

Professional Identity Formation Interventions in Medical
Education: Conceptualizations and Theoretical Perspectives

by

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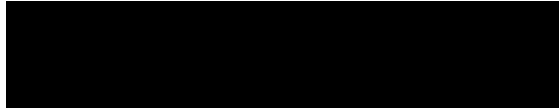
DEDICATION

I dedicate this work to those who have the most significant impact on my identity, my family: my wife Cristin and our boys, PJ, Matthew, and Will. At times, our life together is crazy, chaotic, and challenging, and I wouldn't want it any other way. Thank you for your unwavering support, laughter, and love!

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ABSTRACT

INTRODUCTION: Professional identity formation (PIF) is the integration of the knowledge, skills, values, and behaviors of a profession with one's pre-existing identity. Our current understanding of the conceptualizations and theoretical approaches that underlie PIF interventions in medical education is limited.

METHODS: The authors conducted a critical review on PIF educational interventions published in 5 major medical education journals between 2010 and 2021. The articles' context and findings were extracted, analyzed, and summarized to identify conceptualizations and theoretical approaches to PIF.

RESULTS: The authors identified 43 studies examining interventions aimed at influencing PIF. Reflective writing and the use of narrative reflections were the dominant interventions. Less commonly, PIF was understood as a socialization process, and few studies acknowledged the possibility of identity dissonance or struggle.

CONCLUSIONS: Relying on reflective writing as the intervention of choice feeds the dominant individualist perspective on PIF. Future research should account for the impact of conceptualizations and theoretical preferences.

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CHAPTER 1: INTRODUCTION

Background

Professional identity formation (PIF) is the transformative process through which one integrates the knowledge, skills, values, and behaviors of a professional with one's own identity and core values.¹ Ultimately, an individual employs this complex structure to link motivations and competencies to a chosen career role.² PIF has been widely discussed in the medical education literature because it foundationally contributes to the core competency of professionalism and facilitates an ethical framework from which an individual practices medicine.³ Failed or poorly developed professional identities (e.g., those aligned with detrimental behaviors such as poor teamwork, a paternalistic approach to patient care, or authoritarian leadership) are linked with several negative outcomes including difficulties performing under duress, decreased well-being, impaired interprofessional relationships, and unprofessional behaviors.⁴⁻⁶

Medical educators are tasked not only to teach essential clinical knowledge and skills to learners but also to foster the development of a professional identity.⁷ Therefore, educators must appreciate the mechanisms that catalyze professional identity in medical education and how they might be actualized in PIF interventions. In their PIF interventions, educators translate theory, both explicitly cited and implicitly inferred, into pedagogical practice and support the essential domain of professionalism and professional development. Moreover, PIF occurs in an environment containing vital sociocultural influences, and failure to consider such influences may lead to inherent biases, disadvantaging individuals from diverse populations.⁸

Despite its vital importance, a critical summary of the conceptualizations of PIF that are informing interventions in medical education has not been conducted. As a result, we are unaware of how our field has relied on--or ignored--specific interpretations of PIF. Each PIF theory has affordances while simultaneously having specific “blind spots.” Each PIF theory encourages specific kinds of development, while simultaneously ignoring – or even discouraging – others. Consequently, depending on the PIF theory used in medical education research and scholarship, we may be relying on certain conceptualizations of and theoretical approaches to PIF to the exclusion of others – others that might lend important insights to medical education. This reality invokes several questions of critical importance. How is the literature about PIF interventions for medical education relying on and being informed by different conceptualizations of PIF? How are theoretical approaches informing and shaping PIF interventions in medical education? We reviewed the current literature on PIF in medical education to critique published PIF interventions and the conceptualizations of and theoretical approaches to PIF that underlie them.

Research Question

How is the literature about PIF interventions for medical education relying on and being informed by different conceptualizations of PIF?

Theoretical Framework

Monrouxe and Rees describe six approaches to identity: three individualistic and three social and contextual approaches.⁹ The three individualist approaches to identity are

common in medical education: identity statuses, social-cognitive approaches, and narrative approaches.⁹ Proponents of these approaches argue that identities reside within a person. James Marcia's identity statuses theory is based on Erickson's ego psychoanalytic theory and classifies individuals into four different identity statuses: identity achievement, foreclosure, moratorium, and identity diffusion.¹⁰ Berzonsky takes a social-cognitive approach and so considers one's identity as a cognitive structure encoded, organized, and understood through one's experiences and the relationship of these experiences to one's identity.¹¹ Finally, a narrative approach to identity focuses on the "inner" world of the individual, highlighting the narratives derived from an individual's cognitive or psychological structures.¹²

In contrast to these individualist approaches to identity, several social and contextual approaches posit that a person's identity develops within a social context. Social identity theory aims to examine identity at the group level by exploring the categorizations of groups and how an individual compares other groups to their own.¹³ Social identity complexity theory further examines an individual's sense of various in-group identities and how an individual negotiates these in-group identities.¹⁴ The self-categorization theory considers both inter- and intra-group identities and how and when these identities become relevant, and the influences of social and group interactions.¹⁵

Given these different approaches to identity, both individualistic and social-contextual, we conducted a critical review of the literature to explore how the many different conceptualizations of and theoretical approaches to PIF inform medical education's PIF interventions. While this research will not enable us to identify the impact of these different orientations on long-term professional identity or

professionalism behaviors, our review will allow us to see if the field of medical education is favoring one approach to identity over another.

References

1. Wald HS. Professional identity (trans) formation in medical education: reflection, relationship, resilience. *Academic Medicine*. 2015;90(6):701-706.
2. Holden MD, Buck E, Luk J, et al. Professional Identity Formation: Creating a Longitudinal Framework Through TIME (Transformation in Medical Education). *Academic Medicine*. 2015;90(6):761-767.
3. Cruess S, Cruess R. Teaching professionalism—why, what and how. *Facts, views & vision in ObGyn*. 2012;4(4):259.
4. Cruess RL, Cruess SR. Teaching professionalism: general principles. *Medical teacher*. 2006;28(3):205-208.
5. Stevens S. Surgeons' professional identity and patient safety: time for change. *Soc Sci Med*. 2013;77:9-10; discussion 11-12.
6. Irby DM, Hamstra SJ. Parting the clouds: three professionalism frameworks in medical education. *Academic Medicine*. 2016;91(12):1606-1611.
7. Monrouxe LV. Identity, identification and medical education: why should we care? *Medical education*. 2010;44(1):40-49.
8. Volpe RL, Hopkins M, Haidet P, Wolpaw DR, Adams NE. Is research on professional identity formation biased? Early insights from a scoping review and metasynthesis. *Medical education*. 2019;53(2):119-132.
9. Monrouxe LV, Rees CE. Theoretical perspectives on identity: researching identities in healthcare education. *Researching Medical Education*. 2015:129-140.
10. Kroger J, Marcia JE. The identity statuses: Origins, meanings, and interpretations. In: *Handbook of identity theory and research*. Springer; 2011:31-53.

11. Berzonsky MD. A social-cognitive perspective on identity construction. In:
Handbook of identity theory and research. Springer; 2011:55-76.
12. Smith B, Sparkes AC. Contrasting perspectives on narrating selves and identities:
An invitation to dialogue. *Qualitative research*. 2008;8(1):5-35.
13. Tajfel HE. *Differentiation between social groups: Studies in the social psychology
of intergroup relations*. Academic Press; 1978.
14. Roccas S, Brewer MB. Social identity complexity. *Personality and social
psychology review*. 2002;6(2):88-106.
15. Turner JC, Hogg MA, Oakes PJ, Reicher SD, Wetherell MS. *Rediscovering the
social group: A self-categorization theory*. Basil Blackwell; 1987.

CHAPTER 2: A CRITICAL REVIEW OF PROFESSIONAL IDENTITY FORMATION IN MEDICAL EDUCATION

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Abstract

Objective: Professional identity formation (PIF), is the integration of the knowledge, skills, values, and behaviors of a profession with one's pre-existing identity and values. Several different, and sometimes conflicting, conceptualizations and theories about PIF populate our literature. Understanding these differences is critical because they direct our PIF curricula and pedagogic strategies and thus the PIF of future physicians. The authors conducted a critical review of the recent literature on PIF interventions in medical education to explore the conceptualizations of and theoretical approaches to PIF that underlie them.

Method: The authors searched articles on PIF educational interventions published in 5 major medical education journals between 2010 and March 2021. The articles' context and findings were extracted, analyzed, and summarized to identify conceptualizations and theoretical approaches to PIF.

Results/Key Findings: The authors identified 43 studies examining medical education interventions aimed at influencing PIF. Reflective writing and the use of

narrative reflections were the dominant modes of student activity in PIF interventions, supporting the dominant individualist approach to PIF. Less commonly PIF was understood as a socialization process or as an active process with both individually and socially focused influences. Few studies acknowledged the possibility of identity dissonance or identity struggle.

Conclusions/Implications: Relying on reflective writing as the intervention of choice to impact PIF feeds the dominant individualist perspective on PIF. An unintended consequence of this individualist orientation is that cultural problems embedded in the profession become burdens for each future physician to bear. Since we primarily focus on PIF as an individual's development, the culture expectations of the profession are fixed within PIF become imposed on each physician as fait accompli. Future education and research into PIF should account for theoretical preferences and the impact of these preferences.

Background

Professional identity formation (PIF) has long been recognized as fundamental to becoming a doctor.¹ PIF is understood as the complex, multidimensional, ongoing, and transformative process through which individuals negotiate between or merge their pre-existing knowledge, skills, values, and behaviors with those they perceive as embedded in their chosen career.^{2,3} PIF has been widely discussed in the medical education literature because it provides the foundation for an ethical framework from which an individual practices medicine.⁴ As Monrouxe astutely observed, even if medical learners develop all the skills and knowledge required of them, “they will find it hard to be successful as doctors until they have developed their professional identity.”¹ Indeed, problematic professional identities – such as those aligned with detrimental behaviors like poor teamwork, a paternalistic approach to patient care, and authoritarian leadership are linked with difficulties performing under duress, decreased well-being, impaired interprofessional relationships, and unprofessional behaviors.⁵⁻⁷ And so, given the crucial need to support learners and practicing physicians alike in their PIF work, medical educators must nurture professional identity development.¹ In response to this need, educators have developed, implemented, and assessed myriad educational interventions that (a) explicitly target PIF or (b) target other learning objectives but impact PIF as well. However, these educational interventions are steeped in varying conceptualizations of PIF and grow out of different PIF theories. These differences influence the way physician identity interventions will be enacted for decades to come; therefore, it is essential to critically reflect on how PIF theories shape the future of the medical professional identity.

In 2015, Monrouxe and Rees helpfully distilled this abundance of theories by distinguishing between individualist and social-contextual approaches to PIF.⁸ Proponents of individualist approaches argue that identity resides within a person. From this orientation, PIF is the process through which the individual develops and maintains the desired values, attitudes, and attributes of a physician.⁹ The three individualist theories of identity most common in medical education, as described by Monrouxe and Rees, are identity statuses theory, social-cognitive approaches, and narrative approaches.⁸ Identity statuses theory examines an individual's exploration of future identities and personal commitment to a course of action toward a specific identity.¹⁰ Individual identity formation from a social-cognitive perspective sees identity as a cognitive structure encoded, organized, and understood through individuals' experiences and the relationship of these experiences to their identity.¹¹ A narrative approach to identity focuses on the "inner" world of the individual, highlighting the stories we tell about ourselves as the foundation of identity.¹² These perspectives differ in their understanding of how identity is formed but have in common a focus on each individual's effort to make sense of who they are with respect to their personal attributes and how these relate to the desired values, attitudes, and attributes of a physician.⁸

By contrast, social-contextual approaches posit that a person's identity development is entrenched in their social context and cannot be properly understood without understanding how identities are formed and shaped through social interactions, relationships, and contextual influences.⁸ As an example, social identity theory examines how people identify as part of a group and compare other groups to their own.¹³ Looking

more closely at identities as linked to a person's status with a particular collective (i.e., being in-group), social identity complexity theory focuses primarily on how individuals negotiate these in-group identities.¹⁴ Self-categorization theory considers both inter- and intra-group identities, how and when these identities become relevant, and the influences of social and group interactions on identity.¹⁵ These social-contextual approaches, therefore, firmly place an individual's PIF within the influence of the social environment of medicine.⁸ Though the distinction between individualist and social-contextual provides a valuable framework for examining medical education approaches to PIF, this distinction is rarely dichotomous and researchers often approach identity formation from various points along a spectrum of theoretical perspectives.¹²

Individualist and social-contextual approaches to PIF are rooted in different ways of thinking about an individual's identity and the role of social groups vis a vis that development. These different theoretical foundations give rise to distinctly different PIF interventions with different goals and outcome expectations. And yet, despite the directive forces of the theoretical foundations on which PIF interventions are built, an analysis of the conceptualizations of PIF informing interventions in medical education has not been conducted. As a result, we are unaware of how our field has relied on – or ignored – specific approaches to PIF in shaping our educational efforts. We may be relying on certain conceptualizations of and theoretical approaches to PIF to the exclusion of others – others that might lend important insights to our collective efforts to cultivate physician professional identities. This premise gives rise to a question of critical importance: How is the literature about PIF interventions for medical education relying

on and being informed by different conceptualizations of PIF? To answer this question, we reviewed the literature reporting on medical education interventions focused on PIF and analyzed the conceptualizations of and theoretical approaches to PIF that undergird them.

Method

Working from a constructivist research orientation¹⁶, we conducted a critical literature review. Critical reviews synthesize and appraise literature deemed most relevant to a particular research question.¹⁷ This kind of review emphasizes the conceptual contribution of selected citations rather than striving to account for everything published about a phenomenon, regardless of contribution. As such, a critical review can interrogate citations of most relevance to expose the propositions or paradigmatic assumptions that underlie them.¹⁸ A critical literature review also provides an effective and well-rounded method to explore concepts – like PIF – that might be too broad to examine in a systematic fashion.¹⁹

Search

We searched the English-language literature in five peer-reviewed journals that publish educational interventions reports: Academic Medicine, Medical Education, Medical Teacher, Perspectives in Medical Education, and Advances in Health Science Education. Academic Medicine, Medical Education, and Medical Teacher were selected because they have the highest impact factor of medical education journals.²⁰ These journals are likely to house manuscripts that address PIF since it is a major topic in the field, including the interventions aimed at PIF.²⁰ Perspectives on Medical Education is the highest-ranked core medical education journal that is open access to readers and

without any fee for publication. Since it publishes many innovation reports, this journal is likely to contain PIF intervention reports, especially those from author teams that have limited research funds or who are aiming for the broadest possible dissemination of findings. Finally, *Advances in Health Sciences Education* was selected since it was the highest-ranked core medical education journal with no word limit and explicitly asks authors to link theory to practice, prioritizing manuscripts that describe the theoretical basis of research, including manuscripts addressing educational interventions. This journal is likely to house manuscripts that exceed shorter word length restrictions of higher impact journals.

We limited our search to manuscripts published between January 2010 and March 2021. We delimited our search terms to focus on identity formation interventions within the profession of medicine. We evaluated our search strategy through iterative discussions and consultations with an academic librarian to ensure we obtained articles that adequately address our research questions (Figure 1). Additionally, the team decided to meet with three leading researchers working in medical education and whose research focused on PIF to ensure we achieved broad capture. These individuals acted as key informants helping the research team reflect on theoretical premises of individual manuscripts and consider how PIF is actualized in medical educational interventions in a more holistic way. The insights from these conversations informed our search, analysis, and interpretations. Once the search strategy was finalized, we identified 913 articles for consideration. The title and abstracts of these manuscripts were screened to determine their relevance based on our inclusion and exclusion criteria (Figure 1). Full texts were

screened where inclusion or exclusion could not be established from the abstract alone. The final corpus of included manuscripts totaled 43.

Analysis

An initial audit of 10 selected manuscripts informed our extraction tool, which included the following domains: (a) learners targeted with the intervention – i.e., undergraduate, graduate, or continuing medical education, (b) type of intervention, (c) presence of an explicit definition of PIF, (d) explicit or implied theoretical frameworks for PIF underpinning the study, (e) whether a theoretical framework substantially shaped the intervention, (f) the stated purpose of the intervention or study, and (g) PIF outcomes of each included intervention. While four of the six domains involved little interpretation on the part of the research team, domains (d) and (e) required the researchers to rely on their expertise to inform the data extraction – an expectation inherent in critical literature reviews.¹⁹ Each research team member participated in data extraction, completing an initial extraction on 10 manuscripts. Data from this initial extraction was discussed and reviewed for completeness and relevance. The data extraction tool was revised to reflect the insights developed in team discussion. Extraction was then completed on the remainder of the manuscripts by GM, supported by regular discussions with the research team. GM selected 3 manuscripts for the rest of the research team to extract to foster additional team critique and reflection. Once extracted, data were synthesized, described, and analyzed employing techniques from thematic analysis²¹ to determine dominant theoretical perspectives (i.e., individualist or social-contextual approaches), whether these perspectives were implicitly inferred or explicitly stated. Monrouxe and Rees' theoretical framework initially structured the thematic analysis, with adjustments to this framework

made as the data became apparent.²² Primary analysis of the data was completed by GM, with the other members of the research team participating in iterative discussion about the theoretical perspectives identified and their implications for medical education teaching and research.

Reflexivity

The research team engaged in personal and methodological reflexivity²³ throughout the research process – from selecting the journals from which to build our corpus to interpreting individual manuscripts. In terms of personal reflexivity, we recognize that our prior experiences and motivations informed our research and the insights we generated. Our team consisted of medical education scholars with a wide range of interests and experiences. Three team members are active medical education researchers with specialized training in qualitative research from a constructivist paradigm – two at an expert level (LV, RK) and one at an intermediate level (GM). The other team member was trained as a post-positivist quantitative researcher (JM). The study's primary researcher (GM) is a military physician and clinician educator actively immersing himself in the PIF literature as part of a Master's degree in Health Professions Education. One collaborator is a senior researcher in medical education (LV) who contributed reflections about how findings aligned or misaligned with various perspectives on PIF in the field. Another collaborator is a well-established member of the field (RK) with specialized expertise in PIF and so offered reflections in relation to the broader PIF literature and other topics in the field. LV and RK have expertise in critical and other related qualitative review methodologies; their constructivist perspective informs this approach. Team research discussions often involved debates about the nature

and depth of the interpretations being made from individual manuscripts and the extent to which these interpretations were relevant to the broader field of medical education and PIF literatures.

Methodological reflexivity also informed each phase of our research. Since we are working from a constructivist orientation, we do not assume a “true” or “closer to true” conceptualization of PIF. Therefore, we did not seek to identify which intervention best achieved its PIF goals, whether implicit or explicit. Additionally, since we were not aiming for a systematic synthesis of all PIF intervention literature, we did not include all papers from all domains that report on PIF interventions. Instead, we sought medical education-targeted journals and sought out papers that were favorably evaluated by peer-reviewers, that were freely available and so not guarded by paywall journal subscriptions, and that were intervention articles likely to be explicitly informed by PIF theories. We deemed this a well-rounded representation of the PIF educational interventions we sought to explore. We documented our evolving understandings of the data and our research decisions through memos.

Results

Overall, 43 studies met our criteria (Table 1). Most of these studies focused on undergraduate medical education (UME, n=31), followed by graduate medical education (GME, n=6) and continuing medical education (CME, n=4). Two studies focused on both UME and GME. Reflective writing²⁴⁻³⁶ and similar narrative-based activities³⁷⁻⁴² were the most common interventions (n=19), followed by redesign or specific modules or courses (e.g., medical graphics/comics course)⁴³⁻⁴⁷ (n=5), longitudinal clinical experiences⁴⁸⁻

⁵¹(n=4), curriculum interdisciplinary clinical activities⁵²⁻⁵⁵ (n=4), mentoring, apprenticeship, and coaching⁵⁶⁻⁵⁹ (n=4), support groups⁶⁰ (n=1), self-directed learning⁶¹ (n=1), a patient partner program⁶² (n=1), longitudinal faculty development⁶³ (n=1), mask making⁶⁴ (n=1), an identity and inclusion committee⁶⁵ (n=1), and discourse analysis of faculty interviews⁶⁶ (n=1). Less than half of the studies included a definition of PIF^{35,67-75}, with Cruess et al.⁷⁶⁻⁷⁹ (n=8) and Jarvis-Selinger et al.⁸⁰ (n=5) as the most cited authors for those that included a definition. Overall, the manuscripts in the corpus acknowledged – even if only implicitly – PIF as a process where internalization or integration of characteristics, values, and norms leads to a representation of self, with individuals ultimately beginning to think, act, and feel like a physician.

Conceptual or Theoretical Perspectives

While our theoretical framework relied on two orientations, we identified three theoretical approaches toward PIF in the literature: individualist, social-contextual, and a combination of individualist and social-contextual. We classified an intervention as individualist if it explored identity(ies) residing within a person, even if the intervention included outside influences or people. Conversely, we classified interventions as social-contextual if they explored identities as developing through a social group or context. Though the categories of individualist and social-contextual are not dichotomous⁸, we found that most citations were more aligned with one category or the other. However, several citations blended both perspectives, with relatively equal emphasis on each. We added an additional category (individual and social-contextual) to reflect this finding.

Perspective 1: PIF developing within pedagogic or reflective spaces (individualist).

Interventions that relied on an individualist approach to PIF commonly used reflective writing and narrative to have individuals reflect on their experiences in medicine.^{24-28,31,32,36,37,42} Many of these interventions focused on identity-challenging events such as difficult patient encounters^{32,36}, complex or morally ambiguous circumstances³¹, or rites of passage at critical educational junctures²⁴. Additionally, individualist approaches to PIF grounded several interventions informed by narrative medicine.^{28,32,37} Here, narratives served as portrayals of an individual's cognition and afford investigators a snapshot of an individual's internal state of mind.⁸¹

The body of work by Wald et al.^{24,26,36} was prominent among the individualist interventions in our sample. One illustrative example employed reflective writing on challenging patient encounters as an intervention to impact PIF.³⁶ The investigators noted, "...we have been interested in the value of 'pedagogic spaces' for narrative reflection on clinical experiences⁸² including the 'work of the heart'⁸³ to 'offer emerging physicians opportunities to more fully incorporate their experiences into a professional identity (PI) that embodies reflection, critical awareness, cultural humility, and empathy.'^{84,36}

Similarly, Cunningham et al., utilizing meta-reflections on student narrative writing portfolios to explore PIF, argued that "...the narrative medicine tradition as ideally suited to foster "open educational spaces" sometimes called "reflective spaces," wherein students may effectively develop their reflective capacity and construct a holistic professional identity."²⁸

Highlighting an individualist approach to identity formation afforded by reflective writing, Kneese et al.⁴² invoked the conceptual model by Shapiro et al.⁸⁵ in which they

theorized what happens when medical students engage in reflective writing. Employing a novel narrative medicine intervention (i.e., an intra-class pen pal program for medical students), this group of investigators argued the individual nature of reflective writing provides a valuable counterbalance to a prevailing wind of socialization that occurs in medical education, wherein students might perceive a loss of certainty and control.⁴² Noting the imaginative nature of reflective writing, they posit that reflective writing allows students an opportunity for “... reclamation of a personal identity to help combat the perception of losing autonomy involving in the socialization into the medical profession.”⁴²

Perspective 2: PIF occurs through socialization (social-contextual).

Social-contextual approaches to PIF are the basis for education interventions that frame PIF as developing through a social group or context.^{29,35,38,40,50,52,54-56,58,61,62,64,66} These interventions often use social experiences – e.g., in interprofessional teams^{52,54,55}, patient partner programs⁶², faculty interviews⁶⁶ – to help learners examine identity at the group level, thereby keeping the focus of PIF on the social context. For example, Barr and colleagues⁶² employed an intervention wherein students were partnered with patients to influence the development of a patient-centered professional identity. The authors selected socialization as their theoretical lens of choice, writing: “how and when individuals take their place within ‘Communities of Practice’⁸⁶ and what degree of participation they have in them is crucial to identity formation.”⁶² Similarly, in developing a course on reflection for medical students, Holmes et al.²⁹ approached their intervention from a similar theoretical perspective, utilizing a form of collective reflection to allow students to notice and discuss negative influences of the hidden

curriculum and work together to strategize about how to manage these social pressures collectively. In other words, the course provided a space for discussion and socialization intended to directly counter socializing forces perceived as problematic in other learning environments.

Only one intervention highlighted how a social-contextual approach to PIF can limit insights into a learner's PIF journey. Joseph et al.⁶⁴ employed mask-making to explore the PIF of female UME learners enrolled in the United States military medical school. In this context, these women were developing a PIF as a physician and a PIF as a military officer. The masks created by these participants illustrated the social forces pulling them to be feminine women in society, masculine military officers, and authoritative clinicians. In their art, the participants illustrated how these social pressures created a space of professional identity dissonance. Identity dissonance, the authors posited, occurs in students "who feel that they do not belong as part of the medical community and those who reject alterations of their existing identity."^{64,77} More than just a sense of not belonging, these scholars noted the dissonance between personal and professional identity and suggested that this can "contribute to students questioning their values, ambitions, abilities, and 'their very self-worth.'"^{64,87}

Perspective 3: PIF is an active process with individual and social influences (individualist and social-contextual).

Several investigators adopted theoretical perspectives wherein identity formation is conceptualized as an active process incorporating individualist and social-contextual perspectives.^{30,33,34,39,41,46,48,49,53,59,63} Interventions informed by this approach again included reflective and narrative writing across longitudinal experiences. Such

longitudinal interventions included faculty development programs⁶³, coaching⁵⁹, and a professionalism curriculum⁴⁶. In these educational experiences, learners were followed over time to explore how the context of a longitudinal program influenced individual identities.

Several groups of investigators^{46,63} approached PIF as an active process, invoking the work of constructive development theorist Robert Kegan⁸⁸, which proposes a five-stage identity formation process. In one of the few interventions in our study to explore identity formation in faculty, Branch et al.⁶³ used a multi-institutional faculty development program in humanism to impact identity formation. The authors proposed that the faculty involved in their program proceed through Kegan's stages⁸⁸ and that "each stage involves both social and personal development as the developing clinician-educator engages in a community of practice and internalizes that community's professional and moral values."⁶³ With an intent to measure PIF longitudinally through a professionalism curriculum intervention, Kalet et al.⁴⁶ also adopted Kegan's framework, again expressing the individualist and social aspects of the identity formation process: "a lifelong process of integrating cognitive, social, and emotional capacities which begins before entering professional school and continues throughout professional life."⁴⁶ Furthermore, this group references the work of various development theorists^{88,89} as a direct influence on their intervention, which seeks to support the developmental process of identity formation in medical students over time.⁴⁶

Désilets et al.³⁴ use a familiar intervention – reflective writing. The investigators positioned reflection within the context of a longitudinal, 4-year clinical experience in UME. The authors framed their intervention through the work of Cruess et al.⁷⁷, noting

the deliberate conceptualization and implementation of “a reflection process on the development of professional identity as being comprised of four elements: relationship with self (identification with a role), situations (clinical, learning), profession (appropriation of values and norms), and society.”³⁴ In this way, these investigators provided a clear example of PIF as a process with individualist and social contextual influences.

Discussion

Our critical review identified 43 studies examining interventions impacting PIF in medical education. Three theoretical perspectives were identified: individualist, social-contextual, and those influenced by both individualist and social-contextual approaches. Reflective writing and narrative reflections were the dominant modes of student activity across all three perspectives. This review highlighted clear trends in the way PIF is conceptualized in the medical education literature. First, our field currently relies heavily on reflective writing and narrative medicine as the interventions of choice. Educators employing these interventions often came from an individualist perspective on PIF. Social-contextual PIF perspectives were less prevalent, accounting for only 4 of the 19 reflective writing and narrative medicine interventions^{29,35,38,40} included in this review. The paucity of social-contextual perspectives has significant implications for medical education. Focusing on the individual within critical pedagogical spaces deemphasizes social aspects of identity formation – we leave learners responsible for managing their identity formation as individuals, even though we understand they must “fit in” the professional culture or risk personal, social, and professional consequences. Without emphasizing the social aspects of identity formation, we leave learners “holding the bag”

within often toxic structures that existed long before they entered medicine.⁹⁰ Personal reflection may still play a role in PIF, but we suggest that these interventions account for contextual or social relationships that might influence one's journey toward a professional identity.

Yet another tendency identified in our synthesis is that authors rarely (i.e., only one of the 43 papers) address limitations in their approach. This omission is unexpected since there are aspects of the individualist and social-contextual approaches to PIF that have been critiqued in the literature. Indeed, a recent attempt to encourage identity formation through a faculty development program failed to meet its goal, with the authors suggesting a reliance on an individualist perspective while neglecting social and contextual factors, may have contributed to this failure.⁹¹ These weaknesses may be why the third perspective – i.e., PIF is an active process with individual and social influences – increasingly informs PIF interventions (i.e., it is used 3 times in the interventions before 2014, but 9 times in the interventions from 2017 – 2021). It may be that educators are intentionally trying to address the weaknesses in each PIF approach by combining approaches. Regardless, we suggest that each PIF perspective – individualist, social-contextual, and a combination of these two – has both affordances to harness and weaknesses to address. Acknowledging these is critical if we are to develop new insights into PIF. It is only by critically reflecting on weaknesses in the ways that theory underpins PIF interventions that we can bring those insights back to educational practice to ensure a robust approach to supporting PIF among learners and professionals alike.

Given the widely acknowledged tensions learners struggle with in their PIF,^{90,92,93} it is curious that identity dissonance is rarely addressed in PIF interventions.^{29,41,53,64} Social identity complexity theory, which builds on social identity theory, attends to how individuals manage multiple group identities.¹⁴ This process is prompted by and often fraught with a sense of dissonance – individuals can experience a very real sense of distress when they negotiate between aspects of different identities that are meaningful but not compatible. Depending on the power and compatibility of different identities, they may respond by combining two different intersecting (but compatible) identities, allowing one identity to dominate another, compartmentalizing an identity in context, or merging multiple identities to form something new.⁸ Given the distress these processes can cause and the value in guiding the process toward functional and positive identities, it is surprising that our educational interventions seem to offer so little direct emphasis on these issues.

Relatedly, none of the interventions in our review discussed intersectionality, a theoretical perspective that seeks to understand interactions between gender, race, and other identities, and the implications of power hierarchies that undergird them.^{94,95} In a recent examination of PIF through the lens of minoritized physicians, Wyatt et al.⁹⁶ concluded that race and ethnicity have been largely absent, invisible, or considered irrelevant within PIF research. They note that this is hugely problematic considering that many contemporary and dominant physician identities are grounded in medicine's history of colonialism and patriarchy⁹⁶, making identity dissonance especially acute for those whose racial and gender identities may not easily fit the mold. We suggest that educators critically examine the contextual factors underlying each learner's unique PIF experience.

For instance, reflective writing assignments could move away from challenging patient encounters to focusing on the intersectional experience of becoming or being a physician and how that experience impacts their PIF growth. We might also audit our educational interventions and build curricula that consider experiences of identity dissonance, particularly for learners and physicians who have been historically underrepresented.⁹⁶

Another trend we noted in our corpus is a scarcity of interventions aimed at GME or CME. PIF is a dynamic and continuous process that continues beyond graduation.⁹⁷ We caution educators not to assume that PIF struggles stop occurring after one obtains their medical degree and to ensure that our educational systems continue to support these struggles beyond graduation from medical school. Recent efforts in GME to promote continuing professional development include the American Medical Association initiative “Reimagining Residency,” a collection of PIF innovation projects targeting GME.⁹⁸ Similar discussions of PIF in the CME space are less frequent and when they do appear, primarily involve efforts to promote PIF through faculty development programs.⁹⁹ Supporting PIF in GME and CME provides vital professional development opportunities through the training continuum. It importantly enables faculty capabilities in the crucial tasks of role modeling, coaching, and mentoring PIF.¹⁰⁰ As educators move forward in their efforts to develop interventions aimed at impacting PIF, we hope to encourage an expansion of focus beyond the UME space to include GME and CME.

Our research is not without limitations. Our search strategy may have favored certain types of interventions to the exclusion of others (i.e., reflective writing), skewing the frequency of interventions and, therefore, the resultant theoretical perspectives. Additionally, relying on conceptualizations of PIF theories that simplify them to be

purely individualist or social-contextual may be too categorical a distinction. Theories of PIF are multifaceted and continually evolving. Therefore, characterizations we made in our analyses must be recognized as representing our interpretations using these clear but simplified distinctions. We could have used other PIF theories to shape our critical review – e.g., "thick" individual/"thin" social-contextual conceptualizations.¹² Our theory selection is part of our methodological reflexivity; it was a research design decision that shaped our findings. However, we intentionally selected the individualist and social-contextual distinctions because they aligned with our understanding of the manuscripts in the review and provided insights into the kinds of theories that have shaped the PIF intervention discussion to date. Therefore, our interpretations are precisely that – *our* interpretations which we offer to the community for consideration. They are not a definitive representation of the literature nor the original educators' interventional approach.

The corpus of educational interventions that targeted PIF left our research team with unanswered questions. For instance, we were surprised that many interventions aiming to address a specific non-PIF topic (e.g., longitudinal integrated rural placements⁴⁸⁻⁵¹) were found to have noteworthy PIF implications in the study outcomes. We found ourselves asking if PIF could be considered as part of every educational effort. Is it possible that PIF is part of all the educational activities along the medical education continuum? Our corpus did not enable us to address this question, but we contend that it is a crucial consideration requiring further research. We also questioned if educational interventions should explicitly target PIF. From an individualist perspective, PIF is a deeply personal process. Is it ethical for medical educators to require participation in

interventions that intentionally alter or direct that process? Who is to say what PIF process is correct or better than another? From a social-contextual perspective, what if the PIF intervention positions physicians' identity in a fundamentally incongruent way with other social identities the learner values? Does that mean that they are less a part of the group of professional physicians? The scope of our study did not allow us to explore these ethical questions, but we suggest that they are important considerations for future PIF curriculum planning.

Conclusions

In summary, our study demonstrates that individualist perspectives reliant on reflective writing elide the impact of social contexts of PIF. This individualist orientation is problematic given the body of research suggesting that social context profoundly impacts PIF. An unintended consequence of this individualist orientation is that cultural problems embedded in the profession become burdens for each future physician to bear. Since we primarily focus PIF as an individual's development, the cultural expectations of the profession that are fixed within PIF become imposed on each physician as fait accompli. Future education and research into PIF in medical education should account for theoretical preferences and the impact of these preferences.

References

1. Monrouxe LV. Identity, identification and medical education: why should we care? *Med Educ*. 2010;44(1):40-49.
2. Wald HS. Professional identity (trans) formation in medical education: reflection, relationship, resilience. *Acad Med*. 2015;90(6):701-706.
3. Holden MD, Buck E, Luk J, et al. Professional identity formation: Creating a longitudinal framework through TIME (transformation in medical education). *Acad Med*. 2015;90(6):761-767.
4. Cruess S, Cruess R. Teaching professionalism—why, what and how. Facts, views & vision in *ObGyn*. 2012;4(4):259.
5. Cruess RL, Cruess SR. Teaching professionalism: general principles. *Med Teach*. 2006;28(3):205-208.
6. Stevens S. Surgeons' professional identity and patient safety: time for change. *Soc Sci Med*. 2013;77:9-10; discussion 11-12.
7. Irby DM, Hamstra SJ. Parting the Clouds: Three Professionalism Frameworks in Medical Education. *Acad Med*. 2016;91(12):1606-1611.
8. Monrouxe LV, Rees CE. Theoretical perspectives on identity: researching identities in healthcare education. *Researching Medical Education*. 2015:129-140.
9. Monrouxe L. Theoretical insights into the nature and nurture of professional identities. *Teaching medical professionalism*. 2016;2:37-53.
10. Kroger J, Marcia JE. The identity statuses: Origins, meanings, and interpretations. In: *Handbook of identity theory and research*. Springer; 2011:31-53.

11. Berzonsky MD. A social-cognitive perspective on identity construction. In:
Handbook of identity theory and research. Springer; 2011:55-76.
12. Smith B, Sparkes AC. Contrasting perspectives on narrating selves and identities:
An invitation to dialogue. Qualitative research. 2008;8(1):5-35.
13. Tajfel HE. Differentiation between social groups: Studies in the social psychology
of intergroup relations. Academic Press; 1978.
14. Roccas S, Brewer MB. Social identity complexity. Personality and social
psychology review. 2002;6(2):88-106.
15. Turner JC, Hogg MA, Oakes PJ, Reicher SD, Wetherell MS. Rediscovering the
social group: A self-categorization theory. Basil Blackwell; 1987.
16. Colliver JA. Constructivism: the view of knowledge that ended philosophy or a
theory of learning and instruction? Teach Learn Med. 2002;14(1):49-51.
17. Grant MJ, Booth A. A typology of reviews: an analysis of 14 review types and
associated methodologies. Health Information & Libraries Journal.
2009;26(2):91-108.
18. Burls A. What is critical appraisal? : Hayward Medical Communications; 2014.
19. Eva KW. On the limits of systematicity. Med Educ. 2008;42(9):852-853.
20. Maggio LA, Ninkov A, Frank JR, Costello JA, Artino AR, Jr. Delineating the
field of medical education: Bibliometric research approach(es). Med Educ. 2021.
21. Kiger ME, Varpio L. Thematic analysis of qualitative data: AMEE Guide No.
131. Med Teach. 2020;42(8):846-854.
22. Braun V, Clarke V. Using thematic analysis in psychology. Qualitative research
in psychology. 2006;3(2):77-101.

23. Walsh R. The methods of reflexivity. *The Humanistic Psychologist*. 2003;31(4):51-66.
24. Wald HS, Reis SP, Monroe AD, Borkan JM. 'The Loss of My Elderly Patient:' Interactive reflective writing to support medical students' rites of passage. *Med Teach*. 2010;32(4):e178-184.
25. Sharpless J, Baldwin N, Cook R, et al. The Becoming: Students' Reflections on the Process of Professional Identity Formation in Medical Education. *Acad Med*. 2015;90(6):713-717.
26. Wald HS, Anthony D, Hutchinson TA, Liben S, Smilovitch M, Donato AA. Professional Identity Formation in Medical Education for Humanistic, Resilient Physicians: Pedagogic Strategies for Bridging Theory to Practice. *Acad Med*. 2015;90(6):753-760.
27. Yu E, Wright SM. "Beginning with the end in mind": imagining personal retirement speeches to promote professionalism. *Acad Med*. 2015;90(6):790-793.
28. Cunningham H, Taylor D, Desai UA, et al. Looking Back to Move Forward: First-Year Medical Students' Meta-Reflections on Their Narrative Portfolio Writings. *Acad Med*. 2018;93(6):888-894.
29. Holmes CL, Hubinette MM, Maclure M, et al. Reflecting on what? The difficulty of noticing formative experiences in the moment. *Perspect Med Educ*. 2018;7(6):379-385.
30. Jarvis-Selinger S, MacNeil KA, Costello GRL, Lee K, Holmes CL. Understanding Professional Identity Formation in Early Clerkship: A Novel Framework. *Acad Med*. 2019;94(10):1574-1580.

31. Steinauer JE, Teherani A, Mangini R, Chien J, Ten Cate O, O'Sullivan P. Characterizations of motivation and identity in medical students' reflections about challenging patient interactions. *Med Teach*. 2019;41(10):1178-1183.
32. Wilson H, Warmington S, Johansen ML. Experience-based learning: junior medical students' reflections on end-of-life care. *Med Educ*. 2019;53(7):687-697.
33. Stuart E, O'Leary D, Rowntree R, et al. 'Challenges in experiential learning during transition to clinical practice: A comparative analysis of reflective writing assignments during general practice, paediatrics and psychiatry clerkships'. *Med Teach*. 2020;42(11):1275-1282.
34. Désilets V, Graillon A, Ouellet K, Xhignesse M, St-Onge C. Reflecting on professional identity in undergraduate medical education: implementation of a novel longitudinal course. *Perspect Med Educ*. 2021.
35. Wong A, Trollope-Kumar K. Reflections:an inquiry into medical students' professional identity formation. *Med Educ*. 2014;48(5):489-501.
36. Wald HS, White J, Reis SP, Esquibel AY, Anthony D. Grappling with complexity: Medical students' reflective writings about challenging patient encounters as a window into professional identity formation. *Med Teach*. 2019;41(2):152-160.
37. Miller E, Balmer D, Hermann N, Graham G, Charon R. Sounding narrative medicine: studying students' professional identity development at Columbia University College of Physicians and Surgeons. *Acad Med*. 2014;89(2):335-342.

38. Warmington S, McColl G. Medical student stories of participation in patient care-related activities: the construction of relational identity. *Adv Health Sci Educ Theory Pract*. 2017;22(1):147-163.
39. Sawatsky AP, Nordhues HC, Merry SP, Bashir MU, Hafferty FW. Transformative Learning and Professional Identity Formation During International Health Electives: A Qualitative Study Using Grounded Theory. *Acad Med*. 2018;93(9):1381-1390.
40. Yardley S, Kinston R, Lefroy J, Gay S, McKinley RK. 'What do we do, doctor?' Transitions of identity and responsibility: a narrative analysis. *Adv Health Sci Educ Theory Pract*. 2020;25(4):825-843.
41. Kilbertus F, Ajjawi R, Archibald D. Harmony or dissonance? The affordances of palliative care learning for emerging professional identity. *Perspect Med Educ*. 2020;9(6):350-358.
42. Kneese G, Barrera S, Castillo J, et al. ScribeMD: Mixed-methods analysis of a pen pal program in undergraduate medical education. *Med Teach*. 2020;42(3):316-324.
43. Reis SP, Wald HS. Contemplating Medicine During the Third Reich: Scaffolding Professional Identity Formation for Medical Students. *Acad Med*. 2015;90(6):770-773.
44. Talisman N, Harazduk N, Rush C, Graves K, Haramati A. The Impact of Mind-Body Medicine Facilitation on Affirming and Enhancing Professional Identity in Health Care Professions Faculty. *Acad Med*. 2015;90(6):780-784.

45. Green MJ. Comics and Medicine: Peering Into the Process of Professional Identity Formation. *Acad Med.* 2015;90(6):774-779.
46. Kalet A, Buckvar-Keltz L, Harnik V, et al. Measuring professional identity formation early in medical school. *Med Teach.* 2017;39(3):255-261.
47. Heiman HL, O'Brien CL, Curry RH, et al. Description and Early Outcomes of a Comprehensive Curriculum Redesign at the Northwestern University Feinberg School of Medicine. *Acad Med.* 2018;93(4):593-599.
48. Konkin J, Suddards C. Creating stories to live by: caring and professional identity formation in a longitudinal integrated clerkship. *Adv Health Sci Educ Theory Pract.* 2012;17(4):585-596.
49. Roberts C, Daly M, Kumar K, Perkins D, Richards D, Garne D. A longitudinal integrated placement and medical students' intentions to practise rurally. *Med Educ.* 2012;46(2):179-191.
50. Daly M, Roberts C, Kumar K, Perkins D. Longitudinal integrated rural placements: a social learning systems perspective. *Med Educ.* 2013;47(4):352-361.
51. Cuncic C, Regehr G, Frost H, Bates J. It's all about relationships : A qualitative study of family physicians' teaching experiences in rural longitudinal clerkships. *Perspect Med Educ.* 2018;7(2):100-109.
52. Helmich E, Derksen E, Prevoo M, Laan R, Bolhuis S, Koopmans R. Medical students' professional identity development in an early nursing attachment. *Med Educ.* 2010;44(7):674-682.

53. Helmich E, Bolhuis S, Dornan T, Laan R, Koopmans R. Entering medical practice for the very first time: emotional talk, meaning and identity development. *Med Educ.* 2012;46(11):1074-1086.
54. Meyer EM, Zapatka S, Brienza RS. The development of professional identity and the formation of teams in the Veterans Affairs Connecticut Healthcare System's Center of Excellence in Primary Care Education Program (CoEPCE). *Acad Med.* 2015;90(6):802-809.
55. Hudson JN, Lethbridge A, Vella S, Caputi P. Decline in medical students' attitudes to interprofessional learning and patient-centredness. *Med Educ.* 2016;50(5):550-559.
56. Boudreau JD, Macdonald ME, Steinert Y. Affirming Professional Identities Through an Apprenticeship: Insights From a Four-Year Longitudinal Case Study. *Acad Med.* 2014;89(7):1038-1045.
57. Kline CC, Park SE, Godolphin WJ, Towle A. Professional Identity Formation: A Role for Patients as Mentors. *Acad Med.* 2020;95(10):1578-1586.
58. Sawatsky AP, Huffman BM, Hafferty FW. Coaching Versus Competency to Facilitate Professional Identity Formation. *Acad Med.* 2019.
59. Parsons AS, Kon RH, Plews-Ogan M, Gusic ME. You can have both: Coaching to promote clinical competency and professional identity formation. *Perspect Med Educ.* 2021;10(1):57-63.
60. Satterfield JM, Becerra C. Developmental challenges, stressors and coping strategies in medical residents: a qualitative analysis of support groups. *Med Educ.* 2010;44(9):908-916.

61. Tolsgaard MG, Arendrup H, Pedersen P, Ringsted C. Feasibility of self-directed learning in clerkships. *Med Teach*. 2013;35(8):E1409-E1415.
62. Barr J, Bull R, Rooney K. Developing a patient focused professional identity: an exploratory investigation of medical students' encounters with patient partnership in learning. *Adv Health Sci Educ Theory Pract*. 2015;20(2):325-338.
63. Branch WT, Frankel RM, Hafler JP, et al. A Multi-Institutional Longitudinal Faculty Development Program in Humanism Supports the Professional Development of Faculty Teachers. *Acad Med*. 2017;92(12):1680-1686.
64. Joseph K, Bader K, Wilson S, Walker M, Stephens M, Varpio L. Unmasking identity dissonance: exploring medical students' professional identity formation through mask making. *Perspect Med Educ*. 2017;6(2):99-107.
65. Woodruff JN, Vela MB, Zayyad Z, et al. Supporting Inclusive Learning Environments and Professional Development in Medical Education Through an Identity and Inclusion Initiative. *Acad Med*. 2020;95(12S Addressing Harmful Bias and Eliminating Discrimination in Health Professions Learning Environments):S51-s57.
66. Dornan T, Roy Bentley S, Kelly M. Medical teachers' discursive positioning of doctors in relation to patients. *Med Educ*. 2020;54(7):628-636.
67. Bleakley A, Bligh J, Browne J. Medical education for the future: Identity, power and location. Vol 1: Springer Science & Business Media; 2011.
68. Cooke M, Irby DM, O'Brien BC. Educating physicians: a call for reform of medical school and residency. Vol 16: John Wiley & Sons; 2010.

69. Schein EH. Career dynamics: Matching individual and organizational needs. Vol 6834: Addison-Wesley; 1978.
70. Weaver R, Peters K, Koch J, Wilson I. 'Part of the team': professional identity and social exclusivity in medical students. *Med Educ*. 2011;45(12):1220-1229.
71. Ibarra H. Provisional selves: Experimenting with image and identity in professional adaptation. *Administrative science quarterly*. 1999;44(4):764-791.
72. Slay HS, Smith DA. Professional identity construction: Using narrative to understand the negotiation of professional and stigmatized cultural identities. *Human relations*. 2011;64(1):85-107.
73. Holden M, Buck E, Clark M, Szauter K, Trumble J. Professional identity formation in medical education: the convergence of multiple domains. Paper presented at: HEC forum2012.
74. Pullon S. Competence, respect and trust: Key features of successful interprofessional nurse-doctor relationships. *Journal of interprofessional care*. 2008;22(2):133-147.
75. Trede F, Macklin R, Bridges D. Professional identity development: a review of the higher education literature. *Studies in higher education*. 2012;37(3):365-384.
76. Cruess RL, Cruess SR, Boudreau JD, Snell L, Steinert Y. Reframing medical education to support professional identity formation. *Acad Med*. 2014;89(11):1446-1451.
77. Cruess RL, Cruess SR, Boudreau JD, Snell L, Steinert Y. A Schematic Representation of the Professional Identity Formation and Socialization of

- Medical Students and Residents: A Guide for Medical Educators. *Acad Med.* 2015;90(6):718-725.
78. Cruess RL, Cruess SR, Steinert Y. Amending Miller's pyramid to include professional identity formation. *Acad Med.* 2016;91(2):180-185.
79. Cruess SR, Cruess RL, Steinert Y. Supporting the development of a professional identity: General principles. *Med Teach.* 2019;41(6):641-649.
80. Jarvis-Selinger S, Pratt DD, Regehr G. Competency is not enough: integrating identity formation into the medical education discourse. *Acad Med.* 2012;87(9):1185-1190.
81. Schiffrin D. Approaches to discourse. *Journal of Pragmatics.* 1998;3(29):355-359.
82. Clandinin DJ, Cave MT. Creating pedagogical spaces for developing doctor professional identity. *Med Educ.* 2008;42(8):765-770.
83. Freshwater D, Stickley T. The heart of the art: emotional intelligence in nurse education. *Nurs Inq.* 2004;11(2):91-98.
84. Wear D, Zarconi J, Kumagai A, Cole-Kelly K. Slow medical education. *Acad Med.* 2015;90(3):289-293.
85. Shapiro J, Kasman D, Shafer A. Words and wards: a model of reflective writing and its uses in medical education. *J Med Humanit.* 2006;27(4):231-244.
86. Lave J, Wenger E. *Situated learning: Legitimate peripheral participation.* Cambridge university press; 1991.
87. Costello CY. *Professional identity crisis: Race, class, gender, and success at professional schools.* Vanderbilt University Press; 2005.
88. Kegan R. *The evolving self.* Harvard University Press; 1982.

89. Bebeau MJ. Evidence-based character development. *Lost Virtue*. 2006.
90. Frost HD, Regehr G. "I am a doctor": negotiating the discourses of standardization and diversity in professional identity construction. *Acad Med*. 2013;88(10):1570-1577.
91. Noble C, Young J, Hourn E, Sheehan D. Becoming clinical supervisors: identity learnings from a registrar faculty development program. *Perspect Med Educ*. 2021;10(2):125-129.
92. Beagan BL. Neutralizing differences: producing neutral doctors for (almost) neutral patients. *Soc Sci Med*. 2000;51(8):1253-1265.
93. Erdwinn KM. Like everyone else. In: *What I Learned in Medical School*. University of California Press; 2004:168-176.
94. Crenshaw K. *Univ Chic Leg Forum*. 1989.
95. Tsouroufli M, Rees CE, Monrouxe LV, Sundaram V. Gender, identities and intersectionality in medical education research. *Med Educ*. 2011;45(3):213-216.
96. Wyatt TR, Balmer D, Rockich-Winston N, Chow CJ, Richards J, Zaidi Z. 'Whispers and shadows': A critical review of the professional identity literature with respect to minority physicians. *Med Educ*. 2021;55(2):148-158.
97. Rees CE, Monrouxe LV. Who are you and who do you want to be? Key considerations in developing professional identities in medicine. *Med J Aust*. 2018;209(5):202-203.
98. Andrews JS, Lomis KD, Richardson JA, Hammoud MM, Skochelak SE. Expanding innovation from undergraduate to graduate medical education: A path of continuous professional development. *Med Teach*. 2021;43(sup2):S49-s55.

99. O'Sullivan PS, Steinert Y, Irby DM. A faculty development workshop to support educator identity formation. *Med Teach*. 2021;43(8):916-917.
100. Steinert Y, O'Sullivan PS, Irby DM. Strengthening Teachers' Professional Identities Through Faculty Development. *Acad Med*. 2019;94(7):963-968.

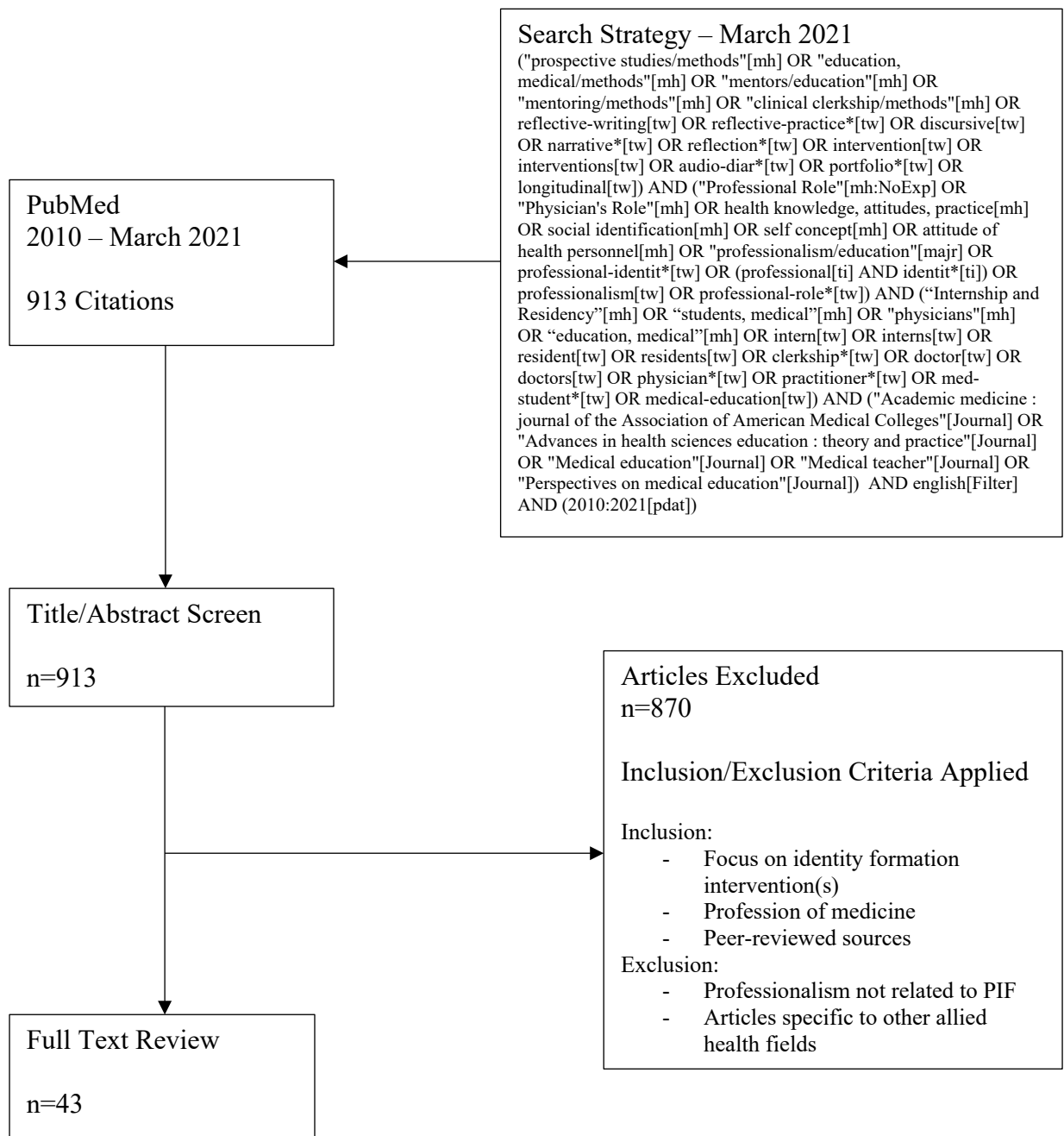


Figure 1. Study design

Table 1. Professional identity formation interventions studies, 2010 – March 2021.

Authors	Year	UME, GME, CME	Type of Intervention	Cited Definition	Theoretical Perspective
Satterfield and Becerra ⁶⁰	2010	GME	Resident support groups	-	-
Wald et al. ²⁴	2010	UME	Reflective writing	-	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Helmich et al. ⁵²	2010	UME	Nursing attachments	-	<i>PIF occurs through socialization (social-contextual)</i>
Konkin and Suddards ⁴⁸	2011	UME	Longitudinal integrated clerkships	Bleakley et al. 2011 ⁶⁷ Cooke et al. 2010 ⁶⁸	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Helmich et al. ⁵³	2012	UME	Nursing attachments	-	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Roberts et al. ⁴⁹	2012	UME	Longitudinal rural placement	Schein 1978 ⁶⁹	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Daly et al. ⁵⁰	2013	UME	Longitudinal integrated rural placement	-	<i>PIF occurs through socialization (social-contextual)</i>
Tolsgaard et al. ⁶¹	2013	UME	Self-directed learning	-	<i>PIF occurs through socialization (social-contextual)</i>
Miller et al. ³⁷	2014	UME	Narrative medicine seminars	-	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Boudreau et al. ⁵⁶	2014	UME	Longitudinal apprenticeship	Cooke et al. 2010 ⁶⁸	<i>PIF occurs through socialization (social-contextual)</i>
Wong and Trollope-Kumar ³⁵	2014	UME	Narrative reflections	Weaver et al. 2011 ⁷⁰ Ibarra 1999 ⁷¹ Slay and Smith 2011 ⁷²	<i>PIF occurs through socialization (social-contextual)</i>
Sharpless et al. ²⁵	2015	UME	Commentary on reflective writing	Holden et al. 2012 ⁷³	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Reis and Wald ⁴³	2015	UME	Curriculum module	-	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Talisman et al. ⁴⁴	2015	CME	Mind-body medicine course	-	<i>PIF developing within in pedagogic</i>

					<i>or reflective spaces (individualist)</i>
Green ⁴⁵	2015	UME	Medical graphic narratives course (comics)	Wong et al. 2014 ³⁵	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Meyer et al. ⁵⁴	2015	GME	Interprofessional teams	Pullon et al. 2008 ⁷⁴	<i>PIF occurs through socialization (social-contextual)</i>
Wald et al. ²⁶	2015	UME, GME	Reflective writing, synergistic teaching modules, faculty development of coaching skills	Cruess et al. 2014 ⁷⁶	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Barr et al. ⁶²	2015	UME	Patient partner program	-	<i>PIF occurs through socialization (social-contextual)</i>
Yu and Wright ²⁷	2015	GME	Reflective exercise	-	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Hudson et al. ⁵⁵	2016	UME	Interdisciplinary clinical experience	Schein 1978 ⁶⁹ Slay and Smith 2011 ⁷²	<i>PIF occurs through socialization (social-contextual)</i>
Branch Jr. et al. ⁶³	2017	CME	Longitudinal faculty development	-	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Kalet et al. ⁴⁶	2017	UME	Professionalism curriculum	Cooke et al. 2010 ⁶⁸	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Joseph et al. ⁶⁴	2017	UME	Mask making	Cruess et al. 2015 ⁷⁷	<i>PIF occurs through socialization (social-contextual)</i>
Warmington and McColl ³⁸	2017	UME	Narrative portfolio	-	<i>PIF occurs through socialization (social-contextual)</i>
Sawatsky et al. ³⁹	2018	GME	Narrative reflections - international health elective	Cruess et al. 2016 ⁷⁸ Jarvis-Selinger et al. 2012 ⁸⁰	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Cunningham et al. ²⁸	2018	UME	Meta-reflection	-	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Heiman et al. ⁴⁷	2018	UME	Curriculum design	-	-
Holmes et al. ²⁹	2018	UME	Reflection-based course	-	<i>PIF occurs through socialization (social-contextual)</i>
Cuncic et al. ⁵¹	2018	CME	Longitudinal integrated clerkships	-	-
Jarvis-Selinger et al. ³⁰	2019	UME	Clinical clerkship – guided reflection and professionalism/hidden curriculum course	Jarvis-Selinger et al. 2012 ⁸⁰	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Steinauer et al. ³¹	2019	UME	Reflective writing	Jarvis-Selinger et al. 2012 ⁸⁰ Cruess et al. 2015 ⁷⁷	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Wald et al. ³⁶	2019	UME	Reflective process	Cruess et al. 2014 ⁷⁶	<i>PIF developing within in pedagogic</i>

Wilson et al. ³²	2019	UME	Experiential learning with reflection	-	<i>or reflective spaces (individualist)</i> <i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Sawatsky et al. ⁵⁸	2019	GME	Coaching	Jarvis-Selinger et al. 2012 ⁸⁰	<i>PIF occurs through socialization (social-contextual)</i>
Woodruff et al. ⁶⁵	2020	UME	Identity and inclusion committee	-	-
Kline et al. ⁵⁷	2020	UME	Patient mentoring	Cooke et al. 2010 ⁶⁸	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Dorman et al. ⁶⁶	2020	CME	Faculty interviews – discourse analysis	-	<i>PIF occurs through socialization (social-contextual)</i>
Yardley et al. ⁴⁰	2020	UME, GME	Narrative analysis - student transition experiences	-	<i>PIF occurs through socialization (social-contextual)</i>
Stuart et al. ³³	2020	UME	Experiential learning with reflective writing	Cruess et al. 2019 ⁷⁹	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Kilbertus et al. ⁴¹	2020	GME	Narratives of memorable learning – palliative care experiences	-	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Kneese et al. ⁴²	2020	UME	Intra-class pen pal program (narrative medicine tool)	Trede et al. 2012 ⁷⁵	<i>PIF developing within in pedagogic or reflective spaces (individualist)</i>
Parsons et al. ⁵⁹	2021	UME	Coaching	Jarvis-Selinger et al. 2012 ⁸⁰ Cruess et al. 2014 ⁷⁶	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>
Désilets et al. ³⁴	2021	UME	Reflective writing in a longitudinal course	Cruess et al. 2014 ⁷⁶	<i>PIF is an active process with individual and social influences (individualist and social-contextual)</i>

Abbreviations: UME = Undergraduate Medical Education; GME = Graduate Medical Education; CME = Continuing Medical Education; PIF = Professional Identity Formation

CHAPTER 3: DISCUSSION

Discussion

Our critical review identified 43 studies examining interventions impacting PIF in medical education. We identified three theoretical perspectives: individualist, social-contextual, and those influenced by both individualist and social-contextual approaches. Reflective writing and narrative reflections were the dominant modes of student activity across all three perspectives.

This review highlighted clear trends in how the medical education literature conceptualizes PIF. First, our field currently relies heavily on reflective writing and narrative medicine as the interventions of choice. Educators employing these interventions often came from an individualist perspective on PIF. Another tendency identified in our synthesis is that authors rarely (i.e., only one of the 43 papers) address limitations in their approach. This omission is unexpected since aspects of the individualist and social-contextual approaches to PIF have been critiqued in the literature. Additionally, given the widely acknowledged tensions learners struggle with in their PIF,¹⁻³ it is curious that identity dissonance is rarely addressed in PIF interventions.⁴⁻⁷ Relatedly, none of the interventions in our review discussed intersectionality, a theoretical perspective that seeks to understand interactions between gender, race, and other identities, and the implications of power hierarchies that undergird them.^{8,9} Another trend we noted in our corpus is a scarcity of interventions aimed at GME or CME. PIF is a dynamic and continuous process that continues beyond graduation.¹⁰

There are several important implications of our review. First, our research highlights the need for medical educators to attend to conceptualizations of PIF

embedded in all our educational interventions, not just those explicitly targeting PIF. Many of medical education's educational strategies focus on the individual within critical pedagogical spaces. This focus deemphasizes the social aspects of medicine and PIF. In doing so, we risk leaving learners with the impression that they alone are responsible for managing their identity formation across our curricula. However, our curricula also require learners to adjust to the unique professional culture of many different clinical settings. When our learners fail to adjust successfully, we risk personal, social, and professional consequences. Without emphasizing the social aspects of identity formation embedded in many of our educational interventions, we abandon learners to wrestle alone with their identities, even within often toxic structures that existed long before they entered medicine.¹ Personal reflection may still play a role in PIF. Still, we suggest that these interventions need to be structured to account for contextual or social relationships that might influence one's journey toward a professional identity.

Additionally, we suggest that each PIF perspective – individualist, social-contextual, and a combination of these two – has strengths and weaknesses. Each allows us to see some aspects of PIF but obscures other aspects of PIF. Acknowledging these foregrounding and backgrounding properties is critical if we are to develop new insights into PIF. It is only by critically reflecting on weaknesses in the ways that theory underpins PIF interventions that we can bring new insights back to educational practice to ensure a robust approach to supporting PIF among learners and professionals alike. Educators must also critically examine the contextual factors underlying each learner's unique PIF experience. If we rely primarily on individualist theories, we create a situation where the work of PIF rests solely on learners' shoulders. Incidents in clinical encounters

– e.g., shaming events – risk becoming deeply personal solitary struggles for the learners. If something goes wrong from a PIF perspective, our individualist orientations suggest to learners that the problems are their fault and theirs alone to fix.

Finally, the current body of PIF intervention publications suggests that PIF is an undergraduate medical education problem. PIF struggles do not stop occurring once an individual obtains a medical degree. Supporting PIF in GME and CME is essential if we acknowledge that professional identity formation is a lifelong process. If we agree that PIF changes over time and indefinitely, residents and practicing clinicians also need support in managing their PIF over time. Furthermore, residents and practicing physicians often take on the crucial tasks of role modeling, coaching, and mentoring PIF to others.¹¹ As educators move forward in their efforts to develop interventions aimed at impacting PIF, we hope to encourage an expansion of focus beyond the UME space to include GME and CME.

Ultimately, the implications of our study emphasize the criticality of considering a theoretical or conceptual approach to the development and implementation of interventions aimed at impacting PIF. A deliberate approach to such interventions must also consider the myriad social and contextual influences on one's professional identity while honoring the uniqueness of our learners. We also charge educators to consider the challenges our learners face reconciling a developing professional identity with the various other personal and cultural identities they might bring to this process. Similarly, the path to identity remains not only variable but also continuous and lifelong, and therefore efforts to impact PIF must likewise span the gamut of a medical professional's career. Failure to appreciate these vital considerations belies the widely held importance

we have placed on PIF, importance demonstrated by the ever-expanding corpus of literature examining this fundamental aspect of medical education. Finally, our review, like most work of this kind, recognizes areas for future inquiry and reminds us to critically examine our practices so that we might ensure we meet our pedagogical intent.

Military Relevance

Medical professionals in the military health system are uniquely challenged to form professional identities as physicians and military officers. The formation of these professional identities is of paramount importance to the military health system. PIF has been widely studied in the medical education literature because it foundationally contributes to the core competency of professionalism and facilitates an ethical framework from which an individual practices medicine. Failed or poorly developed professional identities are linked with difficulties performing under duress, decreased well-being, impaired teamwork and interprofessional relationships, and unprofessional behaviors.^{12,13} Stunted development in these critical areas directly impacts readiness, inhibiting the preparation of a ready medical force and a medically ready force. Our critical review elucidates how theoretical perspectives on PIF inform medical education interventions on identity formation, ultimately providing recommendations for best practices in PIF curricula for military medical education and training. With this enhanced understanding, military medical educators may more effectively develop curricula for the military health system that addresses the vital intersection between medicine and the military that forms the crux of being a military physician.

Limitations

Theories of PIF are multifaceted and continually evolving. Relying on conceptualizations of PIF theories that simplify them to be purely individualist or social-contextual is surely too categorical a distinction. Moreover, our interpretations are not a definitive representation of the literature nor the original educators' interventional approach. The search strategy may have favored certain types of interventions to the exclusion of others (i.e., reflective writing), skewing the frequency of interventions and, therefore, the resultant theoretical perspectives.

Future Directions

Our research team identified several unanswered questions during our research work, thereby providing a potential path for future research. We noted that many interventions aiming to address a specific non-PIF topic were found to have significant PIF implications in the study outcomes. We found ourselves asking if PIF could be considered as part of every educational effort. Is it possible that PIF is part of all the educational activities along the medical education continuum? Our review did not address this question, but we contend that it is a crucial consideration requiring further research. We also questioned if educational interventions should explicitly target PIF. From an individualist perspective, PIF is a deeply personal process. Is it ethical for medical educators to require participation in interventions that intentionally alter or direct that process? Who is to say what PIF process is correct or better than another? From a social-contextual perspective, what if the PIF intervention positions physicians' identity in a fundamentally incongruent way with other social identities the learner values? Does

that mean that they are less a part of the group of professional physicians? The scope of our study did not allow us to explore these ethical questions, but we suggest that they are important considerations for future PIF curriculum planning.

Conclusions

In summary, our study demonstrates that individualist perspectives reliant on reflective writing minimize the impact of social contexts of PIF. This individualist orientation is problematic given the body of research suggesting that social context profoundly impacts PIF. Moreover, our critical review elucidates how theoretical perspectives on PIF inform medical education interventions on identity formation, ultimately providing recommendations for best practices in PIF curricula for medical education and training.

References

1. Frost HD, Regehr G. "I am a doctor": negotiating the discourses of standardization and diversity in professional identity construction. *Acad Med*. 2013;88(10):1570-1577.
2. Beagan BL. Neutralizing differences: producing neutral doctors for (almost) neutral patients. *Soc Sci Med*. 2000;51(8):1253-1265.
3. Erdwinn KM. Like everyone else. In: *What I Learned in Medical School*. University of California Press; 2004:168-176.
4. Holmes CL, Hubinette MM, Maclure M, et al. Reflecting on what? The difficulty of noticing formative experiences in the moment. *Perspectives on Medical Education*. 2018;7(6):379-385.
5. Kilbertus F, Ajjawi R, Archibald D. Harmony or dissonance? The affordances of palliative care learning for emerging professional identity. *Perspect Med Educ*. 2020;9(6):350-358.
6. Helmich E, Bolhuis S, Dornan T, Laan R, Koopmans R. Entering medical practice for the very first time: emotional talk, meaning and identity development. *Med Educ*. 2012;46(11):1074-1086.
7. Joseph K, Bader K, Wilson S, Walker M, Stephens M, Varpio L. Unmasking identity dissonance: exploring medical students' professional identity formation through mask making. *Perspect Med Educ*. 2017;6(2):99-107.
8. Crenshaw K. Univ Chic Leg Forum. 1989.
9. Tsouroufli M, Rees CE, Monrouxe LV, Sundaram V. Gender, identities and intersectionality in medical education research. *Med Educ*. 2011;45(3):213-216.

10. Rees CE, Monrouxe LV. Who are you and who do you want to be? Key considerations in developing professional identities in medicine. *Med J Aust*. 2018;209(5):202-203.
11. Steinert Y, O'Sullivan PS, Irby DM. Strengthening teachers' professional identities through faculty development. *Academic Medicine*. 2019;94(7):963-968.
12. Cruess RL, Cruess SR. Teaching professionalism: general principles. *Medical teacher*. 2006;28(3):205-208.
13. Irby DM, Hamstra SJ. Parting the clouds: three professionalism frameworks in medical education. *Academic Medicine*. 2016;91(12):1606-1611.

APPENDIX 1: CRITICAL REVIEW SEARCH STRATEGY

("prospective studies/methods"[mh] OR "education, medical/methods"[mh] OR "mentors/education"[mh] OR "mentoring/methods"[mh] OR "clinical clerkship/methods"[mh] OR reflective-writing[tw] OR reflective-practice*[tw] OR discursive[tw] OR narrative*[tw] OR reflection*[tw] OR intervention[tw] OR interventions[tw] OR audio-diar*[tw] OR portfolio*[tw] OR longitudinal[tw]) AND ("Professional Role"[mh:NoExp] OR "Physician's Role"[mh] OR health knowledge, attitudes, practice[mh] OR social identification[mh] OR self concept[mh] OR attitude of health personnel[mh] OR "professionalism/education"[majr] OR professional-identit*[tw] OR (professional[ti] AND identit*[ti]) OR professionalism[tw] OR professional-role*[tw]) AND ("Internship and Residency"[mh] OR "students, medical"[mh] OR "physicians"[mh] OR "education, medical"[mh] OR intern[tw] OR interns[tw] OR resident[tw] OR residents[tw] OR clerkship*[tw] OR doctor[tw] OR doctors[tw] OR physician*[tw] OR practitioner*[tw] OR med-student*[tw] OR medical-education[tw]) AND ("Academic medicine : journal of the Association of American Medical Colleges"[Journal] OR "Advances in health sciences education : theory and practice"[Journal] OR "Medical education"[Journal] OR "Medical teacher"[Journal] OR "Perspectives on medical education"[Journal]) AND english[Filter] AND (2010:2021[pdat])

APPENDIX 2: CRITICAL REVIEW EXTRACTION TOOL HEADINGS

Reviewer Name	Title of the Article	Primary focus on the study (UME, GME, UME/GME)	Type of Intervention	Intervention aimed specifically at PIF (definitely include)
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Does the article include a definition of PIF?	If yes, what definition is included?	If maybe, what parts of the text suggest a definition?	Does the article identify a theoretical/conceptual framework for PIF?
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If the article identifies a theoretical/conceptual framework, is it explicitly or implicitly expressed?	What theoretical/conceptual framework is expressed? If other evidence of a theoretical perspective, please include here.	If the article identifies a theoretical/conceptual framework, does it move beyond a cursory mention of PIF to inform or shape the intervention?
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What is the stated purpose of the intervention/study?	Data about PIF outcomes of each included intervention (if it is an intervention aimed at professionalism but there are some PIF related results presented, then we collect ONLY the PIF related data)	Memo (notes, thoughts, discussion points on this article)
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