Professional Psychology: Research and Practice
1993, Vol. 24, No. 1, 100-106

0735-7028/93/$3.00

The Professional/Technician Model in Clinical Neuropsychology: Deployment Characteristics and Practice Issues

John W. DeLuca and Steven H. Putnam

The use of the professional/technician model or, more specifically, the laboratory method in clinical psychology and clinical neuropsychology, dates back to the 1940s. The advantages of this method are thought to include objective data collection, more efficient use of the psychologist's time, and cost-effectiveness. This article investigates some of the characteristics of technician deployment, including an analysis of differential practices of neuropsychologists using technicians versus those who do not, along with a demonstration of the efficiency and cost-effectiveness of the professional/technician model. The results indicate that the use of technicians by neuropsychologists continues to be widespread, and differences between neuropsychologists using technical personnel and those who do not are limited to the number of patients assessed per month and the amount of time allotted for assessments. Increased efficiency and cost-effectiveness is also associated with use of neuropsychology technicians. The implications of these results are discussed within the context of suggestions supporting further proliferation of this practice model.

The use of the professional/technician model has become an integrated part of the health care delivery system. The benefits of services provided by psychiatric nurses, military corpsmen or medics, paramedics, pediatric nurse practitioners, and physician's assistants are well documented. The employment of nondoctoral-level (e.g., bachelor-degree level) technicians by neuropsychologists and, to a lesser extent, by clinical psychologists, is also a historical and long-established tradition (DeLuca, 1989). The use of technical personnel to administer and score psychological tests was introduced by psychologist William A. Hunt in his work with the U.S. Navy during World War II. Ward C. Halstead used the method at the University of Chicago 5 decades ago, as did Ralph M. Reitan at the Army General Hospital (circa 1945) and at the inception of his Neuropsychology Laboratory at Indiana University Medical School (circa 1950–1951). The method was also reported to be used quite successfully in general clinical psychology services such as psychodiagnostic assessment (L'Abate, 1968, 1973, 1991), monitored play therapy (L'Abate, 1979), evaluation of couples and families (L'Abate & Wagner, 1988), and structured enrichment with couples and families (L'Abate, 1987). In fact, several studies have found paraprofessional psychology assistants to function as well as or better than professional counterparts in the administration of psychological tests (Musante, 1974; Sloop & Quarrick, 1974) and limited treatment functions (Durlack, 1979). The advantages of the professional/technician model as they relate specifically to neuropsychology include the following: (a) objective data collection (permitting the use of blind analysis); (b) more efficient and productive use of the psychologist's time; and (c) overall cost-effectiveness.

Within the discipline of psychology, the professional/technician model or laboratory method has generated considerable discussion regarding its ethical and practical ramifications and dimensions. At present, there are restrictions on the use of technical personnel by a limited number of state licensing boards (e.g., California, Kentucky) as well as attempts by third-party health care providers to disallow reimbursement for assessment services conducted by technicians even when supervised by licensed psychologists (Blue Cross and Blue Shield of Michigan, 1989). Nevertheless, the method of employing adequately trained and supervised technicians by licensed psychologists has been consistently and strongly endorsed in numerous practice and ethical guidelines promulgated by the American Psychological Association (see DeLuca, 1989) and more recently by APA Division of Clinical Neuropsychology (Report of the Division 40 Task Force, 1989, 1991). We refer the reader to DeLuca (1989) for a discussion of these and other issues pertaining to the rationale and historical, legal, and professional precedents for the use of nondoctoral-level technical personnel.

With respect to the pervasiveness of this model, several recent professional practice surveys have consistently indicated that slightly more than 50% of the neuropsychologists polled reported using technicians to administer and score psychologi-

JOHN W. DELUCA, PHD, is Chief Psychologist of the Service for Child and Adolescent Neuropsychology at Lafayette Clinic and Assistant Professor of the Psychiatry Department at Wayne State University School of Medicine. He received his PhD from the University of Windsor. His research interests include the interface between child psychopathology and neuropsychological dysfunction, developmental neuropsychology, and professional practice issues in neuropsychology.

STEVEN H. PUTNAM, PHD, is a Research Fellow in the Department of Psychiatry at the University of Michigan. He received his PhD from the University of Illinois at Urbana–Champaign. His research interests include the professional practices of neuropsychologists, traumatic brain injury rehabilitation outcome, and the MMPI/MMPI-2.

THE AUTHORS THANK Russ Newman of the APA Practice Directorate for providing unpublished information as well as Kenneth M. Adams for providing computer support.

A PORTION OF THESE DATA were presented at the Nineteenth Annual Meeting of the International Neuropsychological Society, February 15, 1991, San Antonio, Texas.

CORRESPONDENCE CONCERNING THIS ARTICLE should be addressed to John W. DeLuca, PO Box 404, Dexter, Michigan 48130.

cal and neuropsychological tests. For example, Serenty, Dean, Gray, and Hartlage (1986) found that 50% of the 614 respondents to their survey employed technicians. More recently, Putnam and DeLuca (1990) reported that 53% and 31% of the respondents in primary employment ($n = 562$) and private practice ($n = 545$) settings, respectively, deploy technical personnel. In fact, Sweet and Moberg's (1990) data suggest that advanced or expert practitioners (i.e., certified by the American Board of Clinical Neuropsychology [ABCN]/American Board of Professional Psychology [ABPP]) are more likely to endorse the model (i.e., 77.2% vs. 58.5% for 102 ABPP versus 82 non-ABPP neuropsychologists, respectively). Although other surveys report similar findings regarding use of technicians, data collected in 1986 and reported by Guilmette, Faust, Hart, and Arkes (1990) seem to underestimate the prevalence of the model; only 19% of the 449 respondents employed technical personnel. Such findings may be due to the fact that the Guilmette et al. (1990) sample was composed of respondents self-identified as neuropsychologists in the National Register of Health Service Providers in Psychology. We refer the reader to Adams (1988) for a discussion of the limitations of relying on this sort of self-designation.

The purpose of the present study was to investigate the various aspects of the model, such as features of technician deployment and claims of increased efficiency and cost-effectiveness. More specifically, we report the prevalence rates of technician use across a sample of 872 members of APA Division 40 (DeLuca & Putnam, 1991; Putnam & DeLuca, 1990, 1991) with respect to clinical practice affiliation, employment setting, theoretical approach to assessment, state, and geographic region. In addition, a stepwise multiple-regression analysis was used in an attempt to determine the best predictors of technician utilization. Although one of the major benefits of the model is objective assessment of patients by technical personnel and the possibility of performing blind analysis, these issues have been discussed elsewhere (DeLuca, 1989; L'Abate, 1973; Reitan, 1966; Rourke, 1976; Rourke, Fisk, & Strang, 1986).

The use of technical personnel frees valuable professional time and results in increased efficiency and productive delivery of services. For example, the neuropsychologist is able to allot more time to other activities. However, until now such assertions have lacked objective or public verification. In this study, two groups of neuropsychologists are compared on several important practice characteristics, particularly average number of assessments completed per month, as an indication of efficiency and productivity. It was hypothesized that neuropsychologists using technicians would be more productive (i.e., conduct a greater number of assessments). In the final part of the article, data from recent salary and practice surveys were used to test the claims that the model is more cost-efficient.

Method

These data were obtained as part of a national multidimensional practice survey sent to 2,402 U.S. members of APA Division 40 in November 1989 (DeLuca & Putnam, 1991; Putnam & DeLuca, 1990, 1991). The questionnaire used two sections addressing each respondents' primary employment and private practice, respectively. A total of 936 surveys were returned, resulting in an overall return rate of 40%. Although such a return rate is typical of surveys based on a single mailing (Heberlein & Baumgartner, 1978), this does represent the most extensive sample of neuropsychology practitioners to date. One hundred and two surveys were eliminated because of relocation or no forwarding address, retirement, being clinically inactive, or being identified with Division 40 on a personal interest basis only. The following data analysis was performed on the usable questionnaires of 872 individuals. We refer the reader to Putnam and DeLuca (1990, 1991) for more details regarding the data collection, survey questionnaire, and sample characteristics.

Deployment Characteristics

In the first part of this analysis, several variables related to technician use were reviewed: the total percentage of persons using technical personnel, the number of technicians employed, and the ratio of technicians to neuropsychologists. These variables were analyzed across several different domains, including the following: practitioner affiliation (i.e., clinical neuropsychologists, clinical psychologists, and "other," including rehabilitation and counseling psychologists, for example); employment setting (i.e., university or nonuniversity hospitals, independent rehabilitation centers, school system, group practice, governmental facility, community mental health, etc.); U.S. geographic region; and neuropsychological assessment orientation. The latter were characterized as follows: Halstead–Reitan (Reitan & Wolfson, 1985), Luria-Nebraska (Golden, Hammeke, & Purisch, 1980), Boston Process (Goodglass & Kaplan, 1972, 1979), Benton (Benton, Hamsher, Varney, & Spreen, 1983), flexible clinical battery, and fixed personal battery. With the exception of employment setting, all analyses were conducted separately for both primary employment and private practice settings.

In addition, various state licensing and regulation rules and statutes were ranked on the basis of the presence or absence of regulations pertaining specifically to the use of technical personnel by psychologists. These rankings were based on a review of current state regulations concerning unlicensed persons performing psychological services (Russ Newman, personal communication, August 2, 1989). All variables were then subjected to a stepwise regression analysis (SAS Institute, 1985) to determine factors predictive of use of technicians.

Increased Efficiency

To determine the differences, if any, between the practices of clinical neuropsychologists using technicians and those who do not, a subsample of 456 members were extracted from the entire sample of 872 respondents. All members of this sample were selected because they were clinical neuropsychologists practicing in primary employment settings (i.e., university and nonuniversity affiliated hospitals or medical centers). The rationale for such criteria was to select the most frequent primary employment settings for those respondents to the survey. Of the subsample, 247 respondents used neuropsychology technicians and 209 did not. Comparisons were made between the two groups on the following professional practice characteristics: hourly and fixed rates charged for neuropsychological assessments, number of hours per neuropsychological assessment, percentage of total time spent on assessments (as opposed to treatment or consultation), the average number of neuropsychological assessments completed per month, and the total number of treatment cases conducted per month. Means, standard deviations, and univariate one-way ANOVAs were calculated; the SAS general linear models option, which corrected for unequal sample sizes and variances, was used (SAS Institute, 1985).

Cost Effectiveness

One of the major claims made by practitioners employing technicians is that the method is cost effective. To assess the cost benefits associated with this practice, we developed a Monte Carlo simulation of a single-person hypothetical neuropsychology service for a 1-year period. All data representing practice characteristics have been culled from recent national practice and salary surveys of neuropsychologists (Putnam, 1989; Putnam & DeLuca, 1990, 1991). Table 4 presents average values for variables pertinent to providing clinical services and the use of technical personnel. On the basis of the comparison of users and nonusers just noted, data for the two groups were identical with the exception of number of assessments conducted per month.

Results

For divisions based on clinical practice affiliation (primary employment/private practice), the percentage of psychologists using technicians are as follows: clinical neuropsychologists (61.3%/35.1%); clinical psychologists (39.4%/23.2%); and other combined groups (44.7%/ 32.3%). The mean number of technicians employed (and the ratio of technicians to neuropsychology staff) were 2.45 (1.28:1), 1.75 (.84:1) and 2.85 (.88:1) for the above groups, respectively. Private practice groups evidenced the following rates: 2.03 (1.54:1), 1.56 (1.12:1), and 1.47 (1.37:1), respectively.

Although 31% of all respondents involved in private practice used technicians, the frequency of technician use (and ratio of technicians to neuropsychology staff) for primary employment groups were as follows (see Table 1): university hospital/medical center, 66.2% (1.31:1); nonuniversity hospital/medical center, 46.0% (1.2:1); independent/free-standing rehabilitation center, 50.7% (.65:1); school system, 14.3% (1.33:1); group practice, 44.4% (1.2:1); community mental health center, 22.2% (1.5:1); government agency/facility, 57% (1.04:1); and other setting, 44.4% (1.32:1). Department of Veteran's Affairs medical center respondents were classified under the government agency/facility category.

When respondents in primary employment settings were grouped according to theoretical or methodological approach to neuropsychological assessment, the following percentage of respondents using technicians (ratio of technicians to neuropsychologists) were reported (see Table 2): Halstead-Reitan Neuropsychological Test Battery, 62.2% (1.03:1); Luria Nebraska Neuropsychological Battery, 52.2% (1.25:1); Boston Process Approach, 39% (1.38:1); Benton approach, 75% (1.25:1); Flexible Clinical Battery, 57.5% (1.02:1); and Fixed Personal Battery, 54.4% (1.57:1). For those respondents in private practice, the following results were obtained with respect to assessment approach: Halstead-Reitan Neuropsychological Test Battery, 38.6% (1.31:1); Luria Nebraska Neuropsychological Battery, 29% (1.87:1); Boston Process Approach, 17.9% (1.43:1); Benton approach, 50% (1:1); Flexible Clinical Battery, 30.8% (1.44:1); Fixed Personal Battery, 28.6% (1.41:1).

Respondents in primary employment settings grouped according to geographic region the percentage of respondents using technicians (ratio of technicians to neuropsychologists) were as follows: Northeast, 44.9% (.92:1); North Central, 61.5% (1.17:1); South, 67.2% (1.28:1); and West, 38.4% (1.24:1). For those respondents in private practice, the following results were obtained with respect to geographic region: Northeast, 21.2% (1.20:1); North Central, 34.6% (1.34:1); South, 40.2% (1.69:1); and West, 31.7% (1.23:1).

Stepwise regression analyses (using both forward selection and backward elimination) were performed to predict technician use using the following variables: clinical practice affiliation, employment setting, total number of clients assessed per month, state, type of State Psychology Board regulations regarding technician use, and theoretical approach to assessment. Of the six variables entered using forward selection (SAS Institute, Inc., 1985), only five reached the inclusion criterion of significance at the .05 level; the employment setting variable was eliminated. The R^2 for the remaining five-variable model was .11. For the backward-elimination regression analysis (SAS Institute, Inc., 1985), the largest R^2 obtained was .11 for the six-variable model. With respect to individual beta values, only the total number of assessments per year achieved significance in either model ($b = -.015$, $p < .0001$).

Table 3 presents the means and standard deviations for the various practice characteristics for each group. Significant ANOVAs were obtained for the average number of hours to complete an adult assessment, $F(1,184) = 4.58$, $p < .03$, percentage of the psychologists' time allotted for assessment functions, $F(1,442) = 11.27$, $p < .0009$, and in the total average number of assessments conducted per month, $F(1,437) = 52.89$, $p < .0001$. There were no significant differences on the remaining practice characteristics between those who do and those who do not use technicians.

Table 4 presents a Monte Carlo simulation of two practices: one using technicians and the other not. Given the lack of significant differences between users and nonusers noted above, all variables, with the exception of number of assessments con-

Table 1
Use of Neuropsychology Technicians by Employment Settings

Practice variable	University hospital/ medical center	Nonuniversity hospital/ medical center	Rehabilitation center	School system	Group practice	Community mental health center	Government agency/other facility	Private practice
Technician use by %	66.2	46.0	50.7	14.3	44.4	22.2	57.0	31.0
Mean number of technicians employed	2.76	2.45	2.0	2.0	2.47	1.5	1.7	1.8
Ratio of technicians: neuropsychologists	1.31:1	1.2:1	.65:1	1.33:1	1.2:1	1.5:1	1.04:1	1.38:1

Table 2
Use of Neuropsychology Technicians by Theoretical Approach to Assessment

Practice variable	Halstead–Reitan		Luria–Nebraska		Boston Process		Benton		Flexible battery		Fixed personal	
	Primary setting	Private practice	Primary setting	Private practice	Primary setting	Private practice	Primary setting	Private practice	Primary setting	Private practice	Primary setting	Private practice
Technician use (by %)	62.2	38.6	52.2	29.0	39.0	17.9	75.0	50.0	57.5	30.8	54.4	28.6
Mean number of technicians employed	2.42	1.87	2.0	2.11	2.44	1.57	1.5	1.0	2.25	1.67	3.2	1.71
Ratio of technicians: neuropsychologists	1.03:1	1.31:1	1.25:1	1.87:1	1.38:1	1.43:1	1.25:1	1.0:1	1.02:1	1.44:1	1.57:1	1.41:1

ducted per year and the percentage of time allotted to neuropsychological assessment, were identical. To make the comparisons as equivalent as possible, the percentage of time allotted for neuropsychological assessments were set to be identical (i.e., 50%). The percentage of gross income allotted to salary expenditures was equivalent for the two groups (i.e., 40% and 38%, respectively). Both the number of patients seen and the gross income of practitioners using the model represented a 79% increase from that of practitioners who do not. However, the total salaries for those using the model increased approximately 89% (i.e., approximately $26,400) over those who do not; it was assumed that other overhead charges would be grossly equivalent. Also, the office space requirements for a single practitioner viz-à-viz a single practitioner employing technicians may differ in some situations. In any event, the net profit increase of those using the model over those who do not was estimated to be 72% (i.e., approximately $35,200).

Discussion

Overall, 53% of respondents in primary employment settings reported that they used neuropsychology technicians; only 31% of those respondents in private practice settings indicated such a practice. These data provide a very detailed analysis of technician deployment circa 1989–1990 by clinical practice affiliation, employment setting, theoretical–methodological approach to assessment, state, and region. Several general conclusions can also be gleaned from these data. First, technician use seems to be widespread (i.e., 53% of all respondents and 62% of those identifying themselves as clinical neuropsychologists in primary employment settings). The frequency of use in private practice settings is lower overall but varies in accord with the parameters noted above. It may be that some private practitioners are unaware of the cost-effective nature of adopting the professional/technician model or of other benefits, including

Table 3
Users and Nonusers of Neuropsychology Technicians: Practice Characteristics

Practice variable	Technician deployment					
	Users			Nonusers		
	n	*M*	*SD*	*n*	*M*	*SD*
Hourly rate						
Adult assessment	122	$106	27	102	$104	36
Child assessment	84	$104	26	58	$99	33
Fixed rate						
Adult battery	50	$680	188	26	$700	274
Child battery	38	$666	194	23	$748	324
Average hours per assessment						
Adult	101	5.6	2.0	85	6.2	2.2[a]
Child	73	5.7	2.0	52	5.7	2.0
Percentage of time allotted for assessment	245	52%	28	199	42%	29[b]
Average number of technicians employed	247	2.3	1.6	209	0.0	0.0
Total number of assessments conducted per month	243	15	10.9	196	8	6.6[c]
Total number of treatment cases conducted per month	121	15	19.2	83	13	12.1

[a] $F(1, 184) = 4.58$, $p < .03$. [b] $F(1, 442) = 11.27$, $p < .0009$. [c] $F(1, 437) = 52.89$, $p < .0001$.

Table 4
Monte Carlo Model of Clinical Practice

Practice characteristic	Technician deployment	
	Model user	Nonuser
Neuropsychologist's salary[a]	$59,500	$59,500
Percent time allotted to assessments	50%	50%
Ratio of technicians: psychologists[b]	1.2:1	NA
Technician's salary[c]	$22,000	NA
Number of patients assessed/year[b]	175	98
Number of hours per assessment[d]	8	8
Hourly rate for assessments[e]	$100.00	$100.00
Gross yearly income (assessment)[f]	$140,000	$78,400
Total yearly salary expenditures[g]	$56,150	$29,750

Note. NA = not applicable.
[a] Putnam (1989), median salary range, Division 40 members.
[b] Data presented in this article.
[c] Putnam & DeLuca (1990), median annual salary, primary employment setting.
[d] Putnam & DeLuca (1990), median hours per assessment (child and adult), primary employment setting: 6 hours plus 2 hours added for report writing.
[e] Putnam & DeLuca (1990), median hourly rate for child and adult assessments, primary employment setting.
[f] Number of hours per assessment times hourly rate multiplied by number of assessments per year.
[g] For technician-users, total salary expenditures include 50% of the neuropsychologist's salary and 100% salary for 1.2 technicians; for nonusers, the salary figures represent 50% of the neuropsychologist's salary only.

the ability to serve a greater number of clients. Although not a part of this investigation per se, the limited availability of qualified technicians (particularly on a contract basis) could also be contributing to this phenomenon. It appears that some are graduate students, who are available for only several years. A second and perhaps more interesting finding resulting from the present analysis is the fact that technician deployment appears to extend across domains that have stereotypically been associated with the adoption or nonadoption of the model. That is, no model accounted for more than 11% of the variance in technician usage in a stepwise multiple regression analysis.

Comparison of the practice characteristics of technician users versus nonusers revealed differences in the average number of patients seen per month and the percentage of time allotted for neuropsychological assessment. The two groups did not differ in terms of hourly rates charged for assessments, fixed battery rates, average hours per assessment, or percentage of professional time allotted to treatment duties. Clearly, the advantage of employing technical personnel is increased efficiency and productivity. Although it appears from the data presented here that most neuropsychologists have chosen to use this extra time to assess additional patients, it could of course allow the practitioner increased time for other professional activities. Nevertheless, the model appears to make good organizational and business sense; that is, it employs more staff, provides needed clinical training opportunities, and allows the practitioner to provide increased services.

The Monte Carlo simulation compared two single psychologist practices, one using the model and one not. For the practice using the model, there was a 79% increase in both the number of patients assessed and estimated gross yearly income from those not using the model. However, the model-based practice also produced a 89% increase in total yearly salary expenditures (i.e., additional salary costs for 1.2 technicians, or $26,400) as compared with nonmodel-based respondents. The higher salary costs associated with deployment of the model would be offset by the additional income generated by the increased number of assessments completed per year. Additional income is often critical to the survival of psychological services in a university/medical center setting. Such funds may be necessary to subsidize internships and other clinical training positions, additional professional staff/consultants required for the training programs, as well as the increased overhead costs associated with these facilities. Moreover, the additional funds could also be allocated to subsidize the delivery of neuropsychological services to patients lacking sufficient insurance coverage or personal monetary resources.

Future Directions

Clearly, the use of technical personnel continues to be a widespread and important contribution to the practice of clinical neuropsychology. The professional/technician model or laboratory method promotes a cost-effective approach to health care delivery as has been demonstrated in the medical field. However, given the widespread deployment of technicians in the field of clinical neuropsychology, one might mistakenly assume that much attention has been paid to the issues of education, training, and credentialing of technical personnel. Such issues are especially important because the validity and reliability of the neuropsychologist's interpretation and recommendations arising from the assessment process rests heavily on the quality of the data collection. However, education and training guidelines, such as those recently formulated by APA Division 40, are the first step in ensuring the development and adherence to high professional standards.

The present professional/technician model adheres to the guidelines promulgated by APA's Division 40 Task Force on Education, Accreditation, and Credentialing (1989, 1991) regarding the use of technical personnel in clinical neuropsychology. More specifically, those guidelines indicate "The use of nondoctoral personnel (at both the bachelor's and master's degree level) is a common, recognized, and accepted practice in many areas of psychology when supervised by a qualified licensed psychologist who maintains and monitors high standards of quality assurance" (Report of the Division 40 Task Force, 1991, p. 20). These guidelines also outline issues pertaining to the education and training of technicians with respect to test administration and scoring, ethical issues, and guidelines for dealing with special situations that may arise in the context of the assessment session (e.g., medical emergencies, recommended procedures for dealing with incompetent or adjudicated patients) as well as duties, limitations of roles, and professional relationships with others. For example, neuropsychology technicians are limited to the administration and scoring of neuropsychological tests; test selection, interpretation, and communication of assessment findings are strictly the domain

of the neuropsychologist. The organizational structure and lines of authority are also clearly delineated. That is, ". . . the supervising neuropsychologist has the ultimate and legal responsibility for supervising all aspects of work by the psychometrist" (Report of the Division 40 Task Force, 1991, p. 23). The neuropsychologist is responsible for all work conducted by technical personnel and therefore must be available during assessments in order to provide recourse for technicians to deal with problems exceeding their training or assigned authority (DeLuca, 1989). Finally, the professional relationship is strictly between the patient and the psychologist, with the psychologist billing for work encompassed by subprofessional personnel (Report of the Division 40 Task Force, 1989).

Although the Division 40 Task Force is to be applauded for their efforts in delineating these issues, more work needs to be done. For instance, there is a need to develop either formal technician training programs at the BA degree level or increased apprentice-like work opportunities. The establishment of some form of national credentialing agency and technician professional organizations similar to those currently existing for EEG technicians would help facilitate such objectives.

Such issues are paramount to the survival of the professional/technician model in clinical neuropsychology. This is especially pertinent because some state licensing boards have ruled against the use of technical personnel to administer psychological and neuropsychological tests under the supervision of licensed psychologists. However, these same states do not currently require any specialized education, training, or experience for a licensed psychologist to offer neuropsychological services, nor are there any restrictions limiting physicians or physician's assistants from administering and interpreting psychological and neuropsychological tests. Under these regulations, it would be possible for an unlicensed neuropsychology technician with several years of supervised experience in neuropsychological test administration to be barred from providing assessments under the direction of a licensed psychologist. At the same time, psychologists or other medical professionals would be allowed to administer and interpret neuropsychological tests without any formal education or training experience whatsoever. Such "dissociative states" are clearly counterproductive to the further advancement of the practice of psychology in general and of neuropsychology in particular. Moreover, such restrictive practices are disconcordant with the standards of practice and ethics advocated by the American Psychological Association and Division 40.

Restrictions on the use of technical personnel, whether as the result of misguided attempts to limit payments for psychological services or by ill-informed psychology board members, may pose a threat to the continuation of this practice. On the positive side, such challenges to the existence of the professional/technician model in clinical neuropsychology may be the needed catalyst that mobilizes neuropsychologists and their respective professional organizations to develop well-defined education and credentialing practices for neuropsychology technicians. It is clear that future considerations regarding issues of training, education, and credentialing must occur for this practice to expand and keep pace with the demands for the delivery of cost-effective quality health care services by neuropsychologists. More important, professional organizations such as APA Division 40, the International Neuropsychological Society (INS), and the National Academy of Neuropsychology (NAN) must continue to work with state licensing boards to confront and cooperatively resolve these important issues.

References

Adams, K. M. (1988). Neuropsychology is not just in the eye of the provider. *Professional Psychology: Research and Practice, 19,* 448–449.

Benton, A. L., Hamsher, K. deS., Varney, N. R., & Spreen, O. (1983). *Contributions to neuropsychological assessment: A clinical manual.* New York: Oxford University Press.

Blue Cross and Blue Shield of Michigan. (1989). Psychological testing services. *Hospital News, 2,* 1–3.

DeLuca, J. W. (1989). Neuropsychology technicians in clinical practice: Precedents, rationale, and current deployment. *The Clinical Neuropsychologist, 3,* 3–21.

DeLuca, J. W., & Putnam, S. H. (1991). Deployment patterns in the utilization of neuropsychology technicians. *Journal of Clinical and Experimental Neuropsychology, 13,* 90 (abstract).

Durlack, J. A. (1979). Comparative effectiveness of paraprofessional and professional helpers. *Psychological Bulletin, 86,* 80–92.

Golden, C. J., Hammeke, T. A., & Purisch, A. D. (1980). *Manual for the Luria-Nebraska Neuropsychological Battery.* Los Angeles: Western Psychological Services.

Goodglass, H., & Kaplan, E. (1972). *The assessment of aphasia and related disorders.* Philadelphia: Lea & Febiger.

Goodglass, H., & Kaplan, E. (1979). Assessment of cognitive deficit in the brain injured patient. In M. S. Gazzaniga (Ed.), *Handbook of behavioral neurobiology* (Vol. 2, Neuropsychology). New York: Plenum Press.

Guilmette, T. J., Faust, D., Hart, K., & Arkes, H. R. (1990). A national survey of psychologists who offer neuropsychological services. *Archives of Clinical Neuropsychology, 5,* 373–392.

Heberlein, T. A., & Baumgartner, R. M. (1978). Factors affecting response rates to mailed questionnaires: A quantitative analysis of published literature. *American Sociological Review, 43,* 447–462.

L' Abate, L. (1968, Summer). The laboratory method in clinical psychology: An attempt at innovation. *The Clinical Psychologist,* 182–183.

L' Abate, L. (1973). The laboratory method in clinical child psychology: Three applications. *Journal of Clinical Child Psychology, 2,* 8–10.

L' Abate, L. (1979). Aggression and construction in children's monitored playtherapy. *Journal of Counseling and Psychotherapy, 2,* 137–158.

L' Abate, L. (1987). *Family psychology II: Theory, therapy, enrichment, and training.* Lanham, MD: University Press of America.

L' Abate, L. (1991). Reconciling personal and professional priorities. In F. Kaslow (Ed.), *Voices in family psychology.* Newbury Park, CA: Sage.

L' Abate, L., & Wagner, (1988). Testing a theory of developmental competence in the family. *American Journal of Family Therapy, 16,* 23–35.

Musante, G. J. (1974). Staff evaluations of the technician role. *Professional Psychology: Research and Practice, 5,* 214–216.

Putnam, S. H. (1989). The TCN salary survey: A salary survey of neuropsychologists. *The Clinical Neuropsychologist, 3, 97–115.*

Putnam, S. H., & DeLuca, J. W. (1990). The TCN professional practice survey: Part I. General practices of neuropsychologists in primary employment and private practice settings. *The Clinical Neuropsychologist, 4,* 199–244.

Putnam, S. H., & DeLuca, J. W. (1991). The TCN professional practice

survey: Part II. Analysis of the fees of neuropsychologists by practice demographics. *The Clinical Neuropsychologist, 5,* 103–124.

Reitan, R. M. (1966). Problems and prospects in studying the psychological correlates of brain lesions. *Cortex, 2,* 127–154.

Reitan, R. M., & Wolfson, D. (1985). The Halstead–Reitan *Neuropsychological Test Battery: Theory and clinical interpretation.* Tucson, AZ: Neuropsychology Press.

Report of the Division 40 Task Force on Education, Accreditation, and Credentialing. (1989). Guidelines regarding the use of nondoctoral personnel in clinical neuropsychological assessment. *The Clinical Neuropsychologist, 3,* 23–24.

Report of the Division 40 Task Force on Education, Accreditation, and Credentialing. (1991). Recommendations for education and training of nondoctoral personnel in clinical neuropsychology. *The Clinical Neuropsychologist, 5,* 20–23.

Rourke, B. P. (1976). Issues in the neuropsychological assessment of children with learning disabilities. *Canadian Psychological Review, 17,* 89–102.

Rourke, B. P., Fisk, J. L., & Strang, J. D. (1986). *Neuropsychological assessment of children: A treatment-oriented approach.* New York: Guilford Press.

SAS Institute, Inc. (1985). *SAS user's guide: Statistics, Version 5 edition.* Cary, NC: Author.

Serenty, M. L., Dean, R. S., Gray, J. W., & Hartlage, L. C. (1986). The practice of clinical neuropsychology in the United States. *Archives of Clinical Neuropsychology, 1,* 5–12.

Sloop, E. W., & Quarrick, E. (1974). Technician performance: Reliability and validity. *Professional Psychology: Research and Practice, 5,* 216–218.

Sweet, J. J., & Moberg, P. J. (1990). A survey of practices and beliefs among ABPP and Non-ABPP clinical neuropsychologists. *The Clinical Neuropsychologist, 4,* 101–120.

Received October 7, 1991
Revision received June 22, 1992
Accepted July 2, 1992 ■