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Exploring Postdoctoral Trainee and Faculty Advisor Experiences in a Research-Intensive Pharmacy School: A Qualitative Study

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Abstract

Postdoctoral fellows contribute substantially to grant acquisition, collaborative partnerships, and the supervision of graduate learners while working with mentors who foster their scholarly autonomy. Despite this importance, little is known about postdoctoral experiences, particularly in health professions education. This study aimed to explore the perspectives of postdoctoral fellows and their faculty mentors at a public four-year school of pharmacy and to determine opportunities to strengthen postdoctoral training. Focus groups and individual interviews were used to gather participants' experiences, viewpoints, and recommendations for improvement. Participants included postdoctoral fellows and faculty members serving as postdoctoral mentors. Data were analyzed using thematic coding to identify semantic themes, and summaries of participant perspectives were developed. Findings were aligned with the identity-trajectory framework. Participants reported a range of experiences related to scholarly development, professional networking, and institutional resources. Individual agency emerged as essential for clarifying career objectives and managing professional transitions. The COVID-19 pandemic created distinct challenges, including shifts to remote work and difficulties maintaining motivation and progress toward goals. Identified opportunities for improvement included strengthening infrastructure, improving mentorship practices, and enhancing communication. Postdoctoral fellows are integral to the advancement of academic institutions. Qualitative investigations that examine postdoctoral experiences can assist pharmacy education in more effectively addressing the needs of both fellows and faculty mentors. This study offers insight into the lived experiences of postdoctoral scholars and provides guidance for improving postdoctoral training programs within schools of pharmacy.

Keywords: Postdoctoral, Program evaluation, Qualitative, Pharmacy education, Research

Introduction

Postdoctoral fellows, commonly referred to as "postdocs," are essential contributors to research and innovation within academic settings [1]. With guidance from mentors who support the development of intellectual independence, postdocs enhance institutional research capacity through scholarly output, grant support,

collaborative engagement, and mentorship of graduate students [1, 2]. In exchange, institutions and faculty have a responsibility to provide fair working conditions, adequate compensation, professional recognition, and opportunities for career development [2].

Postdocs hold doctoral-level degrees (e.g., Doctor of Philosophy, Doctor of Pharmacy) and typically engage in activities that foster scholarly independence, disciplinary expertise, and, in some cases, entrepreneurial competencies [1, 3]. Their professional growth is multifactorial and shaped by mentoring relationships, institutional culture, and available resources [1, 4-10]. Supportive research environments, encouragement of career autonomy, and a strong sense of professional identity have been shown to positively influence postdoc

productivity and career outcomes [5, 7, 10]. Nevertheless, limited empirical work has examined postdoctoral development, resulting in an incomplete understanding of how postdocs experience and navigate their training [1].

The identity-trajectory framework emphasizes the importance of individual agency—defined as the capacity to act independently and pursue one's goals—in academic careers [6]. Chen and colleagues identified three interconnected strands of postdoctoral identity-trajectory: intellectual, networking, and institutional, alongside agency [6, 11]. The intellectual strand encompasses activities that build disciplinary expertise, such as research, writing, and formal learning. The networking strand involves cultivating professional relationships and engagement with the broader academic community, including participation in professional organizations, collaborative scholarship, and peer review. The institutional strand reflects responsibilities tied to one's appointment and access to institutional resources, such as teaching roles, committee service, funding, laboratory space, and supervision. Agency captures postdocs' motivations, aspirations, and career intentions, while acknowledging external structural influences beyond their control, including organizational systems, policies, and expectations [6, 11]. Collectively, these components describe the continuous learning and development that occur during postdoctoral training, shaped by both enabling and constraining structures [6].

While postdoctoral development and success have been examined across multiple disciplines [1, 6, 11-13], research focusing on postdoc experiences in the health professions—and particularly in pharmacy and pharmaceutical education—remains limited [14-16]. This gap is notable given the pharmacy's longstanding commitment to postdoctoral training [16, 17]. Additional research is therefore warranted to better understand these experiences [18]. The purpose of this evaluation was to explore the perspectives of postdoctoral fellows and faculty mentors at the UNC Eshelman School of Pharmacy. Findings were interpreted using the identity-trajectory framework [6, 11] and used to generate recommendations for enhancing postdoctoral support within schools of pharmacy.

Materials and Methods

The UNC Eshelman School of Pharmacy maintains a long-standing and expansive postdoctoral training ecosystem, comprising roughly 100 postdoctoral scholars and 60 faculty mentors across five academic divisions: Chemical Biology and Medicinal Chemistry; Pharmacoengineering and Molecular Pharmaceutics; Pharmacotherapy and Experimental Therapeutics; Practice Advancement and Clinical Education; and Pharmaceutical Outcomes and Policy. Postdoctoral appointments are supported through multiple mechanisms. Several trainees participate in National Institutes of Health (NIH)-funded T32 programs, including the NIGMS-supported UNC–Duke Collaborative Clinical Pharmacology Postdoctoral Training Program. Others are funded through industry collaborations with shared mentorship, while additional postdocs receive support via alternative funding sources (e.g., investigator grants, contracts, or awards) and are not affiliated with cohort-based programs. Educational credentials among postdocs vary and include Doctor of Pharmacy (PharmD), Doctor of Philosophy (PhD), and Doctor of Medicine (MD) degrees. PhD-trained fellows originate from a wide range of disciplines, such as chemistry, engineering, public health, library science, and education. The extent and timing of prior training—occurring before, during, or following doctoral study—also differ substantially.

Data collection occurred between March and December 2020 using focus groups and individual interviews to capture detailed perspectives on postdoctoral training experiences. Participants were recruited via email using purposive convenience sampling. Eligibility criteria included a current postdoctoral appointment at the School or current service as a faculty advisor to a postdoc. Faculty mentors were intentionally included to supplement trainee perspectives and provide a more comprehensive understanding of postdoctoral experiences. Seven one-hour focus groups were conducted, including five groups with postdoctoral fellows (n = 18) and two groups with faculty advisors (n = 8). To address scheduling challenges, two additional one-hour individual interviews were completed with postdocs, resulting in a total of 20 trainee participants. Interview guides were designed to solicit reflections on experiences, perceptions, and opportunities for enhancement of postdoctoral training. For example, postdocs were asked, "What have you gained from your postdoc training to date?" while faculty advisors were prompted with, "What strategies do you currently use to support your postdoctoral fellows?" Broad, open-ended questions were used to elicit comprehensive reflections

regardless of training stage, with follow-up probes applied as needed. The timing of the study also enabled exploration of postdoctoral experiences during the COVID-19 pandemic.

All sessions were conducted virtually and transcribed using Zoom [San Jose, CA]. Prior to analysis, data from each stakeholder group were consolidated into separate datasets. One researcher applied inductive thematic analysis to identify semantic patterns within each dataset [19, 20]. This approach emphasized summarizing observable content and organizing findings into interpretive categories [19]. As themes developed, their relevance to the identity-trajectory framework was documented and subsequently used to align findings with the framework, thereby situating results within an established theoretical context. Thematic saturation was reached, yielding a comprehensive representation of the data, with themes consistently observed across participant groups [19-21]. A second researcher independently reviewed a subset of transcripts using the original codebook. Intercoder agreement exceeded 80%, and any discrepancies were resolved through discussion and consensus.

The study protocol was reviewed by the University of North Carolina Institutional Review Board and determined to be exempt as non–human subjects research (IRB #20–0817). Written informed consent was obtained from all participants prior to participation.

Results and Discussion

Postdoctoral participants reported primary specialization in clinical or industry-focused roles (n = 12, 60%), laboratory-based or basic science research (n = 4, 20%), and education or academic pathways (n = 4, 20%). Slightly more than half of the postdocs were in their first year of training (n = 11, 55%), while the remainder were in their second year or beyond (n = 9, 45%). Faculty advisors represented bench/basic science (n = 4, 50%), clinical/industry (n = 3, 38.5%), and education/academia (n = 1, 12.5%). All faculty mentors (n = 8, 100%) reported prior experience supervising more than one postdoctoral fellow during their academic careers.

Fourteen distinct themes were identified through analysis **(Table 1)**, spanning all four components of the identity-trajectory framework. Participants also described areas for improvement and shared insights related to postdoctoral training during the COVID-19 pandemic. Detailed descriptions of each theme are presented below, accompanied by illustrative quotations.

Table 1. Summary of themes from postdoctoral focus groups aligned with the identity-trajectory framework [6, 11]

Element	Definition	Themes Identified	Example Quotes
Intellectual Development	Advancements in one's specialized field of expertise	• Acquisition of Knowledge • Social and Behavioral Competencies • Technical Expertise	- "Definitely gained a lot of new skills in different spaces—like how to write a grant and all the steps that are involved in doing that…" - "The biggest thing for me is just confidence and competence and my own autonomy and self-efficacy within academia"
Professional Networking	Building professional relationships and links to the wider academic community	• Cross-Disciplinary Partnerships • Connections with Former Trainees • Postdoctoral Peer Network	- "Sometimes just asking your peers their experiences, you can just learn so much about what kind of research they're doing, their involvement, and [you're] growing and building your own contacts and just getting to know people"
Organizational Support	Meeting organizational duties and making use of available institutional resources	• Guidance from Mentors/Supervisors • Clarity of Program Requirements • Assistance from the School • Resources from the University	- "I have been a part of the UNC postdoc association. There are some things that as an incoming international postdoc people have to understand on their own—for example, taxes" - "All of my mentors have put me in front of opportunities to progress me in my career"
Personal Agency	Drive, goals, and proactive steps to progress amid	• Future Career Path • Specific Postdoc Objectives	- "When you can see the direct relation between what you're doing as a trainee and how this can help you in the future for your

	uncontrollable structural constraints		professional career, I think that's been a huge motivator and it definitely contributes to [my] happiness"
Agency in Institutional Context	Individual tactics for recognizing, handling, or capitalizing on program-related institutional features	• Alignment with Program Environment • Managing Transitions (e.g., entering or exiting postdoctoral training)	- "And part of whether or not you survive in that environment is the support of your mentor and their guidance and helping you figure out: Oh, I've stepped in a big mud puddle here; I didn't know that was important to this person; or Oh, I should raise my hand and speak up here and offer insight on this"

1.   ^aAdapted from Chen, McAlpine, and Amundsen, 2015 [11]

Intellectual

Three key themes were identified within the intellectual domain: conceptual understanding, methodological competence, and interpersonal or behavioral (often referred to as "soft") skills. Methodological competence encompassed exposure to multiple research approaches, analytic software, and laboratory-based techniques. Interpersonal and behavioral skills included collaboration, effective communication, self-efficacy, and independence. Participants consistently highlighted the strong intellectual foundation of their training programs and described meaningful opportunities to build the knowledge and abilities required for advanced specialization. Faculty participants, in particular, emphasized the essential intellectual contributions of postdocs (e.g., disciplinary knowledge and technical expertise) in supporting both faculty research and graduate education. Although these intellectual components were often discussed separately, participants recognized their interdependence. As one postdoc explained, *I've been able to build a wide range of soft skills, especially communication, teamwork, and time management through my lab-based projects…there really has to be a balance between technical abilities and interpersonal skills.*

Faculty and postdoctoral participants also described the intellectual complexity arising from the diverse emphases of postdoc roles and training programs at the School (e.g., one faculty member noted that the School offers several distinctive programs that draw postdocs). Variation in postdoc backgrounds (e.g., terminal degrees, prior undergraduate and graduate preparation), program structures, and research areas created challenges in addressing the differing intellectual interests and needs of trainees. One postdoc remarked that *the concerns differ a lot depending on research focus—the needs and challenges can be very different.* In response to this diversity, several participants expressed interest in expanded educational offerings (e.g., formal coursework, workshops, symposia, teaching opportunities) and targeted professional development to enhance intellectual growth, broaden skillsets, and better align training with career aspirations.

Networking

Three themes emerged within the networking strand: sense of postdoc community, cross-disciplinary collaboration, and engagement with alumni. Participants described both strengths and gaps within these areas. As one postdoc noted, *I appreciate that there is a postdoc community…but with so many different research areas at the School, there aren't many chances to really get to know people.* Participants also emphasized that networking priorities differed depending on their research focus and professional goals.

Faculty participants similarly identified networking as an area needing improvement, with particular emphasis on strengthening the postdoc community and increasing connections with alumni. Reflecting on the broader School environment, one faculty member commented that postdocs sometimes feel overlooked. In discussing strategies to better support postdoc advisors, another faculty participant suggested developing structured opportunities for postdocs to connect with alumni, increasing visibility into how different departments support postdocs, and hosting events that foster a stronger sense of community and belonging.

Institutional

Four themes were associated with the institutional strand: institutional-level resources, School-level support, clarity of program expectations, and mentorship or supervisory support. Postdocs identified several university-level offices that contributed to their

professional development (e.g., Office of Postdoctoral Affairs, Odum Institute), as well as School-based resources (e.g., Center for Innovative Pharmacy Education and Research, Office of Organizational Diversity and Inclusion). Faculty participants, however, noted that additional School-level infrastructure and coordinated support for postdocs would be beneficial. Postdocs recommended greater cohesion among postdoctoral programs, enhanced communication across the School, and the development of a centralized webpage outlining postdoc-specific resources and information.

Both postdocs and faculty generally viewed program expectations as well defined. Although occasional mismatches occurred between anticipated and actual responsibilities, postdocs described their roles as offering flexibility and independence, with positions evolving over time as training needs changed. Overall, postdocs reported strong mentorship and supervisory support. As one postdoc shared, *I had an exceptional mentor who helped me gain a truly comprehensive experience—I participated in activities such as manuscript writing, presentations beyond T32 requirements, student mentoring, and assisting with course design and instruction.*

Agency
Four themes related to agency were identified: postdoctoral objectives, career direction and planning, transitional periods, and alignment between the trainee and the program. Postdoc goals varied considerably and included aspirations such as presenting scholarly work at conferences, applying for grants or postdoctoral awards, and participating in teaching activities. Participants noted that the reputation of the university, school, and individual mentors strongly influenced their decision to pursue a postdoc, as institutional prestige was viewed as instrumental in advancing career objectives. Postdocs also reported interest in multiple career pathways and generally perceived their training as preparation for common trajectories, including roles in industry and academia.

Faculty mentors similarly emphasized the importance of supporting postdocs in achieving their professional goals and career plans. One faculty participant explained, *We use an IDP [Individual Development Plan]…to better understand what the postdoc's goals are, where they feel confident, and where they need growth, and we revisit that at least annually.* Another faculty mentor suggested

that faculty and postdocs separately articulate goals before jointly discussing how to integrate them. Although postdoctoral goals differed across training types, faculty mentors consistently highlighted shared objectives such as developing competence in research design, gaining experience with scientific writing, learning to effectively communicate research findings, and building the capacity to work both independently and collaboratively. Two themes overlapped between the agency and institutional domains, reflecting individual approaches to navigating or capitalizing on program structures. Transitions were described by postdocs as pivotal developmental moments that presented both challenges and opportunities for reflection and recommitment to career goals. These transitions spanned multiple stages of training and employment, including shifts from student to postdoc, resident to postdoc, and postdoc to professional roles. Participants also underscored the importance of program fit, characterizing their postdoctoral experiences as distinctive and not easily replicated elsewhere, and as providing a competitive advantage for future career paths.

COVID-19 pandemic
Themes related to the COVID-19 pandemic aligned with both the institutional and agency components of the identity-trajectory framework. Institutional considerations included support from the university, the School, and mentors or supervisors. Postdocs expressed disappointment over the loss of in-person School engagement and social interaction, sentiments that faculty mentors acknowledged and understood. As one faculty participant noted, efforts were made to sustain connection throughout the pandemic. Agency-related themes centered on transitions—particularly the rapid shift to remote work—and postdoc goals, especially regarding the pandemic's effects on motivation, well-being, and independence. Overall, postdoctoral experiences during the pandemic varied widely by research area and largely reflected broader academic challenges characterized by uncertainty and concern.

Postdoctoral scholars are essential contributors to the productivity and financial stability of academic institutions [1-3]. In recognition of their importance, the National Postdoctoral Association (NPA) was founded in 2002 to advocate for postdocs and enhance the quality of their training experiences [22]. By incorporating perspectives from multiple stakeholder groups, this study examined the strengths, limitations, and opportunities

associated with postdoctoral training within a research-intensive school of pharmacy. Participants emphasized the intellectual rigor of their training, available networking opportunities, and access to institutional resources, with experiences aligning closely to the identity-trajectory framework. Although these findings are consistent with prior research on postdoctoral training, they also illuminate context-specific challenges and opportunities. Notably, this study represents the first known qualitative assessment of postdoctoral experiences in pharmacy and pharmaceutical sciences education and adds to the limited literature on postdoc training in the health sciences.

Importantly, the results align with existing research underscoring the value of career development and mentorship in postdoctoral training. Participants described their postdoctoral programs as distinctive experiences that would set them apart in the job market and expressed interest in expanded learning opportunities to support their career aspirations. Prior studies have documented significant changes in postdoctoral career outcomes, with fewer than 20% of postdocs securing permanent academic positions [1, 23]. Many postdocs report uncertainty, ambiguity, and insufficient career guidance [24-26]. As career interests increasingly extend beyond traditional academic roles—a trend reinforced by the present findings—postdoctoral programs must adapt to support a broader range of professional pathways. Although universities often provide career and professional development resources for postdocs, these offerings are frequently fragmented, inconsistently implemented [23, 27], and may not fully address the specific needs of postdocs in pharmacy education.

Evidence from this study supports this observation, as both postdoctoral scholars and faculty mentors recognized the need for stronger School-level infrastructure and expanded institutional support for postdocs. Given the central role that mentorship plays in postdoctoral development and long-term success [12], targeted efforts may be necessary to better prepare mentors to guide postdocs toward effective career progression. Prior research involving minoritized postdocs has shown that trainees valued discussions with mentors about both immediate and future career objectives and placed greater importance on relationships with faculty who demonstrated flexibility and openness to novel approaches [28].

In a similar vein, the results of this study are consistent with scholarship emphasizing networking as a key contributor to postdoctoral success. Participants identified networking as an area needing further development, expressing interest in increased engagement with peers, collaborators, and alumni. Åkerlind emphasized the importance of cultivating supportive professional networks to counteract the isolation often experienced during postdoctoral training [29]. While networking may extend to alumni and interprofessional collaborators, Chen *et al.* and Baiduc *et al.* highlighted the particular value of peer-based networks, which have been associated with greater postdoc satisfaction, smoother professional transitions, and enhanced career development [11, 30]. These findings parallel recent work in pharmacy education demonstrating the benefits of peer mentoring and support groups. Such groups have been shown to provide both professional benefits (e.g., improved scholarly productivity, assistance navigating promotion processes, conflict resolution) and personal support (e.g., fostering work–life balance, alleviating stress) [31, 32]. At the School, initiatives to strengthen the postdoc community and networking are underway, including recurring social events (e.g., bagels/coffee), interdisciplinary seminars (e.g., mindfulness, self-compassion, resilience, meditation), and guest panels featuring hybrid academic, industry, and government careers. To further enhance inclusivity and community, many of these initiatives have been expanded to include graduate students.

Findings underscoring the breadth and potential influence of postdoctoral backgrounds, institutional contexts, and research emphases within pharmacy and pharmaceutical sciences education are particularly salient. In the United States, postdoctoral positions within health sciences schools are often characterized by substantial intellectual diversity, encompassing trainees from multiple disciplines with varying levels of research experience, exposure to formal training, and methodological expertise. This contrasts with some European training models, where extensive research experience and publication records are often prerequisites for postdoctoral appointments. Prior studies have documented the complexity of postdoctoral training environments shaped by differences in institutional size, mission, and disciplinary focus [1]. Chen and colleagues, for example, demonstrated that postdocs exercised agency in distinct ways depending on career aspirations and available resources [11]. Although examining differences by background (e.g., prior degree, research training) or geographic context (e.g., the United States

versus Europe) was beyond the scope of this study, such comparisons represent an important direction for future research aimed at better understanding postdoc experiences and supporting the development of agency. Although postdoctoral experiences described in this study were largely positive, it is important to acknowledge factors known to negatively affect postdoc agency, including well-being and perceptions of belonging [26, 33, 34]. During postdoctoral training, these challenges may manifest as imposter syndrome or feelings of exclusion, particularly among individuals from minoritized racial or ethnic groups [26]. Such experiences can influence postdoc performance and readiness for the workforce. Research outside of pharmacy suggests that professional development initiatives and individual development plans focused on skill-building (e.g., academic writing) may help reduce imposter syndrome. Because environmental factors can also contribute to these feelings, intentionally fostering peer support networks and a strong sense of community may provide additional mitigation [31-33]. This may be especially critical during periods of transition, which have been shown to be emotionally demanding within educational settings [35]. Training mentors to actively promote inclusivity may further support positive postdoctoral experiences for individuals from underrepresented racial or ethnic backgrounds. Although no participants in this study explicitly reported imposter syndrome or unwelcoming environments, training programs should remain attentive to the potential presence of these challenges.

The identity-trajectory framework proved effective for structuring and interpreting the findings of this study [11]. This framework is grounded in the premise that individuals' past experiences, expectations, and evolving goals shape their engagement with academic work. This perspective is particularly relevant in the health sciences, where postdocs bring highly diverse backgrounds, interests, and professional experiences, resulting in a wide range of lived realities within a single institution. At the same time, the framework explicitly considers the tension between individual agency and institutional structures that impose expectations, processes, and constraints beyond an individual's control [6]. Findings from this study reflected these tensions, such as postdocs valuing autonomy while simultaneously seeking increased institutional support. All themes identified in the analysis aligned with at least one of the four framework constructs, suggesting that the identity-

trajectory framework is well-suited for examining postdoctoral training in pharmacy. Nonetheless, alternative frameworks also address important dimensions of postdoc development. For instance, Ranieri and colleagues identified six factors influencing career advancement among clinical postdocs: intrinsic motivation, work–life balance, inclusiveness, work environment, mentorship, and funding availability [13]. In engineering contexts, Mendez *et al*. described four components of effective postdoctoral socialization: academic identity development, disciplinary belonging, scholarly performance, and career preparation for the professoriate [12]. Nowell and colleagues expanded upon intellectual and networking dimensions through the Professional Learning and Development framework, which includes professional socialization, skill development, academic growth, and personal effectiveness [1]. Additionally, the National Postdoctoral Association emphasizes mastery of competencies such as discipline-specific knowledge, research skills, communication, professionalism, leadership and management, and responsible conduct of research [2]. While the identity-trajectory framework aligned well with the present study, these alternative models may also inform future efforts to design, evaluate, and enhance postdoctoral training programs.

The annual *Best Places to Work for Postdocs* survey repeatedly demonstrates that postdoctoral scholars favor institutions that actively listen to and address postdoc concerns [4]. Program evaluation efforts, particularly those incorporating qualitative approaches, are essential for helping institutions understand postdoctoral experiences and ensure that training programs are aligned with the needs of trainees, mentors, and schools [36]. By conducting focus groups with multiple stakeholder groups across the School, we were able to capture diverse perspectives on postdoctoral training, generate detailed insights into opportunities for program enhancement, and provide School leadership with evidence to support data-driven decision making. Shortly following this evaluation, and in conjunction with additional independently collected data, the School leadership established a Director of Postdoctoral Programs role. This administrative position, held by a current faculty member, is charged with strengthening engagement and connectivity within the postdoc community; advancing postdoc development; creating new postdoctoral initiatives; overseeing programmatic integration of postdocs; supporting postdoc understanding of relevant

policies and procedures; promoting the use of Individual Development Plans (IDPs); leading strategic initiatives, programming, and policy development aimed at improving postdoc engagement; and managing the financial oversight of postdoctoral programs.

Several limitations should be considered when interpreting these findings. First, the evaluation was conducted within a single research-intensive institution and involved a relatively small sample drawn from a highly diverse postdoctoral population. Although this limits generalizability and reflects the local institutional context, the experiences and needs identified are likely relevant to comparable institutions. Future studies that include multiple institutions would help broaden the understanding of postdoc experiences. Second, participation was voluntary, which may have introduced self-selection bias. Nevertheless, the qualitative design enabled thematic saturation, with consistent themes emerging across participant groups [19]. Third, because the majority of postdocs and faculty at the School identify as White, the findings offer limited insight into how postdoctoral training may be experienced by individuals from marginalized backgrounds. Fourth, despite efforts to de-identify data and ensure anonymity, the possibility of social desirability bias cannot be ruled out.

Conclusion

This study addresses a notable gap in the literature related to postdoctoral experiences in pharmacy education. The findings informed institutional changes at the School and are shared with the intention of supporting other institutions in strengthening their postdoc programs. Postdocs and mentors may use these results to facilitate discussions around professional development planning and to encourage reflection on intellectual growth, networking opportunities, institutional supports, and postdoc agency. Schools may also draw on these findings to inform program design and enhance postdoctoral infrastructure. Given the essential role postdocs play in pharmacy and pharmaceutical sciences, continued attention to understanding and improving postdoctoral training across the Academy is warranted.

Availability of data and materials
The datasets generated and analyzed during the current study are not publicly available due to the small sample size and possibility of compromising anonymity/individual privacy; however, data may be made available from the corresponding author on reasonable request.

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