



Language and Acculturation: Neuropsychological Sequelae of COVID-19 in Indian Americans

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Abstract

Coronavirus 2019 (SARS-CoV-2; COVID-19) has significant mental health and neuropsychological consequences, but data are insufficient on these specific implications of COVID-19, especially for Indian American patients. Few studies have critically explored risk factors and neuropsychological assessment considerations from a cultural and linguistic perspective, including how they impact the evaluation process for Indian Americans. The present paper focuses on cultural and linguistic considerations for case conceptualization, ethical challenges for best practices, and a specific example with a middle-aged Indian American woman. The need for a greater contextual understanding is emphasized as a step forward in establishing methodological and procedural guidelines for working with patients of Indian descent in the United States.

Keywords Language proficiency · Culture · Indian Americans · Cross-cultural neuropsychology

Vignette

Geeta Patel is a 61-year-old, multilingual, right-handed, married Indian American woman with 14 years of education and a prior medical history of diabetes mellitus-type 2, hypothyroidism, and hypertension who was seen in a University Medical Center Neuropsychology Clinic complaining of gait, balance, speech, and cognition changes following COVID-19 (SARS-CoV-2) infection.

Ms. Patel was diagnosed with COVID-19 following fever, fatigue, and sore throat. She was isolated at home and her symptoms improved. Around week three, she started noticing increased weakness, felt shaky, and developed action tremors, gait instability, and speech problems. After visiting a local Urgent Care, she was redirected to the emergency department. She was admitted to the medical/surgical unit, where she underwent a thorough medical examination for any potential health concerns. Neurology was consulted and completed a lumbar puncture study, which was unremarkable. Brain scans using computed tomography (CT) and magnetic resonance imaging (MRI) were negative for stroke or other structural lesions. However, neuroimaging showed mild to moderate small vessel ischemic disease. After being treated for nerve inflammation, Ms. Patel was discharged with a post-infectious/post-COVID cerebellar ataxia diagnosis.

Ms. Patel's tremors resolved, and gait and fatigue improved after receiving physical therapy, but she continued experiencing mild balance problems. Speech initially improved with therapy but regressed with additional cognitive and memory concerns. She was subsequently referred to the Neuropsychology Clinic for further assessment.

Ms. Patel presented to the Neuropsychology Clinic approximately six months after her hospitalization. The initial consultation was completed via telehealth with her daughter present. Ms. Patel reported difficulties with attention, memory, slowed thinking, speech production, and decision-making. She was still independent for instrumental activities of daily living, such as taking medications, housekeeping, and preparing meals, but did report leaving the stove on a few times. There was no history of neurological, psychiatric, developmental, academic, or cognitive difficulties prior to being diagnosed with COVID-19.

Briefly, Ms. Patel spoke three languages: Hindi, Gujarati, and English. She acquired the Gujarati language first, followed by Hindi and then English. She attended an English medium school in India and completed 10th grade and some college, equivalent to a high school degree in the United States (US). Ms. Patel immigrated to the US from Gujarat, India, in 1983, around the age of 23, after finishing her studies in India.

Despite having learned English through schooling in India, a concerted effort was made to gain a better understanding of her actual abilities during her assessment in the Neuropsychology Clinic, resulting in the selection of a modified neuropsychological evaluation battery with reduced emphasis on the English language proficiency and Western based cultural knowledge.

The present vignette primarily highlights the process of selecting assessment measures for a comprehensive neuropsychological assessment, case conceptualization, patient's language preference, cultural considerations, and the significance of these factors in conducting neuropsychological evaluation with a middle-aged Indian American woman. To achieve this goal, the current article will provide a brief overview of significant contributing facets from Indian American sociocultural and linguistic standpoints as they relate to the patient's history, preexisting chronic health conditions, and presenting cognitive concerns.

A Brief Background on the US-Based Indian Americans

Indian Americans are commonly grouped under the larger umbrella of South Asian. The Atlantic Council (2022) lists India, Pakistan, Bangladesh, Nepal, Bhutan, Afghanistan, Sri Lanka, and the Maldives as South Asian countries. This grouping of nations adds complexity when evaluating South Asians because there is a rich diversity of ethnic, religious, cultural, and linguistic heterogeneity. More recently, there has been a push to establish individual identities among the South Asian aggregates. For example, people of Pakistani origin prefer Pakistani American, those of Indian origin prefer Indian American, etc.

Indian Americans (also referred to as South Asians and Indian immigrants in this paper) are approximately one percent of the total United States population and the second-largest Asian American group after Chinese Americans (Budiman & Ruiz, 2021). In 2020, Indian Americans represented the largest source of new immigrants to the US, exceeding immigrants from Mexico or China (Budiman, 2021; Hanna & Batalova, 2020). Population concentration tends to be on the coasts and specific metropolitan areas in several states such as California, Texas, New York, New Jersey, and Illinois. Indian Americans are primarily foreign-born (87%), are between the ages of 18–64 years (81%), are college-educated (70%), and work in professional settings (69%). However, the segment of 65 and older is growing and currently accounts for roughly 12% of the Indian American population, which is estimated to increase in the coming years (Desilver, 2014; Hanna & Batalova, 2020).

Asian immigration to the US has been intermittent and uneven primarily due to ideological and political pressure.

Legislative actions virtually stopped all Indian immigration until 1965's Immigration and Naturalization Act (Sunderaraman et al., 2021; Williams, 2019). This period was the start of the modern age of emigration from India, which can be divided into three phases. Phase I, 1965–1979: Formally educated professionals, majority Punjabis and Gujaratis, moved to the US. About 45% held professional degrees, especially in medicine and engineering. Phase II, 1980–1994: Extended families of the Phase I group moved to the US, and about 33% held advanced degrees and continued to primarily represent immigrants from Punjab and Gujarat. Phase III, 1995-current: Often referred to as the IT Generation (Williams, 2019), those who moved to the US were mostly formally educated in the science and technology fields and benefitted from high demand for their expertise in the US.

For all intents and purposes, Indian Americans arrived in the US by the millions between 1965 and 2020. The different immigration phases represented distinctive racial identities, educational levels, and economic potential (Williams, 2019). In fact, those arriving during Phase I and II demonstrated greater variability in their economic stability and education compared to Phase III, making a bimodal distribution of their socioeconomic, health, and educational characteristics. It has been estimated that around 10% of Asian Americans and 6% of Indian Americans live below the poverty line (Budiman & Ruiz, 2021; Sunderaraman et al., 2021).

Information gathered from Ms. Patel determined that she was a Phase II immigrant and benefited from chain migration. Her academic accomplishment of an associate's degree obtained in India is not as high a level of formal education as was typical in the Phase I or III groups, but still relatively higher than the US population at large. Additionally, she currently works as a civil servant and earns a middle-class income. She lives in a well-known Indian American enclave in the US.

Bilingualism, Language Proficiency, and Education Among Indian Americans

There are 22 scheduled languages spoken in India, with 120 other major languages. Although India's official languages are Hindi and English, and education is disseminated in these languages, hundreds of other dialects are spoken as the first language among Indian communities. People living in North, East, and West India are likely to speak Hindi along with a local language and dialect, while those living in South India are less likely to communicate in Hindi. English is typically spoken by those in urban settings and is associated with higher education or socioeconomic status. Indian American communities in the US also reflect linguistic variety, though not nearly to the same degree as seen in India. Besides English, Indian Americans are most likely to speak Hindi (26%), Telugu (13%), Gujarati (11%), Tamil (9%), and Punjabi (8%; Hanna & Batalova, 2020).

Immigrants and first-generation Indian Americans continue to speak languages other than English within their families and during social and cultural events within the community. Most immigrants also speak fluent English, which likely helped them succeed in the US. About 82% of Indian Americans, who are first-generation, speak English in some capacity (Budiman, 2021). In contrast, those individuals immigrating to the US later in life or after completing their education outside the US may have a limited English vocabulary or proficiency. Among those who were born in the US, there is some evidence that second- and third-generation Asian Americans have a basic understanding of their family's language of origin that is spoken at home, but often prefer to speak English interpersonally and socially.

From the neuropsychological assessment perspective, although the years of formal education are quantifiable, which is usually considered while interpreting the assessment findings utilizing the education-adjusted norms, it is challenging to assess and account for the quality of education that Ms. Patel received. For example, Ms. Patel moved to the US 39 years ago, in 1983, from Gujarat, India, after completing her education, which is likely not the same as it may be for those immigrating in recent years. Moreover, she did not attend any academic institutes in the US.

Communication and Interpersonal Style Among Indian Americans

Cultural influences impact communication style. For instance, Indian Americans may not feel comfortable questioning someone in a position of authority, especially during a doctor visit or cognitive testing. This attribute can be complicated by the fact that many people for whom English is not their first language may avoid asking or clarifying the questions to limit being perceived as unintelligent or “slow” (Birney et al., 2020). The behavior of being courteous, which is culturally a desirable characteristic among many Indian Americans, may be perceived as a lack of assertiveness or adaptive functioning. Moreover, among South Asians more broadly, food and somatic complaints can communicate conflict and interpersonal distress. For example, a state of being upset with a loved one, “idioms of distress,” is usually expressed through refusal to eat or refusing to perform obligatory roles towards that person (Desai & Chaturvedi, 2017).

Relatedly, *stereotype threat* (Appel et al., 2015), a phenomenon that arises when individuals potentially confirm or satisfy a negative stereotype about a group to which they belong (e.g., thinking, “I am not good at taking tests,” could contribute to poorer test performance). Such implicit self-perceived stereotypes can impair cognitive performance as they can generate higher arousal, negative thinking, and anxiety, resulting in a larger cognitive load and reduced resources available to focus on the activities at hand.

During Ms. Patel's initial interview, she frequently looked at her daughter to confirm responses regarding her health and cognitive concerns. She was very cordial during assessment and often smiled at the examiner. Although no modifications were made to the test-taking process, the examiner frequently asked if Ms. Patel understood the instructions or had any follow-up questions before initiating the task. It was noted that she appeared anxious and looked at the examiner after every response in anticipation of feedback regarding her performance. Considering her interpersonal style, the examiner often provided reassurance and made every effort to minimize any test-taking anxiety.

Sociocultural Factors Among Indian Americans

Acculturation is a multidimensional process hinged on the parallels and distinctions between the cultural heritage and the host culture (Needham et al., 2017). The bimodal distribution of socioeconomic variables and range of cultural enclaves for Indian Americans underscores the multidimensionality of acculturation for both recent immigrants or long-term residents. Indian immigrants may encounter cultural and linguistic challenges, including differences in beliefs, attitudes, values, conventions, and behaviors, and possibly experience acculturation-related stress. Acculturation-related stress among Indian Americans can be compounded by economic instability, social isolation, or a sense of helplessness.

From a cultural perspective, while most Indian Americans have nuclear households, it is not unusual for grandparents, parents, and children to live together, mutually influence each other, and contribute to family values. Most Indian families try to pass on to their children what they consider to be traditional Indian values by encouraging participation in cultural/religious practices and marriages within the community. Traditionally, marriages in India were arranged by older family members as it was not customary for men and women to date.

Hence, it is likely that Ms. Patel's marriage was arranged by her parents and older adults of the family. She then moved to the United States around the age of 23 with her husband and had two children, both born in the US. She currently lives with her husband, her daughter, and her daughter's family. For Ms. Patel, living in a multi-generational household is not a firmly held but a preferred value.

Health Conditions in Indian Americans and Cognitive Consequences of COVID-19

The acculturation strategies people employ can have health and well-being consequences (Patel et al., 2012). Patel et al. (2012) outlined several barriers to health behavior changes among South Asians, including cultural identity and

priorities, and an explanatory model of disease, including body image, gender roles, and misconceptions about physical activity. For instance, there are well-established gender norms and expectations among immigrants from India, who have arrived in America even in recent decades. A male figure, traditionally a husband or a father, is often regarded as the head of the Indian American family, who usually makes critical decisions. In Indian American households, the dietary decisions are influenced by the head of the family's preferences, who may prefer to retain what are often considered to be traditional dietary patterns. Similar observations are noted regarding starting an exercise regimen or adopting preferred health habits. Sometimes, Indian American patient health-seeking beliefs and behaviors result in delays in receiving medical care due to religious and cultural notions of patience and ayurvedic practices, which could potentially have adverse patient outcomes. In some instances, embracing healthy eating habits, maintaining a workout routine, and performing self-care may be perceived by some Indian Americans as time away from familial responsibilities and distancing from Indian cultural roots.

According to Needham et al. (2017), Indian Americans who are either assimilated (i.e., are fully or partially assuming predominantly American values, beliefs, and behaviors) or integrated (i.e., equally accepting American and Indian values, beliefs, and behaviors) into the US culture tend to demonstrate better cardio-metabolic profiles (e.g., lower diabetes rates, BMI, triglycerides, and waist circumference) than those who are less acculturated. These findings show the impact of cultural beliefs and practices on health.

There's a dearth of quantitative and qualitative research exploring psychosocial and health outcomes in Indian Americans. Most of the available data on health conditions are obtained from the health records or grouped as 'other' or 'Asian' than epidemiological findings. For instance, a Northern California Kaiser study indicated that Asian Americans had the lowest rate of dementia compared to other racial or ethnic groups; however, Indian Americans were not recruited in the study, limiting understanding and generalizability of dementia characteristics for this group (Mayeda et al., 2016). Furthermore, lack of awareness regarding the exhibited symptoms of cognitive sequelae of health conditions and the stigma associated with a neurological deficit, often disguised by joint family structures, can limit an individual's ability to be referred to the neurological workup.

From a health perspective, Indian Americans have recently garnered some attention in the neuropsychological literature (Sunderaraman et al., 2021). Indian Americans have higher incidences of coronary artery disease, hypertension, dyslipidemia, and type II diabetes than other ethnic groups (Kanaya et al., 2014). Some of the risk factors outlined include acculturation, dietary habits (Garduño-Díaz & Khokhar, 2012), and physical inactivity (Patel et al., 2012;

Ye et al., 2009). Additionally, due to a sedentary lifestyle and fewer opportunities to engage in physical activities, middle-aged and older Indian Americans have a higher prevalence of obesity than East Asians (Patel et al., 2012).

Regarding COVID-19, recent studies have identified a significant COVID-19 burden on cognitive and psychiatric outcomes among Asian Americans (e.g., Kalyanaraman et al., 2022). Preexisting chronic health conditions are significant risk factors among Asian Americans for contracting COVID-19 (Wolff et al., 2021). The health effects of COVID-19 among ethnic groups, particularly Asian American subgroups, remains limited, primarily due to the lack of proper data collection and reporting and the aggregation of all Asian ethnic groups into a single race category. In a retrospective analysis conducted by Kalyanaraman et al. (2022) of 9,971 Asian American patients in New York, 48.2% were South Asian, who experienced substantial COVID-19 burden. Results across studies highlighted that obesity, diabetes, hypertension, and heart disease were prevalent preexisting health conditions among South Asians (e.g., Pareek et al., 2020).

The presence of health conditions, hypertension, and diabetes in Ms. Patel's situation likely increased her risk of testing positive for COVID-19. Beaud et al. (2021) highlighted that cognitive impairment can be observed among people recovering from acute respiratory distress syndrome post COVID-19. Although Ms. Patel was referred to neurology after having recovered from COVID-19 symptoms without needing acute respiratory care, her cognitive assessment revealed lower performance than expected on timed executive skills tasks, processing speed, visual perceptual skills, and attentional variability, which is in keeping with the results obtained in the Beaud et al. (2021) study. However, she did not demonstrate impairment in lexical fluency (timed task), although her scores were in the low average range. Ms. Patel's performance was also below average or impaired in reading, vocabulary, and naming tasks that increased in difficulty as the test continued, but it is worth noting that these findings are likely confounded by language-barrier considerations. Though the neuropsychological consequences of COVID-19 are not fully understood, the current understanding is that it may have a disproportionate impact on executive functioning, which appeared to be the case with Ms. Patel.

Neuropsychological weaknesses in the domains of attention and executive skills have been observed in individuals diagnosed with COVID-19, who were treated in the intensive care unit, along with compromised cognitive performance in the domains of visuospatial processing, memory, and language abilities among patients who received oxygen (Vanderlind et al., 2021). It is often challenging to chart neuropsychological profiles consequential to COVID-19 due to the paucity of literature on neuropsychological functioning

in COVID-19, demographic variability in patient samples, assessment techniques, and the time of cognitive evaluation post-diagnosis. However, further study of attention and executive skills is warranted, particularly investigations that include cultural considerations.

Mental Health Concerns in Indian Americans

It is well known that mood and stress-related disorders can impact cognition, including mimicking cognitive decline (pseudo-dementia) in older adults, and should be considered in a cognitive exam. The data on mental health concerns among Indian Americans are limited in the US due to under-reported symptoms and disparities in terminology, experience, and symptom management. From the symptom perspective, somatic problems rather than sadness or anhedonia are more commonly reported by Indian Americans (Chandra et al., 2016), especially among older women (Leung et al., 2011). For some Indian Americans, reluctance to seek psychological services, in part, could also be attributable to factors such as limited English proficiency, financial stress, reliance on conventional coping strategies (e.g., available social support), and conflict in the home, especially for those born in India (Chandra et al., 2016).

Trauma-related incidences among Indian Americans are generally underreported. Immigrants from India who encounter discrimination have been found to have a higher depression prevalence (e.g., Nadimpalli et al., 2017). While existing societal assumptions regarding mental health have been shifting recently, older individuals in particular often feel less comfortable sharing their problems with an unfamiliar person. Factors such as faith healing, prevalent stigmas, limited awareness regarding the nature of mental health symptoms, and skepticism about providers' understanding of patients' cultural nuances may be linked to the underreporting of symptoms among Indian Americans.

In Ms. Patel's case, she denied sleep difficulties or symptoms of depression but acknowledged increased anxiety and frustration around her COVID diagnosis during the initial interview. However, Ms. Patel's responses on self-report measures indicated moderate anxiety and mild depression symptoms. Knowing that depressive moods are often expressed through somatic complaints in South Asian women, she completed an additional measure of brief symptom inventory to obtain reliable information regarding somatic, depressive, and anxiety symptoms. On this measure, Ms. Patel endorsed only one item measuring recurring multiple and current complaints about health (somatic) concerns. As such, it was not possible to determine if her responses on this measure represented a true absence of symptomatology or if she underreported health concerns, given she described her health as a significant stressor in her life during her interview.

Clinical and Ethical Challenges

The need for developing a culturally and ethnically informed neuropsychological assessment paradigm for Indian Americans is attributable to the demographic shift in the US and, consequently, to the expansion of the field of neuropsychology. Increased immigration rates from India to the US in recent decades have impacted the country's health care system, including mental health and the practice of neuropsychology. There are several ethical considerations that, if not addressed, could result in a dilemma for neuropsychologists, especially those providing cross-cultural psychological services to Indian Americans. These concerns are compounded by serving a diverse clinical population with limited English proficiency. Just because someone was educated in an English medium school does not mean they have acquired the English language to the same degree as someone raised in the US. Indian Americans, mainly those who immigrated to the US in adulthood, may have been learning English but were speaking other languages at home, which can complicate the neuropsychological evaluation process.

To illustrate, Ms. Patel demonstrated adequate English conversational skills and preferred to be interviewed and assessed predominantly in English. While conversing, her expressive communication presented an accent reflective of her first spoken language. Before proceeding with a comprehensive neuropsychological assessment, she completed the Wide Range Achievement Test, Fourth Edition (WRAT-4; Jastak, 1984) Reading subtest, which estimates reading ability that is considerably resistant to neurological impairments, and the Wechsler Abbreviated Scale of Intelligence, Second Edition (WASI-II; Wechsler, 2011) Vocabulary subtest, which measures word knowledge. Ms. Patel's WRAT-4 Reading ability in English was equivalent to someone with 6.4 years of education. She scored below the average range on the English vocabulary test (WASI-II Vocabulary). Despite Ms. Patel's contention of "good" English language proficiency, her assessed abilities were in the below average range. Consequently, assumptions of "good" English language proficiency based on subjective reporting can lead to the misperception that language difficulties were consequential to pathology. This assessment information prompted the evaluator to combine objective and performance measures of English language proficiency to help determine if modifications from a standard neuropsychological assessment would be needed.

Nonetheless, acculturation continues to mediate test performance even after controlling for language differences (Puentes et al., 2013). Using evidence-based instruments standardized on English speakers with a high level of proficiency and largely of Western European descent

may result in higher than predicted false positive pathological findings for individuals from culturally and linguistically diverse backgrounds. Since normative data are not available for the commonly used neuropsychological assessment measures for the Indian American population, test bias may negatively impact the test performance, results, and interpretation. Test interpretation biases can be complicated by Indian American patients' unfamiliarity with items, concepts being tested, and the differences in the cognitive and communication style associated with sociocultural and educational factors (Kedare & Vispute, 2016). Critically exploring the role of cultural and ethnic variables from the examinee's perspective is crucial for neuropsychological assessments of ethnically diverse communities. For instance, some cultures value time differently than in most Western societies. Many South Asians are more concerned about the consequences of their behaviors than the speed with which a task is performed. This factor is of immense importance, especially for timed neuropsychological tasks.

In essence, service providers are recommended to be mindful of their ethical and moral obligations set forth by the American Psychological Association (2017), use best practices when providing cross-cultural neuropsychological services, and take extra measures to practice cultural competency and humility. It is also useful for the neuropsychologist to have a working understanding of the cultural values and morals of the specific ethnic groups with whom they are entering a professional relationship. First, they can become knowledgeable about recent challenges encountered in cultural practices and keep up with the literature. Second, since ethical knowledge and cultural awareness may not always translate into ethical practices, they can make conscious efforts to provide the best care possible to their culturally diverse clients. Third, they can seek consultation and supervision because some ethical dilemmas in neuropsychology may have no apparent solutions. Finally, the selection of specific assessments should be informed by considering the availability and suitability of language, norms, and standards of care for the specific cultural background. In theory, interpreters may be used if they are adequately trained in neuropsychological assessment; however, interpreters are a scarce resource. Nevertheless, such modifications/changes can be made in some cases with the caveat that when it comes to assessment, any deviations from the established procedure or test interpretation methods have ethical implications and need to be documented in the final report.

Evidence-Based Assessment and Practice Considerations

Given the linguistic diversity among Indian Americans, a crucial early consideration is establishing the language in

which testing will be conducted. In some cases, administering tests in English and using assessment tools developed and normed in the US may be sufficient, particularly for individuals born and raised in the US, those who immigrated at a relatively young age, or those who had the opportunities for early English language emersion in India (Sunderaraman et al., 2021). A patient's familiarity with either the standardized or formal testing process is also a critical concern when it comes to neuropsychological testing. This knowledge is crucial for gathering valid assessment data as the attitude towards testing may vary for someone who came to the US for the attainment of higher education and has demonstrated competitive performance on standardized tests versus an older individual who grew up in a rural region and was recommended for evaluation due to deteriorating adaptive functioning. In some situations, Indian American older adults may not know their completed education level or the month and date of their birth.

Several studies have demonstrated outcomes attributable to cultural differences and education—such as favorable outcomes for non-Hispanic White groups compared to racially and ethnically diverse samples tested for neuropsychological performance. These differences have been observed for intellectual functioning, visuospatial processes, memory, executive functioning, processing speed, and decision-making tasks (Puente et al., 2013). They are not necessarily attributable to the clinical diagnoses. For someone whose first language is not English, below-expected confrontational naming performance can result from the cognitive load of switching between two languages and may not actually represent processing speed or executive functioning difficulties. Linguistically diverse examinees likely think/contemplate in their preferred language, translate, and then provide a response that can negatively impact their performance on timed tasks. Assessment challenges are complicated by (1) a significantly high proportion of Non-Hispanic White neuropsychologists compared to the demographic representation of the population, (2) lack of appropriate tests, (3) restricted normative data, (4) limited cultural sensitivity for interpreting the obtained responses, and (5) difficulty understanding the task demand of some measures (e.g., Wisconsin Card Sort Test).

To obtain a comprehensive understanding of Ms. Patel's language acquisition, she additionally completed the Language Experience and Proficiency Questionnaire (LEAP-Q; Kaushanskaya et al., 2020), a validated tool for gathering self-reported language proficiency data from bilingual and multilingual speakers ages 14 to 80. On the LEAP-Q, she indicated English as her dominant language, while Gujarati rather than English was her preferred option for everyday reading, and Gujarati, Hindi, and then English were her preferred options for speaking socially. After her diagnosis of COVID-19, Ms. Patel endorsed word production and word-finding problems in all three languages to a relatively equal

degree. Based on this quantitative and qualitative data, Ms. Patel's language heterogeneity in speaking, reading, and writing, and preference for the English language for neuropsychological assessment, there was a strong possibility that poor performance on verbal tasks may over pathologize presenting symptoms given multilingual speakers can have difficulty with the academic and cognitive abilities that are embedded in the English language-based evaluation measures. Considering these factors, a modified neuropsychological assessment battery with less emphasis on English was utilized, even though she insisted that English was "now" her dominant language.

However, English-based measures could not be eliminated altogether. Measures that relied on English language abilities included auditory attention, verbal comprehension, phonemic and semantic fluency, and contextual verbal memory (story recall). Symptoms and mood checklists were self-report measures that also relied on her English language reading and comprehension abilities. Assessment of abilities that relied less on English were measures of sensory and motor functioning, visual attention, processing speed, visuospatial reasoning, and executive functioning abilities. Normative comparisons were made using data provided in manuals for associated tests and the Heaton Norms (Heaton et al., 2004) for motor speed tasks.

During the evaluation, attentional variability was observed, partly attributable to Ms. Patel's complaints of fatigue. Her visual and auditory attention were in the average range, but her auditory working memory was in the impaired range. Her information processing speed that relied on automatic psychomotor speed to rapidly sequence numbers and controlled speed for coding numbers to shapes also seemed to be compromised. Similarly, her reasoning ability was in the normal range, but mental flexibility (switching back and forth between two simultaneous processes) was slower than expected, indicating the possibility of a slower cognitive tempo. Comprehension and contextual verbal memory were in the average range.

Her performance on a rote verbal learning and memory measure was in the average range for both immediate and delayed recalls. However, verbal fluency for phonemic (words starting with specific letters) and semantic (naming animals) fluency was in the low average range, and so was rote visual learning and memory. According to the testing, her ability to identify and integrate visual details (visuospatial processing) seemed to be impaired. Similarly, her immediate recall of two short stories appeared to be compromised. Although her recall improved after a brief delay, she struggled to recognize story details among distractors. She also completed a symptom checklist endorsing mild depressive and moderate anxiety symptoms.

Overall, Ms. Patel demonstrated processing speed, sensory-motor, and visuospatial difficulties. Her slow speed was

thought to have interfered with performance on a test of mental flexibility and suboptimal sustained attention. Her level of English language proficiency likely contributed to her lower performance on language-heavy tasks. For example, Ms. Patel's ability to name objects (images) was in the below average range, and it did not improve when verbal prompts (phonemic cues) were provided to facilitate word recall, likely reflecting a lack of prior knowledge or familiarity. Despite limitations in her English language lexicon, her comprehension of simple and complex commands was in the typical range for her age. While little is known regarding the full effect of COVID-19 on cognition, given her medical history of hypertension and diabetes, findings indicate subcortical involvement consistent with mild to moderate ischemic disease burden exacerbated by new cerebellar involvement post COVID-19 infection.

Additionally, Ms. Patel's cultural identity and assimilation with the dominant culture were explored using the Mediators of Atherosclerosis in South Asians Living in America (MASALA; Kanaya et al., 2014) cultural traditions questionnaire, which captures commonly exercised cultural and religious practices, social interactions, and dietary patterns on a five-point Likert scale (from *Absolutely* to *Not at all*). This research instrument and its responses were only evaluated qualitatively to supplement the clinical interview and other sources of information to determine cultural identity. In a social context, Ms. Patel's social circle expands beyond her immediate and extended family as she equally interacts with people from Gujarati culture and occasionally with people from other ethnic backgrounds. Nevertheless, her peer group remains primarily Indian American. While Ms. Patel has assimilated into the dominant culture by adopting American attire, a stable source of income rather than being a homemaker, and attending Thanksgiving and Christmas gatherings, she remains committed to practicing ethnic, cultural, religious events, and dietary practices that are common to many Indian Americans. As such, Ms. Patel has integrated US customs as a part of her socialization while her spirituality, values, beliefs, and behaviors remain deeply rooted in Hinduism. She also reports believing in the healing qualities of using spices and herbs (e.g., basil, mint, ginger, honey, turmeric, etc.) for health and healing purposes (Ayurveda).

There are no explicit guidelines for appropriate test selection for bilingual and multilingual patients. However, utilizing instruments such as the LEAP-Q (Marian et al., 2007) and MASALA Cultural Traditions Questionnaire (Kanaya et al., 2014) can better inform the interpretation of the assessment results and provide context to some of the identified areas that can otherwise invalidate the evaluation if conventional assessment practices are followed. Of note, the MASALA measure mostly captures individuals who identify with Hindu and Sikh religious values and may not accurately estimate cultural beliefs in other South Asian populations

or those with different religious preferences. As such, this instrument has not yet been validated for clinical use; more research is needed to develop culturally sensitive tools.

Efforts have been made to validate a few standardized neuropsychological assessment instruments, such as the Mini-Mental Status Exam (MMSE), for Indian Americans. Although not utilized for Ms. Patel's care, MMSE is adapted in several Indian dialects such as Hindi, Kannada, Malayalam, Marathi, Telugu, Urdu, and Gujarati (Lindesay et al., 1997). Other adapted or translated neuropsychological measures (e.g., Montreal Cognitive Assessment [MoCA]; Nasreddine et al., 2005) are available in Hindi and several other languages spoken by Indian Americans. However, such decisions must be made with caution, and measure selection should be made while keeping participants' proximity to representativeness in the available norm data (see Table 1 for key clinical considerations). In any case, practitioners are expected to utilize best practices in providing patient care and engage in continuing education opportunities to familiarize themselves with recent advances in cultural neuropsychology.

Conclusions and Lessons Learned Relating to the Vignette

Ms. Patel self-identified as a good English language speaker. Her low performance on reading and vocabulary measures could have been wrongfully interpreted had her language and acculturation factors not been considered.

Ms. Patel's responses on a measure of language preference and culture-specific questions during the clinical interview provided valuable insight into her degree of acculturation. She firmly retained and practiced her core religious and cultural values and ethnic identity while adapting to Western society's social intricacies and language complexities. Her neuropsychological evaluation sensitively considered factors such as her immigration history, education, age, and occupation in conceptualizing her case, selecting assessment measures, and evaluating and interpreting test results.

Even though the significance of culturally informed neuropsychological assessment has been emphasized recently, there is little specific advice on how to conduct such an evaluation for Indian Americans. A comprehensive clinical interview, when possible, is desirable for a thorough neuropsychological evaluation. Although permissible, translators and interpreters can significantly and negatively impact the validity of the obtained data. Thus, it is advisable to refer patients to neuropsychologists who speak the most appropriate language when possible. From a best practices perspective, an extensive review of academic achievement, testing history, and medical records, when available, may be warranted. Even when this additional information is available, it is crucial to factor in the reliability of such records. Hence, it is advantageous for the evaluator to examine a range of factors when estimating premorbid functioning. Last, cultural competence is imperative, and the neuropsychologist may need to seek appropriate cultural consultation or refer to another professional based on the needs of the patient.

Table 1 Clinical Considerations for Conducting Neuropsychological Assessments for Indian Americans

Diversity Dimensions	Assessment Considerations
Migration History	Migration and acculturation stress and cultural trauma experiences can have significant repercussions for immigrants. The time and circumstances of immigration can differently influence a patient's racial identity, educational level, and economic possibilities
Acculturation	The level of acculturation can vary individually and needs to be assessed before the evaluation process to facilitate comprehensive conceptualization and selection of appropriate assessment measures
Language	Functional knowledge of English for immigrants who did not grow up in the US may do poorly on vocabulary despite demonstrating adequate communication skills. Evaluators ought to decide if an interpreter is needed or if an evaluation in English would be appropriate
Socioeconomic factors	Financial stability and cognitive development are positively associated. The notion of economic stability is mistakenly generalized (stereotyped) to all Indian Americans. Relatedly, the level and quality of education earlier in the development years need to be explored
Interaction Style	Cultural values dictate establishing an interpersonal connection with the examiner and engaging in a friendly dialogue which can be misperceived as a lack of motivation or poor effort
Gender Roles	Strongly defined traditional gender roles and gender-driven stereotype threats can negatively impact performance. Stereotype threats can also put cognitive demands on executive functioning by increasing stress
Concept of Time	Older adults may demonstrate a laid-back style of performance. A sense of urgency and expectation to perform "as fast as you can" can likely create anxiety, impacting testing performance
Premorbid functioning	Usually minimized and undiagnosed, widely used estimates of premorbid functioning can be impacted by the quality of education, internalized stereotypes, and level of acculturation
Testing	Utilizing a flexible battery that includes a variety of tests (i.e., the "battery") based on the patient's presenting symptoms can provide a more accurate assessment of the patient's condition than a fixed battery

Rather than using a fixed or “usual battery” approach, culturally sensitive neuropsychological assessments for Indian Americans and other diverse groups should involve selecting tests relevant to the referral question and patient factors. Additionally, when utilized in conjunction with a comprehensive clinical interview, acculturation measures may provide meaningful information regarding premorbid functioning, quality of education, level of comfort with the English language, work history, culturally relevant interpersonal dynamics, and social factors. There is no concrete guidance on how acculturation factors should be incorporated in neuropsychological evaluations; however, care should be exercised when assessing an Indian American client to avoid a “one size fits all” approach to case conceptualization.

Key Clinical Considerations (Take-Home Points for Clinicians)

1. Below average or impaired performance may be misattributed as neurocognitive sequelae of a neurological or medical condition such as COVID-19. Knowledge about the client’s culture, education, and baseline linguistic abilities can improve the interpretive process of the obtained findings.
2. It is imperative to be mindful of (a) the examinee’s language preference for assessment, (b) whether any measures in the examinee’s preferred language are available at the clinic along with the normative data for scoring, (c) the examiner’s language fluency in the examinee’s preferred language and comfort with such measures, and (d) a balance between the use of standardized assessment procedures and good clinical practices.
3. Assess the examinee’s familiarity and expectations about neuropsychological testing and work to help the examinee understand the task demands and instructions before starting every test. Provide an opportunity to ask questions after delivering test instructions and obtain feedback about the testing experience.
4. Measures that rely heavily on knowledge of American history and US cultural norms should be minimized.
5. The use of language abilities and acculturation measures can enhance clinical judgment during routine clinical examinations for ethnic minorities facilitated by their bio-psycho-socio-cultural history that captures the examinee’s acculturation level.
6. As part of an integrative evaluation report, include findings corroborated by collateral and contextual information when possible to help provide concrete recommendations that are culturally tailored and easy to incorporate into daily practices.

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Declarations

Conflict of Interest The authors report no conflict of interest.

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