Patterns of American Immigration and Their Influence on the Acquisition of Neuropsychological Norms for Hispanics

Antolin M. Llorente
Baylor College of Medicine, Texas Children’s Hospital, and University of California Los Angeles School of Medicine

Marcel O. Pontón
University of California Los Angeles School of Medicine

I. Maribel Taussig
University of Southern California

Paul Satz
University of California Los Angeles School of Medicine

This article examines patterns of legal American immigration (migrations to the United States from abroad) and their direct impact on the acquisition of neuropsychological (NP) normative data for Hispanics. The nonrandom and selective nature of these migrations, and their accompanying demographic attributes, are shown to significantly influence the acquisition process. Specifically, the direct impact of several potential sources of bias while procuring NP norms is explored. Total number of immigrants (absolute immigration), occupational allegiance (and possibly education), and intended area of initial residence seem to play influential roles as a result of their direct impact on demographic characteristics known to have significant

Portions of this work were presented at the 105th Annual Convention of the American Psychological Association in August 1997.

This research was supported in part by a grant from the UCLA CIRID-Fogarty AIDS International Foundation #TW00003-07 to Antolin M. Llorente. The authors would like to express their sincere thanks to Professor Nora Hamilton, Department of Political Science, University of Southern California for her guidance and assistance researching American migratory patterns and for her suggestions on a preliminary draft of this manuscript. The authors also wish to express their gratitude to Johnette Clark, Ph.D. and Professors Vicki Green, Department of Psychology, University of Northern Arizona and Julia Hannay, Department of Clinical Psychology, University of Houston for their helpful comments on earlier drafts of this monograph. We also like to thank the staffs at the University of California, Los Angeles (UCLA), University Research Library (URL, Government Documents Division) and the City of Houston Public Library (Downtown Branch, Government Documents and Humanities Sections) for their assistance in locating immigration information.

Address correspondence to: Antolin M. Llorente, PhD, Baylor College of Medicine, One Baylor Plaza, Houston, Texas 77030.
Clinical and experimental neuropsychology rely largely on the norm-referenced approach to interpret assessment results. This approach to assessment interpretation depends on the development of quantitative indices, collectively referred to as normative comparison standards or norms (Lezak, 1995). These indices serve as reference when comparing the performance of a single individual with that of the normative group to judge the performance of the former against the backdrop of the standardization cohort. The information derived from these comparisons afford statistical and clinical inferences regarding brain-behavior relationships.

Equally important are the psychometric properties of an assessment instrument and the valid and reliable inferences that can be drawn from them, both of which are partially and dynamically influenced by the characteristics of the subject population (normative sample) used to derive normative information (Franzen, 1989). Selective biases encroaching upon the acquisition of neuropsychological norms limit the utility of these comparison standards by restricting the number and type of valid inferences that can be devised from them. For example, when normative data are ascertained through a demographically restricted or otherwise biased sample, the information obtained from this limited group most likely will not represent the population under investigation, thus limiting the inferential process.

Consequently, a phenomenon capable of influencing the procurement of NP norms most likely would have significant consequences for neuropsychology. American immigration patterns are such a phenomena as they indirectly influence the acquisition of normative standards for Hispanics in the United States (U.S.) (Llorente, 1997). These influences are, partially, the indirect effect of migration patterns and their demographic characteristics on the availability of adequate and suitable reference groups. Be they the result of educational attainment, socioeconomic status, or a confluence of these and other variables associated with selective configurational patterns of immigrants secondary to nonrandom migratory causes (e.g., sociopolitical, etc.), demographically biased samples indirectly impact the norm acquisition process for various Hispanic groups.

This manuscript examines legal immigration patterns from abroad to the U.S. over the last six decades for several Hispano-American countries while addressing the impact of their migration patterns on the process of acquiring neuropsychological norms. Although several issues impacting norm acquisition for Hispanic groups could be addressed in this manuscript (e.g., acculturation, language [bilingualism], definitions of ethnicity, etc.) because they are intrinsically interwoven with the process of migration, the present paper focuses primarily upon the latter process proper and its direct impact on the procurement

---

1Ethnicity is actually a difficult issue to address due to the confusion that has existed regarding this concept and the misrepresentations of this notion not only by lay people but by government agencies alike. For example, the mainstream caricatures of Asians do not allow to take into consideration “ethnic” differences between Japanese, Korean, Chinese, Hawaiians or other Pacific Islanders. Similarly, the mislabeling of “ethnicity” with country of origin or ancestry as labeled by the U.S. Census Bureau compounds and complicates this issue further. Ethnicity is a dynamic and evolving concept. A better understanding of this notion will be developed with the help of psychological anthropology (see Marin & Marin, 1991 for a more in-depth review of this topic).
of valid and reliable norms for Hispanics. Other pertinent issues (e.g., level of acculturation, bilingualism, use of translators or translated tests, etc.) have been previously addressed by other investigators (cf. Ardila, 1993; Ardila, Rosselli & Puente, 1994; Gordon, 1980; Laosa, 1984; Marin & Marin, 1991; Paradis, 1978; Pontón et al., 1996; Pontón, 1994).

AMERICAN IMMIGRATION PATTERNS

A review of the literature and records of migrational patterns reveals that American immigration (migration from foreign countries to the U.S.) is not the result of chance processes (Hamilton & Chinchilla, 1991; Portes & Rumbaut, 1990; U.S. Immigration and Naturalization Service, 1991). In fact, according to Portes and Borocsz (1989), there are multiple determinants, including nonrandom causation (e.g., governmental policies), impinging upon international migrational patterns that affect American immigration characteristics (cf. Portes & Rumbaut, 1990). The nonrandom nature of migratory patterns is the result of selective factors associated with both the sending and host countries (Portes and Rumbaut, 1990). For example, according to Garcia (1981), the U.S. government has had in the past arbitrary immigrations aims. Portes and Rumbaut (1990) place partial responsibility on the immigration laws of the host country as the impetus for these migrations. In this regard, the 1990 Statistical Yearbook of the Immigration and Naturalization Service (U.S. Immigration and Naturalization Service, 1991) states that “country specific quotas were eliminated in 1965” and replaced by a new emphasis to create quotas “based in part on humanitarian concerns.” According to this Statistical Yearbook, the “shift from European to Asian and Latin American immigration reversed the pattern that characterized U.S. immigration for 200 years.”

Figure 1 depicts the total number of legal immigrants entering the U.S. from 1901 to 1990. Perusal of this figure shows a great deal of variability in the amount of immigrants

allowed into the U.S. A detailed examination of American immigration patterns, coupled with perusal of this figure, reveal distinct migratory patterns for each country of origin and their associated demographic variables across time. Although the causes for the varying migrations from nation to nation and intra-country do not alter the conclusions presented below, it is evident from historical records that their migrations have had contrasting causes at various points in time. The various etiologies for migration to the U.S. are most likely responsible for their distinct migratory characteristics. Whereas famine may have been partly responsible for large scale migrations from Ireland during the 1840–1860s (Blum, Catton, Morgan, Schlesinger, Stampp & Woodward, 1968), forcing a large portion of this country’s population to settle in other countries, including the U.S., Jewish and Cuban migrations to the U.S. during World War II and the Cold War Era, respectively, occurred partly as a result of fleeing totalitarian governments. American immigration laws and foreign policies also played a major role in the large scale migrations from these countries to the U.S. In fact, there have been other countries that suffered from similar famines or totalitarian regimes, yet the U.S. government did not seek large migrations from such countries. Despite their distinct migratory causes and time of occurrences, their patterns of immigration are similar in the sense that they all are large-scale migrations representing a large cross-section of their native population. In contrast, immigration from Japan and Costa Rica to the U.S. has been historically more limited and restricted for various reasons (particularly during the WWII era in the case of Japanese migrations). Nevertheless, one would expect the immigration patterns from the first three sovereign states to be quite discrepant demographically from the latter two during the various time periods discussed.

American immigration records over the last six decades (1931–1990) for several Latin American countries are now briefly examined. This analysis reveals sharp discrepancies in demographic characteristics between these groups of immigrants (U.S. Immigration and Naturalization Service, 1975, 1981, 1991).

Absolute Number of Immigrants

Table 1 depicts the number of legal immigrants entering the U.S. by decades between 1931 and 1990 for Argentina, Cuba and Mexico. Whereas the total number of immigrants from Mexico surpassed 3 million during the past sixty years, peaking at approximately 1.5 million between 1981 and 1990, the total number of Cuban immigrants only

<table>
<thead>
<tr>
<th>Decade</th>
<th>Argentina</th>
<th>Cuba</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>1931–1940</td>
<td>1,349</td>
<td>9,575</td>
<td>22,319</td>
</tr>
<tr>
<td>1941–1950</td>
<td>3,338</td>
<td>26,313</td>
<td>60,589</td>
</tr>
<tr>
<td>1951–1960</td>
<td>19,486</td>
<td>78,948</td>
<td>299,811</td>
</tr>
<tr>
<td>1971–1980</td>
<td>29,897</td>
<td>264,863</td>
<td>640,294</td>
</tr>
<tr>
<td>1981–1990</td>
<td>27,327</td>
<td>144,578</td>
<td>1,655,843</td>
</tr>
</tbody>
</table>

reached a total of 732,809 during the same period, peaking at approximately 264,000 during the 1970s through 1980. During the same time-span, migration from Argentina to the U.S. reached a total of approximately 131,000 immigrants, climaxing between 1961 and 1970 at approximately 49,000 individuals. The total number of Argentinean immigrants is approximately twenty-four times less than the number of Mexican immigrants and approximately six times less than the number of Cubans immigrating to the U.S. over the same period. The total number of Cuban immigrants is also four times less than the total number of Mexican immigrants during the same six decades. Sharp discrepancies in the total number of immigrants similar to those observed for these three countries were also apparent for other countries across the same period of time (U.S. Immigration and Naturalization Service, 1991).

A chi-square analysis was conducted to test whether the absolute number of immigrants from each country differed statistically for the three countries and across the six decades under investigation. This analysis reached statistical significance ($\chi^2(10) = 304,573; p < .0001$). The distribution of absolute number of immigrants changed over time and for each country.

Finally, an analysis examining the proportion of absolute number of immigrants for three decades relative to the total population of each country at the end of those decades was also conducted for 1970, 1980, and 1990. This analysis also revealed significant differences between the three countries under scrutiny. In 1970, Cuba had a total population of approximately 264,863 or 3% of its population. In contrast, Argentina had a total estimated population of 24,352,000 inhabitants and a migration to the U.S. of 49,721 (.2%) while Mexico had a population of 48,313,438 and an American immigration of 453,937 or .9% of its population. In 1980, Cuba had a total estimated population of 9,980,000 inhabitants and a U.S. migration of 264,863 individuals, a total of 2.6% of that country’s population. Argentina had a total population of 27,300,000 and immigrants of 29,893 or .1% of its population whereas Mexico’s immigration ratio was .9% of its total number of inhabitants (total U.S. immigration, 1971–1980 = 640,294/total estimated population, 1980 = 71,910,000). In 1990, the ratios for Argentina, Cuba, and Mexico were .1%, 1.3%, and 1.8% respectively. Therefore, in terms of proportions of immigrants relative to each country’s total population, Cuban immigration reached its peak during the decade between the 1970s and 1980 with decreasing American immigration during the last decade while Mexico’s immigration to the U.S. has been steadily increasing during the same period. In contrast, Argentinean migrations to the U.S. have remained relatively low and constant over the last three decades.

**Occupational Status**

Figure 2 shows the occupational allegiance of legal immigrants entering the U.S. from 1976 to 1990. These data indicate that the various occupational categories for legal immigrants during those two decades were not proportionally represented. The disproportionate occupational representation of Hispanics is much more pronounced relative to total U.S. migration as depicted in Figure 2.

These data are presented in Table 2. This table tabulates the ‘occupational group allegiance’ for Hispanic legal immigrants during the year 1990 for the same three Hispanic-American nations. It is clear from these data that the occupational (and most likely educational) levels of these three migrational groups were substantially different. Whereas Mexican immigrants reporting occupation were primarily classified under Operator/Fabricator, Farming/Forestry and Service classifications, with few immigrants from the
Executive/Managerial, Sales, and Administrative Support sectors, Argentinean and Cuban immigrants reporting occupational status showed greater diversity. Specifically, Argentinean and Cuban immigrants proportionally represented the entire occupational spectrum including those from the Professional/Technical (except for Cuba), Executive/Managerial, Sales, Administrative Support, Precision Craft and all other occupational

TABLE 2
Percentage of Total Legal Immigration and Their Reported Occupational Allegiance at Time of U.S. Entry for 1990*

<table>
<thead>
<tr>
<th>Occupation</th>
<th>Argentina</th>
<th>Cuba</th>
<th>Mexico</th>
</tr>
</thead>
<tbody>
<tr>
<td>Professional/Technical</td>
<td>9.2</td>
<td>4.0</td>
<td>8.8</td>
</tr>
<tr>
<td>Executive/Managerial</td>
<td>7.9</td>
<td>1.7</td>
<td>1.4</td>
</tr>
<tr>
<td>Sales</td>
<td>3.6</td>
<td>2.6</td>
<td>1.7</td>
</tr>
<tr>
<td>Administrative Support</td>
<td>6.5</td>
<td>4.0</td>
<td>2.7</td>
</tr>
<tr>
<td>Precision/Craft</td>
<td>8.1</td>
<td>7.7</td>
<td>9.2</td>
</tr>
<tr>
<td>Operator/Fabricator</td>
<td>6.7</td>
<td>16.2</td>
<td>24.0</td>
</tr>
<tr>
<td>Farming/Forestry</td>
<td>.5</td>
<td>.4</td>
<td>12.0</td>
</tr>
<tr>
<td>Service</td>
<td>10.2</td>
<td>10.6</td>
<td>17.4</td>
</tr>
</tbody>
</table>

*Excludes immigrants not reporting occupation (e.g., children).
ranks. Immigrants from Argentina comprised the most proportional representation across all occupational categories relative to the two other countries and to the size of their respective migrations.

Similar data to that presented above for occupational allegiance were obtained when examining (randomly selected) this demographic both 10 and 21 years earlier. Therefore, the patterns observed in 1980 and 1974 were similar to those seen in 1990 (U.S. Immigration and Naturalization Service, 1975, 1981). These findings suggest that the configuration of immigration as it relates to occupational status (and possibly education) for these three nations are indeed vastly different. In addition, these data suggest that these countries have been differentially targeted for decades by the U.S. government to satisfy occupational manpower needs. This selective recruitment is partly responsible for their demographic differences as it relates to occupational status (cf. Portes & Rumbaut, 1990 for specific U.S. government recruitment aims for Mexican nationals as it relates to occupational allegiance).

To determine whether statistical differences existed in reported occupational allegiance for the three countries under study for the year 1990, a chi-square analysis was conducted. This analysis revealed statistically significant differences ($\chi^2(14) = 29.75; p < .01$). Whereas Argentinean and Cuban immigrants reported occupational allegiance in 1990 from across the entire occupational spectrum within the range of expectation with under-representation in the Farming/Forestry category, Mexican immigrants have been under-represented for most occupational categories in the same year, except for Farming/Forestry category where they were over-represented at twice the rate of expectation. Therefore, regardless of the cause for the differences in reported occupational allegiance, it is clear from these data that discrepancies do exist in occupational allegiance and possibly educational attainment. It is also important to recognize that in addition to discrepancies between Hispano-American countries, significant differences also exist in Hispanic migrations relative to the occupational allegiance of the total number of immigrants allowed into the U.S.

**Residential Preference**

Table 3 depicts graphically the number of legal immigrants admitted to this country from Ecuador, Cuba and Mexico for the year 1990 and their intended area of initial residence for several metropolitan areas. Perusal of these data reveals that immigrants tend have circumscribed preference for certain geographical areas within the U.S. Whereas 34% of Mexican immigrants during 1990 reported Los Angeles, California as their initial intended residence, only 2.5% and 8.8% of immigrants from Cuba and Ecuador, respectively, reported this metropolitan city as their intended initial residence. In sharp contrast, 72% of Cuban immigrants reported Miami, Florida as their intended residence for the year 1990, whereas only 3.7% of immigrants from Ecuador and .2% of immigrants from Mexico reported this city as their intended initial area of residence (U.S. Immigration and Naturalization Service, 1991). Strikingly discrepant patterns of migration were not only observed for other major metropolitan cities as depicted in Table 3 for immigrants from these three countries, they were also present for immigrants from other countries and all other years under investigation randomly selected as part of this study as well (e.g., 1980 and 1974). Thus, it seems that certain groups of immigrants have his-

---

2 Ecuador was chosen for this comparison in lieu of Argentina due to the unavailability of these records for the latter country. It is hoped that the reader does not interpret the exchange in country as implying that their data are interchangeable.
torically selected specific metropolitan areas of residence different from those chosen by other groups of immigrants (Portes & Rumbaut, 1990).

In summary, based on the migrational data presented above, several tentative conclusions can be drawn. First, the total number of immigrants (absolute migration) to the U.S. from abroad varies substantially for each country and fluctuates over time for each nation as a result of variables affecting both the host and sending states. Therefore, migrational patterns must be considered dynamic nonrandom processes that oscillate over time as a result of selective factors. The variability of these patterns of immigration may be the result of various social, political, and economic factors affecting all countries sharing migrations (i.e., the host and the sending country). Second, the range of occupational status of foreign immigrants also varies extensively between nations regardless of the total size of their migration. This variation may be, among other factors, the result of selective recruitment policies or similar nonrandom variables adopted by the host country to satisfy certain of its unmet occupational classification requirements (cf. Garcia, 1981 and Portes & Rumbaut, 1990). For this reason, occupational allegiance from immigrants entering the U.S. can not be assumed to be random as a certain degree of selectivity for specific vocational groups was observed for some nations. Instead, nonrandom shifts in the occupational choice of immigrants from foreign countries should be expected longitudinally including the occupational choice of immigrants from the same country. Finally, a great deal of selective preference for certain geographical/residential areas was observed for most immigrant groups across the time span under investigation.

These findings are important from a neuropsychological viewpoint. They suggest that norms acquired in the U.S. for certain minority groups may represent their respective country of origin with more accuracy than others, if anything, as a result of varying demographic characteristics. All other variables being equal, norms ascertained from individuals living in the U.S. whose countries of origin are cross-sectionally represented in the U.S. would probably make for a more valid inferential tool assuming this is the desired goal.³

³ This is a very important issue to neuropsychology because it relates to the definitions of populations and applications of normative data for Hispanics. On the one hand, do we want our norms to be representative of the population of the country of origin or do we prefer our norms to be appropriate representations of American-born individuals of foreign ancestors living in the U.S.? It is clear that this issue is closely associated with acculturation level and that the latter is inextricably associated with the acquisition process.
AMERICAN MIGRATORY PATTERNS AND THEIR IMPACT ON THE ACQUISITION OF NEUROPSYCHOLOGICAL NORMS

Although recent work has appropriately suggested that current “large-scale migrations” provide a rich source for psychological research with these populations (Rogler, 1994), research and norm acquisition opportunities with these groups, are not available free from potential biases. A host of potential confounds could bias research findings invalidating the neuropsychological norm acquisition process. Three of these potential sources of bias are subsequently reviewed while addressing the demographic characteristics of the Hispanic groups previously discussed. Potential confounds that may arise as a result of ignoring these inherent migrational biases are also reviewed.

Potential Confounds Associated With Demographic Characteristics

The profound effects of several demographic variables including age and education on neuropsychological performance are well established in the literature (Adams, Boake & Crain, 1982; Ardila, 1993; Ardila, Rosselli, & Rosas, 1989; Heaton, Grant & Matthews, 1986). Therefore, a neuropsychological performance comparison between a subject and a normative cohort differing in educational attainment would be inappropriate in certain circumstances. This issue is best exemplified with Hispanic populations by research recently conducted by Ponton and his associates (1996). This investigation demonstrated, as part of a normative study with neuropsychological measures for Hispanics, the impact of educational attainment on neuropsychological performance. In their sample, individuals of similar age attained higher levels of performance on measures assessing neuropsychological functions as a result of greater educational attainment across all groups of Hispanics. In the same vein, Rey, Feldman, Rivas-Vazquez, Levin, and Benton (1999, this issue), while conducting research to develop psychological instruments for Hispanics, have shown that differences exist among Cuban, Mexican, and Puerto Rican normative samples in Dade County, Florida with regard to their level of neuropsychological performance. Although at first glance the differences between these three seemingly similar Hispanic groups could have been attributed to differences in brain functions, a closer look at the demographic characteristics of the samples revealed selection biases associated with lower levels of education in the Mexican and Puerto Rican cohorts available in Dade County, Florida relative to the Cuban cohort. When subjects were matched on age, gender and education, the discrepancies in neuropsychological performance disappeared.

Therefore, potential confounds associated with certain demographic characteristics must be monitored to avoid the introduction of these putative sources of systematic error from entering the norm acquisition process with Hispanics. These potential sources of error especially apply to age, education, occupation, acculturation, and other regional differences.

Potential Confounds Associated With Site Selection Biases

It is a well known fact that standardization populations differ according to region (Anastasi, 1988; Ponton et al., 1996). These differences are probably accentuated for certain Hispanic groups as a result of their tendency to reside in circumscribed geographical regions within the U.S. This issue is best depicted by the intended area of initial residence data presented earlier in Table 3. The figures presented relating to this variable revealed large residential affinity discrepancies for the three groups of immigrants ex-
amined. Other minority groups (e.g., Asians) revealed similar patterns for 1990 and across the six decades studied. These findings are significant for neuropsychology because they suggest that differential geographic migrational patterns and predilection for certain residential areas may have a substantial impact on the collection and subsequent application of neuropsychological norms for Hispanics (cf. Rey et al., 1999). Despite the many ramifications of this potential confound, only the impact of site selection bias as it relates to the acquisition of neuropsychological norms will be briefly reviewed.

Neuropsychological data has traditionally been collected in academic and medical centers in or near metropolitan areas around the U.S. where the majority of neuropsychologists reside and conduct research with urban Hispanic populations. Although keeping in mind that the observed pattern of Mexican migration has been historically typical of that observed during the year depicted by Table 3 (1990), it suggests that neuropsychological data collected in Dade County, Florida, by its very nature, will most likely under-represent individuals from Mexico or Mexican foreign nationals living in the U.S. due to their limited number at this geographical site. Consequently, unless procedures are established during the collection of norms in Miami, Florida to preclude biases from entering into the acquisition process, such procurement could very well result in invalid inferences were the norms to be applied at a later date with individuals of Mexican origin in Los Angeles, California. In Los Angeles, individuals from Mexico or Mexican ancestry comprise the largest Hispanic group. Therefore, Hispanic patients and research populations are most likely to come from this cohort. The obverse is also possible. Normative data ascertained in Los Angeles, where the prevalent Hispanic population is of Mexican background would probably not be representative of Argentinean, Cuban or Ecuadorian populations, not readily available to researchers at this site.

Site selection bias also has significant implications when making inferences about Hispanic populations living in the U.S. on the basis of foreign norms. As depicted by the migrational data, most populations in the U.S. from foreign countries, or foreign nationals, are not represented cross-sectionally in the U.S. Therefore, when foreign norms do not represent individuals in the U.S. (or even individuals from that country living in the U.S.), the accuracy of the inferences made on the basis of those norms may be compromised due to their lack of validity.

In summary, it should be recognized that Hispanic populations tend to display preferential geographical affinity in the U.S. and that this geographical predilection may impact their acculturation to American culture (e.g., limit their exposure to American customs and language, etc.). This factor alone will inevitably influence the acquisition process as previously noted.

Potential Confounds Associated with Interaction Between Various Demographic Variables

Education and geographical region most probably interact with other demographic characteristics (modulated by migrations) to create specific patterns of neuropsychological performance captured through the normative process. For example, although Cuban populations may be available to researchers in Dade County, Florida different levels of acculturation may lead, as a result of poor sampling or other factors, to a poor representation of this Hispanic group regardless of the number of subjects comprising the normative cohort. Therefore, other potential confounds such as level of acculturation (Marin & Marin, 1991), interacting with demographic characteristics known to impact neuropsychological performance (Heaton et al., 1986), may play a moderating role in the acquisition process.
CONCLUDING REMARKS

Although the effects of certain demographic variables have been known to significantly affect neuropsychological performance (c.f., Heaton et al., 1986; Satz, 1993), the causes for demographic differences have not been well researched, especially among Hispanics. For this reason, the present manuscript examined a plausible candidate capable of modulating demographic variables, namely, American immigration patterns.

Examination of the migration process revealed nonrandom, shifting, selective, and dynamic mechanisms affecting patterns of American immigration. Regardless of the causes for the nonrandom nature of immigration (e.g., economic, immigration laws of the host country), absolute migration to this country was observed to vary dramatically. Fluctuations over time for migrations within the same country of origin were also evidenced. Similarly, the occupational affiliation of immigrants from foreign nations to the U.S. varied extensively. More important, occupational status and possibly educational attainment differed significantly from one country to the next and within the same nation over time independent of absolute migration. Finally, substantial preference for certain geographical regions within the U.S. was observed for most immigrant groups across time.

The current results have significant implications for neuropsychology. They suggest that migrational patterns are capable of modulating demographic characteristics, partly infringing upon the acquisition of norms for Hispanics. This infringement could possibly bias normative data and their application (e.g., assessment or rehabilitation results). Such biases could potentially invalidate studies comparing intellectual functioning in research participants or patients between sites. Similarly, such selective factors could potentially render invalid research comparing Hispanic groups at the same or different sites.

These results also argue in favor of comparing a Hispanic individual’s performance with multiple normative data sets, especially to those with similar demographic characteristics as that of the individual undergoing evaluation or rehabilitation. The present results additionally support an assessment posture favoring the use of longitudinal assessment. This type of assessment allows the subject undergoing evaluation to serve as his/her own baseline, thus reducing reliance on the nomothetic approach.

The present findings also have implications for private and governmental bodies responsible for the development of policies funding neuropsychological research. For example, the geographical predilection of certain Hispanic groups for select metropolitan areas suggest that funded attempts to acquire norms for Hispanics should be conducted at several centers throughout the U.S. Multicenter acquisition would allow for proportional stratification according to the latest U.S. Census Bureau data with full representation of specific groups of Hispanics.

The current results buttress the need for the development of standards and guidelines for the appropriate acquisition of normative data for minority groups. Future normative studies with Hispanics should be required to describe in more detail their research cohorts while alerting potential users of their possible shortcomings and possible misapplication(s). In addition to information historically critical to normative data sets in neuropsychology (age, education [parental education in the case of children], gender, lateralization, medical criteria, sample size, etc.), norms for Hispanic populations should minimally report the level of acculturation of the sample, location of data collection, language fluency, and broad stratification information of the sample.

Finally, these results place limitations on the assumptions neuropsychologists may be able to make when using normative data sets for Hispanics. For example, it would be erroneous for neuropsychologists to assume that norms ascertained in one geographical region of the U.S., or in a foreign country, would be applicable to individuals (and inter-
changeable with norms) from other geographical areas in the U.S. solely because the normative cohort was predominantly similar (e.g., Hispanic) as that of the Hispanic individual undergoing assessment.

Despite these caveats, Hispanics offer numerous and unique research and clinical opportunities (cf. Rogler, 1994). These groups represent a source of unsurpassed wealth in terms of their potential contributions to a broad and comprehensive science of brain-behavior relationships.

REFERENCES


