

A scoping review of Fit in medical education: a guaranteed success, or a threat to inclusivity?

Un examen approfondi de la notion de compatibilité en enseignement médical : un succès garanti ou une menace pour l'inclusivité?

Julian Wang,¹ Samuel Skulsky,¹ Lindsey Sikora,² Isabelle Raiche¹

¹Department of Surgery, University of Ottawa, Ontario, Canada; ²Health Sciences Library, University of Ottawa, Ontario, Canada
Correspondence to: Dr. Isabelle Raiche MD MaEd, The Ottawa Hospital Civic Campus, 737 Parkdale Ave, Ottawa ON; phone: 613-798-5555 x13963; email: iraiche@toh.ca

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Abstract

Background: Finding applicants that fit in with educational environments is a goal of many educators in hopes that it will lead to successful training. “Fit” is used colloquially to describe a general feeling, however the field of study has grown to include specific terms describing the compatibility between people and their environments, organizations, and jobs. Despite common use, the term is used often but non-specifically in medical education. This review aims to examine the current literature of fit in medical education, how fit is defined, measured and whether it correlates to educational outcomes.

Methods: A systematic database search was conducted in 2024 with Medline, Embase, APA PsychINFO, ERIC and Education Source from 1970 to April 23, 2024. Key search terms included fit, student, medicine, clinical, education. Relevant data included definitions of fit, measurement tools, and correlation with educational outcomes. The standard six-step scoping review framework and PRISMA-ScR reporting guidelines were used.

Results: The search identified 1960 non-duplicate articles, 11 of which were included in the review after screening. Fit was specifically defined in only three articles and was measured primarily through personality and value testing with interviews and surveys. Educational outcomes correlated positively with fit, however were studied in just three articles.

Conclusions: Person-organization fit may correlate positively with medical education outcomes however there is limited research in this field. Further research should explore methods in evaluating for fit in trainee selection while focusing on the risk of discrimination based on intrinsic biases.

Résumé

Contexte : Trouver des candidats qui s'adaptent aux environnements éducatifs est un objectif pour de nombreux éducateurs dans l'espoir que cela conduise à une formation réussie. On parlera familièrement de « bon candidat », de « bonne recrue » pour décrire un sentiment général, mais le domaine d'étude s'est développé pour inclure des termes spécifiques décrivant la compatibilité entre les personnes et leur environnement, les organisations et les emplois. Malgré son usage courant, le terme est souvent utilisé, mais de manière non spécifique, dans le domaine de l'enseignement médical. Cette étude a pour but d'examiner la littérature actuelle sur la compatibilité dans l'enseignement médical, la façon dont la compatibilité est définie et mesurée et si elle est en corrélation avec les résultats de l'enseignement.

Méthodes : Une recherche systématique a été effectuée dans les bases de données Medline, Embase, APA PsychINFO, ERIC et Education Source entre 1970 et le 23 avril 2024. Les termes clés de recherche comprenaient compatibilité (*fit*), étudiant, médecine, clinique, éducation. Les données pertinentes comprenaient les définitions de l'adéquation, les outils de mesure et la corrélation avec les résultats éducatifs. Le processus standard d'examen de la portée en six étapes ainsi que les recommandations du PRISMA-ScR ont été utilisés.

Résultats : L'étude a permis d'identifier 1960 articles non dupliqués, dont 11 ont été inclus dans la revue après sélection. La compatibilité (le *fit*) n'a été définie spécifiquement que dans trois articles et a été mesurée principalement par des tests de personnalité et de valeur au moyen d'entrevues et de sondages. Les résultats sur le plan éducatif sont en corrélation positive avec la compatibilité, mais ils n'ont été étudiés que dans trois articles.

Conclusions : La compatibilité entre la personne et l'organisation peut être en corrélation positive avec les résultats des études médicales, mais les recherches dans ce domaine sont limitées. D'autres recherches devraient explorer les méthodes d'évaluation de la compatibilité lors de la sélection des apprenants, tout en considérant le risque de discrimination basé sur les biais intrinsèques.

Introduction

Finding applicants that will “fit” well in a training program is a goal identified by many authors involved in the selection process of medical training programs.¹⁻⁵ While initially a seemingly good idea, the term “fit” is vague and can often be used to describe a general feeling rather than a well-defined construct.⁴

“Fit” is a colloquial term describing the compatibility between an individual and a group or environment.⁶ The study of fit has grown over the past 30 years, pioneered by Cable and Judge to include many related definitions including person-environment fit (P-E, congruence between employees and their overall work environment), person-organization fit (P-O, congruence between employees personal values and the organization’s culture), person-job fit (P-J, congruence between an employees’ skills and abilities to the demands of the job), and needs-supplies fit (congruence between employees’ needs and the rewards they receive in return for their service and contributions on the job).^{7,8-10}

Fitting in with the workplace correlates positively with employee performance and satisfaction.¹¹⁻¹³ Better P-O, P-E, P-J in the office setting has been linked with decreased stress and employee turnover.¹⁴ In the healthcare sector, the concept of fit has emerged as a crucial independent factor in mitigating caregiver burnout and enhancing patient care outcomes. A recent systematic review of 28 articles focusing on healthcare professionals found that a perceived good fit was consistently linked to positive outcomes in 27 studies. Specifically, a strong sense of fit was associated with increased job satisfaction, organizational loyalty, and reduced rates of burnout, absenteeism, stress, and intention to quit.¹² However, within medical education, the correlation between fit and educational outcomes is not as clearly established. While the medical education often takes place in the same setting as the professional healthcare environment, it is uniquely influenced by mentor-trainee dynamics, peer interactions, and the intrinsic pressures of trainee selection and evaluation.^{15,16} For this reason one cannot assume good fit will guarantee better educational outcomes. Furthermore as some authors have warned, overemphasizing the importance of fit in trainee selection could inadvertently threaten the diversity of an educational program – an essential component to a well-rounded training program.^{17,18} If evaluators use an ambiguous definition of fit to justify trainee selection, they could risk relying on

unconscious biases in these decisions.⁴ With this in mind, there is a need to identify what is known about the influence of fit in medical education. The focus will be on how fit is defined, measured, and whether it correlates to educational outcomes.

Methods

The scoping review format was chosen to account for the heterogenous definitions of “fit” in the literature. Prior to beginning this project, we identified a paucity of relevant articles using a variety of quantitative and qualitative methodologies. A scoping review was best suited to allow for a broad inclusion of studies, ensuring all relevant themes in the literature could be examined. The review used the conventional six-step framework described initially by Arksey and O’Malley and improved upon by Levac et al. while adhering to Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) Extension for Scoping Review reporting guidelines.¹⁹⁻²²

1. Identifying the research question

The objective of this scoping review was to study the impact of “fit” in the context of the educational environment by examining educational outcomes, rather than focusing solely on personality testing which has been well described in medical education literature.²³⁻²⁵ The research question is: what is known about “fit” in medical education, how is it measured, and how does it correlate with educational outcomes?

2. Identifying relevant studies

With the aid of a university librarian specializing in healthcare, we conducted a broad literature search in 2024 through Medline, Embase, APA PsycINFO, ERIC and Education Sources databases from 1970 to April 23, 2024. We performed a comprehensive search using several key terms including: fit, student, medicine, clerk, resident, clinical, education. We purposely kept these keywords broad in hopes of capturing the particular body of literature that examined fit in combination with medical educational outcomes, rather than those focusing on student selection or education alone. The detailed search strategy is listed in Appendix A. We conducted a supplementary manual search through the reference lists of the included articles to identify any relevant articles not included in the original search.

3. Study selection

We kept inclusion criteria broad. Both quantitative and qualitative works were used, including prospective and retrospective studies, surveys, and commentaries. All fields directly relating to medicine and allied health were included, such as but not limited to medicine, nursing, pharmacy, physiotherapy, occupational therapy. Exclusion criteria were: 1) Studies not pertaining to fit, 2) studies that did not include the relevant health professions fields, 3) studies that did not involve students or trainees, 4) review articles, 5) abstracts, and 6) studies not available in English or French.

The university librarian conducted the search. Two authors (J.W. and S.S.) screened titles, abstracts and full texts blindly and independently for inclusion using the Covidence systematic review software (Veritas Health Innovation, Melbourne Australia). If the two authors were unable to reach agreement with a particular study, a senior author (I.R.) was available for consultation.

4. Charting the data

Data extraction was recorded into an electronic spreadsheet (Microsoft Excel, version 16.0, Redmond USA), independently and blindly by two authors (J.W. and S.S.). Pre-determined data extraction categories were established. This included study demographics, field of healthcare, the definitions of fit that were used, fit measurement tools and any reported educational outcomes. These data were entered manually into the Microsoft Excel sheet and examined all together to extract the different objective study criteria used (definitions of fit, measurement tools), and to extract common themes within the findings (such as how many studies positively correlate fit with educational outcomes).

5. Collating, summarizing and reporting the results

Themes were extracted from the charted data, summarized in a table, and reported in categories defined by our three original questions: what is known about fit in medical education, how is it measured, and how does it correlate with educational outcomes. The results of these findings were expanded upon in the discussion of the scoping review.

We performed a quality assessment of the included studies at the time of data extraction using the Medical Education Research Study Quality Instrument (MERSQI).²⁶ This is a known tool used to appraise the quality of studies performed in the medical education field. In brief, the MERSQI tool is a scoring tool consisting of 10 items

providing a publication with a score out of a maximum of 18.²⁸ The MERSQI score has been shown to correlate with study funding, quality, and likelihood of a manuscript being accepted for publication.^{26–28} The included studies were appraised independently by the two reviewers and the MERSQI scores were compared. The reviewers discussed discrepancies in scores to reach consensus. The score was not used to choose to include or exclude a study but to describe the quality of the available evidence.

6. Consultation with stakeholders

As recommended in scoping review methodology, the review involved consultation with experts relating to this study.^{19–21} The results of the project were discussed with a medical education researcher and committee member of our institution's residency selection committee. They reviewed the findings and offered insight on how the findings resonate with their experience. This was done in a relaxed setting through in-person discussions after reviewing the manuscript. This step was designed to reconcile findings from the literature and the experience of educators.

Results

Database search results

The initial search yielded 1960 articles of which 443 were duplicates. After screening the 1517 non-duplicate articles, 1463 were excluded through title and abstract screening, resulting in 54 articles for full-text screening. The full-text screen excluded 44 articles. Thirty-one of the excluded articles did not pertain to healthcare professions education, six did not comment on fit, four did not have full-text availability, and three were systematic reviews. A manual search was conducted after this database search yielding one additional article. Ultimately 11 articles were included in the scoping review for data extraction. A diagram detailing the search is found in Figure 1, and a table summarizing the included articles is found in Table 1.

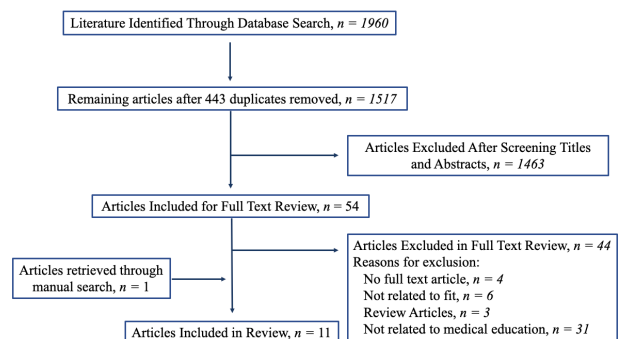


Figure 1. Results of search strategy and article screening

Table 1. Included study characteristics. P-O: person-organization; P-E: person-environment; P-J: person-job, P-S: person-supervisor, PT: physical therapy

Author, pub year	Field of healthcare	Study design, participants (n)	Definitions of fit	Objective of study	Major findings pertaining to fit	MERSQI
Cevallos et al. 2023 ³⁶	Medicine	Mixed cross-sectional survey and semi-structured interviews, 251	P-O Value-congruence	To study the perspectives of value congruence between surgical residents and program directors, and how it correlates to flourishing in residency	Lack of value-congruence was identified in programs with subthemes of inaccessibility, inconsiderateness, inauthenticity and inefficiency of wellness initiatives Higher value-congruence was associated with flourishing	9.5
Clarke et al. 2020 ²⁹	Pharmacy	Cross-sectional survey of pharmacy residency program directors, 1280	P-E P-O P-J Program fit	To study how pharmacy residency program directors perceive advance pharmacy practice experience when selecting candidates for interviews	PGY1 pharmacy residency program directors found the most influential category for their decisions on selecting applicants to their programs were: 1) APPE (Advanced Pharmacy Practice Experience) preceptor reference letters 2) APPE location 3) APPE structure 4) APPE elective type Sought out applicant factors that imply a higher person-organization fit. Conversely, no person-job fit factors were considered a necessity	11
Bamba et al. 2020 ³²	Medicine	Cross sectional survey of plastic surgery fellowship applicants, 18	Fit	To study the satisfaction and costs of virtual versus in-person interviews	Applicants found that in-person interviews allowed them to get a better sense of the faculty and program they were applying for. They rated this experience more positively compared to virtual interviews	9.5
Henderson et al. 2018 ³⁰	Medicine	Cross-sectional long-format interviews of general practitioners (GP), 12	Teacher-learner relationship	To explore the GP perspective on what factors create a positive learning experience for medical students rotating through longitudinal community-based practices	Educational experiences between GPs and medical students benefited from a longitudinal relationship and synergy between motivated preceptors and keen students. Detractors from this experience include time pressures and lack of clinical variety	8
Sutzko et al. 2018 ³³	Medicine	Cross sectional survey of dyads of surgical residents and staff using Regulatory Focus Questionnaire and OpTrust entrustment tools, 63	Congruency	To determine the association between personality alignment and intraoperative entrustment between residents and staff	Resident-surgeon pairings with congruent personality scores were independently associated with higher operative entrustment. These pairs were found with senior residents, difficult cases, and female residents	13
Hadinger et al. 2016 ³⁴	Medicine	Cross sectional long-format interviews of minority medical students, 33	Perceived fit	To explore minority medical students' perceptions of the medical school admissions process	One motivating factor for minority students applying to medical school were factors pertaining to person-job fit, as represented by their expectation of lifestyle, career, family obligations, and salary	7
Thomas et al. 2015 ³¹	Nursing	Cross sectional analysis of experience logs from first year nursing students, 12	Fit in	To explore nursing students' experiences on their first clinical placement	Nursing students face challenges adapting to the clinical environment, including experiencing professional incivility, status dislocation as a learner, and disillusionment in their role. They navigated and adapted to these challenges by seeking out mentorship, remaining altruistic and negotiating learning opportunities	7
Hoffman et al. 2010 ²⁴	Medicine	Cross sectional survey of medical students and residents using Big-Five Inventory and Balanced inventory of Desirable responding, 264	None	To explore personality differences between surgical and non-surgical residents, and if it can be applied to applicant selection	Surgical residents had significantly higher conscientiousness than medical students and pediatrics residents, and significantly higher extroversion and lower openness compared to 1st year medical students. Further study into how personality relates to educational outcomes may guide resident selection	12.5
Giberson et al. 2008 ⁹	Physical Therapy (PT)	Cross sectional survey of physiotherapy student-supervisor pairs using Big-Five Personality Inventory, work values scale, P-O fit scale, physical therapist performance instrument, 59	P-E P-O Person-supervisor fit	To study the association between P-E, P-O and P-S fit and ratings of technical and professional competency in PT training	P-O and P-S fit correlated with physiotherapy students' rotation satisfaction. Personality differences between student and supervisor were associated with lower technical competency scores, but not professional competence	15.5
Laurence et al. 2007 ³⁵	Medicine	Cross sectional survey of registrars (22) and GP supervisors (24), 46	Fit with practice	To describe a local GP residency matching system, and to survey participants on their satisfaction with this system	Registrar interviews were found to be the most important aspect of the matching process. This was aided by a checklist completed by both parties to provide information pertaining to fit. Registrars cited proximity to home, 'feel' of the practice, and working hours and supervisors cited registrar personality, motivation, ability to fit in, and practice feedback as the most important factors	5.5
Wasserman et al. 1969 ²⁵	Medicine	Longitudinal survey of medical students transitioning into residency, 106	None	To study the personalities of medical students, which fields they chose, and the stability of those choices over time	48/106 medical students switched specialty preferences between first year and fourth year. They were influenced by extrinsic factors such as income, prestige, working hours. Students classified as "isolate" tended to prefer technique-oriented specialties. Five years after graduating medical school, 90% of trainees remained in the same field	7

Study characteristics

Of the 11 included studies, 10 (91%) were cross sectional studies primarily using survey or long-form interview methods to obtain information from participants.^{9,24,29–36} One was a longitudinal study following participants with survey questionnaires.²⁵ The healthcare fields that were studied included medicine ($n = 8$),^{24,25,30,32–36} nursing ($n = 1$),³¹ pharmacy ($n = 1$),²⁹ physiotherapy ($n = 1$).⁹

Quality assessment

MERSQI scores ranged from 7 to 15.5, with a mean of 9.5 (IQR 7–11.75). This is comparable to the mean score of 9.95 of articles used in validating the tool.²⁶ However compared to more recent studies, this is lower than the average reported score of 11.3 (range 8.9–14.1) in reviews which use the scoring tool.²⁸

Definitions of fit used in the literature

Of the included studies, 3 used pre-existing definitions of fit described in the literature.^{9,29,36} These included person-organization (P-O), person-job (P-J), person-environment (P-E), and person-supervisor (P-S) fit. Another four studies used the word “fit” in describing the way trainees integrated with their organizations without any further specification.^{31,32,34,35} The remaining four studies did not explicitly use the word “fit” but instead used other terms describing relationships between learners and their supervisors, colleagues, or environments. Phrases found in these studies included “teacher-learner relationship”, or “congruency” between personnel. Alternatively, they also described these relations by means of comparing personality survey results.^{24,25,30,33}

Tools used to evaluate fit

Fit was measured using a variety of tools and methods, the most common of which included surveys. Five studies created their own surveys with topics including how well applicants got to know faculty during interviews, how important the “feel” of the workplace was to trainees, how well one thought they would fit in with the workplace, what students are looking for in a career, how much residents think the actions of the leaders reflect their words, and the importance of reference letters and applicant electives to program directors.^{25,29,32,35,36} Another four studies used existing validated survey instruments.^{9,24,33,37} These included the Regulatory Focus Questionnaire, the Big-Five inventory, the Balanced Inventory of Desirable Responding, the Work Value Scale, a person-organization fit scale developed by Cable and Judge, and questions derived from the Institute for Healthcare Improvement Framework for

Improving Joy in Work.^{7,36,38–41} Three studies used long form interview questions, exploring themes such as what educators perceive as desirable student attributes, what personal and career traits motivate a student to pursue medicine, and program director perspectives on resident wellness initiatives.^{30,34,36} Lastly, one study used data extraction from the diary entries of nursing students during their first clinical placements, focusing on student identity, and challenges faced in their role as trainees in a clinical environment.³¹

Educational outcome measures

Three studies used validated tools to correlate fit with educational outcomes.^{9,33,36} These included the OpTrust entrustment tool to examine intra-operative faculty-resident interactions, the American Physical Therapy Association (APTA) physical therapist clinical performance instrument, and the Mental Health Continuum-Short Form (MHC-SF).^{42–44} Three studies used custom tools to evaluate outcomes. One used a survey to evaluate students’ satisfaction with a clinical rotation, and another was a questionnaire inquiring if medical residents switched fields during their training.^{9,25} The third study interviewed general practitioners in a narrative interview format to determine what made a medical student successful in their clinical rotation.³⁰

Association between fit and trainee selection

Three studies commented on the role fit plays in selecting trainees.^{29,32,35} A study of pharmacy residency program directors conducted by Clark et al. reported the most important elements in selecting applicants for interview were the factors predicting person-environment fit (reference letters, elective placements in similar fields, visiting electives in the host program).²⁹ Bamba et al. showed that applicants to plastic surgery fellowships reported preferring in-person interviews, citing they could better acquaint themselves with the program, faculty and residents when compared to virtual interviews ($p < 0.005$) despite a significantly higher cost of attending in-person interviews ($p < 0.001$).³² Laurence et al. found that those involved in the general practitioner residency selection process reported the most important qualities to be applicants’ personality, motivation, and ability to fit in. Similarly, the applicants rated the “feel” of the practice, and proximity to home being the most important aspects of a program.³⁵

Association between fit and educational outcomes

Four studies commented on the association between fit and educational outcomes.^{9,25,33,36} Sutzko et al. measured the personality congruence between surgical residents and staff, using the validated OpTrust score. This instrument gauges the perceived entrustability between residents and staff across five domains including operative plan, instruction, types of questions asked, problem solving, and leadership. An aggregate score ranging from 2-8 categorizes entrustability into four levels: low, medium, high, and full, with each incremental two-point rise indicating a step up in the degree of trust.⁴² The study demonstrated that pairs of residents and staff with congruent personalities experienced a notable increase of 0.88 points in their OpTrust scores compared to non-congruent pairs, adjusting for variables such as case complexity, and seniority of the faculty and residents (OpTrust score range 2-8, $p = 0.006$).³³ Giberson et al. measured P-O fit and educational outcomes of physiotherapy students in longitudinal rotations. Using the Physical Therapist Clinical Performance Instrument, they determined that student perceived P-O fit was significantly correlated to overall rotation satisfaction ($r = 0.64$, $p < 0.05$), and greater differences in personality values between trainees and staff were associated with lower levels of technical competency ratings ($r = -0.33$, $p < 0.05$). Personality differences however were not associated with a difference in professional competency ratings ($r=0.19$). Wasserman et al. followed medical students five years after graduation, examining their choices of medical specialty. They found that after five years, 48/104 (46%) of trainees had changed choice of field compared to their first-year medical student predictions, and 7/104 (7%) of trainees changed choice compared to their fourth-year medical student predictions. The main reasons cited for changing fields were job-related extrinsic factors such as working hours, prestige, and income – factors associated with P-J fit.²⁵ Lastly, Cevallos et al. conducted a two-part study on value congruence and flourishing for general surgery residents and their program directors (PDs). The first portion compared resident and PD perspectives on well-being initiatives within their programs through surveys and semi-structured interviews. One year later, they administered surveys designed to evaluate resident flourishing within the program with the MHC-SF score and compared how it correlated to value congruence. The MHC-SF score is a 14-item psychological assessment that measures key components of well-being including emotional, social, and psychological well-being. Response

scores are categorized as languishing, moderate mental health, or flourishing.⁴⁴ Value congruence was assessed by comparing the self-reported values of residents and program directors (PDs), alongside residents' perceptions of how closely their values aligned with those of their PDs. Additionally, an attempt to measure value congruence objectively was made using a Likert scale assessing residents' perceptions of the extent to which leaders' actions reflected their stated words. This analysis revealed that higher value congruence significantly correlated with flourishing. A linear regression model demonstrated that each unit increase in value congruence was associated with a 91% increase in odds of flourishing (OR 1.91 95% CI 1.44-2.52 $p < 0.001$).³⁶

Discussion

The amount of research examining the field of “fit” seems disproportionately low for how often the word is used in the medical field.¹⁻⁵ The literature search revealed 11 studies with heterogeneous methodologies, populations, and objectives. They were all either cross sectional or interview-based studies. Adding to the heterogeneity, there as a wide variety of disciplines relating to medicine including nursing, pharmacy and physiotherapy. The board inclusion was by design to capture as many related studies as possible and was the purpose of using the scoping review methodology.

From the 11 studies that were included in our review, there was clearly no single methodology or approach used in the attempt to measure fit. The most common feature among the studies was examining trainee personality traits using questionnaires and surveys. This is in line with existing practice in other fields that attempt to quantify fit through similar means.^{6,7,23,41,45} In comparison to the existing literature on fit, only two of the articles in this review employed pre-existing terminology in fit research such as person-environment, person-organization, person-job, person-supervisor fit.^{9,29} The remaining articles only either referenced the word “fit” or described it in other words such as “congruence of personalities” or by comparing personalities. This suggests fit research has not yet reached mainstream medical education research in the same way it has done so in other industries.¹¹⁻¹³

Three articles did however directly address the question of how fit is measured in medical education and compare it to educational outcomes.^{9,33,36} They were able to quantify the relationships between surgery and physiotherapy trainees to their supervisors, and correlate them to measures of

performance and flourishing. The results of these studies demonstrate what may seem intuitive to many—those with better relationships and values similar to their supervisors achieve better training results. One could speculate many reasons why this correlation exists. For instance, new recruits who are perceived to fit in may receive better treatment, leading to stronger interpersonal relationships, learning opportunities, or mentorship.¹⁵ Alternatively, they may receive better evaluations due to favourable perceptions resulting from the halo effect bias.⁴⁶ The opposite could also be true of those with perceived poor fit, resulting in worse outcomes for these learners. Definitive conclusions however cannot be drawn from these three studies in part due to relatively small sample sizes ($n = 373$ total).

Fit is a frequent topic of discussion in the context of trainee selection.^{2,5} The modern selection process for medical trainees is a high-resource annual undertaking.^{32,47,48} This field is continuously improving on the methodologies to select those who will thrive in the learning environment.⁴⁹ Intuitively, one can assume that a trainee who “fits in” with the environment will do well. As others have noted however, without clearly defining what is sought after with “fit” or how it is measured, placing emphasis on “fitting in” may allow intrinsic bias to influence decisions and create self-fulfilling prophecies.⁴ More recently, there has been an emphasis of ensuring diversity in the workplace through trainee selection.^{50,51} Focusing on one’s gestalt of how well an applicant fits in rather than attempting to quantify it may be counteractive to a culture of diversity and inclusion. Educators may be unknowingly selecting for a more homogenous pool of applicants, people that are similar to them, rather than selecting applicants that would do well in their training.⁴ The results of this review were discussed with a medical education researcher and member of our institution’s residency selection committee. They were in general agreement with the findings, acknowledging the lack of robust literature and the dangers of bias.

While the goal of this study was to identify the state of research of fit in medical education, the lack of high-quality evidence limits one’s ability to draw further conclusions beyond the correlational findings reported in our review. The search identified heterogeneous study methodology, sample size, and quality. A possible explanation could be that definitions of fit used in the literature (“person-organization, “person-environment” etc.) are not found in common parlance in the medical community. For example, there may have been studies not included in the search

which examined educational outcomes but used terminology that did not match our search keywords. As part of the inherent limitation of scoping reviews, the search criteria could have been either too narrow or too broad, and the scoping review methodology lacks the ability to perform comprehensive evaluations of data. More robust review methods such as meta-analyses however are unlikely to be feasible for this particular topic given the paucity of existing literature. An alternative study question could be posed to explore why the research on fit is so varied in the medical field: what do medical educators define as fit? Such a question could examine how the medical community perceives fit in comparison to what is reported in existing literature.

Future research in medical education impacted by fit, especially those involving trainee selection, should clearly define the concept of fit and incorporate objective assessment tools before widely employing the term. Before this can be established as a standard of trainee selection, additional research much be done to better understand the relationship between fit and educational outcomes.

Conclusion

Fit is a term that finds its way into everyday language; however, the lack of clear definitions and assessment metrics may foster ambiguity and bias. There is limited evidence suggesting a positive correlation between fit and educational outcomes. Educators should strive to better define this term so as to not inadvertently foster discrimination and decision-making based on intrinsic bias.

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References

1. Nuthalapaty FS, Jackson JR, Owen J. The influence of quality-of-life, academic, and workplace factors on residency program selection. *Acad Med J Assoc Am Med Coll.* 2004;79(5):417-425. <https://doi.org/10.1097/00001888-200405000-00010>
2. Min AA, Leetch A, Nuño T, Fiorello AB. How well will you FIT? Use of a modified MMI to assess applicants’ compatibility with an emergency medicine residency program. *Med Educ Online.* 2016;21(1):29587. <https://doi.org/10.3402/meo.v21.29587>

3. Selvam R, Moloo H, MacRae H, Alam F, Raiche I. Virtual interviews: Less carbon, less bias? *J Clim Change Health*. 2022;8:100167. <https://doi.org/10.1016/j.joclim.2022.100167>
4. Shappell E, Schnapp B. The F word: how “fit” threatens the validity of resident recruitment. *J Grad Med Educ*. 2019;11(6):635-636. <https://doi.org/10.4300/JGME-D-19-00400.1>
5. Stephenson-Famy A, Houmard BS, Oberoi S, Manyak A, Chiang S, Kim S. Use of the interview in resident candidate selection: a review of the literature. *J Grad Med Educ*. 2015;7(4):539-548. <https://doi.org/10.4300/JGME-D-14-00236.1>
6. Cable DM, DeRue DS. The convergent and discriminant validity of subjective fit perceptions. *J Appl Psychol*. 2002;87(5):875-884. <https://doi.org/10.1037/0021-9010.87.5.875>
7. Cable DM, Judge TA. Person-organization fit, job choice decisions, and organizational entry. *Organ Behav Hum Decis Process*. 1996;67(3):294-311. <https://doi.org/10.1006/obhd.1996.0081>
8. Swanson WS, Harris MC, Master C, Gallagher PR, Mauro AE, Ludwig S. The impact of the interview in pediatric residency selection. *Ambul Pediatr*. 2005;5(4):216. <https://doi.org/10.1367/A04-149R1.1>
9. Giberson TR, Black B, Pinkerton E. The impact of student-clinical instructor fit and student-organization fit on physical therapist clinical education experience outcomes. *J Phys Ther Educ*. 2008;22(1):59-64. <https://doi.org/10.1097/00001416-200801000-00009>
10. Towajj C, Raïche I, Younan J, Gawad N. everyone is awesome: analyzing letters of reference in a general surgery residency selection process. *J Grad Med Educ*. 2020;12(5):566-570. <https://doi.org/10.4300/JGME-D-20-00034.1>
11. Kristof-Brown AL, Zimmerman RD, Johnson EC. Consequences of individuals' fit at work: a meta-analysis of person-job, person-organization, person-group, and person-supervisor fit. *Pers Psychol*. 2005;58:281-342. <https://doi.org/10.1111/j.1744-6570.2005.00672.x>
12. Herkes J, Churruca K, Ellis LA, Pomare C, Braithwaite J. How people fit in at work: Systematic review of the association between person-organisation and person-group fit with staff outcomes in healthcare. *BMJ Open*. 2019;9(5):1-9. <https://doi.org/10.1136/bmjopen-2018-026266>
13. Braithwaite J, Herkes J, Ludlow K, Testa L, Lamprell G. Association between organisational and workplace cultures, and patient outcomes: systematic review. *BMJ Open*. 2017;7(11). <https://doi.org/10.1136/bmjopen-2017-017708>
14. Ketkaew C, Manglakakeeree O, Naruetharadhol P. The interrelationships of work-related factors, person-environment fit, and employee turnover intention. Amankwah-Amoah J, ed. *Cogent Bus Manag*. 2020;7(1):1823580. <https://doi.org/10.1080/23311975.2020.1823580>
15. Hee JM, Yap HW, Ong ZX, et al. Understanding the mentoring environment through thematic analysis of the learning environment in medical education: a systematic review. *J Gen Intern Med*. 2019;34(10):2190-2199. <https://doi.org/10.1007/s11606-019-05000-y>
16. Allen M, Gawad N, Park L, Raïche I. The educational role of autonomy in medical training: a scoping review. *J Surg Res*. 2019;240:1-16. <https://doi.org/10.1016/j.jss.2019.02.034>
17. University of Alberta Faculty of Medicine & Dentistry. *PGME resident selection best practices.*; 2019. Available from <https://www.ualberta.ca/medicine/media-library/policies/programs/pgme/resident-selection-best-practices.pdf> [Accessed Jan 5, 2023].
18. Ryan T. Addressing bias and lack of objectivity in the Canadian resident matching process. *CMAJ*. 2018;190(40):E1211-E1212. <https://doi.org/10.1503/cmaj.70008>
19. Arksey H, O'Malley L. Scoping studies: towards a methodological framework. *Int J Soc Res Methodol Theory Pract*. 2005;8(1):19-32. <https://doi.org/10.1080/1364557032000119616>
20. Pham MT, Rajić A, Greig JD, Sargeant JM, Papadopoulos A, McEwen SA. A scoping review of scoping reviews: advancing the approach and enhancing the consistency. *Res Synth Methods*. 2014;5:371-385. <https://doi.org/10.1002/jrsm.1123>
21. Levac D, Colquhoun H, O'Brien KK. Scoping studies: advancing the methodology. *Implement Sci*. 2010;5(1). <https://doi.org/10.1186/1748-5908-5-69>
22. Tricco AC, Lillie E, Zarin W, et al. PRISMA extension for scoping reviews (prisma-scr): checklist and explanation. *Ann Intern Med*. 2018;169(7):467-473. <https://doi.org/10.7326/M18-0850>
23. Phillips D, Egol KA, Maculatis MC, et al. Personality factors associated with resident performance: results from 12 accreditation council for graduate medical education accredited orthopaedic surgery programs. *J Surg Educ*. 2018;75(1):122-131. <https://doi.org/10.1016/j.jsurg.2017.06.023>
24. Hoffman BM, Coons MJ, Kuo PC. Personality differences between surgery residents, nonsurgery residents, and medical students. *Surgery*. 2010;148(2):187-193. <https://doi.org/10.1016/j.surg.2010.04.005>
25. Wasserman E, Yufit RI, Pollock GH. medical specialty choice and personality. *Arch Gen Psychiatry*. 1969;21(5):529. <https://doi.org/10.1001/archpsyc.1969.01740230017003>
26. Reed DA, Cook DA, Beckman TJ, Levine RB, Kern DE, Wright SM. Association between funding and quality of published medical education research. *JAMA*. 2007;298(9):1002-1009. <https://doi.org/10.1001/jama.298.9.1002>
27. Reed DA, Beckman TJ, Wright SM, Levine RB, Kern DE, Cook DA. Predictive validity evidence for medical education research study quality instrument scores: quality of submissions to JGIM's medical education special issue. *J Gen Intern Med*. 2008;23(7):903-907. <https://doi.org/10.1007/s11606-008-0664-3>
28. Cook DA, Reed DA. Appraising the quality of medical education research methods: the medical education research study quality instrument and the Newcastle-Ottawa Scale-Education. *Acad Med*. 2015;90(8):1067-1076. <https://doi.org/10.1097/ACM.0000000000000786>
29. Clarke CL, Cooper R. Impact of advanced pharmacy practice experiences on residency interview invitations. *Am J Pharm Educ*. 2020;84(2):277-286. <https://doi.org/10.5688/ajpe7575>
30. Henderson M, Upham S, King D, Dick ML, Van Driel M. Medical students, early general practice placements and positive supervisor experiences. *Educ Prim Care*. 2018;29(2):71-78. <https://doi.org/10.1080/14739879.2017.1409084>

31. Thomas J, Jinks A, Jack B. Finessing incivility: The professional socialisation experiences of student nurses' first clinical placement, a grounded theory. *Nurse Educ Today*. 2015;35(12):e4-e9. <https://doi.org/10.1016/j.nedt.2015.08.022>
32. Bamba R, Bhagat N, Tran PC, Westrick E, Hassanein AH, Wooden WA. Virtual interviews for the independent plastic surgery match: a modern convenience or a modern misrepresentation? *J Surg Educ*. 2020;78(2):612-621. <https://doi.org/10.1016/j.jsurg.2020.07.038>
33. Sutzko DC, Boniakowski AE, Nikolian VC, et al. Alignment of personality is associated with increased intraoperative entrustment. *Ann Surg*. 2018;270(6):1058-1064. <https://doi.org/10.1097/SLA.0000000000002813>
34. Hadinger MA. Underrepresented minorities in medical school admissions: a qualitative study. *Teach Learn Med*. 2016;29(1):31-41. <https://doi.org/10.1080/10401334.2016.1220861>
35. Laurence C, Black LE. A person-practice-program fit, Evaluation of a GP training placement process. *Aust Fam Physician*. 2007;36(8):666-669. <https://hdl.handle.net/2440/43674>
36. Cevallos JR, Gonzales PA, Berler MH, Greenberg AL, Lebares CC. Operationalizing the culture of burnout and well-being: multicenter study of value congruence and flourishing in general surgery residency. *J Am Coll Surg*. 2023;237(3):397-407. <https://doi.org/10.1097/XCS.0000000000000775>
37. Cevallos JR, Gonzales PA, Berler MH, Greenberg AL, Lebares CC. Operationalizing the culture of burnout and well-being: multicenter study of value congruence and flourishing in general surgery residency. *J Am Coll Surg*. 2023;237(3):397-407. <https://doi.org/10.1097/XCS.0000000000000775>
38. Higgins ET, Friedman RS, Harlow RE, Idson LC, Ayduk ON, Taylor A. Achievement orientations from subjective histories of success: promotion pride versus prevention pride. *Eur J Soc Psychol*. 2001;31(1):3-23. <https://doi.org/10.1002/ejsp.27>
39. John OP, Srivastava S. The Big-Five trait taxonomy: history, measurement, and theoretical perspectives. In: *Handbook of Personality: Theory and Research*. 2nd ed. Guilford Press; 1999:102-138.
40. Lanyon RI, Carle AC. Internal and external validity of scores on the balanced inventory of desirable responding and the Paulus deception scales. *Educ Psychol Meas*. 2007;67(5):859-876. <https://doi.org/10.1177/0013164406299104>
41. Cable DM, Edwards JR. Complementary and supplementary fit: a theoretical and empirical integration. *J Appl Psychol*. 2004;89(5):822-834. <https://doi.org/10.1037/0021-9010.89.5.822>
42. Sandhu G, Nikolian VC, Magas CP, et al. OpTrust: validity of a tool assessing intraoperative entrustment behaviors. *Ann Surg*. 2018;267(4):670-676. <https://doi.org/10.1097/SLA.0000000000002235>
43. Roach K, Gandy J, Deusinger SS, et al. The development and testing of apta clinical performance instruments. *Phys Ther*. 2002;82(4):329-353. <https://doi.org/10.1093/ptj/82.4.329>
44. Keyes CLM. Mental illness and/or mental health? Investigating axioms of the complete state model of health. *J Consult Clin Psychol*. 2005;73(3):539-548. <https://doi.org/10.1037/0022-006X.73.3.539>
45. Herkes J, Ellis LA, Churrua K, Braithwaite J. The 'goodness-of-fit' of fit models: Creating a multidimensional survey for person-organisation and person-group fit in health care. *BMC Med Res Methodol*. 2020;20(1):1-10. <https://doi.org/10.1186/s12874-020-01033-8>
46. Murphy KR, Jako RA, Anhalt RL. Nature and consequences of halo error: a critical analysis. *J Appl Psychol*. 1993;78(2):218-225. <https://doi.org/10.1037/0021-9010.78.2.218>
47. Fung B, Raiche I, Lamb T, Gawad N, MacNeill A, Moloo H. A chance for reform: the environmental impact of travel for general surgery residency interviews. *Can Med Educ J*. 2021. <https://doi.org/10.36834/cmei.71022>
48. Weissbart SJ, Stock JA, Wein AJ. Program directors' criteria for selection into urology residency. *Urology*. 2015;85:731-736. <https://doi.org/10.1016/j.urology.2014.12.041>
49. Patterson F, Prescott-Clements L, Zibarras L, Edwards H, Kerrin M, Cousans F. Recruiting for values in healthcare: a preliminary review of the evidence. *Adv Health Sci Educ*. 2015;21(4):859-881. <https://doi.org/10.1007/s10459-014-9579-4>
50. Crites K, Johnson J, Scott N, Shanks A. Increasing Diversity in Residency Training Programs. *Cureus*. 14(6):e25962. <https://doi.org/10.7759/cureus.25962>
51. Dinh JV, Salas E. Prioritization of diversity during the residency match: trends for a new workforce. *J Grad Med Educ*. 2019;11(3):319-323. <https://doi.org/10.4300/JGME-D-18-00721.1>

Appendix A. Search strategy

Medline

1. (person-organi*ation fit or person organi*ation fit or supplementary fit or complementary fit or needs-supplies fit or supplies-values fit or demands-abilities fit or supplementary congruence or complementary congruence or similarity fit or value congruence or goal congruence or personality congruence or person-group fit or person-team fit).tw,kf,kw.
2. (person adj3 group).ti,ab.
3. (person adj3 organi*ation).ti,ab.
4. (fit adj2 practic*).ti,ab.
5. or/1-4
6. exp Education, Medical/
7. Students, Medical/
8. Schools, Medical/
9. Clinical clerkship/
10. ((medicine or medical*) adj2 (educat* or student* or school* or learner* or professional*)).tw,kf,kw.
11. ((teaching or attending or clinical or morning or grand) adj2 round*).tw,kf,kw.
12. (morning adj2 report*).tw,kf,kw.
13. (residen* or intern or interns or internship* or train*).tw,kf,kw.
14. or/6-13
15. 5 and 14

Embase

1. (person-organi*ation fit or person organi*ation fit or supplementary fit or complementary fit or needs-supplies fit or supplies-values fit or demands-abilities fit or supplementary congruence or complementary congruence or similarity fit or value congruence or goal congruence or personality congruence or person-group fit or person-team fit).tw,kf,kw.
2. (person adj3 group).ti,ab.
3. (person adj3 organi*ation).ti,ab.
4. (fit adj2 practic*).ti,ab.
5. or/1-4
6. exp medical education/
7. medical student/
8. medical school/
9. ((medicine or medical*) adj2 (educat* or student* or school* or learner* or professional*)).tw,kf,kw.
10. ((teaching or attending or clinical or morning or grand) adj2 round*).tw,kf,kw.
11. (morning adj2 report*).tw,kf,kw.
12. (residen* or intern or interns or internship* or train*).tw,kf,kw.

13. or/6-12
14. 5 and 13

APA PsycINFO

1. (person-organi*ation fit or person organi*ation fit or supplementary fit or complementary fit or needs-supplies fit or supplies-values fit or demands-abilities fit or supplementary congruence or complementary congruence or similarity fit or value congruence or goal congruence or personality congruence or person-group fit or person-team fit).ti,ab.
2. (person adj3 group).ti,ab.
3. (person adj3 organi*ation).ti,ab.
4. (fit adj2 practic*).ti,ab.
5. or/1-4
6. exp medical education/
7. medical students/
8. ((medicine or medical*) adj2 (educat* or student* or school* or learner* or professional*)).ti,ab.
9. ((teaching or attending or clinical or morning or grand) adj2 round*).ti,ab.
10. (morning adj2 report*).ti,ab.
11. (residen* or intern or interns or internship* or train*).ti,ab.
12. or/6-11
13. 5 and 12

ERIC

1. (person-organi*ation fit or person organi*ation fit or supplementary fit or complementary fit or needs-supplies fit or supplies-values fit or demands-abilities fit or supplementary congruence or complementary congruence or similarity fit or value congruence or goal congruence or personality congruence or person-group fit or person-team fit).ti,ab.
2. (person adj3 group).ti,ab.
3. (person adj3 organi*ation).ti,ab.
4. (fit adj2 practic*).ti,ab.
5. or/1-4
6. exp medical education/
7. medical students/
8. medical schools/
9. ((medicine or medical*) adj2 (educat* or student* or school* or learner* or professional*)).ti,ab.
10. ((teaching or attending or clinical or morning or grand) adj2 round*).ti,ab.
11. (morning adj2 report*).ti,ab.
12. (residen* or intern or interns or internship* or train*).ti,ab.
13. or/6-12

14. 5 and 13

Education Source

Search history:

#	Query
S11	S5 AND S10
S10	S6 OR S7 OR S8 OR S9
S9	(residen* or intern or interns or internship* or train*)
S8	(morning N2 report*)
S7	((teaching or attending or clinical or morning or grand) N2 round*)
S6	((medicine or medical*) N2 (educat* or student* or school* or learner* or professional*))
S5	S1 OR S2 OR S3 OR S4
S4	(fit N2 practic*)
S3	((person N3 (organization or organisation))
S2	(person N3 group)
S1	(person-organi*ation fit or person organi*ation fit or supplementary fit or complementary fit or needs-supplies fit or supplies-values fit or demands-abilities fit or supplementary congruence or complementary congruence or similarity fit or value congruence or goal congruence or personality congruence or person-group fit or person-team fit)