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PROFESSIONAL EDUCATION & TRAINING | REVIEW ARTICLE

History of medical specialty interest assessment

Stephanie T. Burns[1]*

Abstract: Medical specialties require decidedly different abilities, skills, and talents; which results in divergent experiences, lifestyles, skill sets, and income levels. To help medical students select their preferred medical specialty and alleviate shortages in medical specialty staffing, US medical schools and associations invest time and money in decision-making resources, such as career-specific interest inventories. Strong and Tucker failed in their attempt to create a medical specialty interest assessment. Gough created the Medical Specialty Preference Scales; however, the instrument failed to achieve adequate reliability and validity. Zimney created the Medical Specialty Preference Inventory (MSPI), which achieved reliability and validity warranting use and continued development. Significant improvements and changes have been made to improve the predictive hit rates achieved by the MSPI. The Medical Specialty Preference Inventory-revised (MSPI-R) currently achieves predictive hit rates between 33 and 54%. Medical school career centers may want to provide students with the autobiographies of practicing physicians who share similar profile patterns to ensure a better fit between the medical student and the medical specialty. Career autobiographies could shift the type and volume of information offered to medical students seeking answers to specialty selection, which may help alleviate shortages in medical specialty staffing.

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*Corresponding author: Stephanie T. Burns, Counselor Education and Counseling Psychology, Western Michigan University, 1903 W. Michigan Avenue, Kalamazoo, MI 49008-5226, USA
E-mail: stephanie.burns@wmich.edu

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May Cheng, Hong Kong Institute of Education, Hong Kong

Additional information is available at the end of the article

Stephanie T. Burns

ABOUT THE AUTHOR

Stephanie T. Burns' publications include: *Education Level, Occupational Classification, and Perceptions of Differences for Blacks in the US; Adding Career Biographies and Career Narratives to Career Interest Inventories; Predictive Validity of Person Matching at the Scale and Discriminant Analysis Levels; Neurofeedback in Hereditary Angioedema: A Single Case Study of Symptom Reduction; Perspectives on Membership in a State Counseling Association; Mental Health Counselors' Use of the Transtheoretical Model in Interprofessional Collaboration; Validity of Person Matching in Vocational Interest Inventories; Gender Differences in the Validity of Career Interest Inventories; Counseling Adult Clients Experiencing Chronic Pain; Legacy of the Vocational Bureau of Cincinnati: Research Advances Social Justice; and Utilizing Fictional Stories When Counseling Adults*. This paper offers a historical perspective that supports the researcher's past efforts at improving career interest inventory reports and could inform improvements in career interest inventories in general, the career development needs of medical students, and the medical profession.

PUBLIC INTEREST STATEMENT

Dermatologists, surgeons, and family physicians use different abilities, skills, and talents. Choosing a job as a physician offers much diversity in experiences, lifestyles, skill sets, and income levels. To help medical students select their job, US medical schools offer students support, such as career-specific tests that help to identify a good match between the medical student's interests and jobs. Several attempts were made to create a test to help medical students pick the job that would fit best. One test, the Medical Specialty Preference Inventory, has stood out over time to be the most helpful to medical students. Significant improvements and changes have been made to improve the test over time. These improvements are not only helpful to medical students to find their ideal job, but also can help to fill jobs in medical specialties where there are shortages in staffing, which leaves US citizens without appropriate medical care.

Subjects: Assessment Tests & Diagnosis; Career & Lifestyle Development; Medical Education; Professional Resources & Reference

Keywords: medical specialty; career development; career assessment; specialty selection

1. Introduction

Medicine has a complex and diverse array of specialties, which requires decidedly different abilities, skills, and talents and results in divergent experiences, lifestyles, skill sets, and income levels (Rogers, Creed, & Searle, 2009; Sodano & Richard, 2009; Stratton, Witzke, Elam, & Cheever, 2005). With over 100 medical specialties to choose from medical specialty selection is a crucial part of a medical student's career development (Borges, 2007; Reed, Jernstedt, & Reber, 2001). In 1950, approximately 15% of US physicians specialized, by 1960 specialization had grown to 47%, and by 1971 90% of medical students specialized (Athlestan & Paul, 1971). The Health Maintenance Organization Act of 1973 permitted cost control in health care and encouraged even greater physician specialization to increase independence and financial freedom (Cheng, 2012).

Currently in the US, 35% of practicing physicians specialize in primary care and only 21–24% of US medical students currently plan to enter primary care (The Council on Graduate Medical Education (COGME), May 5, 2009, Letter from council on graduate med. educ. to the honorable Kathleen Sebelius. Retrieved from http://www.hrsa.gov/advisorycommittees/bhpradvisory/cogme/Publications/letter050509.pdf). Unlike other specialties, primary care is suggested to enhance patient outcomes, disease prevention, cost effectiveness, and coordination of care (Cheng, 2012). Previous suggestions to increase primary care selection have included an emphasis on outpatient and preventive care in medical school educational curricula along with increased funding of medical school primary care departments (Cheng, 2012). Additionally, primary care selection has been positively influenced by recruiting and matriculating students specifically for primary care; actively mentoring students in primary care selection; offering seminars and activities that focus on primary care; and promoting primary care externships, clerkships, and elective rotations (Cheng, 2012). The US is facing a physician shortage in several areas including primary care (Bureau of Health Professions, 2008). General surgery, ophthalmology, orthopedic surgery, urology, psychiatry, and radiology are also expected to see shortfalls (Bureau of Health Professions, 2008).

Medical students choose their specialty based upon the opportunities they explored during medical school, the effect of role models and mentors, academic performance, personality attributes, and interest in the skills used in a medical specialty (Reed et al., 2001). To help medical students select their preferred medical specialty and to help alleviate shortages in medical specialty staffing, US medical schools and associations invest time and money in career education and counseling programs that offer interest inventories, values surveys, occupational information, and other resources (Borges, Savickas, & Jones, 2004). The American Association of Medical Colleges' Medical School Graduation Questionnaire (GQ) suggested 83% of medical students reported personality, interests, and skills were most influential in determining their specialty choice (Association of American Medical Colleges, 2010).

The measurement of interests has been the most widely used approach to help medical students select their medical specialty (Sodano & Richard, 2009). Career interest inventories promote self-knowledge and an understanding of how interests match the demands of differing medical specialties in an effort to increase sound decision-making (Leong, Hardin, & Gaylor, 2005). Interest inventories focusing on task performance are suggested to be more helpful in predicting a medical specialty than personality inventories, self-reported qualities, and perceptions of the medical student (Borges & Savickas, 2002; Gough, 1979). When helping medical students pick their residency, advisors assess the student's values (what the student finds meaningful), personality (the student's combination of emotional, attitudinal, and behavioral response patterns), skills (the student's ability to carry out tasks), and interests (the student's attraction to activities) (Richard, 2011). Several medical specialties may appear appealing to a student and result in a satisfying career. Medical specialty

inventories can help the student narrow down choices; allowing advisors to focus on helping the student interpret results, place those results in context, and then take action by planning electives and applying for residency (Richard, 2011). It therefore becomes crucial that medical students are given the best interest inventories possible to assist them in making medical specialty decisions (Borges, Gibson, & Karnani, 2005; Glavin, Richard, & Savickas, 2007; Richard, 2005). The research question addressed the history of career interest assessments for medical students selecting their medical specialty. This knowledge can assist in understanding current trends in medical specialty career development so that future directions best support medical students.

In the review of US medical specialty career interest inventories, inclusion and exclusion criteria were defined with the development of the study protocol. Included publications were required to discuss US medical specialty career interest inventories, but no other restriction was imposed. The author searched Scopus, EBSCO, Medline Plus, PsychINFO, ERIC, and PubMed, from their earliest dates until August 2015 as part of a systematic review of the literature. In addition, the author reviewed reference lists, author files, and experts in the field. She included and synthesized publications, published in any language, on US medical specialty career interest inventories. Twenty-four publications met inclusion criteria. All publications discussing US medical specialty career interest inventories have been included.

2. History of medical specialty inventories in the US

2.1. Strong and Tucker

Seven journal articles discussed Strong and Tucker's scales (Athlestan & Paul, 1971; Campbell, 1966; Holmen, 1954; Savickas, Brizzi, Brisbin, & Pethtel, 1988; Strong & Tucker, 1952; Tucker & Strong, 1962; Tyler, 1959). Strong and Tucker used the Strong Vocational Interest Blank and the Medical Specialists Reference Blank in 1952 with 3,600 physicians to construct a new scale for physicians and the first medical specialty scales for Internists, Surgeons, Pathologists, and Psychiatrists (Athlestan & Paul, 1971; Strong & Tucker, 1952). The medical specialty scales eliminated similarities in interests by using only a handful of items from all of the items on the inventory to determine how much the test taker resembled others in one of the medical specialties (Campbell & Borgen, 1999; Case & Blackwell, 2008; Strong, 1943). Those small number of items on the interest inventory that show large differences between the medical specialties would be assigned beta weights to determine how much the item closely resembled or differed significantly from the preferences of physicians in that medical specialty. These "adjusted" raw scores are then summed to create a score for the scale for a specific medical specialty, which is then standardized to a *t*-score for the scoring report. The scoring report provided the medical student a scale score for each of the four medical specialties, which suggested how much the student resembled physicians in that medical specialty.

Unfortunately, Strong and Tucker failed to predict the eventual choice of medical specialty by the medical student (Tucker & Strong, 1962). In 1966, Campbell reevaluated the Strong and Tucker scales by rescoring and re-computing the findings, however, the results remained the same and there was no ability to predict a medical student's specialty (Campbell, 1966). Campbell's reevaluation did suggest that well-established medical professionals answered the interest inventory very differently from students preparing for entry into the same medical specialty. He believed that this difference explained the failure of the scales (Campbell, 1966).

2.2. Holland

Two journal articles discussed Holland's scales (Borges et al., 2004; Holland, Powell, & Fritzsche, 1994). In 1959, Holland created an occupational classification system comprised of six categories: Realistic, Intellectual, Artistic, Social, Enterprising, and Conventional (Holland, Whitney, Cole, & Richards, 1969). This subtle coding system described a typical prototype for both persons and environments based upon initials from the six scales (Holland, 1961; Holland et al., 1969). A Holland code (which is created using the initials of the highest three scoring scales in order of most to least resemblance) allows for 720 different variations of personality (Holland, 1966). Holland's ability to assess

both individuals and work environments via stereotypical examples (or prototypes) offers a parallel way to link the two together and increases the effectiveness of career interventions (Holland, 1966; Nauta, 2010).

Holland did not attempt to create a medical specialty inventory. However, Holland's inventories are currently used in medical schools as part of career counseling. Research has suggested that the data gathered from Holland's interest inventories are not as helpful once the medical student is looking for their medical specialty since the majority of medical specialties classify with the same Holland code as the profession of medicine in general (Borges et al., 2004). For example, inventories such as the Self-Directed Search (SDS) (Holland et al., 1994) are not as effective in determining medical specialty preferences because medical students often receive a primary code of "Investigative" (Borges et al., 2004). Medical students with a well-defined primary code of "Investigative" (where the highest score was significantly distant from the second and third highest score) were more likely to pursue technique-oriented and service specialties (Borges et al., 2004). Further, medical students with a well-defined "Investigative-Social" code (where the two highest scores were significantly distant from the third highest score) were more likely to pursue patient-oriented specialties (Borges et al., 2004). Inventories such as the SDS can be helpful to a medical student working to define their medical specialty preference by directing the student toward technique-oriented or patient-oriented specialties (Borges et al., 2004). However, the SDS has not been found to be statistically significant in helping medical students select their medical specialty (Borges et al., 2004).

2.3. Zimny

Thirteen journal articles discussed Zimny's scales (Borges et al., 2005; Glavin, Richard, & Porfeli, 2009; Klos, Dielman, Curtis, & Krol, 1981; Savickas et al., 1988; Sodano & Richard, 2009; Sodano, Savickas, & Richard, 2007; Zimny, 1979, 1980, 2002; Zimny, Iserson, & Shepherd, 1979; Zimny & Senturia, 1973; Zimny & Shelton, 1982). In 1979, Zimny based the construction of the Medical Specialty Preference Inventory (MSPI) on the pioneering work of Strong and Tucker, which compared the medical student's score to a normed occupational group comprised of physicians who practice a specific medical specialty (Zimny, 1979). However, instead of following in Strong's footsteps and using generic concepts of an occupation as the basis of item formation, Zimny based the MSPI's items on specific medical activities performed in specific medical settings (Zimny, 1979, 2002).

The MSPI provided scores on 40 factors (or areas of practice) in medicine, which were used to calculate preference scores for six major medical specialties (Family Medicine, Internal Medicine, Pediatrics, Psychiatry, Obstetrics and Gynecology, and Surgery) (Zimny, 1979) and garnered reliability in the .70–.90 range (Richard, 2005). Predictive validity was tested by comparing the overall specialty preference scores of medical students voluntarily taking the MSPI to the first-year graduate program they later obtained in the National Intern and Resident Matching Program (Zimny, 1980). A specialty was predicted for a student when the overall specialty score on the MSPI was at or above the lower cut-off score of 70 and was the highest of the six overall scores (Zimny, 1979, 1980). In four different examinations of medical students, a 51% predictive accuracy rate was achieved by the MSPI, which is greater than the conservative chance expectancy of hit rate 1 out of 6 or 17% (Zimny, 1979, 1980, 2002). Zimny and Shelton (1982) noted, however, that there were differences in the way that females and males scored the instrument. Results suggested that females demonstrated a significantly higher preference for obstetrics-gynecology, pediatrics, and psychiatry. Males demonstrated a significantly higher preference for internal medicine and surgery. The scoring report provided the medical student a scale score for each of the six medical specialties, which suggested how much the student resembled physicians in that medical specialty.

2.4. Gough

Two journal articles discussed Gough's scales (Gough, 1979; Savickas et al., 1988). Gough was not satisfied with a medical specialty inventory that could only be used by individuals in medical school (Gough, 1979). Like Zimny, he also based the construction of his scales on the pioneering work of Strong and Tucker (Gough, 1979). Gough utilized the Strong-Campbell Interest Inventory (SCII) as

the basis for his attempt at Medical Specialty Preference Scales (MSPS) designed for individuals prior to entering medical school (Gough, 1979). The items on the SCII were made up of school subjects, occupational titles, and types of people (Savickas et al., 1988). To obtain Gough's medical specialty scales, first an individual would have to pay for the initial general scoring of the SCII and then pay extra to have Gough's medical specialty scales calculated from the general SCII scores.

To develop his scales, Gough administered the SCII to first-year medical students and analyzed the responses after they had begun practicing in their medical specialty to identify items that differentiated medical students who had entered different medical specialties (Savickas et al., 1988). His MSPS predicted 10 medical specialties (Internal Medicine, Obstetrics and Gynecology, Pediatrics, Psychiatry, Surgery, Family Medicine, Anesthesiology, Eyes Ears Nose Throat, Pathology, and Radiology) (Gough, 1979). Ultimately, Gough's MSPS failed to predict the eventual choice of medical specialty (Gough, 1979). Gough's research into developing medical specialty scales did suggest the prevalence of sex differences in the selection of medical specialties, which has been an important contribution to medical specialty inventory development (Gough, 1979). The scoring report provided the medical student a scale score for each of the 10 medical specialties, which suggested how much the student resembled physicians in that medical specialty.

2.5. Comparison of the MSPS and the MSPI

Researchers examined the predictive validity of the MSPS and the MSPI (Savickas et al., 1988). To test the predictive validity of both inventories, each student's predicted specialty on the inventory was compared to the specialty entered by the student. The researchers used overall hit rates and Cohen's kappa to determine agreement between the predicted medical specialty made by each inventory and the actual medical specialty selected by the individual. Hit rate was defined as the portion of students who actually entered the specialty that received the highest score on the inventory.

The maximum value of kappa is 1.0 and occurs when there is perfect agreement between predicted and actual outcomes. A kappa value of less than .20 represents poor agreement; between .21 and .40 represents fair agreement; between .41 and .60 represents moderate agreement; between .61 and .80 represents good agreement; and between .81 and 1.0 represents very good agreement beyond chance (Landis & Koch, 1977). The MSPS was suggested to yield a 19% hit rate and an overall kappa of .15. Overall, the MSPS displayed poor predictive validity little beyond what one would expect simply by chance. The MSPI was suggested to yield a 59% hit rate and an overall kappa of .48. The MSPI displayed moderate predictive validity and accurate predictions that were well beyond chance. The results suggested that the MSPI appeared to be more useful than the MSPS for counseling medical students about specialty choice.

Table 1 outlines the characteristics of the assessment instruments reviewed to understand similarities and differences at a glance.

Table 1. Characteristics of the assessment instruments reviewed

	Strong & Tucker	Holland	Zimny	Gough
Strong assessment serves as foundation for scoring	X			X
Only some assessments items used to create scale scores	X		X	X
Attempted to create medical specialty scales	X		X	X
Score on assessment compared to normed occupational group	X	X	X	X
Assessment items based on generic concepts	X	X		X
Assessment items based on medical specialty tasks			X	
Differentiates between technique and patient-oriented specialties		X		
Must be a medical student to take assessment	X		X	

3. The MSPI's current role in medical specialty selection

Through repeated demonstrations of effectiveness, the MSPI is the predominantly used inventory for medical specialty selection in the US today. Clearly Zimny's decision to make assessment items focus on specific medical activities performed in specific medical settings made a significant difference in success of the career interest inventory. The MSPI originally consisted of 199 items, which were answered by students using a seven-point scale representing degrees of low (1, 2), moderate (3, 4, 5), and high (6, 7) preference for each item (Zimny, 1979, 2002). The stem for each item is "A practice in which I…" Two examples of items are "A practice in which I can make precise diagnoses" and "A practice in which I discuss death and dying with patients." The MSPI was updated in 2000, acquired by the Association of American Medical Colleges (AAMC) in 2003, and released on the Careers in Medicine (CiM) website in January 2005 (Richard, 2011). This second edition, MSPI-2, utilized 150 items to calculate 38 factors and six major medical specialties (Family Medicine, Internal Medicine, Pediatrics, Psychiatry, Obstetrics and Gynecology, and Surgery) (Zimny, 2002). Preliminary studies of the MSPI-2 demonstrated good internal consistency (Sodano et al., 2007). Reliability and validity remained consistent between the original and revised versions (Richard, 2005). The MSPI-2 was suggested to achieve a 33% predictive hit rate (Borges et al., 2005). In addition, research suggested that physicians who had picked the medical specialty predicted by the MSPI-2 as medical students were happier with their work than those physicians who had not picked the medical specialty predicted by the MSPI-2 (Borges et al., 2005). A second study suggested a predictive hit rate of 45% for the MSPI-2 (Glavin et al., 2007).

Unfortunately, half of the 38 factor scales used in the MSPI and MSPI-2 were composed of only two items and another eleven scales consisted of three items (the remaining eight scales contained four to five items per scale) (Richard, 2011). As such, the original MSPI would not be supported using today's methodological standards (Richard, 2011; Sodano & Richard, 2009; Sodano et al., 2007). Improvements to the MSPI-2 have resulted in a new version: the Medical Specialty Preference Inventory-Revised (MSPI-R).

There are 150 items included in the MSPI-R; however, only 102 items are used to score the instrument (Richard, 2011). Of those, 88 items are used to score the 18 Medical Interest Scales and 30 items are used to score the 16 Specialty Choice Probabilities (Richard, 2011). Sixteen of the items are scored in both the Medical Interest Scales and the Specialty Choice Probabilities (Richard, 2011). The remaining 48 items are not scored and may be used in the future for possible replacement of items as needed to improve the predictive ability of the instrument and to support the development of new specialties (Richard, 2011).

Confirmatory factor analysis (an inductive measurement model) was used with the MSPI-R to match a test taker's interests with the presumed interests of an occupational environment based upon medical students who completed the assessment between 2005 and 2008 (Sodano & Richard, 2009). The result was a homogeneous grouping of items that represent 18 Medical Interest Scales: Complex Problems, Comprehensive Care, Diagnostic Precision, Emergency-Critical Care, History Taking, Home Health Care, Immediate Results, Knowledge of Anatomical Structures, Knowledge of Organ Systems, Laboratory Results, Palliative Care, Patient Counseling, Prevention and Education, Procedural Care, Psychological Care, Reproductive Care, Social Context, and Technology in Medicine (Richard, 2011). Cronbach's alpha was calculated to determine reliabilities for each of the 18 Medical Interest Scales. Reliability coefficients ranged from a low of .77 for History Taking and Diagnostic Precision to .94 for Psychological Care, indicating good internal consistency ratings for all scales (Richard, 2011).

Discriminant function analysis (an empirical measurement model) determined that 30 of the 150 MSPI-R items could predict a student's medical specialty (Porfeli, Richard, & Savickas, 2010). The MSPI-R currently calculates preferences for 16 medical specialties (Anesthesiology, Dermatology, Emergency Medicine, Family Medicine, Internal Medicine, Neurology, Obstetrics and Gynecology, Orthopedic Surgery, Otolaryngology, Pathology, Pediatrics, Physical Medicine and Rehabilitation,

Psychiatry, Radiology, Surgery, and Urology) with the potential to add more specialties over time (Richard, 2011). Results of one study suggest a 53.6% predictive hit rate for the MSPI-R (Porfeli et al., 2010). The MSPI-R manual suggests a predictive hit rate of 52% (Richard, 2011). It is important to note that these hit rates are based upon random samples including medical students from only the 16 medical specialties that are predicted by the MSPI-R. A third study suggested a hit rate of 58% with medical students entering the big six medical specialties: Family Medicine, Internal Medicine, Obstetrics and Gynecology, Pediatrics, Psychiatry, and Surgery. Later MSPI-R research using a random sample that included medical students from 22 different medical specialties suggested a predictive hit rate of 33% (Burns, 2012). Cronbach's alpha, a measure of internal consistency, suggested reliabilities ranging from a low of .77 for History Taking and Diagnostic Precision to .94 for Psychological Care (Richard, 2011). Comparisons between the 2nd edition MSPI factors and the revised MSPI-R Medical Interest Scales suggested high positive correlations and indicated sufficient validity of the new MSPI-R Medical Interest Scales (Richard, 2011).

4. Conclusion

While there have certainly been many improvements made to medical specialty interest assessments over the last 60 years, room for advancement exists. Postmodern and constructivist career theories are evolving career counseling and career interest inventories in the US (Amundson, 2009; Cochran, 1997; McMahon & Watson, 2010; Peavy, 1998; Savickas et al., 2009). With these theories, emphasis is placed on the use of narratives, story, and biography to activate meaning making processes to assist the individual in shaping their preferred future. Medical specialty interest inventories in the US currently lack significant narratives, story, and biography processes for physicians who are making medical specialty decisions (Borges & Savickas, 2002; Hartung, Borges, & Jones, 2005; Kuder, 1977b). The literature has called for the MSPI-R to incorporate the psychometric scoring methodology of Kuder's person matching model (Borges & Savickas, 2002; Hartung et al., 2005). This model provides the medical student with the autobiographies of practicing physicians who scored the interest inventory the same way as the medical student to ensure a better fit between the medical student and the medical specialty (Borges & Savickas, 2002).

To perform person matching, a reference group of at least 5,000 people from the full range of medical specialties is used, which cannot be accomplished using the current MSPI-R scoring methodology. These 5,000 individuals have taken the assessment and have also furnished an autobiography (including current occupations, past occupations, lifestyles, future goals, and descriptions of what they like best and least about their occupation). Further, all items on the MSPI-R are scored to measure similarities as well as differences in medical students (Donnay, 1997; Ihle-Helledy, Zytowski, & Fouada, 2004). Using person matching, the test taker's scores are compared to all members of the reference group to offer the test taker autobiographies of the 20 reference group members who scored the inventory in the most similar manner (Kuder, 1977a). The person matching scoring report would allow the test taker to reflect on the career themes found within the narratives as well as the medical specialties pursued by the closest 20 reference group matches to improve their career decision-making processes and consider more diverse medical specialties (Kuder, 1977b).

New research has suggested that person matching with the MSPI-R was able to increase the number of medical specialties included in the scoring of the MSPI-R and could offer test takers the ability to receive autobiographical data, which may offer a more robust career exploratory experience than receiving a medical specialty title alone (Burns, 2012). However, this same research noted that predictive hit rates using the current scoring system with the MSPI-R garnered higher hit rates and kappa coefficients than when attempted using person matching with the same participants (Burns, 2014). The research called for significant improvements to be made to person matching with the MSPI-R. Further, a study needs to be conducted with medical students receiving the autobiographies of physicians practicing in a medical specialty to determine the perception of the increase in career information offered to medical students beyond the tradition career assessment report (Burns, 2014). Additionally, many of the autobiographies included in the reference group will be obtained from primary care, general surgery, ophthalmology, orthopedic surgery, urology, psychiatry, and

Table 2. Ways to integrate career autobiographies into current career development interventions

(1) First have the medical student take the MSPI-R at https://www.aamc.org/cim/specialty/findyourfit/interests/
(2) Identify the five highest Medical Specialty Predictions for the medical student (Case example: Internal Medicine, Pathology, Pediatrics, Dermatology, and Psychiatry)
(3) Identify the five highest Medical Interest Scales for the medical student (Case example: Laboratory Results, Diagnostic Precision, Immediate Results, Technology in Medicine, and Procedural Care)
(4) Either provide to the medical student or have the medical student find on the internet the autobiographies of five physicians from each of the five highest Medical Specialty Predictions. There will be 25 autobiographies in total (Case example: five autobiographies from Internal Medicine, five autobiographies from Pathology, five autobiographies from Pediatrics, five autobiographies from Dermatology, and five autobiographies from Psychiatry)
(5) Have the medical student note the themes that come up throughout the Medical Specialty Predictions, Medical Interest Scales, and 25 autobiographies from the five highest Medical Specialty Predictions (Case example: The medical student strongly connected with Laboratory Results and Diagnostic Precision because they were "hands-on" and working with the latest technology. After reviewing the 25 autobiographies, the medical student found several themes: working with technology, performing research, publishing research, and teaching at a medical college. The medical student realized that Dermatologists use technology and hands-on procedures in their practice, which connected to the five highest Medical Interest Scales: Laboratory Results, Diagnostic Precision, Immediate Results, Technology in Medicine, and Procedural Care. Further, the medical student found the Dermatology very interesting)
(6) The medical student used the Careers in Medicine specialty pages (https://www.aamc.org/cim) to better understand the training requirements, employment outlook, sources of information (such as specialty associations for networking), and online reading materials for medical specialties of interest (Case example: The medical student researched Pathology, Dermatology, and Orthopedics)
(7) Lastly, have the medical student schedule elective clinical rotations in medical specialties of interest during their fourth year of medical school (Case example: The medical student scheduled elective clinical rotations in Pathology, Dermatology, and Orthopedics before finally deciding on Dermatology)

radiology physicians. Medical students reading these autobiographies as part of their career exploration may increase their awareness, excitement, and perceptions of medical specialties with anticipated shortages and could allow for better informed choices. As person matching with the MSPI-R does not currently exist, Table 2 suggests ways to integrate career autobiographies into current career development interventions for medical students.

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Author details
Stephanie T. Burns[1]
E-mail: stephanie.burns@wmich.edu
[1] Counselor Education and Counseling Psychology, Western Michigan University, 1903 W. Michigan Avenue, Kalamazoo, MI 49008-5226, USA.

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