized that different "subsystems" or "modules" may be involved in individuals' recognition; "living" versus "non-living", "own species" versus "other species", "familiar" versus "non-familiar", "males" versus "females", and "individual identification" versus "emotional identification".

In the final paper "Neuropsychology of illiteracy", M. Rosselli reviews brain organization of cognition, and cognitive sequelae of brain pathology in illiterates. She concludes that: (1) cognitive abilities, as measured by standard neuropsychological tests, are strongly influenced by schooling background; and (2) educational and cultural variables may affect the degree (but not the direction) of hemispheric dominance for language, and other cognitive abilities. A more bilateral representation of cognitive abilities in illiterates is hypothesized.

The authors of this collection of papers sincerely hope this monograph will further interest in the analysis of historical and cultural variables in cognition, and will contribute to the development and strengthening of cross-cultural neuropsychology.

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