

# Effective Mentoring of Underrepresented Doctoral Trainees and Early Career Scholars in the Biobehavioral and Health Sciences: A Developmental Framework to Maximize Professional Growth

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Effective mentoring of underrepresented scholars in the biobehavioral and health sciences is vital for the future of scientific inquiry, as well as for clinical and public health applications. Through the mentoring process, both the mentee and mentor can benefit by broadening their knowledge, skills, and perspectives relative to the professional goals and interests of the mentee. Establishing a trusting and nurturing relationship allows the mentor and mentee to identify short- and long-term goals, accompanied by strategies designed to maximize the mentee's success. Many relationships benefit from establishing explicit working guidelines early on, with recognition that flexibility may be necessary as the relationship matures. Adapting to the specific needs and challenges facing underrepresented doctoral trainees and early career scholars, we propose an integrative developmental framework informed by 3 fundamental assumptions: (a) the mentee's professional growth and personal development are intertwined; (b) the mentee's goals will evolve and sometimes change over time; and (c) reflective analysis of the distinctive skill sets, life experiences, and limits of the mentor and mentee will help strengthen the mentoring plan. A challenging issue in mentoring is how to individualize the approach for each mentee, recognizing the need to balance mentor support and advice with opportunities for mentee independence, self-appraisal, and creativity. We share our developmental framework with the hope that others may adapt this as a practical template to develop a joint plan amenable to intermittent monitoring to optimize productivity and personally rewarding professional career trajectories for an increasingly diverse workforce.

## ***Public Policy Relevance Statement***

Building on current initiatives and incorporating new and innovative resources while recognizing inadequacies of the past are critical for effective mentoring of underrepresented doctoral trainees and early career scholars in biobehavioral and health sciences. We advance an integrative developmental framework to help navigate this process. We wholeheartedly believe that mentoring is an honor and privilege and that it should support a professional environment that will be attractive for future recruitment and retention of a diverse workforce.

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**E**ffective mentoring of diverse individuals in the biobehavioral and health sciences is vital for the productive future of scientific inquiry, as well as for the success of implementing clinical and public health interventions (Belcher & McFadden, 2015; Betancourt, Green, Carillo & Ananeh-Firempong, 2003; Freeman & Huang, 2014; Gandhi & Johnson, 2016; Johnson & Gandhi, 2015; McGee, 2016; National Academy of Sciences, National Academy of Engineering, & Institute of Medicine, 2011; Valantine & Collins, 2015; Zerhouni, 2003). The mentoring experience creates a context for the mentee and mentor to broaden their knowledge, skills, and perspectives in a bidirectional way, in which both the mentee and the mentor improve and learn from each other. Through their relationship, both recognize they can mutually contribute. This thought contrasts with the traditional models in which the primary focus is on preparing the mentee to fulfill the establishment's criteria for scientific and professional "success" in the mold of the mentor. While historically many different mentoring styles and approaches (usually implicit) have been successful for many scholars, we think a new and coconstructed framework to support the mentoring endeavor is warranted, especially in an era of rapid scientific, clinical, and sociodemographic change. Zerhouni, as director of the National Institutes of Health (NIH) in 2009, recognized at the time of launching a new major journal, *Translational Research in Medicine*, that:

Never before have scientists had access to the remarkable tools that are available today and that allow rigorous translational investigations to be conducted. However, the creation of a refined discipline of translational medicine will require **the emergence of a new and vibrant community of dedicated scientists, collaborating to fulfill knowledge gaps and to dissolve or circumvent barriers to improve clinical medicine.** (p. 1, emphasis added by current authors)

Our assessment follows Zerhouni's earlier reflection that "[i]t is more and more difficult to recruit, mentor, and retain a critical mass of clinical and translational scientists" (Zerhouni, 2005, p. 1621). Although there have been a number of mentoring initiatives, including mentoring workshops (e.g., Gandhi & Johnson, 2016; Pfund et al., 2013) and the creation of national networks (e.g., Diversity Program Consortium, 2018; National Research Mentoring Network, 2018), more than a decade later the situation of recruiting and retaining those from underrepresented groups—most alarmingly concerning individuals who are African American/Black and those of Hispanic ethnicity—remains seriously challenging (Valantine, 2017).

This lack of improvement indicates the need for several changes, including increasing the availability of mentors who express an explicit interest in and commitment to tackle issues that are inherently difficult, uncertain, and often uncomfortable for both mentors and mentees to acknowledge (American Psychological Association, 2006; Dobbin & Kalev, 2016; McGee, 2016).

### Defining "Underrepresented" More Broadly and Explicitly

The NIH defines underrepresented populations in the U.S. Biomedical, Clinical, Behavioral and Social Sciences Research enterprise as: (a) individuals from racial and ethnic groups who have been shown by the National Science Foundation (NSF) to be

underrepresented in health-related sciences on a national basis; (b) individuals with disabilities, who are defined as those with a physical or mental impairment that substantially limits one or more major life activities; (c) individuals from disadvantaged backgrounds, such as coming from families with low socioeconomic status or educational environments that limit the individual from readily obtaining the knowledge, skills, and abilities necessary to develop and participate in a research career; and (d) women from the above backgrounds as well as women at senior faculty levels at doctorate-granting research institutions in most biomedical-relevant disciplines (NIH, 2018). Over time and across settings and disciplines, these definitions may change, informed by new data and emerging awareness of what comprises diversity at a given time and place. Above all, we consider the exclusion, marginalization, neglect, mistreatment, and/or insensitivity toward individuals based on ethnicity, race, native language, culture, socioeconomic class, gender, orientation, religion, disability, or other individual characteristics to be egregious and worthy of vigorous corrective actions.

### The Need for Strengthening Diversity in Doctoral Programs

Of great need is increasing the presence of underrepresented scholars in the biobehavioral and health sciences fields to expand the diversity of productive teams of scholars, scientists, and clinicians who work collaboratively with patients, advocates, and communities. By diversifying the field, we anticipate greater potential to realize a transformative impact on health and well-being in the United States and globally. Research teams with individuals from different ethnic/racial, educational, and socioeconomic backgrounds afford greater variety of perspectives and skills that ideally will enhance the quality and impact of their scientific inquiry and research (Freeman & Huang, 2014; Hong & Page, 2004).

Doctoral trainees and early career investigators are vibrant members of the scientific community, and it is imperative to ensure their representation from all walks of life. Doctoral degree programs, however, evidence a limited diversity, particularly by NIH's definition of underrepresented populations. In 2016, African Americans and Hispanics/Latinos together accounted for only 14% of doctoral recipients; American Indian/Alaska Native constituted less than 1% (National Science Foundation [NSF], 2018). Further, although women earn 46% of all doctoral degrees awarded, there remain disparities between men and women who earn degrees by field and program prestige (Weeden, Thebaud, & Gelbgiser, 2017). About 2 out of 3 high school students from low-income families immediately enroll in college versus 83% of high school students from high-income families, with greater economic disparities in those who complete college (Bailey & Dynarski, 2011; National Center for Education Statistics [NCES], 2018). Furthermore, college education for individuals with mental and/or physical disabilities poses multiple, unique challenges. In 2016, only 14.4% of individuals with any type of disability had a bachelor's degree or higher (United States Census Bureau, 2016). It has been estimated that 86% of individuals with mental disabilities enrolled in college withdraw without completion (Kessler, Foster, Saunders, & Stang, 1995). These challenges can be expected to persist or even be amplified in doctoral programs. Constraints for completion of doctoral programs are especially difficult

for many underrepresented candidates and can include heavy financial burden (Goldrick-Rab, Kelchen, Harris, & Benson, 2016), inadequate mental health resources (Storrie, Ahern, & Tuckett, 2010), attitudinal and physical barriers in relation to disability (Paul, 2000; Rao, 2004), and difficulties in effectively accessing research and networking opportunities that address issues of relevance for those from minority groups (Ellis, 2001).

### Effective Mentoring Relationships and Progression Through Doctoral and Early Career Stages

It is widely believed that effective mentoring relationships can facilitate doctoral degree completion and early career advancement for underrepresented scholars and support them in overcoming their unique challenges (Davidson & Foster-Johnson, 2001; Maher, Ford, & Thompson, 2004). Effective mentoring relationships have been shown to improve motivation and retention of doctoral students, increase their self-efficacy and research productivity, provide experiences and skills to prepare them for future job opportunities, and offer enhanced professional socialization and networking (Noonan, Ballinger, & Black, 2007; Paglis, Green, & Bauer, 2006).

Fleming, Burnham, and Huskins (2012) describe mentoring as having both career and psychosocial functions, a process during which students learn to become productive researchers along with gaining respect for the values and practices of their research team. Further, they state that this relationship is foundational in preparing students for a productive, fulfilling research career and providing them a model for later becoming mentors to a new generation of trainees.

Although many mentors experience satisfaction and joy from watching their mentees grow and develop into valued and respected colleagues (Busch, 1985), mentoring can also result in negative experiences (Maher et al., 2004; Merriam, 1983). When mentoring underrepresented scholars, it is particularly important to be conscious of the individual mentoring relationship and needs of the mentee to avoid an unproductive relationship, in contrast to helping the mentee grow and move to a rewarding career that encourages them to bring forth new perspectives and advance science. In this article, we present a developmental mentoring framework for underrepresented doctoral trainees and early career scholars designed to improve mentoring relationships within the biobehavioral and health sciences fields. This framework is based in part on the American Psychological Association (APA) prepared guide, the product of a presidential task force on mentoring, which provides an excellent overall orientation for both mentors and mentees (APA, 2006). In this article, we adopt APAs definition of mentoring (APA, 2006):

A *mentor* is an individual with expertise who can help develop the career of a mentee. A mentor often has two primary functions for the mentee. The career-related function establishes the mentor as a coach who provides advice to enhance the mentee's professional performance and development. The psychosocial function establishes the mentor as a role model and support system for the mentee. Both functions provide explicit and implicit lessons related to professional development as well as general work-life balance. (p. 5)

The APA guide specifically proposes four stages of mentoring, which we incorporate into and then expand upon in our proposed framework, described below. Briefly, mentoring begins with an *initiation stage*, followed by a *cultivation stage*—perhaps the most central and primary stage, then a *separation stage*, and finally a *redefinition stage*.

### A Developmental Mentoring Framework for Underrepresented Doctoral Trainees and Early Career Scholars

In our suggested developmental mentoring framework, we conceptualize the mentoring process to be initiated, based on mutual interest, further strengthened and built on trust, open and ongoing communication, and active reflection, and fostered by a variety of mentoring styles and approaches. The process is dynamic, evolving, and individualized to each mentor-mentee dyad as the relationship develops throughout the four developmental mentoring stages (see Figure 1).

#### Description of the Developmental Stages

We adopt as well as revise these same four stages of the mentee-mentor relationship as APA (2006)—initiation, cultivation, separation, and redefinition—by renaming each to better emphasize aspects that depict an evolution of the mentee within a supportive, challenging, and responsive doctoral training environment. Our emphasis is on the wide spectrum of needs of underrepresented scholars. Stage 1 corresponds to a *launching stage*; Stage 2 is an *active growth and learning stage*; Stage 3 corresponds to *independence and maturity*; and Stage 4 is one of *peerage and mutual mentoring*. After launching, each subsequent stage builds on the previous and projects into the future. How quickly the mentee and mentor move from one stage to the next is as varied as the individuals who are in the mentee-mentor dyad. Table 1 summarizes the proposed framework.

**Stage 1: Launching (initiation).** The *launching stage* is a time when the mentee and mentor engage, become acquainted, establish working guidelines, build trust, and demonstrate shared commitment at a personal level (APA, 2006; Keller, 2005; Pascarelli, 1998). For doctoral trainees, this occurs during the *initial stage of engagement with the doctoral program, mentor, and coursework*. In this stage, mentee and mentor actively engage and express mutual interest in mentorship (APA, 2006; Keller, 2005; Pascarelli, 1998).

In the beginning, establishing a trusting and nurturing relationship allows the mentor and mentee to identify short- and long-term goals and strategies designed to maximize the mentee's success (Dallos & Comley-Ross, 2005; Wang, Tomlinson, & Noe, 2010). Although it seems to occur spontaneously, establishing trust is actually a process that is built and reinforced over time and involves 2 major components: (1) affect-based, by engaging in social conversations and activities outside the office and showing care for each other; and (2) cognitive-based, by showing reliability, dependability, and competence from both the mentor and mentee (Dallos & Comley-Ross, 2005; Wang et al., 2010).

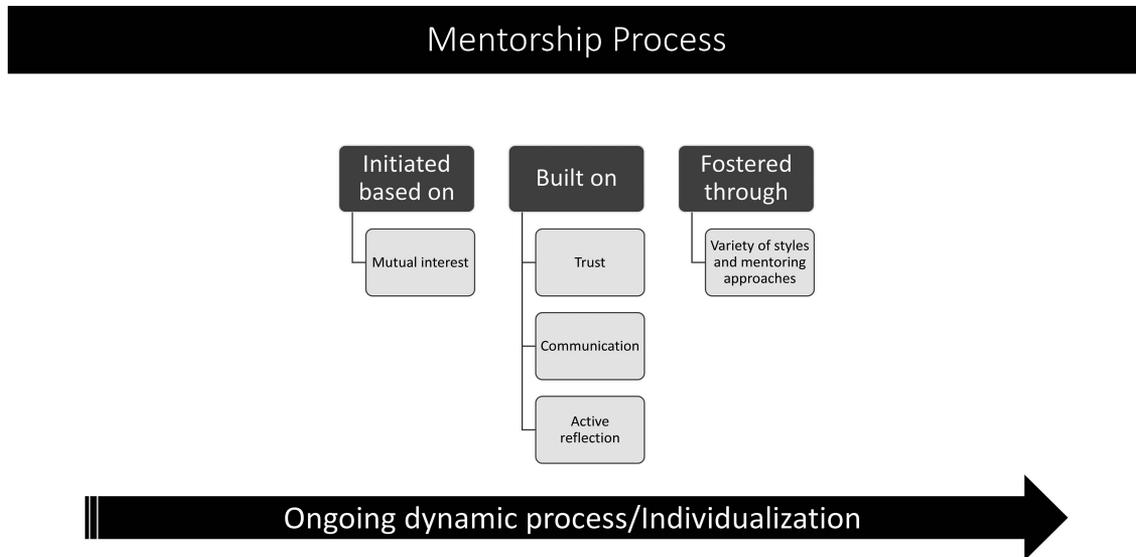


Figure 1. Conceptual framework.

A critical part of this early stage is clearly delineating how the mentoring process will work, setting expectations, and agreeing on how to individualize the mentoring process. The mentor and mentee collaboratively establish the purpose and scope of the relationship by talking about the specialty area and the profession, learning what the other will bring to the relationship, and determining what to expect from the relationship. The goal-setting should consider conventional and formal short- and long-term goals associated with the mentee's current position and explore more personal aspects and variations relating to goals. An essential step in the process is the mentor discussing his or her commitment to the mentor-mentee relationship and offering validation for the mentor-mentee choice. The regularity of mentoring activities during this stage is generally more frequent than at the other stages. As the relationship grows and advances to the next stage, the frequency of contacts and meetings may change.

During this initial stage, the mentor will appraise the strengths and individual needs of the mentee to make continuous progress, based on input from both. Working together, the mentor and mentee can write out an inventory of the strengths and needs of the mentee, as well as how the mentor can support and complement the mentee, which lays a sturdy foundation for setting goals and planning.

Difficulties that arise during this time may stem from unknowns expectations that the mentee and mentor have, in addition to cultural cues that are sometimes hard to judge, creating opportunities for misunderstanding. It is sometimes like going into "foreign" territory. If you do not know the rules of that culture, you may find yourself repeatedly in awkward situations. Diversity-related challenges may be the most sensitive and difficult to realize. Microaggressions—that are subtle, frequent, usually unnoticed insults related to the mentee's background—can have eroding effects on the mentee's spirit, energy, sense of belonging, and self-perception of intelligence (Gandhi et al., 2014). These microaggressions are oftentimes unintentional. And the perpetrator can be unaware of these; usually the only person who is conscious

about these microaggressions is the recipient of the insult (Gandhi et al., 2014). Conscious and unconscious biases and stereotypes can surface during this stage (Case Western Reserve University, 2008; Thomas, 2001), as can uncertainty of each other's behaviors, culture, experiences, and/or values (Case Western Reserve University, 2008; Mondisa, 2014).

Overcoming these sensitive issues and challenges necessitates open communication in which the mentee and mentor each have the option to share the personal and professional experiences that have shaped both their careers thus far and lives in general. Mentees will want to know that their mentoring space is a safe environment in which they will not be judged unfairly. Emphasizing the mutuality and bidirectionality of the mentoring relationship in a nonhierarchical way can pave the way for creating such an environment (Yun, Baldi, & Sorcinelli, 2016). Being open-minded and nonjudgmental about the explicit needs of the mentee is equally important (Gandhi et al., 2014; Mondisa, 2014). Effective communication—including active listening, acknowledgment, and showing understanding of and empathy for the challenges facing underrepresented mentees—can foster an open and safe environment (Fleming, 2012; Gandhi et al., 2014). Mentors need to be self-aware of their biases and exercise cultural humility (Hook, Davis, Owen, Worthington, & Utsey, 2013).

General challenges often occur that are not directly related to diversity, such as imprecision in identifying potential barriers in a particular mentor-mentee relationship (Thomas, 1989, 2001; University of Michigan, 2018). We believe open and active communication can mitigate this challenge. The mentor-mentee pair can explore ways to communicate and work collaboratively with ongoing evaluation, recognizing that there will likely be trial-and-error learning along the way. Negotiating about practical issues—such as each person's time, availability, and preferred method of communication—is important, as is anticipating that there will be challenges. Talking about the process for addressing these potential problems, which are inherent in all relationships, with active reflection may help move the relationship to the next stage.

**Table 1.** Summary of the Developmental Framework for Mentoring Underrepresented Doctoral Trainees and Early Career Scholars

Stage <sup>a</sup>	Definition <sup>a</sup>	Time frame	Challenges	Strategies for success
Launching (initiation)	Mentee and mentor engage, become acquainted, set expectations and working guidelines, build trust, and demonstrate shared commitment	Initial stage of engagement with the doctoral program, mentor, and coursework	<ol style="list-style-type: none"> <li>1. Microaggressions</li> <li>2. Conscious and unconscious biases and stereotypes</li> <li>3. Uncertainty of each other's behaviors, culture, experiences, and/or values</li> <li>4. Inability to identify potential barriers in the mentor/mentee relationship</li> </ol>	<ol style="list-style-type: none"> <li>1. Engagement:               <ol style="list-style-type: none"> <li>a. Either informally or formally</li> <li>b. Express mutual interest</li> <li>c. Mentor commitment and validation</li> </ol> </li> <li>2. Setting expectations:               <ol style="list-style-type: none"> <li>a. Short- and long-term goals and strategies discussion</li> <li>b. Preferred methods of communications</li> <li>c. Expected outcomes</li> </ol> </li> <li>3. Building trust:               <ol style="list-style-type: none"> <li>a. Affect-based</li> <li>b. Cognitive-based</li> </ol> </li> <li>4. Mutual appraisal of strengths and individual needs of mentee</li> <li>5. Mutuality and bidirectionality of the mentorship relationship</li> <li>6. Open-mindedness and nonjudgmental attitude</li> <li>7. Effective communication</li> <li>8. Empathy and cultural humility</li> </ol>
Active growth and learning (cultivation)	Mentee and mentor work together, generating products and realizing measurable achievements	During dissertation preparation	<ol style="list-style-type: none"> <li>1. The above mentioned may persist</li> <li>2. Lack of awareness of disability and mental health related resources</li> <li>3. Mentees may exhibit:               <ol style="list-style-type: none"> <li>a. Uncertainty</li> <li>b. Hesitancy to seek advice</li> <li>c. Intolerance to critique</li> <li>d. Unclear foresight into future goals</li> <li>e. Unfamiliarity with networking strategies</li> </ol> </li> </ol>	<ol style="list-style-type: none"> <li>1. Identify mentee's strengths and weaknesses</li> <li>2. Provide mentee with opportunities to help with current work</li> <li>3. Revise and expand goals and learning outcomes</li> <li>4. Engage mentees in discussing emerging trends in their field</li> <li>5. Build connections between mentee and other faculty and staff</li> <li>6. Incorporate skill-building activities</li> <li>7. Awareness of the needs/available resources of mentees with mental and physical disabilities</li> <li>8. Explore/tailor creative mentoring styles and approaches</li> <li>9. Boost mentee's self-confidence and self-efficacy</li> <li>10. Provide consistent, constructive feedback</li> <li>11. Respond promptly to work</li> </ol>
Independence and maturity (separation)	A mentee practices more independence and begins to develop his or her own identity in their field of study	Gradual succession to completing and defending the dissertation	<ol style="list-style-type: none"> <li>1. Challenges from previous stages may persist</li> <li>2. Mentees may feel uncomfortable with independence</li> <li>3. Difficulty tolerating critique</li> <li>4. Student may not have clear foresight into what their career trajectory</li> <li>5. Unfamiliarity with networking strategies</li> <li>6. Increased anxiety and stress</li> </ol>	<ol style="list-style-type: none"> <li>1. Take the time to talk through feedback</li> <li>2. Set time to practice public speaking and lecturing skills</li> <li>3. Provide students with examples of scholarly papers and identify tips for success</li> <li>4. Encourage the student to continue to critically assess their own weaknesses and strengths</li> <li>5. Encourage the student to critique mentor work and provide opportunities to review</li> <li>6. Identify the best ways to build relationships through networks</li> <li>7. Reflective communication</li> </ol>
Peerage and mutual mentoring (redefinition)	Mentors and mentees enter a period when they become peers	After graduation—early career and beyond	<ol style="list-style-type: none"> <li>1. Can be hard to redefine the relationship</li> <li>2. Time and commitment constraints</li> </ol>	<ol style="list-style-type: none"> <li>1. Talk through relationship expectations after graduation</li> <li>2. Explore opportunities for collaborative work</li> <li>3. Consider mutual mentoring opportunities</li> </ol>

<sup>a</sup> Adapted from APA (2006); Keller (2005); Pascarelli (1998).

### Stage 2: Active growth and learning (cultivation).

The transition to the second stage, characterized as *active growth and learning*, shifts to the mentee and mentor working together, conducting research, and generating products (APA, 2006; Keller, 2005; Pascarelli, 1998). For doctoral trainees, this period is important in building a foundation for their career and *occurs during the dissertation preparation phase* of their program. This second stage represents a time of concentrated skill-building and expansion of technical knowledge to directly support the mentee's dissertation. Periods of taking stock of the pace and the mentee's progress are important as the needs of the doctoral student shift to finalizing the dissertation topic, forming the dissertation committee, proposing the dissertation plan, and conducting the research. During this time, the mentor and mentee continue to review and assess mentoring and learning opportunities.

During this stage, diversity-related challenges may continue to surface. In particular, the influence of concordance (e.g., race/ethnicity, gender) on mentorship satisfaction, especially when considering intersectional identities and complexities experienced by underrepresented trainees (McCall, 2005; Sanchez-Hucles & Davis, 2010). Individuals with disabilities may need additional support on how to reach the resources needed to facilitate their learning experience (Paul, 2000; Rao, 2004). Special attention and care for individuals with mental health concerns may be required during this period as the stress level rises during dissertation preparation (Evans, Bira, Gastelum, Weiss, & Vanderford, 2018; Hyun, Quinn, Madon, & Lustig, 2007; Smith & Brooks, 2014). Sometimes outside expertise may be critical concerning how best to address dynamic and sometimes covert mental health issues.

Challenges not related to diversity may also arise. Some mentees may experience low self-confidence and be hesitant to ask for advice (Mondisa, 2014). Identifying areas may hinder communication between mentors and mentees, particularly if a mentee is not open to criticism (University of Washington, 2018). Mentees may not have a clear or accurate picture of desired goals and learning outcomes (Thomas, Willis, & Davis, 2007). In addition, they may not be familiar with strategies in networking. Further, women and minorities may not be comfortable or aware of how to relay their achievements to help build relationships (Bland, Taylor, & Shollenberger, 2018).

In overcoming these difficulties, particularly for underrepresented scholars, creative mentoring styles and approaches may be helpful. It is vital that both the mentee and mentor work on identifying their strengths and weaknesses to provide the mentee with opportunities applicable to their skill set (University of Washington, 2018) and to help guide the selection of appropriate and effective diverse mentoring approaches. Critically important at this stage for underrepresented scholars is tailoring the mentoring experience versus a one-size-fits-all mentoring style. This is a time when reaching out to others with diverse background, training, and expertise—including other faculty members and more senior students or junior colleagues—might enhance the mentoring experience (Mondisa, 2014). Mentorship teams and mentors for different training components may be extremely helpful (Weinreich, 2004). This may take the form of dissertation co-mentors and mentorship teams for different aspects of the mentee's training. Near-peer mentors have been shown to be particularly helpful for different aspects of training (Colvin & Ashman, 2010).

During this time, mentors should strive to boost mentees' confidence and self-efficacy by breaking major tasks given to mentees into manageable pieces, providing consistent constructive feedback, offering tips for improvement, and responding promptly to their work. Mentors should encourage mentees to think critically about problems, rather than merely provide them with answers, and engage them by discussing the scope and emerging trends in their field (Thomas et al., 2007). Offering creative and specific tasks to the mentee's learning activities may be helpful (e.g., having scavenger hunts in identified prominent journals, guidelines for journal articles, and hot topics in the field; University of Washington, 2018). Introducing mentees to professional networking opportunities may help increase their networking skills and provide new opportunities for mentoring from others from diverse backgrounds. Being aware of the needs of mentees with mental and physical challenges and the resources available to them is important to best guide them to utilize resources (Paul, 2000; Rao, 2004).

### Stage 3: Independence and maturity (separation).

Entry into the third developmental stage of *independence and maturity* typically marks *the gradual succession to completing and defending the dissertation*. It is a period when mentees practice more independence and begin to develop their own identity in their field of study (APA, 2006; Keller, 2005; Pascarelli, 1998). It is during this phase that mentees are tasked with formalizing their own position in their field of research, specifically as they engage in completing and defending their dissertation.

During this stage, mentees expand their academic portfolio by expanding their submission of abstracts for scientific presentations and articles for publication. Ideally, mentees will shift to become lead investigators and authors on research studies, presentations, and articles. Mentors can offer leadership opportunities for the mentees on their research teams, as well as on university committees. Another area that can support the mentees in garnering recognition in the field as an expert is serving on review panels for scientific conferences and a variety of grant mechanisms, including federal, state, and local agencies, as well as private foundations and organizations. These opportunities naturally expand professional networks and build new collaborations. Additionally, mentees may enrich their academic competencies by becoming a primary instructor or co-instructor (as opposed to teaching assistant) for a core course or an elective specific to their scientific interests and inquiry. These lead teaching experiences support mentees in their growth and independence, while assuring the supports necessary to address any issues that may arise. As such, mentees can "practice" handling some of the difficult leadership roles while under direct mentorship.

As the dissertation process progresses to the mentee's final defense and revisions, the mentor will review and provide critical feedback on the dissertation, while emphasizing mentee independence. This helps the mentee critically assess his or her writing and presentation skills in preparation for a final defense. At this stage, more nuanced issues arise related to ensuring that others understand the scientific rigor and integrity that guided the dissertation research, in part because the committee includes faculty with diverse areas of expertise and the audience for the dissertation will include newcomers to the field. With such issues in mind, mentees will become aware of additional strengths and areas for improve-

ment, and en route to independence, mentees can engage their mentors in nominating effective solutions that will be applicable long after completion of the final degree (Paré, 2011; Thomas et al., 2007).

This is also a period for having many recursive conversations about career directions and selection of the right place and colleagues for the mentee's next stage. Depending on the mentee's age and other aspects of his or her personal life, there may be worthwhile discussions that explore ways to integrate the personal and professional dimensions of one's life. Even though mentors may hold strong opinions about how to proceed, most realize there are many pathways to a rewarding and contributory professional career. Of high sensitivity is that some mentees may not want to do things the way their mentors have done them. Ideally, this is a time in which a mentee's inner strengths and now-strong preparation for independence will soar. Rightfully, the mentor can feel pride and excitement for what the future holds for the mentee. The mentee and mentor can indulge now with some good humor and personal reflection on how far the mentee has progressed; sometimes a bit of nostalgia may enter if the relationship has been particularly rewarding as the pair knows that they will not work in the same ways in the future (Weinberger, Garringer, & MacRae, 2005).

Difficulties from previous stages may persist in this stage and should continue to be addressed, but it is important to recognize that this can be an especially uncomfortable stage for both mentor and mentee, as mentors are placed in a more supportive position contrary to their previous role as a very "hands on" contributor to the relationship. Underrepresented mentees may have special challenges regarding their career trajectory and networking opportunities (Bland et al., 2018; Mondisa, 2014). As the anxiety for the uncertain career future and the stress of the final preparations for the dissertation increase (Evans et al., 2018; Hyun et al., 2007), individuals with mental health disabilities can be especially challenged. In general, and regardless of diversity-related difficulties, this period can induce many fears and worries because mentees have to fend for themselves in multiple ways, whether speaking, writing, proposing, and defending their discoveries or assumptions, including acknowledging genuine errors or gaps, not all of which can be corrected. Mentees may feel uncomfortable with independence related to presenting posters, speaking at conferences, or leading papers. Mentors may feel overly responsible and interfere, even with good intention, in this getting-ready-to-launch phase.

To overcome these difficulties, mentors can work with their mentees to identify the best ways to build relationships through networking, introducing the mentee to the mentor's own networks, and thoroughly discussing career options (Weinberger et al., 2005). Mentors should continue to be aware of their mentee's overall well-being (including mental health) through open and reflective communications and to guide them to the appropriate resources when needed (Hyun et al., 2007). Mentors can set time to allow mentees to practice speaking and lecturing skills and to allow them to critically assess their own weaknesses and strengths and to identify strategies for improvement (Crisp & Cruz, 2009). To further support mentees' transition to independence, opportunities to critically evaluate the other's work (e.g., article peer reviews, grant reviews, and scientific conference reviews) are important training opportunities, as well as opportunities to critique their mentors' work, empha-

sizing the importance of the partnership in the mentoring relationship (Paré, 2011). Toward the end of the third stage, looking ahead to the next advanced stage—centered on the mentee completing major activities with greater independence, with the mentor providing even more rigorous and mature-level feedback (approaching full peerage)—and anticipating how to maximize that fully mature stage is vital.

#### **Stage 4: Peerage and mutual mentoring (redefinition).**

Fourth and finally, the *peerage and mutual mentoring* stage marks the beginning of a peer-to-peer relationship between the mentor and mentee (APA, 2006; Keller, 2005; Pascarelli, 1998). Theoretically, doctoral trainees transition to this stage soon *after graduation*. Some may enter postdoctoral fellowships, others may transition straight into faculty positions, while others may choose to take on positions within nonacademic settings. Although this early career peerage stage marks a time of transition, independence, and often physical "moving" away from the home institution, it is a wonderful time for both mentee and mentor to discuss explicitly ideas and wishes for staying in contact and supporting one another. As always, mentors have much to learn from their mentees. During this early career stage, it is our hope that mentors and mentees continue to engage with each other in professional capacities (APA, 2006; Keller, 2005; Pascarelli, 1998).

It is imperative for both the mentor and mentee to understand potential conflicts and limited capacities that may affect the new dynamic of the relationship. For example, the mentor may no longer have the time to set up long meetings or critically assess all of the mentee's scholarly work and other tasks. It also may not be feasible or advisable for the mentee to continue to help the mentor with projects, scholarly articles, and other tasks they previously worked on as they begin to build their unique identity in the field. To mitigate the challenges of this critical stage, it is important to redefine the relationship to fit the new roles. This can be facilitated by engaging in an open communication to reach mutual understanding and expectations as each engages in a shift in the relationship (Kram, 1983).

Nevertheless, we have seen many mentors and mentees stay in touch—sometimes working collaboratively and sometimes competitively—and sometimes choose to engage in mutual mentoring, an emerging concept, especially for underrepresented junior faculty, that emphasizes the idea that each member of the scientific community has something to teach and something to learn in a nonhierarchical way in which both mentors and mentees benefit from the mentoring relationship (Yun et al., 2016). Mentors and mentees now become "mentoring partners" in a supportive mutually beneficial relationship, exchanging experience and support in scholarly and professional activities (Yun et al., 2016). For example, a mentee may be more comfortable using and exploring emerging technologies, while a mentor may remain more experienced in traditional research methodologies. They can work collaboratively, exchanging these different skill sets and experiences as peers and colleagues. A former doctoral candidate and now junior faculty may invite his or her previous mentor—and now "mentoring partner"—to speaking engagements and to make contributions to his or her teaching activities. Similarly, the mentor may invite the mentee to give a master lecture, serve as moderator for a scientific panel, or edit a special topic issue of a journal.

Mutual mentoring can be especially helpful for underrepresented scholars. This can occur between multiple partners transcending campus boundaries. For example, the International Scholars Mutual Mentoring Network was created by faculty from international backgrounds with diverse disciplinary and institutional backgrounds to address their specific challenges. The group provides support for professional growth and mutual mentoring opportunities with peers and senior scholars (Sorcinelli, Yun, & Baldy, 2016). Another example is the Women's Interdisciplinary Writing and Publishing Network. The network includes women faculty in the humanities who support one another in their writing and publishing activities. The group discusses articles, organizes writing workshops, and engages editors from respected publishing venues in their activities (Sorcinelli et al., 2016).

Lifelong peerage relationships occur for many, often expressed publicly at special events, such as receiving an award, participating in an honorific symposium or Festschrift, celebrating a promotion or retirement, or serving on national advisory boards. At the personal level, notes and phone calls as well as meeting at professional meetings and finding time to catch up are some of the extra benefits of realizing peerage. Telling stories about the mentoring process, to each other and to others, helps all remember how a positive mentoring relationship can transform both the mentor as well as the mentee.

### Key Themes of the Developmental Framework for Mentoring Underrepresented Doctoral Trainees and Early Career Scholars

Key themes of the developmental framework for mentoring underrepresented doctoral trainees and early career scholars include: (a) the mentee's professional growth and personal development are intertwined, prompting an *individualized* approach to mentoring; (b) the mentee's goals will *evolve* and sometimes change over time; and (c) reflective analysis of the distinctive skill sets, life experiences, and ideas of the mentor and mentee will help strengthen the mentoring plan and process, necessitating leveraging a wide *variety of mentoring styles and approaches*. Below are detailed explanations for each theme.

#### Individualization of the Mentoring Approach

Cultivating future generations of individuals to advance our scientific understanding has been far from a "one approach works for all." We would be presumptuous if we thought or even expected that specialty fields in basic and biobehavioral sciences should aspire to any rigorous standardization of the mentoring process. Rather, in reviewing the literature and in writing this article, we have had interesting opportunities to invite opinions from our colleagues about how to effectively mentor individuals. True to the past, we found no single or clear agreement on the topic of whether we should mentor individuals from diverse backgrounds "in a fundamentally different way" from all mentees and the extent to which mentoring strategies depend on the career stage of the mentee. We did receive enthusiastic support for mentoring that transcends formal programs and institutional boundaries, a type of mentoring that is individualized to the unique needs of the mentee (professionally and personally), responsive to the mentee's

evolving needs, and frequently complemented with a variety of mentoring styles and approaches.

### A Dynamic, Evolving Relationship

In science, the mentoring relationship provides a natural opportunity to prepare for the increasingly multidisciplinary work environment and to transcend our implicit biases about individuals who approach issues differently than we do. Accordingly, mentees have a responsibility to assess what is really important to them in the mentoring relationship by reflecting on their expectations and goals. Selecting a mentor is not akin to choosing a total life-mate and more aptly can be compared with embarking on an opportunity to identify someone well-suited to enhancing one's own existing education and professional opportunities. A mentee's priorities for what is important may shift over time, especially within the transactional framework of a positive mentee-mentor relationship that opens new ways of thinking and connections to others in the field. At the same time, mentors have a responsibility to learn about the mentee's priorities and acknowledged strengths and weaknesses known at the time, which will permit joint decision-making about "the goodness of fit" between the mentee and mentor.

### Applying a Variety of Mentoring Styles and Approaches

Just as there are many different ways of coaching in a sports setting and there are various bedside manners in a physician-patient relationship, there is an array of mentoring styles. What one individual strongly likes or naturally adopts may not be what the other prefers. When someone seeks coaching, treatment, or mentoring from a person deemed to be an expert, that person may prove—for that individual—to be too abrupt (or too nurturing), to not spend enough time (or may insist on spending too much time), or to have competing priorities that interfere with establishing an ideal relationship. Above all, the developmental and transactional model of effective mentoring is grounded on the premise that selection of the expert should be informed by the primary professional goals and the degree to which that person's skill set will be materially beneficial for the individual (e.g., athlete-in-training, patient, or mentee). Individual approaches to mentoring are inherent—and truly welcomed—in how a mentor conveys knowledge and helps build and refine the mentee's skills and career plan. Some mentors may achieve these goals by example (i.e., being a role model); some may write long, detailed notes to provide guidance and feedback; and others best accomplish their mentoring objectives via frequent in-person meetings. Mostly, mentors combine a variety of approaches. Increasingly, mentees and mentors engage one or more other scientists to serve as a co-mentor or join a mentoring team, including near-peer mentors as well.

The kinds of behavior and thinking that characterize cultures or groups in general also extend to the realm of science and the behavior of scientists. Within certain specialty areas—and sometimes in certain universities or geographical areas—there are noticeable differences relating to everyday professional life. Behaviors include the tendency to talk and/or think quickly (vs. cautiously or slowly); to intrude upon another's discourse (vs. waiting until the other has finished); to be demonstrative, enthusiastic, and/or emphatic in asserting one's ideas

and opinions (vs. being consistently skeptical and/or more guarded in their emotional responses); to start and end meetings on time (vs. not); and to praise and credit each individual (vs. just moving ahead or giving credit to the entire group). The academic-scientific environments are aptly characterized as cultures that can be fast-paced, vigorously critical, attentive to detail, focused on outcomes, and highly ambitious (e.g., always ready to take on more work and to think “big”). Perhaps ironically, many of us behave as if we are perpetual or lifelong students, explorers, and inventors—still trying “to prove” ourselves and seldom concluding that we have “arrived” or even “finished” what we set out to accomplish. For sure, we as scientists and clinical investigators are engaged in trying to prove and to disprove our and others’ theories, methods, and empirical findings. In this culture, we see being a perpetual student pursuing truth in a competitive and uncertain environment as highly positive (at least mostly). What is important is that the mentee feels confident in his or her skill set and abilities to conduct research, teach, collaborate, advance, and lead a productive career. For some scientists, this mind set comes naturally and easily; for others, their embracing the scientific culture—as we currently know it—can be described as an acquired taste over time. What is important to diversify our scientific workforce is that the culture of our science not present an unchanging or insurmountable obstacle to those we seek to recruit to become the next transformative generation.

### Evaluation of Mentor-Mentee Relationship Within the Developmental Mentoring Framework

Of high value is evaluating the relationship between mentors and mentees as they progress through the four stages: is the pair ready to transition from one stage to the next? We acknowledge, however, that the mentoring relationship, like any human relationship, is multifaceted and nearly as complex as human nature; this means that any attempt to measure it is an oversimplification or likely inadequate. We propose to attempt to “partially” evaluate the mentoring relationship in each stage using two methodologies:

1. Active reflection, a cognitive and affective activity that involves active engagement of both mentors and mentees in open and deep communication, examining responses, beliefs, and premises of issues pertaining to the mentoring relationship, resulting in integrating new understandings in actionable plans (Rogers, 2001); and
2. Evaluating the success of the mentee in transitioning through the phases of the doctoral program (coursework, dissertation preparation, dissertation defense and approval, and graduation) through early career stages.

When the mentor and mentee are from quite divergent backgrounds, there often is an especially poignant appreciation for the complementarity and exposure to new ways of thinking and doing. Encouraging and supporting an active dialogue about mentoring can bring out the best in mentors and help ensure that preparing the next generation to succeed and to exceed that of their mentors does not become stagnant. Try asking your colleagues and mentees the question “What makes a good mentoring relationship?” or “How is diversity good for our field?” Be prepared for lively exchanges. We share our developmental framework hoping that others will be

able to adapt this as a practical template for developing a joint plan that they can monitor intermittently to increase productivity and establish personally rewarding professional career trajectories for an increasingly diverse workforce.

There are some thorny issues that have remarkably wide applicability. Examples of these thorny topics concern how mentees tend to interpret and then act upon strong, detailed criticism from a mentor or other senior individuals in their fields (e.g., peer reviewers for presentations, publications, and research applications); when and how mentees should bring up personal matters that may impinge on some aspect of their professional development; whether mentees can or should openly challenge their mentor when they disagree with an idea or activity; and whether a mentee’s “background differences” (i.e., the variables associated with diversity) warrant having explicit dialogue so that these so-called differences can be appropriately facilitative and not distracting or detrimental to either the mentee’s career progress or the scientific enterprise itself.

Above all, mentees and mentors, regardless of background, may have areas of relative weakness or vulnerability for realizing career success. These warrant frank review and joint problem-solving regarding how to address them, including a need for corrective and remedial study or practice; collaboration with others who complement the mentee’s and mentor’s strengths and can compensate for relative weaknesses; and sometimes reformulating what a mentee’s career pathway and area of specialization will be. For many of us and our colleagues, these topics rarely surfaced early on. In retrospect, we think some of the distress and uncertainty for many individuals could have been easily mitigated; rarely (if ever) can we justify that excess angst, worry, and self-doubt made us or anyone else stronger as scientists or even as individuals. We know that the scientific endeavor itself will present enough serious roadblocks to overcome (and, thus, serve to “toughen us up” and “build our resilience”) without carrying excess baggage attributable to lack of understanding or insensitivity to the culture and subcultures of science, health care, and higher education.

### Discussion

We envision there being a new, vibrant community of scientists and clinicians to enact fundamental changes in our approaches to mentoring—propelled initially by an increasing awareness that our translational science workforce is woefully lacking a rich and representative diversity of ethnic, racial, gender, social, and disability backgrounds (National Science Foundation, National Center for Science and Engineering Statistics, 2017). This awareness compels a genuine search for new methodologies and ideas to strengthen diversity in our university campuses and having mentors who are willing and ready to tackle the difficult and sensitive challenges that may arise along the way (APA, 2006; Dobbin & Kalev, 2016; McGee, 2016). Because many of the mentees “survived” professionally and now comprise today’s successful workforce, some faculty members and even mentees themselves might presume that little needs to change, concluding that the solution is simply to recruit more mentees from diverse backgrounds initially and then to continue the variety of traditional mentoring approaches that have worked well in the past.

We advocate enacting readily visible and substantive changes so that we can realize widely shared goals of expanding the interdisciplinary engagement of social and behavioral science fields and of

offering highly attractive, exciting, and rewarding long-term career pathways for talented young individuals from all walks of life.

Although virtually all leading universities have announced vigorous and sincerely well-intentioned plans to attract and to retain students and scholars from historically underrepresented backgrounds, the evidence of success in diversification is limited. One of the most frequent laments we hear is that universities are competing with one another for an extremely limited pool of students and faculty members. Accordingly, we interpret the current situation—that is, one characterized by relatively modest or small incremental increases in diversity of faculty and students at leading research universities—as indicative of the need to review our mentoring approaches thoughtfully, so that we identify potential new and innovative strategies worthy of testing and ensure that we retain and strengthen the positive aspects of our traditional and current mentoring approaches that are effective.

In terms of increasing the depth and breadth of understanding about human development, health and wellness, health care, and public health, our fields need a more diverse workforce. That is, to close the gap in understanding how attitudes, beliefs, and behaviors of individuals and groups collectively impact their health, health promotion, health-seeking, and compliance with recommended health treatments, a more diverse scientific and professional workforce is invaluable. This urgent need for greater diversity similarly extends to successfully attracting and preparing of the next generations of health care professionals and social and behavioral scientists who study treatments and their implementation.

In the biobehavioral and health sciences, mentees need to know that our fields seek and highly value what the next generation has to offer. Mentees bring a range of life experiences, educational backgrounds, and approaches to problem-solving that may yield insights that in turn transform our research and service-delivery models. Such mentee-driven perspectives warrant being encouraged to come forward early in the mentoring and educational process, so these can be incorporated into and serve to drive science and public health. As our nation and the world face crises about preventing and treating diseases, optimizing health, and reducing disparities—many of which are new and monumental in scale—we need to cultivate colleagues who will improve the productivity of our multidisciplinary, transdisciplinary work (cf., *Enhancing the Effectiveness of Team Science* by Cooke & Hilton, 2015). This commitment demands that many administrative and programmatic leaders and mentors move outside their traditional ways of doing things. The “we/they” divide—that many still justify as “just part of being human”—must be eliminated and appropriately reframed in terms of history and context. This will permit moving beyond anger, guilt, blame, or denial and ideally will change the ways we judge merit, contributions, and individual success. We approach this by doing our best to frequently and vocally share with underrepresented scholars and all of our colleagues that public health and the biobehavioral sciences are striving toward breakthroughs. This includes our own self-critique in addition to questioning prior and widely held conclusions, both about science and educational “standards” for measuring outcomes.

For those of us who have directed programs that oversee the system of entry into and successful advancement within our fields, we will need to give up many of our “traditions” and customary ways of doing things. Undoubtedly, we will spark and endure controversy and challenges along with our own soul-searching. We

hope that we will have the same type of stamina and receptivity to change that we ask of our mentees: to invest enough time to become deeply knowledgeable and then to combine this knowledge with creative ideas and previously unknown approaches—from those of diverse backgrounds—to change rather than to defend the old order per se.

Although we now endorse the use of a general framework and the setting of explicit goals in mentoring, we mostly have bumbled through without rigid adherence to any set of rules. We have benefitted so much from others who were caring enough to criticize us, listen to us, and see the best in us when we were at more junior periods in our lives. We now propose our developmental mentoring framework with the intention that it will provide general guidance and support to mentors and mentees, especially underrepresented doctoral trainees and early career scholars, as they discover their own very special and individual mentoring journey.

**Keywords:** mentoring; underrepresented scholars; doctoral trainees; early career scholars

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