

Supplementary Materials

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Survey

Overview

To better understand the state of the field, we conducted our own anonymous national online survey of clinical psychology Ph.D. students and faculty. Data were collected in April and May 2019, and yielded nearly 600 usable responses from current affiliates of APA-accredited clinical psychology Ph.D. programs residing in 32 U.S. states (426 students, 171 faculty). Respondents had a wide range of expertise, from first-year graduate students to senior faculty with decades of mentorship experience. In addition to the quantitative data summarized in our Review, survey respondents generously provided a wide range of suggestions—nearly 40,000 words of narrative—for enhancing training practices. While this approach is not without some potential limitations (e.g., selection biases), it represents the largest and most comprehensive attempt to discern the state of the field from the perspective of both faculty and students at research-intensive clinical psychology programs in the U.S.

Method

The survey was advertised on the Council of University Directors of Clinical Psychology (CUDCP), Society for Research in Psychopathology (SRP), and Society for a Science of Clinical Psychology (SSCP) listservs and social media. In addition, we emailed the Directors of Clinical Training (DCTs) at every Carnegie Research I institution with an APA-accredited clinical psychology Ph.D. program. The survey was completely anonymous to minimize potential reporting biases. All respondents provided informed written consent and all procedures were approved by the University of Maryland Institutional Review Board.

Participants

- 426 students and 171 faculty ($n=597$)
- 28.5% private institutions
- Faculty (48.5% female)
 - Median=13 years of faculty experience
 - Median=10 supervised students (total to date)
- Students (79.6% female)

Additional Recommendations

Due to journal-imposed word limits, some of our more granular recommendations and suggestions are detailed here.

Recommendation: *Reimagine Multidisciplinary Technical Training*

Increase Access

- **Massive Open Online Courses.**
 - As others have noted, online courses create opportunities for expanding access to specialized technical training (McFall, 2006). Online coursework is particularly useful in situations

where there is insufficient student demand or faculty expertise to warrant traditional classes.

- In some cases, it may be useful to deploy hybrid instructional approaches, where students watch pre-recorded lecture materials and complete learning exercises and knowledge checks outside of the classroom. This would be complemented by hands-on classroom training led by a campus-approved instructor of record. This approach would enable students to receive institutional (i.e., department, university, accreditor, licensing board) credit for training that was partially completed off campus. It would also enable faculty to receive appropriate credit for multi-institutional team-taught courses. Alternatively, students and their mentors could petition the department or graduate school to provide credit for online coursework.
- **Open-Source Software.** Training platforms that incorporate well-supported open-source software tools (e.g., *AFNI*, *R*, *scikit-learn*) are especially valuable because they connect students to international communities of experts, who can provide an additional source of scientific guidance and methodological advice.
- **Winter/Summer Courses.** In some cases, winter and summer courses may be useful, but this should be balanced against students' self-care needs (see Challenge 6).

Increase Utility

- **Maximize Utility and Research Integration.**
 - Survey respondents highlighted the value of student-driven, hands-on technical training, which is typically achieved via traditional one-on-one mentorship in the laboratory. To achieve this at scale, existing courses could be retooled to increase the amount of learning-by-doing and on-demand teaching (e.g., Lombardi et al., 2021; Millman, Brett, Barnowski, & Poline, 2018). Consider a course on Psychometrics. Students could complete readings, watch pre-recorded video lectures, and complete online learning checks outside the classroom. The content and techniques emphasized could be partially informed by student and faculty polls (e.g., conducted several months before the course is delivered). Classroom time could be devoted to question-driven mini-lectures and hands-on exercises (e.g., devise a new psychometric instrument) using real or simulated data. This same recommendation applies to bootcamps and workshops.
 - In some cases, it will be helpful to integrate classroom instruction and ongoing student research projects, for instance, by explicitly allocating a portion of the semester to hands-on mentoring of individual projects.

Increase Efficiency

- **Enhance the undergraduate curriculum.** In the long-run, significant gains in the efficiency of graduate training could be realized by modifying the *undergraduate* curriculum. Integrative course sequences (e.g., pre-clinical psychology, data science, behavioral neuroscience, computational psychology) that lead to specific degrees, minors, or certificates are likely to be highly desirable for undergraduates pursuing a range of careers and, ultimately, would provide the next generation of

doctoral students with the additional time and mentorship necessary to master these increasingly crucial technical skills.

- **Consolidate Coursework.** We encourage programs to eliminate ‘checklist’ coursework and, insofar as possible, develop mechanisms that enable students to satisfy multiple discipline-specific knowledge (DSK) requirements with a single course. This can be accomplished in an integrative manner, by tailoring the title, content, and assessments to specific DSKs (e.g., *Developmental Affective Neuroscience*). Course ‘overlays’ are an alternative approach that can be implemented with more traditional courses, including courses taught by faculty in other departments. In this case, students are required to successfully complete both the course (e.g., *Human Attachment*) and an independent written assessment (‘overlay’) of DSK-specific competency (e.g., developmental aspects of behavior), with the latter organized by clinical faculty in consultation with the course instructor or other subject-matter experts. Foundational knowledge in the affective, biological, cognitive, developmental, and social DSKs can be demonstrated by successful completion of undergraduate coursework or the Psychology Graduate Record Examination.
- **State Licensing Mandates.** We recognize that some state licensing boards mandate a minimum of 3 credit hours per DSK. If programs choose to ignore the local licensure mandate, we urge them to transparently advise students on alternatives and to actively lobby—with partnership with PCSAS and other institutional allies—for updated standards grounded in demonstrated competencies (e.g., thoughtfully designed examinations or simulations), not credit hours.
- **Department Requirements.** In some cases, it will be useful for clinical psychology faculty to encourage refinement of department-level course requirements to maximize compatibility with program requirements and students’ training needs.
- **Multi-Course Sequences.** Thoughtful multi-course approaches and sequences create additional opportunities for strengthening technical training. For example, using a unified conceptual framework (e.g., generalized linear model) and a single open-source software package (e.g., *R*) for a sequence of basic (e.g., regression) and advanced (e.g., multilevel modeling, machine learning) statistics courses sidesteps the need for students to master multiple software packages or programming languages.
- **Create structured flexibility.** Sabbaticals, retirements, leaves, and course buy-outs create additional training barriers. This can be partially mitigated by proactively creating a selection of courses—inside or outside of the department—that students can use to satisfy particular DSKs (‘choose-your-own-adventure’). In some cases, there may be sufficient demand to warrant the development of specialty coursework tracks (e.g., clinical neuroscience, developmental psychopathology). In other cases, individualized development plans (IDPs) make more sense. In contrast to *ad hoc* approaches, intelligently structured tracks and IDPs have the virtue of compelling faculty and students to actively prepare for future instructional needs, including specialized technical and multidisciplinary training that falls outside the scope of traditional DSK requirements.

Supplementary References

- Lombardi, D., Shipley, T. F., Astronomy Team, Biology Team, Chemistry Team, Engineering Team, . . . Physics Team. (2021). The curious construct of active learning. *Psychological Science in the Public Interest*, 22, 8-43.
- McFall, R. M. (2006). Doctoral training in clinical psychology. *Annual Review of Clinical Psychology*, 2, 21-49.
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