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The Sub-Saharan African Context and the Birth of Neuropsychology

Jean N Ikanga and Lingani Mbakile-Mahlanza

Division of Sub-Saharan Africa: Regional Differences

Africa’s History and Its Impact on Division

The World Bank Annual Report\(^1\) considers Africa the second largest continent in both area (11.7 million square miles) and inhabitants (1.3 billion people) after Asia. Before colonization, Africa was divided into empires (e.g., Kongo, Luba) and kingdoms (e.g., Kush, Aksum, Carthage, Mali, Zimbabwe, etc.). After the conference of Berlin (1885), Africa’s traditional frontiers were reshaped to fit Western political, social, and economic needs. The imperialistic powers divided Africa into many countries (53 countries) and these countries are subdivided into five regions (Northern, Southern, Central, Western, and Eastern countries). The Sahara Desert became another historical landmark, which divided Africa into two parts (Saharan and Sub-Saharan Africa).

As neuropsychologists from the Democratic Republic of Congo and Botswana, who were trained in the United States and Australia, we will focus on the Sub-Saharan Africa context in this chapter. This Sub-Saharan region is geographically and ethnoculturally distinct from the Middle East and North African region of primarily Arab League states. We will provide an overview of some relevant aspects of the region as well as the current state of the development of neuropsychology in the Sub-Saharan African context.

From Colonial Divisions to Linguistic Divisions

The conference of Berlin led Western countries to colonize Africa. Africa was divided mostly into French and British colonies (almost twenty-five countries each), Portuguese (six countries), Italian (five countries), German (four countries), Belgian and Spanish (three countries each) colonies. This colonial division led to three main African linguistic divisions involving English-, French-, and Portuguese-speaking countries. The colonization ignored African languages, which imperial powers considered as “poor” and inadequate for science and civilization. After colonization, many African leaders have tried to return to traditional roots and languages.

Linguists have estimated between 1,500 and 2,000 African languages.\(^2\) These languages are subdivided into four groups: (1) Afro-Asiatic (spoken in the Northern Africa); (2) Nilo-Saharan (spoken mostly in Central and Eastern Africa); (3) Niger-Saharan/Niger-Congo (comprising of more than 1000 languages called Bantu and spoken in Central, Southern and Eastern Africa); and (4) Khoisan (mostly spoken in Western parts of Southern Africa\(^3\)). Therefore, an African is apparently a polyglot who speaks the tribal language, national language, and colonial language.\(^4-6\)

During neuropsychological evaluations, it becomes important to consider which languages a person speaks and which language they might be most comfortable with for an evaluation.

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Impact of Political Division

Colonization has shaped the African political life and antagonized ethnic divisions. As indicated previously, the two main colonial powers were British and French. The British imperial approach was of “assimilation,” which wanted to make African countries an extension of the United Kingdom, with British training the next generation of African leaders and scientists. The French (also Belgians) imperial approach was the principle of “paternalism” where colonizers were considered as “fathers” and Africans as “children.” Comparing the two approaches, the British approach has been “more conducive to growth” than the one of France or other colonizers, with British former colonies having had better political stability, economic growth, and public goods provision compared to French and other colonies. In the Sub-Saharan Africa, neuropsychology has been taking roots mostly in British colonies. In addition, understanding this context can help appreciate the mindset that African migrants may have toward assimilation or acculturation in host countries.

Education and Its Barriers

The World Bank Annual Report reported an increase in children completing primary school across the continent from 27% to 67% between 1971 and 2015. Yet, the educational system in Africa faces many challenges, including language barriers where children have to be educated either in colonial, national, or mother tongues. In its World Education Report, the United Nations Educational, Scientific and Cultural Organization (UNESCO) pointed concerns about lack of facilities, libraries, manuals, and educators. Due to the low economic status of many Africans, parents may be unable to pay tuition, textbooks, and transportation costs for their children. In French-speaking countries, education is additionally challenged by ongoing conflicts/wars (e.g., Mali, Ivory Coast, Democratic Republic of Congo). Teachers in Africa also earn a very low salary, which can lead to corruption and low motivation. Overall, the educational system in Africa is not set to stimulate academic excellence but to build the intellectual scheme of “minimum” or “at least 5/10 passing grade.” As a result, many children may be unable to read a letter, do basic calculations, or write an essay. In its World Education Report, UNESCO estimates rate of adult illiteracy in Africa to be at 39%. Women have the highest illiteracy rates (an estimated 94 million) since many girls tend to be forced to get married very young (between the ages of 12 and 14). Finally, there are differences in educational quality depending on proximity to urban areas as those in the city have greater access to materials. As a result, inquiring about access to education, quality of education, and any barriers is crucial in a neuropsychological evaluation with the African population.

Cultural Considerations

Africa is a large continent with diversity of cultures, beliefs, and traditional systems that predominate it. However, there are some more frequent cultural traditions that are worth being aware of from a psychological perspective, with the understanding that each patient will have their own unique cultural beliefs to share.

Ancestors and Traditions

The ancestral wisdom and legacies in Sub-Saharan African societies have mostly been transmitted through oral tradition. Often, elders utilize evenings around the fire to transmit traditions through metaphors, symbolisms, proverbs, and stories. Through this process, elders build strong family bonds and emphasize the sense of tribe, clan, and family so an individual learns to be “We”
rather than “I.” This creates importance for tradition, respect for elders, and ancestors. From a neuropsychological perspective, the question remains whether many Africans’ experience on auditory acquisition of information provides a benefit to verbal processing approach over visuospatial modalities. This remains an outstanding research question relevant to neuropsychology.

**Belief in Supreme Being, Spirits, and Witchcraft**

Many Africans believe in the Supreme being and in spirits which can be harmful to human beings. One of the most harmful spirits is the “spirit of witches,” which comes from witchcraft. Witchcraft is understood as “belief that the spirit of living human being can be sent out of the body on errands of doing havoc to other persons in body, mind, or estate.” John Mbiti has argued that witches can operate in three ways: (1) alone; (2) through other human beings invisibly, or (3) through a lower creature such as an animal or a bird. Therefore, many Africans could generally find the origin of every biological, mental, and spiritual diseases in bad spirits and witchcraft. Any misfortunes in life and death could be viewed as caused by the spirits of witches in the family or clan. From a neuropsychological perspective, for example, epilepsy or seizures and neuropsychological syndromes could be viewed as a possession by evil spirits.

**Traditional African Religions**

These beliefs in the Supreme Being and spirits are the source of traditional religious activities. Many Africans have a strong sense of what is in the sphere of profane and sacred. They may offer rituals and incantations to God, spirits, and ancestors in every important life event (i.e., conception, marriage, birth, and death). Scholars have argued that “Religion is to the Africans an ontological phenomenon which pertains to the question of existence or being.” Many Sub-Saharan Africans tend to be Christians while Northern Africans tend to be Muslims. Therefore, Sub-Saharan Africans will easily discuss their faith during clinical interview or neuropsychological evaluation process.

**Concept of Time**

It has been argued that Africans do not have notion of time. John Mbiti has articulated that time in Africa is an event rather than being mathematically oriented as it is in the Western cultures. Passed events are what mark the past time. The eventful moments of the present are what constitute the present. However, Mbiti continued in affirming that Africans do have shorter understanding of future. This Sub-Saharan African understanding of time can lead to conclude that Africans do not do longer planification of their life and anticipate life’s events. Another consequence of this notion of time is well expressed in the African saying: “There is no hurry in Africa.” From a neuropsychological perspective, many Sub-Saharan Africans have difficulty with neuropsychological tests which require mathematical concepts of time or timing (e.g., processing speed, verbal fluency, etc.) and involve planning. Many experts have pointed out influences from the change in traditional agrarian-based African societies due to urbanization and modernization.

**Clinical Health Considerations**

Many scholars have reported the presence of communicable diseases (CDs), particularly infectious diseases and non-communicable diseases (NCDs) in Africa, which have neurological and neurocognitive sequelae.
Infectious Diseases

Public health experts have indicated that infectious diseases are the most prominent source of burden and causes of illness in Sub-Saharan Africa.¹⁴–¹⁶ The most prevalent CDs in Africa include infectious diseases such as tuberculosis, Human Immunodeficiency Virus/Acquired Immune Deficiency Syndrome (HIV/AIDS), typhoid fever, and parasitic infections such as human African trypanosomiasis (“sleeping sickness”) and malaria.²⁰ Other prevalent infectious diseases in Africa include amoebiasis, neuroschistosomiasis, cysticercosis, neurocysticercosis, onchocerciasis, and Chagas disease. Tropical infectious diseases which are often neglected include filariases, leprosy, rabies, ascaris suum, and nematodes.²¹ Finally, some areas of Sub-Saharan Africa (Democratic Republic of Congo, Guinea, Liberia, etc.) have been the epicenters of Ebola infection. Neuropsychological sequelae of these infectious diseases in Africa have been neglected.

Toxic Diseases

Africa is also impacted by toxic diseases which therapeutically need neurocognitive expertise. Conditions which impact the nervous system include abuse of Khat (leaves of shoots of khat trees), konzo (a non-progressive motor neuron disorder associated with cassava toxicity), food preservation issues, snake venom exposure, as well as air and water pollution related toxicities.²¹,²²

Psychiatric Disorders

Many Africans are exposed to violence, civil combat, and continual displacement. These traumatic events increase risks for psychiatric disorders such as depressive disorders, anxiety disorders, and trauma and stress-related disorders (post-traumatic stress disorder). As Hill-Jarret, Ikanga, and Stringer¹⁰ have reported the presence of traumatic brain injuries among Africans exposed to wars, along with the presence of unsanitary hygienic practices and diseases of poverty among African refugees who are fleeing conflict conditions and political unrest. Many of these conflict and war-torn areas also struggling with food insecurity and malnutrition which has subsequent psychiatric manifestations.

Non-Communicable Diseases

The aging population in Sub-Saharan Africa is also grappling with NCDs such as cardiovascular disease, cancer, obesity, and neurodegenerative disorders.¹⁷–¹⁹ These diseases are often associated with cognitive deficits,²³,²⁴ but may not be adequately assessed, especially if using neuropsychological measures originally developed for non-African populations.

Health Care Barriers

African countries vary significantly in socio-economic status, but many African healthcare systems face difficult issues such as lack of trained healthcare professionals, absence of adequate medical equipment, neuroimaging, or diagnostic technologies.²⁵ The few healthcare professionals and medical equipment that do exist are often only in big cities and remain inaccessible to people in the rural areas.¹⁰ This creates challenges for early identification and treatment of neuropsychologically relevant health conditions.
Although the last three decades have seen enormous growth in the field of neuropsychology, this growth has been more apparent in North America, Australia, and Europe. The profession in these regions is well established and several training and certification programs are available. In contrast, academic programs for neuropsychology in Sub-Saharan Africa are sparse, mainly due to a shortage of financial and human resources. There is also a paucity of data on the number of neuropsychologists in practice as well as on the academic institutions that offer training in neuropsychology.

Neuropsychology Training and Practice

Given the clinical issues and different disease conditions that face the continent, there is a great need to develop the discipline of neuropsychology in Africa. Yet, due to limited capacity in terms of training facilities, the few neuropsychology service providers that do exist, tend to receive their training outside the continent.

Countries such as South Africa have however made greater strides in training efforts. For example, a Master of Clinical Neuropsychology is offered at the University of Cape Town (UCT) and a Master of Clinical Neuropsychology program has also been established in Zambia. This program in Zambia is an 18-month program with a dissertation that has been running since 2009. To date, the program has produced around 60 Clinical Neuropsychologists. The majority of the people who took the course were already employed as Teachers, Special Education Teachers, Nurses, or doctors, who then went back to their place of work following the training. One joined the Department of Psychiatry as Lecturer and two joined the Department of Psychology of the University of Zambia. They all have strengthened these departments and delivery of services. There are others who have gone into private practice as counselors (personal communication with head of department). In Rwanda, a neuropsychology-training program has also recently been established in conjunction with Emory University.

In tandem with limited training programs in Sub-Saharan Africa, the practice of neuropsychology is also in its infancy. A recent literature review by Kissani and Naji found only 7 published indexed articles related to the state of neuropsychology in Africa, highlighting low levels of focus on neuropsychology on the continent. There is even more varied service delivery and availability of neuropsychology across regions in Africa. For example, relatively speaking, there has been much more significant development of neuropsychology in South Africa, although the services are often only largely available to privileged few. Most other countries in Sub-Saharan Africa have no neuropsychologists or practice of neuropsychology. For example, in the Botswana context, neuropsychological assessment is still very limited due to a lack of neuropsychologists and health care facilities that specialize in the treatment and rehabilitation of cognitive impairment. Countries such as Namibia and Botswana have one neuropsychologist in their respective country. In addition, since the description of what constitutes a neuropsychologist and the scope of practice is vague, other professionals such as psychiatrists, general practitioners, or neurologists are often called upon do neuropsychological work.

Neuropsychological Testing Challenges

Neuropsychological tests are needed to screen for cognitive impairments caused by illnesses, diseases, and brain injuries, as well as for recovery and rehabilitation. Yet, the majority of test batteries that are available and currently being used have been developed, normed, and standardized...
mainly in Western countries, and are not suitable in various regions of Sub-Saharan Africa, especially given the linguistic diversity on the continent.

While there remains an urgent need for robust cognitive tools that are culturally sensitive with good psychometric properties and consider effects of education and languages, there is currently an absence of focused efforts to develop different types of tools needed. This includes a lack of development of comprehensive neuropsychological batteries that require expertise to administer, as well as briefer cognitive assessments that are accurate at screening for neurocognitive disorders and can be administered by non-specialists, and functional assessments.

This is relevant because in the West, there is awareness that changes in brain function and structure are the earliest signs of progressive neurocognitive disorders, followed by cognitive and functional impairment. High standards of care typically entail dementia diagnosis following comprehensive neurological, cognitive, functional, neuroimaging, and biomarker assessments. Yet, many countries in Africa lack both material and instrumental resources, and neuroimaging technology or biomarker studies are not readily available or too expensive. Along with a lack of culturally appropriate neuropsychological tests and normative data, this hampers good quality brain healthcare and creates barriers to diagnosis, treatment, and care for African patients.

In the Democratic Republic of Congo, Ikanga and Stringer have developed the African Neuropsychological Battery (ANB) and efforts for validation across various countries are underway. The African Neuropsychological Battery consists of tests of visuospatial perception, language, memory, abstract reasoning, and problem solving, as well as sensory and motor screening tests. ANB uses content and stimuli that are based in Sub-Saharan Africa cultures, with versions in French, English, Swahili, Lingala, Tshiluba, and Kikongo. Initial research on the reliability and validity of the ANB has been encouraging. The individual ANB tests have been shown to have generally high internal consistency (0.64–0.93) and test-retest (0.44–0.91) reliability coefficients, comparable to similar tests used in Western countries. Further, our team is examining whether currently available computerized and pen and paper-based tests often used to diagnose dementia can be culturally adapted and validated to improve the diagnosis of dementia for people in Botswana.

Research Developments in Neuropsychology

It is important to consider the clinical utility of the neuropsychological tests used and ensure that they are efficient and practical for various African contexts. The need for local standardization of tests cannot be over emphasized. There is currently limited investment in research infrastructure. Most of the current research in Sub-Saharan Africa focuses on HIV with funding mainly coming from the United States. For example, in Botswana a neurocognitive battery for assessing school-aged children and adolescents with HIV is being developed with a partnership between The University of Pennsylvania and the Botswana-Baylor Children’s Center of Excellence in Gaborone.

The Future of Neuropsychology in Africa

Overall, there is a need for the countries in Sub-Saharan Africa to further develop and disseminate neuropsychology services across all levels of health care. One way this can happen is if positions for neuropsychology are created at the primary health care level. This can aid in early diagnosis and treatment and reduce the healthcare burden in their respective countries and de-centralize services in countries that do have services. As previously mentioned, resources are scarce in Sub-Saharan Africa, therefore we need to leverage what is already in existence in terms of resources. While there is a need to develop neuropsychology graduate programs in various countries, to ensure that services can be available more widely, it is also prudent to train
non-neuropsychologists including psychometrists and psychology assistants, health auxiliaries, nurses and doctors, teachers, other psychologists as well as patients and their careers. This training could be in the form of professional development or short courses on brain health (assessment, diagnosis, protective factors, etc.). Further training on administering screening tools as well as more comprehensive assessments could be beneficial. There is also clearly a need to develop and utilize cognitive and functional assessment instruments that are culturally appropriate and adapted to common approaches to clinical evaluation across Sub-Saharan African countries. Local normative data collection also needs to be a priority. Capacity building in clinical service delivery and research needs to be a priority in Sub-Saharan Africa to further support the growth of neuropsychology in Africa.

References