

A Survey of Doctoral Internships Offering Clinical Neuropsychology Training: Updated Expectations for Competitive Applicants

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Abstract

Objective: The specialty of clinical neuropsychology has experienced significant professional growth and increasing standardization of educational and training guidelines over the past 20 years. Previous literature demonstrated the importance of routine distribution of selection criteria used by training directors and supervising neuropsychologists for competitive applicants aiming to specialize in neuropsychology during internship. This study examined supervisors' updated expectations for competitive applicants from a more diverse sample of doctoral internship programs offering neuropsychological training. These data also provide cross-sectional and longitudinal comparisons to help trainees tailor their graduate training experiences.

Method: The sample included training directors and/or supervising neuropsychologists from 80 internship programs (73.4% of submitted surveys). Spearman correlations, analyses of variance, and chi-square tests of independence were conducted for cross-sectional and longitudinal comparisons.

Results: Clinical experience in assessment and the personal interview were consistently the two most prioritized criteria across all groups, whereas prioritization of the additional criteria was variable based on the program's characteristics. Internship programs generally preferred practica experience at university-affiliated medical centers, Veterans Affairs medical centers, and private/community-based hospitals. University-affiliated medical centers and internships offering $\geq 50\%$ neuropsychology training showed similar preferences for applicants with a depth and breadth of graduate school experience in neuropsychology. Longitudinally, the applicant expectations for programs offering $\geq 50\%$ neuropsychology training remained largely unchanged between 2000 and 2020.

Conclusions: This study updated expectations for competitive applicants from a diverse sample of neuropsychology training programs, underscored the importance of fit between trainee and program, and demonstrated consistency over time for trainees seeking neuropsychology training during internship.

Keywords: Assessment; Professional issues

Introduction

In the 25 years since its formal recognition by the American Psychological Association (APA; Meier, Crosson, & Eubanks, 1995), the recognized specialty of clinical neuropsychology has grown in scope and importance, with the International Neuropsychological Society (INS) membership growing ever larger and the Society for Clinical Neuropsychology (SCN; APA Division 40) becoming the largest of 55 APA divisions (APA, 2020; Barr, 2011). With an increasing number of clinical neuropsychologists entering practice, the number of specialty training programs and available internship positions has also increased. Mittenberg, Petersen, Cooper, Strauman, and Essig (2000) identified 50 training programs offering $\geq 50\%$ time spent

training in neuropsychology, and Ritchie, Odland, Ritchie, and Mittenberg (2012) identified twice as many internship programs offering $\geq 50\%$ time spent training in neuropsychology. Consequently, doctoral internship training in neuropsychology remains quite popular, and information regarding training directors' expectations for competitive applicants is incrementally important to both trainees and training programs.

The Houston Conference (HC) on Specialty Education and Training in Clinical Neuropsychology defines a framework for specialty training in neuropsychology, which delineates broad recommendations across all levels of trainees, including doctoral students, doctoral interns, and postdoctoral fellows (Hannay et al., 1998). Over the past 23 years, this structure has been widely adopted and is increasingly considered the requisite training model among both trainees and supervisors both within the United States (Sweet, Benson, Nelson, & Moberg, 2015) and internationally (Hessen et al., 2018). Although the HC provided trainees with a broad framework for training in neuropsychology, specific expectations at various levels of training were designed to be flexible for each individual trainee. The HC guidelines state that “the percentage of time in clinical neuropsychology should be determined by the training needs of the individual intern,” based upon the student's previous background and training in neuropsychology (Hannay et al., 1998, p. 163). As a result, some neuropsychologists have suggested that competency-based approaches need to be defined for entry-level practice (Rey-Casserly, Roper, & Bauer, 2012).

Recently, the Clinical Neuropsychology Synarchy (CNS) published an inter-organizational set of competency guidelines for entry- and postdoctoral-level trainees meant to “describe the expected *outcomes* from following the HC guidelines” (Smith & CNS, 2019, p. 421). In the context of the doctoral internship match process, many graduate students seeking a career in neuropsychology may apply to internship programs offering a range of neuropsychology training experiences. The taxonomy as described by Sperling and colleagues (2017) acknowledges that students may gain a range of experiences in neuropsychology training, from “Exposure” to “Experience” to “Emphasis” to “Major Area of Study,” the highest level of neuropsychology training intensity that most closely aligns with the $\geq 50\%$ neuropsychology training previously surveyed (and also requires didactic experiences consistent with HC guidelines). Yet for applicants to be fully prepared for a 2-year postdoctoral fellowship in clinical neuropsychology, recent data suggest that postdoctoral training directors and supervisors prioritize experience in clinical neuropsychology during graduate school and internship when evaluating prospective trainees (Driskell, Del Bene, & Sperling, 2021). As the scope and required proficiencies for neuropsychologists evolve, the expectations of internship training directors and supervisors require periodic reevaluation. The periodic surveying of training directors and supervising neuropsychologists at doctoral internship programs offering specialized training in neuropsychology helps to understand specific training experiences expected of competitive applicants, as well as observe changes or stability in training expectations over time.

Mittenberg and colleagues (2000) conducted the first published survey of doctoral internships offering $\geq 50\%$ time spent training in neuropsychology, and a follow-up survey was published approximately a decade later (Ritchie et al., 2012). Changes in the relative importance of specific evaluation criteria between these two surveys underscore the need for periodic reassessment. As noted by the aforementioned authors and reinforced by the present study, the public distribution of information regarding applicant evaluation criteria better equips students to make informed decisions regarding training opportunities that arise during their doctoral education. Additionally, these data increase the likelihood that internship training directors and supervising neuropsychologists will receive applications from trainees with a higher degree of fit and readiness to succeed during internship. Overall, access to information regarding internship applicant selection criteria benefits trainees, training programs, and the specialty of clinical neuropsychology as a whole by highlighting specific training goals and competency benchmarks appreciated, though not yet formally established, by professional organizations.

Therefore, the present survey aims to reassess and expand upon internship programs' expectations of competitive applicants identified by Mittenberg and colleagues (2000) and Ritchie and colleagues (2012) and used by internship programs offering specialized training in neuropsychology within a more diverse sample of training programs in North America. These criteria include specific educational, clinical, and research experiences completed prior to internship by competitive applicants. While previous surveys only assessed internship programs with $\geq 50\%$ time spent training in neuropsychology, the present study also included programs with $< 50\%$ neuropsychology training (but at least 5%–10%) to provide more detailed information from internship programs offering a range of experiences in neuropsychological training. Additionally, the present survey details novel group cross-sectional comparisons based on the endorsement of meeting HC guidelines, maximum percentage of time spent training in neuropsychology, internship setting, and patient demographics to further delineate significant differences relevant to fit between trainees and training programs. Finally, this study also provides longitudinal comparisons across the 2000, 2012, and current 2020 surveys to examine how expectations of internship programs offering $\geq 50\%$ time spent training in neuropsychology have evolved over time and to identify any emergent trends.

Method

Participants

Training directors and supervising neuropsychologists who were affiliated with a doctoral internship program that offered at least an “Exposure” in neuropsychology (i.e., 5%–10% maximum time spent training; Sperling et al., 2017) were identified through the membership directory of the Association of Psychology Postdoctoral and Internships Centers (APPIC, 2020). Participants were asked to restrict responses to only one individual per internship program (either the program training director, a supervising neuropsychologist, or the person who holds both positions) to avoid redundant survey completions.

A list of internship training programs that may qualify for inclusion was identified from the APPIC online directory. The list initially included only programs that listed “Neuropsychology” as one of their training components; however, several programs were identified that instead listed their training component as “Assessment” more generally. Therefore, the email list was expanded to include all programs listing either Neuropsychology or Assessment as a training component, in an effort to be overly inclusive in contacting all internship programs that may possibly meet the inclusion criteria. Invitation emails were sent to a total of 757 training directors in the spring of 2020; however, it is unknown how many of those programs met the inclusion criteria. Of all individuals contacted, 34 opted out of the study, though the authors cannot determine whether these individuals self-excluded because they did not meet the inclusion criteria or simply preferred not to complete the survey. Of note, 26 individuals voluntarily contacted the author to state that their internship program did not meet the inclusion criteria, and others not meeting inclusion criteria may have chosen not to respond. A total of 109 surveys were submitted. Two respondents (1.8%) declined to provide informed consent, and 27 surveys (24.8%) contained an insufficient number of responses for inclusion (i.e., informed consent was provided but no contributory data to the survey’s purpose). Therefore, they were excluded from formal analyses. Thus, a total of 80 surveys were included in formal analyses, or 73.4% of those who responded to the invitation email, which is comparable to previous similar studies (Mittenberg et al., 2000; Ritchie et al., 2012). The response rate for programs offering $\geq 50\%$ neuropsychology training was comparable to the previous 2000 survey (Mittenberg et al., 2000) but lower than the response rate in the 2012 survey (Ritchie et al., 2012). This was likely impacted by the COVID-19 pandemic, which started just 3 months before recruitment for the present study began.

Table 1 provides a summary of respondent and training program demographic characteristics included in the study. Most respondents served as the supervising neuropsychologist or both the supervising neuropsychologist and training director (about 71%), and nearly one-third were board certified in neuropsychology. About 70% of respondents worked at Veterans Affairs medical centers (VAMCs) or university-affiliated medical centers (UAMCs), and the majority of respondents worked at APA-accredited internship programs. Over half of respondents reported that their internship program met HC guidelines, and 50% of respondents reported that their program offered $\geq 50\%$ time spent training in neuropsychology. Nearly all the programs reporting $\geq 50\%$ time spent training in neuropsychology also endorsed following the HC guidelines (39/40, 97.5%), while only 10 out of 40 (25.0%) internship programs reporting $< 50\%$ time in neuropsychology training endorsed following the HC guidelines. To explore the relationship between intensity of neuropsychology training and setting, Table 2 shows the distribution of programs by percent time spent in neuropsychology training, according to both setting and report of following the HC guidelines. Most of the programs offering $\geq 50\%$ training in neuropsychology were UAMCs or VAMCs who reported following the HC guidelines (35/39, 89.7%), while programs offering $< 50\%$ neuropsychology training generally did not endorse following the HC guidelines and were less likely to be at UAMCs or VAMCs.

Procedure

Palo Alto University’s Institutional Review Board approved the study in accordance with all laws, regulations, and ethical standards pertinent to research with human subjects. The survey was administered using Qualtrics, an online survey platform (Qualtrics, 2020). The invitation email contained information regarding the survey’s purpose, participation criteria, a link directing recipients to the survey, and a separate link directing recipients to enter their contact information to be included in a random drawing to win a \$100 gift card as compensation for participation, to keep survey responses anonymous. After clicking on the survey link, respondents were provided additional information about the inclusion criteria to determine whether their internship program met criteria for participation, and if so, they were asked to provide informed consent to participate in the survey. The informed consent clearly detailed that only one respondent per internship training program should complete the survey—either the training director, one of the supervising neuropsychologists, or someone who served in both roles. Respondents who confirmed that they met the inclusion criteria for the study completed demographic and program-specific

Table 1. Sample demographics ($n = 80$)

	Group	n (%)
Respondent's primary role	Supervising Neuropsychologist	35 (43.8)
	Training Director	23 (28.8)
	Training Director and Supervising Neuropsychologist	22 (27.5)
Respondent board-certified	No	54 (67.5)
	ABPP-CN	22 (27.5)
	ABN	3 (3.8)
	ABPdN	1 (1.3)
Program setting	VAMC	34 (42.5)
	UAMC	22 (27.5)
	Private or Community Hospital or Clinic	10 (12.5)
	Other	6 (7.5)
	University or College Clinic	4 (5.0)
	Psychiatric or State Hospital	2 (2.5)
	Independent or Group Private Practice	1 (1.3)
	Rehabilitation Facility	1 (1.3)
	Program geographic region ($n = 75$)	South
Midwest	16 (21.3)	
West	16 (21.3)	
Northeast	12 (16.0)	
Canada	4 (5.3)	
Program community type	Urban	55 (68.8)
	Rural	13 (16.3)
	Suburban	12 (15.0)
Program accreditation	APA-accredited	70 (87.5)
	Not APA-accredited	10 (12.5)
Program follows HC guidelines	Yes	49 (61.3)
	No	16 (20.0)
	Unsure	15 (18.8)
Maximum percentage of time spent training in neuropsychology	≥50%	40 (50.0)
	11–29%	18 (22.5)
	5–10%	13 (16.3)
	30–49%	9 (11.3)
Primary patient demographic	Balanced Adult and Geriatric	35 (43.8)
	Mostly Adult	16 (20.0)
	Mostly Pediatric	16 (20.0)
	Lifespan	10 (12.5)
	Mostly Geriatric	3 (3.8)
Mean Number (SD) of Board-Certified Neuropsychologists ($n = 78$) ^a		1.1 (1.3)

Notes: ABPP-CN = American Board of Professional Psychology–Clinical Neuropsychology, ABN = American Board of Professional Neuropsychology, ABPdN = American Board of Pediatric Neuropsychology, VAMC = Veterans Affairs Medical Center, UAMC = University-Affiliated Medical Center, APA = American Psychological Association, HC = Houston Conference.

^a Range = 0–5 with two programs reporting six or more.

questions. Subsequently, respondents were asked to rank order, indicate the level of importance, and report minimums and averages for various criteria commonly used to select competitive doctoral internship candidates. Following the completion of the study, the respondents were reminded of the opportunity to enter a random drawing to win a \$100 gift card as compensation for participation.

Statistical Analyses

Spearman correlations compared rank-order lists. The rank-order lists of applicant selection criteria were created by averaging the rank-order responses for each criterion (e.g., if 15 programs ranked clinical assessment experience as the most important [1] and 5 programs ranked it as fourth most important [4], then the averaged rank would be 1.75). After the averaged rank-order values were calculated for each criterion, the criteria were ranked based on these averaged rank-order values. Tie values were allowed for these lists and reported accordingly. This procedure was used for all rank-order lists reported in

Table 2. Internship program respondents by intensity of neuropsychology training and endorsement of following HC guidelines

	≥50%		30–49%		11–29%		5–10%		Total
	Yes HCG	No/ Unsure HCG	Yes HCG	No/ Unsure HCG	Yes HCG	No/ Unsure HCG	Yes HCG	No/ Unsure HCG	
UAMC	17	–	–	1	1	2	–	1	22
VAMC	18	–	3	4	2	4	1	2	34
Priv./Comm. Hosp./Clinic	3	1	–	–	1	1	–	4	10
Rehab. Facility	–	–	–	–	1	–	–	–	1
Psych./State Hospital	–	–	–	–	–	1	–	1	2
Univ./College Clinic	1	–	–	–	–	1	–	2	4
Indep./Group Private Practice	–	–	–	–	–	1	–	–	1
Other	–	–	1	–	–	3	–	2	6
Total	39	1	4	5	5	13	1	12	80

Notes: HCG = Houston Conference guidelines, UAMC = university-affiliated medical center, VAMC = Veteran Affairs medical center.

the present study. Pearson chi-square tests of independence compared frequency distributions for categorical variables (i.e., essential/very important versus somewhat/not important). One-way analyses of variance were used for variables with continuous distributions, including number of board-certified neuropsychologists, clinical hours, integrated reports, publications, and conference presentations. All analyses were conducted using SPSS Statistics 27.

Results

The present study gathered responses from a more diverse sample of training directors and supervising neuropsychologists working at internship programs, compared to previous surveys (i.e., including all programs with at least 5%–10% time spent training in neuropsychology). Table 3 shows a summary of the 2020 survey results. The top five most prioritized aspects of trainees' applications were clinical experience in assessment, the personal interview, neuropsychology specialization during graduate school, clinical experience in intervention/psychotherapy, and letters of recommendation written by a neuropsychologist. The top three most preferred neuropsychology practicum experiences were completed at UAMCs, VAMCs, and private or community-based hospitals/clinics, and the top three most desired psychotherapy or treatment experiences were cognitive-behavioral therapy, group therapy, and cognitive/neurorehabilitation.

Regarding preferred clinical experiences, 82.5% of respondents regarded overall clinical neuropsychological patient referrals to be essential or very important, with neurology (71.3%) and general medicine (71.3%) referrals preferred slightly over psychiatry (61.2%). Similarly, most respondents reported clinical psychology referrals to be essential or very important (82.5%). The majority of respondents believed that prior experience with flexible testing batteries (85.0%) and objective personality assessment (76.3%) was essential or very important, whereas less than 20% of respondents prioritized experience with projective personality or vocational/everyday functional assessment approaches. In describing the experiences of competitive applicants to their program, respondents reported the average number of supervised neuropsychological assessment hours and intervention/psychotherapy hours was 312 ($SD = 313$) and 405 ($SD = 240$), respectively. The reported average number of integrated reports was 29.8 ($SD = 22.3$).

Most respondents reported several educational experiences as essential or very important, including graduate school curriculum meeting HC guidelines (56.2%), neuropsychologist faculty and supervisors (61.2%), letters of recommendations written by neuropsychologists (62.5%), completing multiple neuropsychological practica (61.3%), diversity in neuropsychology practica type and setting (57.5%), defending a dissertation proposal (86.3%), and collecting data for a dissertation (56.2%). Additionally, most respondents preferred students enrolled in the following degree programs: PhD in Clinical Psychology (100%), PsyD in Clinical Psychology (98.7%), or PhD in Counseling Psychology (87.5%).

Thirty-six percent of respondents believed that prior publication experience was essential or very important, and 43.8% of respondents believe that prior experience presenting at national or international conferences was essential or very important, without preference for one specific conference over others. Respondents indicated that the average number of first-authored and co-authored publications reported by competitive applicants to their program was 1.5 ($SD = 1.4$) and 2.5 ($SD = 1.8$), respectively. The average number of paper/workshop and poster presentations was 2.0 ($SD = 1.9$) and 4.1 ($SD = 2.9$), respectively.

Table 3. Summary data of 2020 survey of internships offering clinical neuropsychology training

1. Please rank the following items in order of importance when considering an applicant for the neuropsychology rotation at your internship (most important = 1; least important = 14).				
Clinical Experience–Assessment				1
Personal Interview (i.e., interpersonal characteristics)				2
Neuropsychology Curriculum During Graduate School				3
Clinical Experience–Intervention/Therapy				4
Letters of Recommendation Written by a Neuropsychologist				5
Personal Statement (i.e., professional goals/interests)				6
Clinical Experience–Cultural Sensitivity (i.e., multicultural competence)				7
Letters of Recommendation				8
Review of Work Samples (e.g., sample clinical reports, integrated reports)				9
Publications/Presentation (i.e., research competence)				10
Graduate School GPA				11
Familiarity with Applicant's Supervisor				12
Participation in Student Groups or Leadership Roles (e.g., ANST)				13
Other				14
2. Please rank the desirability of the following types of neuropsychology practicum experience completed prior to internship when considering an applicant for your internship (most preferred = 1; least preferred = 8).				
University-Affiliated Medical Center				1
Veterans Affairs Medical Center				2
Private or Community-Based Hospital or Clinic				3
Rehabilitation Facility				4
Psychiatric or State Hospital				5
Independent or Group Private Practice				6
University or College Clinic				7
Other				8
3. Please rank the desirability of the following types of psychotherapy/treatment experience completed prior to internship when considering an applicant for your internship (most preferred = 1; least preferred = 8).				
Cognitive-Behavioral Therapy				1
Group Therapy				2
Cognitive/Neurorehabilitation				3
Family Therapy				4
Couple Therapy				5
Psychodynamic Therapy				6
Biofeedback Therapy				7
Other				8
4. Please indicate the importance of an applicant's prior experience with the following types of patients (assessment and/or intervention).				
	Essential	Very Important	Somewhat Important	Not Important
Clinical Neuropsychology–Overall	60.0%	22.5%	15.0%	2.5%
Neurology Referral	23.8%	47.5%	21.2%	7.5%
Psychiatry Referral	15.0%	46.2%	33.8%	5.0%
General Medicine Referral	17.4%	53.8%	23.8%	5.0%
Clinical Psychology	50.0%	32.5%	17.5%	0.0%
Rehabilitation–Cognitive	1.2%	26.2%	53.8%	18.8%
Rehabilitation–Medical	3.8%	26.2%	43.8%	26.2%
Counseling	17.6%	21.2%	41.2%	20.0%
Other	3.8%	2.5%	2.5%	5.0%
5. Please indicate the importance of an applicant's prior assessment experience.				
	Essential	Very Important	Somewhat Important	Not Important
Neuropsychological				
Flexible Battery/Functional Systems	51.2%	33.8%	12.5%	2.5%
Fixed Battery (e.g., Halstead-Reitan)	5.0%	20.0%	42.5%	32.5%
Process Approach	8.8%	36.2%	42.5%	12.5%
Personality				
Objective (e.g., MMPI-2, PAI)	27.4%	48.8%	18.8%	5.0%
Projective (e.g., Rorschach)	3.8%	7.5%	21.2%	67.5%
Vocational/Everyday Functional	1.2%	15.0%	57.6%	26.2%
Other	7.5%	1.2%	2.5%	3.8%

(Continued)

Table 3. Continued.

6. Please indicate the importance of the following items regarding an applicant's graduate school educational background.

	Essential	Very Important	Somewhat Important	Not Important
Curriculum follows HC guidelines	16.2%	40.0%	17.6%	26.2%
Teaching faculty/supervisors are neuropsychologists	30.0%	31.2%	25.0%	13.8%
Letters of recommendation are written by a neuropsychologist	27.6%	35.0%	16.2%	21.2%
Completed at least one practicum in neuropsychology	61.2%	12.6%	15.0%	11.2%
Completed two or more practica in neuropsychology	22.4%	38.8%	20.0%	18.8%
Diversity in type/setting of practica in neuropsychology	7.5%	50.0%	30.0%	12.5%
Dissertation topic in the field of neuropsychology	11.2%	31.2%	23.8%	33.8%
Dissertation proposal scheduled prior to internship	57.5%	22.5%	15.0%	5.0%
Dissertation proposal approved prior to internship	63.8%	22.5%	11.2%	2.5%
Dissertation data collected prior to internship	6.2%	50.0%	33.8%	10.0%
Dissertation data analyzed prior to internship	1.2%	30.0%	47.6%	21.2%
Dissertation defense scheduled prior to internship	1.2%	16.2%	41.3%	41.3%
Dissertation defended prior to internship	1.2%	12.5%	38.8%	47.5%
Received honors/awards	0.0%	15.0%	53.8%	31.2%
Other	3.8%	2.5%	0.0%	5.0%

7. Please indicate the desirability of the following doctoral degrees (presume from APA-accredited program, where applicable).

	Preferred	Acceptable	Not Acceptable
PhD in Clinical Psychology	91.2%	8.8%	0.0%
PsyD in Clinical Psychology	56.2%	42.6%	1.2%
PhD in Counseling Psychology	22.5%	65.0%	12.5%
Edd/PhD in School/Educational Psychology	3.8%	42.4%	53.8%
PhD in Other (e.g., psychobiology, neuroscience)	5.0%	36.2%	58.8%

8. Please indicate the importance of prior research activity (i.e., publications or conference presentations).

	Essential	Very Important	Somewhat Important	Not Important
Publications in referred journals	5.0%	31.2%	48.8%	15.0%
Presentations at national or international conferences	10.0%	33.8%	46.2%	10.0%
INS	0.0%	16.2%	60.0%	23.8%
NAN	0.0%	13.8%	60.0%	26.2%
AACN	0.0%	11.2%	62.6%	26.2%
SCN	0.0%	10.0%	62.5%	27.5%
Peer-reviewing manuscripts	0.0%	16.2%	46.2%	37.6%
Other scholarly activities	5.0%	5.0%	7.5%	10.0%

9. Please indicate the MINIMUM and AVERAGE number of hours of direct neuropsychological assessment, hours of direct psychotherapy or other interventions, integrated reports, peer-reviewed first- and co-authored publications, as well as paper/workshop and poster presentations for a competitive applicant to your internship.

	Minimum		Average	
	<i>M (SD)</i>	Range	<i>M (SD)</i>	Range
Neuropsychological Assessment (hours)	187 (219) ^a	0–1500	312 (313) ^a	0–2000
Intervention/Psychotherapy (hours)	259 (167) ^b	0–800	405 (240) ^b	0–1000
Integrated Reports	19.9 (56.2) ^a	0–500	29.8 (22.3) ^a	2–100
First-authored Publications	0.3 (0.6) ^b	0–2	1.5 (1.4) ^a	0–7
Co-authored Publications	0.6 (1.0) ^b	0–5	2.5 (1.8) ^a	0–8
Paper/Workshop Presentations	0.5 (0.9) ^b	0–4	2.0 (1.9) ^a	0–8
Poster Presentations	1.1 (1.5) ^b	0–8	4.1 (2.9) ^c	0–15

Notes: GPA = grade point average, ANST = Association of Neuropsychology Students and Trainees, MMPI-2 = Minnesota Multiphasic Personality Inventory–2, PAI = Personality Assessment Inventory, HC = Houston Conference, INS = International Neuropsychological Society, NAN = National Academy of Neuropsychology, AACN = American Academy of Clinical Neuropsychology, SCN = Society for Clinical Neuropsychology (APA Division 40).

^a *n* = 78.

^b *n* = 79.

^c *n* = 77.

Cross-Sectional Comparison of Selection Criteria by HC Guidelines Endorsement, Maximum Percentage of Neuropsychology Training, Internship Setting, and Patient Demographic (2020)

Cross-sectional comparisons demonstrated significant differences within the 2020 sample based on several characteristics: HC guidelines endorsement (yes vs. no; “unsure” responses were excluded), maximum percentage of time spent training in neuropsychology ($\geq 50\%$ vs. $< 50\%$), internship setting, and patient demographic. Additional group comparisons were conducted based on geographic region; however, no significant differences were found. Table 4 shows a summary of the cross-sectional comparisons.

Training directors and supervising neuropsychologists consistently prioritized clinical experience in assessment and the personal interview as the two most important criteria for competitive applicants with considerable variability across other selection criteria depending on the internship setting. Notably, two of the three additional criteria added in the 2020 survey (i.e., Letters of Recommendation Written by a Neuropsychologist and Clinical Experience—Cultural Sensitivity) were ranked in the top half of most prioritized criteria by most respondents. All rank-order lists regarding prior neuropsychology practicum settings and psychotherapy/treatment experience were significantly correlated across groups, with the exception of programs meeting HC guidelines preferring different types of prior psychotherapy experience (cognitive/neurorehabilitation) and UAMC, VAMC, and pediatric-focused internship programs preferring prior neuropsychology practicum experience. Although prior neuropsychological practica at UAMCs, VAMCs, and private or community-based hospitals/clinics were similarly prioritized across all training settings, internship programs within UAMCs and VAMCs preferred experience at rehabilitation facilities, whereas programs within other settings preferred experience at a psychiatric/state hospital and independent/group private practices. Additionally, prior neuropsychological practica at UAMCs, private or community-based hospitals/clinics, and rehabilitation facilities were similarly preferred by internship programs providing services to pediatric and adult/geriatric populations. However, pediatric-focused internship programs desired prior experience at psychiatric/state hospitals and independent/group private practices, whereas adult/geriatric-focused programs preferred prior experience at rehabilitation facilities.

Training programs offering $\geq 50\%$ time spent training in neuropsychology, internship programs within UAMCs, and programs who endorsed meeting the HC guidelines reported higher than average numbers of board-certified clinical neuropsychologists on staff compared to programs offering $< 50\%$ training in neuropsychology, within other settings, or not meeting the HC guidelines, respectively. Respondents from training programs within UAMCs, programs offering $\geq 50\%$ time spent training in neuropsychology, and programs who reported meeting the HC guidelines similarly prioritized clinical experience in assessment, the personal interview, neuropsychology specialization during graduate school, and letters of recommendation written by neuropsychologists. Additionally, these programs prioritized prior practicum treatment experience in cognitive-behavioral therapy, cognitive/neurorehabilitation, and group therapy at either a UAMC, VAMC, or private or community-based hospital or clinic. These programs preferred more experience with flexible batteries and the Boston process approach and emphasized specialization in neuropsychology during graduate school (e.g., HC curriculum, neuropsychology faculty and supervisors, letters of recommendation written by neuropsychologists, completion of multiple neuropsychology practica). Most notably, these programs also preferred trainees’ dissertations to be focused on neuropsychology. Programs with $\geq 50\%$ neuropsychology training, those who endorsed meeting the HC guidelines, and programs at UAMCs expected a higher degree of research productivity during graduate school (e.g., publications, conference presentations). Further, internships offering $\geq 50\%$ time spent training in neuropsychology and those who endorsed meeting the HC guidelines reported higher average number of integrated reports and poster presentations. Lastly, internships with $\geq 50\%$ neuropsychology training reported a higher average number of direct neuropsychological assessment hours, whereas those who reported meeting the HC guidelines reported a higher average number of co-authored publications from their competitive applicants. There was no significant difference in expected average number of neuropsychological assessment hours between programs following the HC guidelines and those who do not, but programs not following the HC guidelines expected significantly more intervention/psychotherapy hours from applicants than those who endorsed following the HC guidelines.

In contrast, VAMCs demonstrated a preference for objective personality assessment in addition to experience with flexible battery approaches. VAMCs prioritized specialization in neuropsychology during graduate school, though not to the same degree as respondents from UAMCs and programs offering $\geq 50\%$ time spent training in neuropsychology. More specifically, these programs did not prioritize a dissertation focused on a neuropsychology-related topic and did not as strongly prefer a high degree of research productivity.

Internships specializing in adult/geriatric and lifespan patient populations more often considered objective personality assessment as essential or very important compared to pediatric-focused programs. Additionally, internships specializing in pediatric patient populations more often considered applicants from doctoral programs in school or educational psychology as preferred or acceptable compared to internships specializing in adult/geriatric or lifespan patient populations. Lifespan-focused

Table 4. Cross-sectional comparisons of internships offering specialized training in clinical neuropsychology (2020)

	HC Guidelines		Intensity of NP Training		Setting		Patient Demographic			
	Yes (n=49) ^a	No (n=16) ^a	≥50% (n=40) ^a	<50% (n=40) ^a	UAMC (n=22) ^{c,d}	VAMC (n=34) ^{b,e}	Other (n=24) ^{a,e}	Pediatric (n=16) ^{f,g}	Adult (n=54) ^{f,h}	Lifespan (n=10) ^{g,h}
Mean Number (SD) of Board-Certified Neuropsychologists	1.7 (1.4)^{***}	0.2 (0.4)^{***}	1.9 (1.4)^{***}	0.3 (0.6)^{***}	1.7 (1.2)^{**}	1.3 (1.5)^{**}	0.2 (0.5)^{**}	1.0 (1.4)	1.2 (1.4)	0.4 (0.7)

1. Please rank the following items in order of importance when considering an applicant for the neuropsychology rotation at your internship (most important = 1; least important = 14).

	Yes (n=49) ^a	No (n=16) ^a	≥50% (n=40) ^b	<50% (n=40) ^b	UAMC (n=22) ^{c,d}	VAMC (n=34) ^{b,e}	Other (n=24) ^{a,e}	Pediatric (n=16) ^{f,g}	Adult (n=54) ^{f,h}	Lifespan (n=10) ^{g,h}
Clinical Experience—Assessment	1	1	1	1	1	1	1	1	1	1
Personal Interview (i.e., interpersonal characteristics)	2	2	2	2	3	2	2	2	2	2
Letters of Recommendation Written by a Neuropsychologist	3	7	4	8	4	3	9	9	3	5
Neuropsychology Curriculum During Graduate School	4	6	3	6	2	6	8	3	6	3
Personal Statement (i.e., professional goals/interests)	5	3	5	7	6	4	6	8	4	6
Clinical Experience—Intervention/Therapy	6	5	6	3	5	5	4	4	5	8
Letters of Recommendation	7	8	7	9	8	7	7	7	8	7
Clinical Experience—Cultural Sensitivity (i.e., multicultural competence)	8	10	8	4	7	9	3	6	7	4
Review of Work Samples (e.g., sample clinical reports, integrated reports)	9	4	10	5	10	8	5	5	9	9
Publications/Presentation (i.e., research competence)	10	9	9	10	9	10	10	11	10	10
Graduate School GPA	11	13	11	11	11	12	11	10	12	11
Familiarity with Applicant's Supervisor	12	11	12	12	12	11	12	12	11	12
Participation in Student Groups or Leadership Roles (e.g., ANST)	13	12	13	13	13	13	13	13	13	13
Other	14	14	14	14	14	14	14	14	14	14

2. Please rank the desirability of the following types of neuropsychology practicum experience completed prior to internship when considering an applicant for your internship (most preferred = 1; least preferred = 8).

	Yes (n=49) ⁱ	No (n=16) ⁱ	≥50% (n=40) ^j	<50% (n=40) ^j	UAMC (n=22) ^{k,l}	VAMC (n=34) ^{b,m}	Other (n=24) ^{l,m}	Pediatric (n=16) ^{n,o}	Adult (n=54) ^{n,p}	Lifespan (n=10) ^{o,p}
UAMC	1	1	1	1	1	2	1	1	2	1
VAMC	2	2	2	2	4	1	4	7	1	4
Private or Community-Based Hospital or Clinic	3	3	3	3	2	4	2	2	3	2
Rehabilitation Facility	4	4	3	5	2	3	7	3	4	2
Psychiatric or State Hospital	5	6	5	4	5	5	3	4	5	5
Independent or Group Private Practice	6	7	6	7	6	6	4	4	6	7
University or College Clinic	7	5	7	6	7	7	4	6	7	6
Other	8	8	8	8	8	8	8	8	8	8

3. Please rank the desirability of the following types of psychotherapy/treatment experience completed prior to internship when considering an applicant for your internship (most preferred = 1; least preferred = 8).

	Yes (n=49) ^q	No (n=16) ^q	≥50% (n=40) ^r	<50% (n=40) ^r	UAMC (n=22) ^{s,t}	VAMC (n=34) ^u	Other (n=24) ^u	Pediatric (n=16) ^{v,w}	Adult (n=54) ^{v,x}	Lifespan (n=10) ^{w,x}
Cognitive-Behavioral Therapy	1	1	1	1	1	1	1	1	1	1
Cognitive/Neurorehabilitation	2	6	2	3	2	3	3	3	3	3
Group Therapy	3	2	3	2	3	2	2	2	2	2
Family Therapy	4	5	4	4	4	6	4	4	5	4
Couple Therapy	5	4	6	5	6	4	6	6	4	6
Biofeedback Therapy	6	7	5	7	6	5	7	5	7	7
Psychodynamic Therapy	7	3	7	6	7	7	5	7	6	5
Other	8	8	8	8	8	8	8	8	8	8

(Continued)

Table 4. Continued

4. Please indicate the importance of an applicant's prior experience with the following types of patients (assessment and/or intervention).

	Essential or Very Important									
	HC Guidelines		Intensity of NP Training		Setting		Patient Demographic			
	Yes (n=49)	No (n=16)	≥50% (n=40)	<50% (n=40)	UAMC (n=22)	VAMC (n=34)	Other (n=24)	Adult (n=54)	Lifespan (n=10)	
Clinical Neuropsychology—Overall	98.0%***	62.5%***	97.5%***	67.5%***	90.9%***	94.1%***	58.3%***	75.0%	85.2%	80.0%
Neurology Referral	83.7%	62.5%	87.5%***	55.0%***	86.4%***	82.4%***	41.7%***	62.5%	72.2%	80.0%
Psychiatry Referral	71.4%	50.0%	70.0%	52.5%	68.2%***	82.4%***	25.0%***	50.0%	68.5%	40.0%
General Medicine Referral	87.8%***	56.3%***	90.0%***	52.5%***	86.4%***	88.2%***	33.3%***	62.5%	77.8%	50.0%
Clinical Psychology	79.6%	81.3%	80.0%	85.0%	86.4%	79.4%	83.3%	100%	77.8%	80.0%
Counseling	26.5%	50.0%	27.5%*	31.8%*	31.8%	32.4%	54.2%	31.2%	38.9%	50.0%
Rehabilitation—Cognitive	34.7%	18.8%	40.0%*	15.0%*	45.5%	23.5%	16.7%	37.5%	24.1%	30.0%
Rehabilitation—Medical	36.7%	25.0%	42.5%*	17.5%*	45.5%	26.5%	20.8%	25.0%	29.6%	40.0%
Other	4.1%	12.5%	7.5%	5.0%	4.5%	2.9%	12.5%	18.8%	3.7%	0.0%

5. Please indicate the importance of an applicant's prior assessment experience.

	Essential or Very Important									
	HC Guidelines		Intensity of NP Training		Setting		Patient Demographic			
	Yes (n=49)	No (n=16)	≥50% (n=40)	<50% (n=40)	UAMC (n=22)	VAMC (n=34)	Other (n=24)	Adult (n=54)	Lifespan (n=10)	
Neuropsychological	91.8%	75.0%	95.0%*	75.0%*	90.9%	88.2%	75.0%	87.5%	87.0%	70.0%
Flexible Battery/ Functional Systems	26.5%	18.8%	35.0%*	15.0%*	36.4%	20.6%	20.8%	6.2%	31.5%	20.0%
Fixed Battery (e.g., Halstead-Reitan)	53.1%	31.3%	60.0%*	30.0%*	68.2%*	35.3%*	37.5%*	56.2%	44.4%	30.0%
Personality	69.4%	81.3%	72.5%	80.0%	54.5%*	82.4%*	87.5%*	50.0%*	81.5%*	90.0%*
Objective (e.g., MMPI-2, PAI)	0.0%*	18.8%*	0.0%*	22.5%*	0.0%*	2.9%*	33.3%*	25.0%	5.6%	20.0%
Projective (e.g., Rorschach)	20.4%	12.5%	27.5%*	5.0%*	27.3%	8.8%	16.7%	12.5%	20.4%	0.0%
Vocational/Everyday Functional	4.1%	18.8%	7.5%	10.0%	0.0%	5.9%	20.8%	18.8%	5.6%	10.0%
Other										

6. Please indicate the importance of the following items regarding an applicant's graduate school educational background.

	Essential or Very Important									
	HC Guidelines		Intensity of NP Training		Setting		Patient Demographic			
	Yes (n=49)	No (n=16)	≥50% (n=40) ^a	<50% (n=40)	UAMC (n=22)	VAMC (n=34)	Other (n=24)	Adult (n=54)	Lifespan (n=10)	
Curriculum follows HC guidelines	81.6%***	25.0%***	90.0%***	22.5%***	90.9%***	58.8%***	20.8%***	56.2%	59.3%	40.0%
Teaching faculty/supervisors are neuropsychologists	79.6%***	37.5%***	80.0%***	42.5%***	81.8%***	67.6%***	33.3%***	56.2%	64.8%	50.0%
Letters of recommendation are written by a neuropsychologist	83.7%***	25.0%***	87.5%***	37.5%***	81.8%***	73.5%***	29.2%***	56.2%	66.7%	50.0%
Completed at least one practicum in neuropsychology	95.9%***	50.0%***	97.5%***	50.0%***	90.9%***	91.2%***	33.3%***	68.8%*	81.5%*	40.0%*
Completed two or more practica in neuropsychology	85.7%***	25.0%***	90.0%***	32.5%***	90.9%***	70.6%***	20.8%***	56.2%	68.5%	30.0%
Diversity in type/setting of practica in neuropsychology	65.3%	43.8%	65.0%	50.0%	63.6%	67.7%	37.5%	62.5%	59.3%	40.0%
Dissertation topic in the field of neuropsychology	59.2%***	18.8%***	67.5%***	17.5%***	72.7%***	44.1%***	12.5%***	31.2%	48.2%	30.0%
Dissertation proposal scheduled prior to internship	91.8%	81.3%	82.5%	77.5%	77.3%	88.2%	70.6%	79.6%	79.6%	80.0%
Dissertation proposal approved prior to internship	55.1%	75.2%	92.5%	80.0%	90.9%	88.2%	79.2%	81.2%	88.9%	80.0%
Dissertation data collected prior to internship	28.6%	31.3%	30.0%	32.5%	59.1%	52.9%	58.3%	56.2%	53.7%	70.0%
Dissertation data analyzed prior to internship	12.2%	18.8%	15.0%	20.0%	40.9%	20.6%	37.5%	37.5%	25.9%	50.0%
Dissertation defense scheduled prior to internship	10.2%	12.5%	10.0%	17.5%	9.1%	14.7%	16.7%	6.2%	16.7%	30.0%
Dissertation defended prior to internship	16.3%	18.8%	17.5%	12.5%	27.3%	8.8%	12.5%	12.5%	13.0%	30.0%
Received honors/awards	2.0%	6.3%	2.5%	10.0%	0.0%	5.9%	12.5%	6.2%	7.4%	0.0%
Other										

(Continued)

Table 4. Continued

7. Please indicate the desirability of the following doctoral degrees (presume from APA-accredited program, where applicable).
Preferred or Acceptable

	HC Guidelines		Intensity of NP Training		Setting			Patient Demographic		
	Yes (n=49)	No (n=16)	≥50% (n=40) ^a	<50% (n=40)	UAMC (n=22)	VAMC (n=34)	Other (n=24)	Pediatric (n=16)	Adult (n=54)	Lifespan (n=10)
PhD in Clinical Psychology	100%	100%	100%	100%	100%	100%	100%	100%	100%	100%
PsyD in Clinical Psychology	98.0%	100%	100%	97.5%	100%	100%	95.8%	100%	100%	90.0%
PhD in Counseling Psychology	85.7%	87.5%	87.5%	87.5%	77.3%	91.2%	91.7%	93.8%	87.0%	80.0%
EdD/PhD in School/Educational Psychology	34.7% *	62.5% *	30.0% **	62.5% **	50.0% **	23.5% **	75.0% **	93.8% **	29.6% **	60.0% **
PhD in Other (e.g., psychobiology, neuroscience)	36.7%	50.0%	30.0% *	52.5% *	31.8%	38.2%	54.2%	43.8%	37.0%	60.0%

8. Please indicate the importance of prior research activity (i.e., publications or conference presentations).
Essential or Very Important

	HC Guidelines		Intensity of NP Training		Setting			Patient Demographic		
	Yes (n=49)	No (n=16)	≥50% (n=40) ^a	<50% (n=40)	UAMC (n=22)	VAMC (n=34)	Other (n=24)	Pediatric (n=16)	Adult (n=54)	Lifespan (n=10)
Publications in referred journals	42.9%	31.3%	47.5% *	25.0% *	54.6%	29.4%	29.2%	50.0%	31.5%	40.0%
Presentations at national or international conferences	57.1%	31.3%	65.0% **	22.5% **	63.6% *	44.1% *	25.0% *	43.8%	44.4%	40.0%
INS	24.5%	6.3%	22.5% *	10.0% *	31.8% *	14.7% *	4.2% *	12.5%	18.5%	10.0%
NAN	20.4%	6.3%	20.0% *	7.5% *	27.3% *	14.7% *	0.0% *	12.5%	16.7%	0.0%
SCN	14.3%	6.3%	17.5% *	2.5% *	27.3% **	5.9% **	0.0% **	18.8%	9.3%	0.0%
AACN	16.3%	6.3%	15.0%	7.5%	22.7%	8.8%	4.2%	12.5%	13.0%	0.0%
Peer-reviewing manuscripts	20.4%	12.5%	17.5%	15.0%	36.4% *	8.8% *	8.3% *	25.0%	13.0%	20.0%
Other scholarly activities	10.2%	12.5%	10.0%	10.0%	9.1%	11.8%	8.3%	18.8% *	7.4% *	10.0% *

9. Please indicate the AVERAGE number of hours of direct neuropsychological assessment, hours of direct psychotherapy or other interventions, integrated reports, peer-reviewed first- and co-authored publications, as well as paper/workshop and poster presentations for a competitive applicant to your internship.
M (SD)

	HC Guidelines		Intensity of NP Training		Setting			Patient Demographic		
	Yes (n=49)	No (n=16)	≥50% (n=40) ^a	<50% (n=40)	UAMC (n=22)	VAMC (n=34)	Other (n=24)	Pediatric (n=16)	Adult (n=54)	Lifespan (n=10)
Neuropsychological Assessment (hours)	382 (242)	262 (479)	443 (359)***	181 (185)***	439 (251)	288 (231)	225 (424)	287 (287)	322 (321)	297 (337)
Intervention/Psychotherapy (hours)	351 (230)**	559 (223)**	367 (254)	442 (222)	350 (220)	463 (264)	375 (213)	410 (256)	419 (247)	322 (172)
Integrated Reports	38.9 (22.5)**	14.0 (12.4)**	41.1 (23.0)***	18.5 (14.9)***	38.8 (19.2)**	32.0 (24.6)**	18.0 (16.8)**	27.9 (17.3)	31.4 (23.2)	24.00 (25.8)
First-authored Publications	1.6 (1.3)	1.3 (1.5)	1.6 (1.3)	1.5 (1.5)	2.1 (1.7)	1.2 (1.1)	1.4 (1.4)	1.8 (1.6)	1.4 (1.4)	1.8 (1.6)
Co-authored Publications	2.9 (1.5)**	1.4 (1.6)**	2.9 (1.5)	2.1 (2.0)	3.1 (1.3)	2.5 (1.9)	2.1 (2.0)	2.8 (2.0)	2.5 (1.7)	2.1 (1.8)
Paper/Workshop Presentations	1.9 (1.9)	1.4 (1.1)	2.2 (2.1)	1.8 (1.6)	1.9 (1.6)	2.1 (2.1)	2.1 (1.7)	2.7 (2.3)	1.9 (1.8)	1.4 (1.0)
Poster Presentations	4.8 (3.1)**	2.6 (1.9)**	4.8 (3.0)**	3.7 (2.5)** ^{xy}	4.8 (3.1)	4.2 (2.6)	3.3 (2.8)	4.1 (2.9)	4.0 (2.8)	4.4 (3.2)

Notes: Bolded coefficients represent significant differences. HC = Houston Conference, NP = neuropsychology, UAMC = university-affiliated medical center, VAMC = Veteran Affairs medical center, GPA = grade point average, ANST = Association of Neuropsychology Students and Trainees, MMPI-2 = Minnesota Multiphasic Personality Inventory-2, PAI = Personality Assessment Inventory, APA = American Psychological Association, INS = International Neuropsychological Society, NAN = National Academy of Neuropsychology, AACN = American Academy of Clinical Neuropsychology, SCN = Society for Clinical Neuropsychology (APA Division 40).

a-k-o-x p < .05.
l-n,q p > .05.
* p < .05.
** p < .01.
*** p < .001.

Table 5. Longitudinal comparison of internships offering $\geq 50\%$ training in neuropsychology (2000–2020)

1. Please rank the following items in order of importance when considering an applicant for the neuropsychology rotation at your internship (most important = 1; least important = 10).			
	2000 ^{a,b} (n=40)	2012 ^{a,c} (n=75)	2020 ^{b,c} (n=40)
Clinical Experience–Assessment	1	1	1
Personal Interview (i.e., interpersonal characteristics)	3	3	2
Neuropsychology Curriculum During Graduate School	2	2	3
Letters of Recommendation	4	4	4
Clinical Experience–Intervention/Therapy	7	7	5
Personal Statement (i.e., professional goals/interests)	5	6	6
Publications/Presentation (i.e., research competence)	6	5	7
Review of Work Samples (e.g., sample clinical reports, integrated reports)	9	9	8
Graduate School GPA	10	10	9
Familiarity with Applicant’s Supervisor	8	8	10
2. Please rank the desirability of the following types of neuropsychology practicum experience completed prior to internship when considering an applicant for your internship (most preferred = 1; least preferred = 5).			
	2000 ^{d,e} (n=40)	2012 ^{d,f} (n=75)	2020 ^{e,f} (n=40)
UAMC	1	1	1
VAMC	2	2	2
Private or Community-Based Hospital or Clinic	3	4	3
Rehabilitation Facility	4	3	4
Independent or Group Private Practice	5	5	5
3. Please rank the desirability of the following types of psychotherapy/treatment experience completed prior to internship when considering an applicant for your internship (most preferred = 1; least preferred = 5).			
	2000 ^{g,h} (n=40)	2012 ^{g,i} (n=75)	2020 ^{h,i} (n=40)
Cognitive-Behavioral Therapy	1	1	1
Cognitive/Neurorehabilitation	2	2	2
Group Therapy	3	3	3
Biofeedback Therapy	4	4	4
Psychodynamic Therapy	5	5	5
4. Please indicate the importance of an applicant’s prior experience with the following types of patients (assessment and/or intervention).			
	Essential or Very Important		
	2000 (n=40)	2012 (n=75)	2020 (n=40)
Clinical Neuropsychology–Overall	97.5%	98.6%	97.5%
Neurology Referral	95.0%	91.9%	87.5%
Psychiatry Referral	77.5%	86.6%	70.0%
Clinical Psychology	72.5%	60.8%	80.0%
Rehabilitation–Cognitive	25.0%	29.8%	40.0%
Rehabilitation–Medical	47.5%	47.3%	42.5%
Counseling	30.0%	24.6%	27.5%
5. Please indicate the importance of an applicant’s prior assessment experience.			
	Essential or Very Important		
	2000 (n=40)	2012 (n=75)	2020 (n=40)
Neuropsychological			
Flexible Battery/Functional Systems	80.0%	86.5%	95.0%
Fixed Battery (e.g., Halstead-Reitan)	37.5%	28.7%	35.0%
Process Approach	60.0%	67.1%	60.0%
Personality			
Objective (e.g., MMPI-2, PAI)	90.0%	82.4%	72.5%
Projective (e.g., Rorschach)	20.0%*	9.5%*	0.0%*
Vocational/Everyday Functional	27.5%	27.4%	27.5%

(Continued)

programs did not as strongly prefer completion of neuropsychological practica or trainees earning a PsyD in Clinical Psychology compared to pediatric- and adult/geriatric-focused programs. All other comparisons based on the internship program’s patient demographic across the survey variables were not statistically significant.

Table 5. Continued

6. Please indicate the importance of the following items regarding an applicant's graduate school educational background.			
	Essential or Very Important		
	2000 (n=40)	2012 (n=75)	2020 (n=40)
Curriculum follows HC guidelines	82.5%	79.7%	90.0%
Teaching faculty/supervisors are neuropsychologists	87.5%	90.5%	80.0%
Letters of recommendation are written by a neuropsychologist	85.0%	93.3%	87.5%
Dissertation proposal approved prior to internship	92.5%	91.9%	92.5%
Dissertation defended prior to internship	27.5%**	37.9%**	10.0%**
7. Please indicate the desirability of the following doctoral degrees (presume from APA-accredited program, where applicable).			
	Preferred or Acceptable		
	2000 (n=40)	2012 (n=75)	2020 (n=40)
PhD in Clinical Psychology	100%	100%	100%
PsyD in Clinical Psychology	87.5%	94.6%	100%
PhD in Counseling Psychology	75.0%	86.5%	87.5%
PhD in Other (e.g., psychobiology, neuroscience)	52.5%	41.1%	30.0%
EdD/PhD in School/Educational Psychology	15.0%***	52.7%***	30.0%***
8. Please indicate the importance of prior research activity (i.e., publications or conference presentations).			
	Essential or Very Important		
	2000 (n=40)	2012 (n=75)	2020 (n=40)
Publications in referred journals	42.5%	48.6%	47.5%
Presentations at national or international conferences	50.0%	54.4%	65.0%
INS	47.5%*	51.4%*	22.5%*
NAN	40.0%*	43.2%*	20.0%*
SCN	45.0%*	43.3%*	17.5%*
9. Please indicate the AVERAGE number of hours of direct neuropsychological assessment, hours of direct psychotherapy or other interventions, integrated reports, peer-reviewed first- and co-authored publications, as well as paper/workshop and poster presentations for a competitive applicant to your internship.			
	M (SD)		
	2000 (n=40)	2012 (n=75)	2020 (n=40)
Neuropsychological Assessment (hours)	–	575 (506)	443 (359)
Publications	1.4 (1.2)**	1.7 (1.1)**	2.3 (1.4)**
Presentations	2.5 (1.8)**	3.9 (2.4)**	3.5 (2.6)**

Notes: Bolded coefficient represent significant differences. UAMC = university-affiliated medical center, VAMC = Veteran Affairs medical center, MMPI-2 = Minnesota Multiphasic Personality Inventory-2, PAI = Personality Assessment Inventory, HC = Houston Conference, INS = International Neuropsychological Society, NAN = National Academy of Neuropsychology, SCN = Society for Clinical Neuropsychology (APA Division 40).

^{a-i} $r_s \geq .90, p < .001$.

* $p < .05$.

** $p < .01$.

*** $p < .001$.

Longitudinal Comparison of Selection Criteria for Internships Offering $\geq 50\%$ Time Spent Training in Neuropsychology (2000–2020)

Table 5 shows a summary of the longitudinal comparisons between 2000, 2012, and 2020 for internships offering a maximum of $\geq 50\%$ time spent training in neuropsychology. For these programs, the prioritization of specific didactic and experiential criteria has remained consistent and reliable between 2000 and 2020 ($r_s \geq .90, p < .001$). Additionally, expectations for applicants' prior neuropsychology practicum settings and psychotherapy/treatment experience were highly correlated across all three time points ($r_s \geq .90, p < .001$). Clinical experience in assessment, the personal interview, neuropsychology specialization in graduate school, and letters of recommendation were consistently ranked as the top four selection criteria. Statistically significant differences in levels of importance between the 2000, 2012, and 2020 survey responses notably include reduced preference of experience with projective personality assessment and a lower number of respondents expecting an applicant's dissertation to be defended prior to starting internship. Finally, the mean number of publications for competitive applicants has steadily increased over time, with the highest number reported in 2020 ($M = 2.3$), and the mean number of conference presentations showed the greatest increase between 2000 and 2012.

Discussion

Given the increasing educational opportunities for trainees looking to specialize in neuropsychology, the present study expanded upon internship programs' expectations of applicants, as well as other educational, clinical, and research experiences established by Mittenberg and colleagues (2000) and Ritchie and colleagues (2012), that training directors and supervising neuropsychologists prioritize when considering applicants for doctoral internship programs offering training in neuropsychology. The present study highlights three important themes from this periodic review of the internship selection criteria: diversity in training opportunities for trainees interested in engaging with neuropsychology during internship, the importance of fit between the trainee and the training program, and consistency over time for training programs offering $\geq 50\%$ time spent training in neuropsychology.

Greater Diversity in Training Opportunities and Selection Criteria

The present survey collected responses from a much more diverse sample of internship programs in North America compared to previous studies, with half of respondents working at programs offering $< 50\%$ (but at least 5%–10%) time spent training in neuropsychology. It is worth noting that the taxonomy described by Sperling and colleagues (2017) was intended to be descriptive rather than meant to “dictate what particular training sequence is ‘correct’ or appropriate for one individual” (p. 825). However, trainees hoping to obtain a 2-year neuropsychology postdoctoral fellowship and ultimately to pursue board certification in clinical neuropsychology may wish to consider how their internship training could contribute to their professional goals. Further, internship training directors and supervising neuropsychologists are encouraged to discuss with prospective interns how the training experiences offered through their internship program may impact trainees' professional goals.

Thus, the information provided in this manuscript offers the opportunity for trainees to become knowledgeable about internship programs' expectations for competitive applicants, including programs offering $< 50\%$ time spent training in neuropsychology (though applicants should check whether those programs focus on training future neuropsychologists, as many do not). Consequently, the criteria emphasized by training directors and supervising neuropsychologists were more variable across different groups relative to previous surveys; however, a few common themes emerged across all groups. Within the questions asking respondents to rank-order the importance of application materials, two of the newly included criteria were ranked in the top half of most prioritized selection criteria: letters of recommendation written by neuropsychologists and clinical experience with culturally diverse populations. These data suggest that trainees should be encouraged to seek out and build strong professional relationships with neuropsychology faculty and clinical professionals with similar clinical and research interests. Trainees may wish to prioritize work completed with these neuropsychology professionals, with the aim of not only strengthening their neuropsychological acumen but also providing the supervisor with a clear demonstration of the trainees' professional strengths to draw upon for composing a recommendation. Additionally, the results indicate that trainees would benefit from focusing on didactic, clinical, and research opportunities to strengthen their abilities in working with patients from diverse cultural backgrounds, building skills that will not only benefit their personal and professional development but also may be considered more competitive for internship consideration.

Regarding specific preferences for assessment and intervention experience, respondents generally prioritized prior experience with flexible neuropsychological test batteries above fixed batteries and the Boston process approach. The use of fixed batteries in clinical settings has decreased dramatically over the years (Sweet et al., 2015); thus, applicants who are skilled in the administration of individualized or flexible batteries may be preferred to those who use a standard battery for all patients. Additionally, the prioritization of family and couple therapies over psychodynamic and biofeedback therapies suggests that training directors and supervising neuropsychologists may be looking for trainees who have developed their communication and psychoeducational skills with family members and caregivers in addition to patients. These clinical skills are critical during neuropsychological assessment, which often involves obtaining relevant background information from informants, as well as working closely with family members and loved ones in implementing and monitoring the neuropsychologist's suggested recommendations or treatment plan. Further, prior experience with clinical psychology patient referrals for neuropsychological evaluation was rated as more important than experience in administering cognitive rehabilitation. These findings suggest that trainees should bear in mind the importance of having a well-developed foundation in clinical psychology, which may suggest to training directors and supervising neuropsychologists that trainees are adequately prepared to further their neuropsychology training during internship.

When considering a trainee's educational background, the majority of training directors and supervising neuropsychologists preferred some degree of specialization in neuropsychology during graduate school (e.g., curriculum meeting HC guidelines, neuropsychologists for faculty and supervisors, letters of recommendation written by neuropsychologists, at least one neuropsychological practica, diverse neuropsychological practica). Additionally, despite a slightly reduced preference for

research productivity on the rank-order list relative to other identified selection criteria, a significant number of respondents preferred some research productivity, especially presenting at professional conferences. Moreover, the skills required to succeed as a researcher (e.g., critical thinking, planning and organization, written and oral professional communication) prepare even clinically focused students to evaluate, learn, and implement evidence-based assessment practices, treatments, and recommendations in clinical settings (Gelso, 2006).

Importance of fit Between Trainees and Training Programs

When considering the setting of the doctoral internship program, many factors play a role in determining the best fitting program for a trainee, and the present study demonstrated significant variability in what neuropsychology supervisors and training directors prioritized in their applicants across the four categories: endorsement of meeting HC guidelines, maximum percentage of time spent training in neuropsychology, internship setting, and patient demographic. These findings will help trainees tailor their application materials to the type of training program they are seeking. It is worth noting that training programs offering less depth of neuropsychology training likely differ from those offering more training, as their focus is not solely on training students who are pursuing a career in neuropsychology. Applicants are strongly encouraged to carefully review the training brochures offered by each site to determine if those programs list specific criteria that they require for applicants to be considered qualified for the position. This will allow applicants to make informed decisions about the internship programs to which they are applying. Further, they should inquire during the interview process about the types of previous experiences and training opportunities that training directors and supervisors expect of competitive applicants, to ensure that the program is a good fit for the applicant.

Clinical experience in assessment and effective personal communication during the interview were rated the most important among the respondents; however, the additional selection criteria were differentially preferred based on program characteristics. Although prior clinical practicum training in UAMCs and VAMCs were similarly preferred, respondents from internship programs offering $\geq 50\%$ time spent training in neuropsychology and those from UAMCs expected applicants to gain a greater depth of educational, clinical, and research training in neuropsychology during graduate school, relative to other types of internship programs. For example, competitive applicants pursued relevant experience with various assessment approaches, patient referrals, specialization in graduate school, and research productivity. Additionally, internships offering $\geq 50\%$ time spent training in neuropsychology reported the highest average hours of direct neuropsychological assessment experience, number of integrated reports, and number of poster presentations from their competitive applicants. Students hoping to match at internship programs meeting these characteristics are recommended to prioritize these experiences early during graduate school to be competitive on internship. Programs that endorsed meeting the HC guidelines preferred intervention experience in cognitive/neurorehabilitation, greater research productivity, and fewer intervention/psychotherapy hours relative to programs not meeting the HC guidelines, though the expected number of neuropsychological assessment hours was comparable. It should be noted, however, that this analysis is limited by the small sample size of programs that reported their training does not meet HC guidelines.

Trainees hoping to match at VAMCs should focus on clinical experiences with flexible batteries as well as objective personality assessment within a VAMC practicum training setting. Additionally, the results suggest that expectations around neuropsychological specialization and research productivity during graduate school are not quite as high for VAMC internship programs compared to UAMCs and other programs offering $\geq 50\%$ time spent training in neuropsychology, though of course these training experiences are still valued. Furthermore, students who prioritized more generalist clinical psychology training rather than neuropsychological specialization in their clinical, research, and education experiences may be more successful when applying to programs offering $< 50\%$ time spent training in neuropsychology or settings other than a UAMC or VAMC. However, those programs may not be as focused on training future career neuropsychologists, and students may wish to consider whether or not their training goals and anticipated career will align with the goals of these programs, especially if they aim to apply for a 2-year postdoctoral fellowship with specialized training in neuropsychology. Notably, programs in settings other than UAMCs or VAMCs more often prioritized experience with culturally diverse patients, and trainees may wish to prioritize those opportunities when available.

When considering the differences between programs based on the demographics of the patients most often seen, as might be expected, prior experience at a VAMC or with objective personality assessment was less prioritized by training directors and supervising neuropsychologists at programs serving primarily pediatric populations. Additionally, fewer respondents at pediatric- and lifespan-focused training programs prioritized completion of neuropsychology practica during graduate school. Therefore, it may be more important for trainees seeking experience in pediatric neuropsychology on internship to focus on gaining clinical experience with children more generally (i.e., in pediatric intervention/therapy) rather than in pediatric neuropsychological evaluations specifically. Lastly, pediatric- and lifespan-focused internship programs were more open to

accepting students from school and educational psychology graduate programs compared to internship programs treating mostly adult and geriatric patients, again highlighting the importance of clinical and research experience oriented to the specialty of child psychology in general.

Consistency Over Time

Longitudinally, the present findings indicated a high degree of consistency in expectations held by training directors and/or supervising neuropsychologists at programs offering $\geq 50\%$ time spent training in clinical neuropsychology. Over the past 20 years, training directors and supervising neuropsychologists have routinely prioritized assessment experience, interpersonal interview skills, neuropsychological specialization during graduate school, and the professional opinions of trusted mentors and supervisors. Consequently, applicants interested in concentrating their training in neuropsychology need to invest heavily in training in neuropsychological assessment and report writing, and to do so, they should seek out professional mentorship by neuropsychologists. Also, the preferred types of neuropsychology practicum experiences and intervention/therapy experiences expected of applicants were highly consistent, and applicants will likely be more competitive for internship programs if their practicum experiences are within multidisciplinary team settings that focus on neuropsychological patient referrals (e.g., UAMCs, VAMCs, private or community-based hospitals or clinics).

Although research productivity was slightly less prioritized relative to other application components in 2020 on the rank-order list compared to previous years, more than half of these training programs preferred applicants with research publications and presentations. Therefore, trainees hoping to be competitive at training programs offering $\geq 50\%$ time spent training in neuropsychology should continue to engage significantly in research productivity before internship, even if their ultimate career goals are not focused on research. Moreover, training directors and supervising neuropsychologists reported that their competitive applicants have a higher number of accepted publications prior to internship relative to previous surveys; however, it is unclear whether this trend is driven by student perception or expectations of training directors and supervising neuropsychologists. Across all respondents, the mean number of publications for competitive applicants was reported as 1.5, while within internships offering $\geq 50\%$ time spent training in neuropsychology, the mean publication number was 2.3. These findings suggest that even trainees who are preparing for professional careers that are solely clinical should strengthen their competitiveness for matching with their desired internship program by striving for at least two publications accepted prior to beginning internship, with higher expectations for applicants seeking careers more heavily focused on research.

The current findings also complement the results of a recent survey of postdoctoral fellowship training directors in North America from programs offering specialized training in neuropsychology (Driskell, Del Bene, & Sperling, 2021). The survey highlighted the importance of trainees obtaining specialized training and education in neuropsychology during their doctoral program and doctoral internship to be competitive applicants for a 2-year postdoctoral fellowship in neuropsychology. Particularly, respondents prioritized similar applicant selection criteria to doctoral internship training directors and supervising neuropsychologists, including clinical and educational experiences in neuropsychology, letters of recommendation written by neuropsychologists, and personal communication during the interview (Driskell, Del Bene, & Sperling, 2021). Additionally, the results emphasized the importance of having a curriculum and training that follows HC guidelines. Therefore, trainees hoping to specialize in neuropsychology will likely benefit from reviewing these survey findings as they develop a program of training and complete professional milestones (e.g., doctoral training, doctoral internship, postdoctoral fellowship).

Limitations and Future Directions

The present study offers an advantage over previous surveys in its inclusion of a much more diverse range of internship programs compared to previous literature; however, the number of respondents from training programs offering $< 50\%$ time spent training in neuropsychology was not sufficient enough to explore more comprehensively by subgroups. The recruitment process may have been vulnerable to a response bias, in that internship programs offering minimal neuropsychology training experience may have been less likely to participate in this survey. Although it is impossible to know how many internship programs would have qualified for inclusion in the present study, it is likely that the group of programs offering $< 50\%$ neuropsychology training is not as well-represented in these data. Future surveys might consider prioritizing recruitment from programs offering an Exposure (5%–10%), Experience (11%–29%), and Emphasis (30%–49%) in neuropsychology to investigate unique differences between these groups rather than conducting analyses between two groups of programs providing $\geq 50\%$ and $< 50\%$ time spent neuropsychology training time. Additionally, the overall sample was predominantly comprised of respondents from UAMCs and VAMCs, which may have influenced other cross-sectional comparisons. This survey may also provide guidance to students training in countries other than North America, as it would be beneficial for international neuropsychologists to survey training programs within their own country to see how their responses compare to the present results.

When investigating change over time, the 2020 sample was comparable to that of the 2000 sample ($n = 40$), though smaller than the 2012 sample ($n = 75$). Likely contributing to this smaller sample size was the timing of recruitment, which unfortunately fell shortly after the COVID-19 pandemic began. As a result, the generalizability of these findings may be reduced. Importantly, the present study is the first to investigate internship programs' expectations for applicants in programs offering <50% time spent training in neuropsychology; therefore, continued monitoring of the expectations for training programs representing the full spectrum of neuropsychology training opportunities is needed.

Lastly, as described above, the present findings illustrate the importance of cultural sensitivity in trainees, which is crucial for patient care; personal and professional development; and relationships between supervisors, directors, and trainees. Given the importance of clinical experience with culturally diverse patients noted within this study, future studies should investigate more thoroughly the important aspects that comprise clinical experience with diverse patients, as well as the key aspects of cultural identity that impact rapport between trainees, training directors, and supervising neuropsychologists within the application process.

Conclusion

This survey demonstrated that many internship programs follow a generally consistent selection process and consider similar application criteria; however, each program varies among how these criteria are weighted during the application review process. The current findings suggest that many application review committees look for well-rounded applicants with clinical, research, and educational experiences in neuropsychology. Yet, trainees' success during the application process is highly dependent on the unique characteristics and expectations of the training program, which may vary by setting, patient population, and proportion of time offered in neuropsychology training. With continued review and distribution of selection criteria used by internship training directors and supervising neuropsychologists, trainees will be better prepared for success on internship and throughout the rest of their careers. Further, internship programs benefit by communicating their own expectations for applicants, resulting in a better fit between programs and trainees. Finally, the specialty of clinical neuropsychology benefits from communicating clear expectations of training necessary for competency in neuropsychology, as well as how these expectations are manifested in the internship application review process. Ultimately, these data underscore the importance of trainees knowing the training experiences expected of them and actively seeking out and obtaining those experiences. Trainees are encouraged to remain watchful for future changes to professional competencies and guidelines (e.g., Hannay et al., 1998; Smith & CNS, 2019; Sperling et al., 2017) as they will likely be routinely amended to reflect best practices for education and training in clinical neuropsychology.

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Conflict of Interest

None declared.

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