Cultural Diversity in Neuropsychological Assessment
Developing Understanding through Global Case Studies
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Cross-Cultural Neuropsychological Assessment in the European Context

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Clinical Neuropsychology in Europe

Clinical neuropsychology has grown rapidly in Europe over the last 40 years and has expanded into new and wider areas. With the advent of increasingly sensitive multi-modal neurologic biomarker techniques, neuropsychological assessment has shifted from its original role in localizing the lesion to more in-depth characterization of patterns arising from disruptions of brain-behavior relationships.\(^1\) Within healthcare, European neuropsychologists now offer services for patients with cognitive and behavioral symptoms related to neurological, developmental, and psychiatric disorders. The impact of disorders affecting the central nervous system is considerable both in Europe and globally. According to the Global Burden of Disease 2019 study,\(^2\) in the European Union (EU) the burden from neurological diseases is only surpassed by the burden from cardiovascular diseases and neoplasms. The largest burden from neurological diseases in terms of deaths and disability is from stroke, migraine, and Alzheimer’s disease, and other dementias, followed by medication-overuse headache, brain and nervous system cancer, and epilepsy. While not responsible for significant portions of deaths, mental disorders represent a large burden in terms of disability.\(^2\) Thus, across Europe there is a great need for healthcare, including neuropsychological services, related to these diseases.

Depending on the definition used, Europe consists of about 50 countries and has a total population of approximately 742 million people, or 11% of the world population. From the later 20th century, “Europe” has come to be widely used as a synonym for the European Union (EU) even though there are millions of people living on the European continent in non-EU countries, mainly in Eastern European countries but also in countries such as Switzerland, Norway and more recently the United Kingdom. Currently, the EU has 27 member countries: Austria, Belgium, Bulgaria, Croatia, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, and Sweden. The EU recognizes 27 official languages, not counting 60 or so regional or EU minority languages and languages spoken by people from other parts of the world.\(^3\) Many European countries have national neuropsychological societies that support specialist education and keep registries of qualified professionals, but their regulatory effect is less well defined. The Federation of the European Societies of Neuropsychology (FESN) was founded in 2008 with the aim of supporting development of scientific and clinical neuropsychology in Europe and currently encompasses 18 national neuropsychological societies.\(^4\) In 2017, a Standing Committee on Clinical Neuropsychology became a permanent body of the

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European Federation of Psychologists’ Associations (EFPA), aiming to make recommendations for developments in specialization training for neuropsychology.  

**Legal Status and Role in Healthcare**

While most European countries regulate the profession of psychologists, there is large diversity in the regulation of the different fields or specialist areas within psychology. Whereas the general title of psychologist is protected by law in most countries, clinical neuropsychologist is only a protected title in a handful of countries. A license to practice within healthcare from a national authority is the only requirement for clinical neuropsychologists in most countries. There is also wide variability in terms of the healthcare systems and socio-economic situations across the countries. All EU countries, as well as most other European countries, provide universal health insurance or service coverage, or nearly universal coverage, for healthcare through compulsory schemes. While Scandinavian countries (Denmark, Norway, Sweden) have universal public healthcare systems paid largely from taxation, most European countries have systems of competing private health insurance companies, along with government regulation and subsidies for citizens who cannot afford (compulsory) health insurance premiums. However, access to healthcare services, including neuropsychological services, vary greatly by country. Also, there are differences in professional roles so that neuropsychologists in some countries have a subordinate and primarily advisory role concerning diagnosis and treatment planning, while psychologists in other countries have a fully independent role in diagnosis and treatment of patients.

**Education and Training Models**

There is no commonly agreed model for specialization in clinical neuropsychology in Europe and the legal and professional status differs greatly between European countries. Europe mostly follows a common higher educational structure, implemented by the so-called Bologna Process. Programs are offered at three levels, namely bachelor’s, master’s, and doctoral studies, which are referred to as the three-cycle system. EU programs such as the Erasmus Program have promoted mobility of students within the European community, and many European universities offer psychology and cognitive neuroscience master’s and doctoral programs in English. European standards for psychology have been set by the EFPA to serve as the basis for evaluating the academic education and professional training of psychologists across countries. These standards define competencies for psychologists having completed the master’s level. Cross-cultural training, awareness, and knowledge are not part of these standards. Psychological specialties are generally less regulated and requirements for study in neuropsychology have not yet been established by EFPA.

The specialization models of clinical neuropsychology in Europe and North America are similar in their content and requirements for courses and practice. However, in contrast to the United States and Canada, specialist education in most European countries is related to clinical training and not an academic degree. A survey of 30 European countries found that in one-third of the countries, no commonly agreed-upon model for specialist education in clinical neuropsychology existed and that the duration of specialist education varied from one to five years. Although specialist training can generally only be initiated after completing a master’s degree, countries such as Spain only require a bachelor’s degree, while the United Kingdom and Ireland require a doctoral degree. As legal regulation is mostly absent and training models differ, those actively practicing clinical neuropsychology have a very heterogeneous educational background and skill level.
Approach to Neuropsychological Assessment

The history and traditions in neuropsychology differ both between and within European countries. Whereas neuropsychology in some countries (or national groups) has historically been dominated by the largely qualitative, flexible, and non-standardized Lurian approach, in other countries the quantitative and highly standardized fixed battery approach introduced by Ward Halstead and Ralph Reitan has been more influential. Although remnants of both traditions are still found throughout Europe, as in North America and other parts of the world, European neuropsychologists now generally use a flexible assessment approach, meaning that a fairly standardized, fixed set of neuropsychological tests is given to most clients with some flexibility to add or subtract tests given the specific referral question. Often qualitative aspects of performance are considered in the interpretation of test results, and most European neuropsychologists prefer to do the testing themselves rather than relying on test technicians for the collection of neuropsychological data.

In contrast to the United States, in most European countries there is no systematic use of performance validity testing and the issue of formally assessing response bias remains somewhat controversial. A survey in six European countries found that most neuropsychologists prefer to rely on their clinical judgment, whereas only a minority use performance validity tests in standard clinical neuropsychological assessments (12%). Even in forensic assessments, it is only a minority (45%) who always include a performance validity test. However, there are considerable differences between countries, ranging from 14% in Finland to 70% in the Netherlands, and referral sources are increasingly exerting pressure on neuropsychologists to examine the credibility of symptom reports and the validity of test profiles with formal measures. In cross-cultural assessments, formal performance validity testing has not been validated in many European ethnic minority groups, and the cross-cultural validity of some performance validity tests may be limited in the European context.

Use of Neuropsychological Tests and Normative Data

Although locally developed tests are sometimes used, most of the tests and test batteries used by European neuropsychologists come from the international literature and have Anglo American origin. Thus, they have often required translation and cultural adaption to non-English speaking cultures before implementation in clinical practice. Despite the usage of collaborative standardization of batteries such as the Wechsler Adult Intelligence Scale, fourth edition (WAIS-IV) and Repeatable Battery for the Assessment of Neuropsychological Status (RBANS) across Scandinavian countries and the Consortium to Establish a Registry for Alzheimer’s Disease (CERAD) neuropsychological assessment battery across German-speaking countries, well-known tests from the international literature have generally required country-specific adaption and standardization.

For instance, it has been necessary to develop Greek and Italian versions of the Trail Making Test as the Greek alphabet differs from the Latin one, and the Italian alphabet does not include the letters “J” and “K.” As a result, tests scores are often interpreted using locally developed normative data of variable quantity and quality. Also, across Europe there is a multitude of different education systems that differ considerably in quantity and quality, and general education level and literacy rates also differ between countries. This further complicates collaborative test standardization. In most European countries, literacy rates lie between 99% and 100%. However, lower literacy rates are found in some Southern and South-Eastern European countries, including Greece, Malta, and Portugal, mainly driven by lower literacy rates in

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older generations. Although this complicates standardization of neuropsychological tests across European countries, it has also spurred important neuropsychological research. Research groups in Portugal and Greece were thus some of the first to describe associations between illiteracy, cognitive abilities, neuropsychological test performance, and the functional and structural organization of the brain.25–39 Although rarely considered, key aspects of cross-cultural neuropsychological assessment and test development have thus been central to European neuropsychology since its advent as a modern clinical discipline.

Cross-Cultural Neuropsychological Assessment in Europe

Although a certain degree of diversity has always been present in European countries, ethnic diversity has increased greatly over the last seven decades. This started with the immigration of labor workers from countries outside the EU from 1950 to 1974 and the immigration of people from once-colonized countries, followed by the influx of asylum seekers and refugees in more recent years.40 Therefore, European countries have had to adjust rapidly to the increasing diversity in their societies. In 2019, non-EU immigrants made up about 5% (21.8 million people) of the total EU population.41 Several ethnic minority groups in European countries are at an increased risk of medical conditions that are associated with cognitive impairment, such as stroke,42 diabetes mellitus,42 and dementia.43,44 As a result, neuropsychologists in Europe increasingly receive referrals of clients from ethnic minority groups.

Challenges in Cross-Cultural Assessment

Several issues may pose unique challenges to cross-cultural neuropsychological assessment of people from ethnic minority groups in Europe. First, limited proficiency in the host country language is widespread among older people from some ethnic minority groups, including Moroccans and Turks in the Netherlands,45 South Asians in the United Kingdom,46 Turks in Germany,47 and Turks and Vietnamese in Belgium.47 The language in which neuropsychological tests are administered, as well as the level of formality used, can significantly impact communication, rapport, and subsequent test scores.48–50 Very few European neuropsychologists speak relevant minority languages, and interpretation through (formal or informal) interpreters is often needed to assess clients in their native language.15 Several studies indicate that interpreter-assisted neuropsychological assessment may be challenging. The use of relatives as interpreters has been associated with the exclusion of the client from the conversation,51 problems with adequate translation of medical terminology,52 obscuring the client’s explanatory models, and difficulties in assessing the level of insight.53 The use of formal interpreters may be challenging as well, especially for tests with high demands on the abilities of the interpreter or when interpreters have received little formal training.54,55 In many countries, training and licensure of interpreters is not well-regulated. For instance, in Sweden and Denmark, professional tends to be used for all interpreters available by interpreter services, irrespective of degree of training.55 The degree of training of interpreters may therefore range from those who have taken a few courses to authorized interpreters with a medical specialization. Also, access to formal interpreters differs greatly between European countries. For example, in Austria and France, formal interpreters are provided through governmental funding; in Denmark and Belgium there are different rules depending on the specific case and context; and in most other countries there are no government-funded interpreter services.15 Although general guidelines for psychologists working with interpreters have been published in countries such as the United Kingdom,56 no specific guidelines are available to European neuropsychologists who generally lack training in working with interpreters.
Second, although the level of education is heterogeneous both across and within ethnic minority groups, low education levels or illiteracy are common among (older) people from various ethnic minority groups in Europe.\textsuperscript{45,46} For example, 17\%-36\% of older Turkish and Moroccan first-generation immigrants in the Netherlands are illiterate, and more than half (50\%-90\%), especially women, have not completed any form of formal education.\textsuperscript{57} Illiteracy, a limited number of years of education, as well as a low quality of education significantly impact neuropsychological test scores across several cognitive domains.\textsuperscript{58-61} Clients who are illiterate may also experience more discomfort in testing situations due to unfamiliarity with the setting, the content of the tests, or differences in what is considered a good response.\textsuperscript{62} Also, as the length, quality, and content of the school day and year may vary considerably from country to country and even from school to school in some countries,\textsuperscript{58,60} it may be inappropriate or even misleading to apply European norms to immigrants who have their education from a school system that differs greatly from the Western ones.

Third, neuropsychologists in Europe may encounter substantial cultural barriers in their clinical practice. Although ethnic minorities and immigration patterns differ between European countries, the largest ethnic minority groups across Europe originate from South Asian, Middle Eastern, and North African, predominantly collectivist Muslim, cultures.\textsuperscript{63} Other significant ethnic minority groups are mainly found in specific European countries, including groups of Sub-Saharan African origin in the United Kingdom and France and of Latin American origin in Spain. Additionally, notable ethnic minorities include the Roma, who are found across most of Europe, indigenous peoples such as the Saami in Sweden, Norway, Finland, and Russia, and Irish Travelers. Acculturation toward the dominant culture differs greatly between and within ethnic minority groups and is closely associated with other factors, such as generation in the country, language proficiency, migration history, and level of education.\textsuperscript{64} In particular the “guest workers,” who came to Europe as labor migrants in the post-World War II period, may have limited levels of acculturation to the dominant culture as they were initially expected to return to their countries of origin after a number of years—often resulting in a delay of decades in the development of policies promoting social integration and acculturation.\textsuperscript{40} The second generation is generally more bilingual and higher educated than the first generation of immigrants, although notable heterogeneity exists within this group. For instance, in the Netherlands second-generation Turks often have poorer Dutch language fluency and are often lower educated than their Moroccan peers.\textsuperscript{65} It often poses a significant challenge to European neuropsychologists to determine which tests and normative data are most appropriate for this heterogeneous population.\textsuperscript{15} Cultural differences may impact the neuropsychological assessment in several ways. The client may have different expectations of (the purpose of) the assessment, of what is relevant information, and of what information may be shared with a stranger.\textsuperscript{66} A neuropsychologist from the majority group may not automatically be trusted. Some clients fear unfair treatment or misunderstanding of their complaints and way of life. For example, if asked about the burden of providing informal care for an older family member, clients from collectivist, family-oriented, cultures may object to this as they do not consider themselves to be informal caregivers. They just do their expected duty as a daughter or son.\textsuperscript{67} Additionally, culture influences communication styles, idioms of distress, and the way symptoms may manifest themselves.\textsuperscript{62} Also, Al-Jawahiri and Nielsen (2020)\textsuperscript{64} showed that lower levels of acculturation are associated with poorer performance on tests of mental speed and executive functioning—even when tests are administered in the person’s native language and scores correct for other demographics. Finally, culture and acculturation may influence test scores when tests include “Western items” or when the tests involve culture-specific testing elements and strategies.\textsuperscript{68-70}

Cross-cultural neuropsychological assessment could benefit from matching clients from ethnic minority groups with neuropsychologists who are of the same ethnicity and/or are fluent in
the client’s language. However, in line with the reality in the United States, providing same-ethnicity neuropsychologists to all clients from ethnic minority groups in Europe is currently not feasible considering the number of different ethnic minority groups and the limited ethnic diversity among neuropsychologists in Europe. Instead, there is a general need to improve cross-cultural training, awareness, and knowledge among European neuropsychologists and to increase recruitment of culturally and linguistically diverse neuropsychologists into the field. Cross-cultural training of neuropsychologists has also been identified as a priority in the United States, where “clinicians often lack in-depth training in assessment of ethnic minorities.”

In sum, language, (quality of) education, literacy, and culture substantially influence neuropsychological assessment. Cultural and language adaptations, or newly developed, neuropsychological tests for ethnic minority groups in Europe are needed, but such tests are often lacking. Although neuropsychologists in several of the countries of origin of ethnic minority clients are working on the validation of cognitive tests, these initiatives have mostly focused on tests originally designed for (educated) populations in North America and Europe, such as the Trail Making Test or the Montreal Cognitive Assessment in Morocco, and tests from the BİLNOT battery in Turkey. Furthermore, people who are low educated or illiterate are not included in these validation studies or in the normative data samples.

Taking these barriers into consideration, conducting a cross-cultural neuropsychological assessment requires that European neuropsychologists acquire culture-competence skills and knowledge. Although some general directions for training of psychologists are presented in the “Guidelines on Multicultural Education, Training, Research, Practice, and Organizational Change for Psychologists” by the American Psychological Association, these guidelines are not specific to neuropsychologists. Despite European and North American neuropsychologists emphasizing that the ability to handle cultural diversity is a “vital functional competency” for clinical neuropsychologists worldwide and, more specifically, “one of the foundational entry-level competencies for neuropsychologists,” no details have been provided on the specific knowledge or skills that European neuropsychologists should acquire to attain sufficient competence to handle the substantial barriers in culture, language, and education.

All these factors pose challenges to the assessment of clients from ethnic minority groups and have initiated recent developments in cross-cultural neuropsychological assessment in Europe. In contrast to North American initiatives that have generally focused on adapting and standardizing well-established tests or batteries for specific languages or ethnic groups (e.g., Hispanics or African Americans), European efforts have generally aimed at developing and validating neuropsychological tests and batteries for use across diverse ethnic groups.

**Advances in Cross-Cultural Assessment**

A recent Delphi expert study found that considerable work has been carried out in the development and validation of cross-cultural neuropsychological tests in Europe, but mainly by neuropsychologists working in memory clinic settings. In particular, the European Cross-Cultural Neuropsychological Test Battery (CNTB) and the Rowland Universal Dementia Assessment Scale (RUDAS), which was originally developed for multicultural populations in Australia, are well-validated across European countries. These instruments have been studied in people from numerous minority groups, with a wide variety of education levels, in studies from across multiple European countries (CNTB; RUDAS). Together, these instruments measure a variety of cognitive functions including general cognitive functioning (RUDAS), memory (Recall of Pictures Test, Enhanced Cued Recall and recall of a semi-complex figure), language (Picture naming and semantic verbal fluency), executive functions (Color Trails Test, Five Digit Test and
Serial Threes), and visuospatial functions (Clock Reading Test, Clock Drawing Test and copying of simple and semi-complex figures). For some of the other instruments identified in this study, few (if any) validation studies have been published for the target population. However, better cross-culturally validated instruments used in some countries include the Cross-Cultural Dementia screening\textsuperscript{85} and modified Visual Association Test\textsuperscript{84} in the Netherlands, the computerized EMBRACED battery (unpublished) in Spain, the Multicultural Cognitive Examination\textsuperscript{94} in Denmark, and TNI-93,\textsuperscript{95} TMA-93,\textsuperscript{96} and TFA-93\textsuperscript{97} in France.

In order to make them suitable for use across diverse ethnic groups, languages, education, and literacy levels, these instruments were designed without using culture- or language-specific stimuli,\textsuperscript{48,68} black-and-white line drawings,\textsuperscript{29,30,84} or test elements that require skills learned in school (e.g., Nielsen & Jørgensen, 2013).\textsuperscript{61} Generally, the influence of limited education and illiteracy is reduced by using test procedures with higher ecological relevance for people without formal school experience; that is, test procedures relying on elements and strategies from everyday life rather than the classroom.\textsuperscript{37,48,73} Often, smaller modifications of existing test paradigms are sufficient to make tests more ecologically relevant. For instance, in the RUDAS the memory subtest requires memorization and recall of a shopping list rather than a list of unrelated words, and in the Multicultural Cognitive Examination the semantic verbal fluency subtest adopts a supermarket category rather than the commonly used animal category. Whereas knowledge about supermarkets is usually obtained through everyday life experience, knowledge about animals and strategies for memorizing and recalling words is largely obtained through formal school experience.\textsuperscript{37,58,61} These instruments all represent important contributions to the field of (cross-cultural) neuropsychological assessment in Europe. However, many European neuropsychologists are not familiar with these newer additions to the neuropsychological toolbox, and there is a need for better publication and implementation of the instruments across Europe.\textsuperscript{15}

Aside from looking into neuropsychological tests in themselves, European experts in cross-cultural neuropsychological assessment also recognize the importance of taking the cultural context of neuropsychological assessment into consideration.\textsuperscript{15} These contextual factors are neatly summarized by the acronym of the ECLECTIC framework\textsuperscript{62}: Education and literacy, Culture and acculturation, Language, Economics (e.g., socio-economic status), Communication, Testing situation, Comfort and motivation, Intelligence conceptualization, and Context of immigration. Although this framework has not been formally assessed or implemented in Europe, several key contextual factors have been included in research and clinical practice. For example, an unpublished literacy screening test is used in the Netherlands to determine the quality of the clients’ education (E).\textsuperscript{15} Neuropsychologists from several European countries make use of short acculturation scales (C) in their research and clinical practice, including a modified version of the Short Acculturation Scale for Hispanics (SASH\textsuperscript{98}). Additionally, the effects of language abilities in both native and host country languages (L) are recognized by European experts in the field, as well as the effects of stereotype threat,\textsuperscript{99} of being unfamiliar with cognitive testing, and of examinee–examiner ethnic discordance (T) on the assessment.\textsuperscript{15} Experts in the field also recognize that it is important to take lifetime (socio)demographic factors and access to and availability of healthcare services into account (E).\textsuperscript{15} Some aspects from the ECLECTIC framework, particularly communication styles and intelligence conceptualization, has received less explicit attention among European neuropsychologists. Other specific examples of relevant issues to take into consideration in working with ethnic minority groups in the European context are traumatic experiences, migration-related distress or grief,\textsuperscript{100} exposure to discrimination,\textsuperscript{101} differences in explanatory models of illness (e.g. van Wezel et al\textsuperscript{102}, Fazil et al\textsuperscript{103}), and differences in symptom manifestation and idioms of distress, such as mixed affective and somatic presentations of depression in Moroccan and Turkish clients.\textsuperscript{104} Consistent with this, a survey among European dementia
experts found that 84% perceived cultural differences in the presentation of symptoms to frequently affect clinical assessments of clients from ethnic minority groups.105

Summary

To sum up, significant work has been carried out in the development and validation of cross-cultural neuropsychological tests in Europe. However, the field of cross-cultural neuropsychological assessment is largely still a developing field, and formal expertise is localized rather than widespread. Despite recent advances in cross-cultural neuropsychological testing and training in some European countries, there is a continuing need for development of cross-cultural tests and normative data, for culture-sensitive training, awareness, and knowledge among European neuropsychologists, and recruitment of culturally and linguistically diverse neuropsychologists into the field. Also, ethnic minority groups are often excluded from scientific research of diagnostic criteria or treatment efficacy for (neuro)psychological therapies because of language or educational barriers.106,107 More inclusive research with increased efforts to include “hard to reach” ethnic minority groups is needed. Also, the scope of cross-cultural neuropsychological assessment should be widened to include indigenous and transnational minorities such as the Roma across Europe and the Saami across Sweden, Norway, Finland, and Russia.

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