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Personality and Medical Specialty Choice: A Literature Review and Integration

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This review examines the literature on personality and medical specialty choice. First, it describes studies categorized by medical specialties that to date have used the same measures: Adjective Check List, California Psychological Inventory, Sixteen Personality Factor Questionnaire, and Myers-Briggs Type Indicator. Then it integrates these results using the framework provided by the Five-Factor Model of personality. This model provides a method to organize the personality descriptors associated with medical specialties and to summarize information in an understandable and meaningful way. Conclusions drawn from the review suggest a loose association between a few personality factors and particular medical specialties. Recommendations for further research on personality and medical specialties encourage shifting from the “variable” to the “person” approach and studying how different personalities succeed in the same specialty.

Keywords: Personality, physicians, specialty choice

Physicians represent a homogenous group in terms of intellectual and cognitive ability and seem to share common personality traits based on their choice of medicine as a career (Reeve, 1980; Schwartz et al., 1994). During medical school, they experience a fairly uniform curriculum, including similar apprenticeship experiences. Differences between physicians become evident only when we consider the work they actually perform after graduating from medical school. Following graduation, physicians enter a variety of medical specialties that differ in work settings, job duties, requisite skills, and vocational interests. In fact, these specialties differ so much that they almost constitute distinct occupations. For all practical purposes, deciding to become a physician is an educational choice, one leading to a medical degree. In contrast, selecting a specialty more closely resembles an occupational choice.

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Accordingly, medical educators and career counselors who seek to help physicians choose their specialties have done so by using a general model for vocational choice, one that matches personality traits to occupational requirements, routines, and rewards. Most often, they have used anecdotal evidence about the incumbents of different medical specialties to direct students toward specialties that fit their personalities. Only occasionally have they empirically studied personality differences between physicians practicing different medical specialties (Coombs, 1978; *Pathway Evaluation Program for Medical Professionals*, 1999; Schwartz et al., 1994, Taylor, 1993).

Although these qualitative studies and surveys are interesting, they lack the scope and rigor provided by research that uses standardized personality inventories to operationally define traits that may differentiate medical specialists. The studies that have used these instruments provide a more objective view of occupational personalities in various specialties. Unfortunately, this accumulated literature has not been systematically reviewed and integrated to paint portraits of the personalities that populate different specialties. Therefore, the present literature review had two goals. First, it provides a comprehensive summary of the literature regarding personality and medical specialty choice. Although several reviews of the literature on medical specialty choice have been published (Anderson, 1975; Association of American Medical Colleges, 1993; Bland, Meurer, & Maldonado, 1995; Davis et al., 1990; Mowbray, 1989; U.S. Department of Health, Education, & Welfare, 1974), these reviews have neither concentrated on personality nor provided an extended treatment of the topic. Although a step forward, a summary of studies using different personality inventories offers a limited view of occupational personalities and medical specialties. Accordingly, the second purpose of this article is to interpret the results of studies on personality and medical specialties using the integrative framework provided by the Five-Factor Model (FFM) of personality.

FFM

The FFM provides a comprehensive framework for describing personality (Deniston & Ramanaiah, 1993) and organizing individual differences (Goldberg, 1993). Unlike other personality models, the FFM is not based on one theory of personality but rather combines a variety of theoretical perspectives (McCrae & Costa, 1989a). The model includes affective, experiential, and motivational traits (McCrae & Costa, 1989b) using the five dimensions of Agreeableness, Conscientiousness, Openness to Experience, Neuroticism, and Extraversion. McCrae and Costa (1989a) associate Agreeableness with trust, altruism, cooperation, and sympathy. Conscientiousness includes being organized, persistent, and achievement oriented, whereas Openness to Experience is described by imaginativeness, curiosity, sensitivity, and a need for variety. Neuroticism refers to negative affect and emotional instability characterized by anxiety, anger, and

depression, whereas Extraversion pertains to positive emotions and includes being social, active, and dominant.

For our purposes herein, the FFM provides a systematic way to organize the personality descriptors associated with medical specialties and to summarize information so it is more understandable and meaningful. Studies of personality and medical specialty have used a variety of personality instruments. In addition, researchers have investigated medical specialists using measures of personality traits such as interpersonal style, work values, and vocational interests. Despite the abundance of research in this area, it is difficult to draw comprehensive and meaningful conclusions about personality and specialty choice because of the variety of instruments used to measure personality. This is where the FFM becomes useful.

The FFM accounts for the dimensions of personality measured by all of these instruments. This allows the diverse literature on personality and medical specialty to be integrated in a way that optimizes what we know by generalizing across studies that used different measurement operations. This translation of the results from studies into a common language and a single perspective has obvious advantages for research integration and interpretation. Subsuming narrow, homogeneous, and specific traits into broad, superordinate constructs may clarify the important and generalizable links between personality and occupational specialty. Without such a superordinate perspective, we are left to observe correlations between specialties and scales on a half dozen different instruments. In due course, using the FFM as an integrative framework could lead to the description of personality traits that characterize particular medical specialties and predict success in performing the tasks entailed by different specialties. The following sections review studies of personality and medical specialty and integrate the findings using the FFM.

FFM and Personality Inventories

The basic dimensions of personality described by the FFM provide a framework from which other personality systems can be interpreted. Research studies have been conducted to determine the generality and comprehensiveness of the FFM and to provide alternative measures of the model using a variety of personality inventories. For example, a study by Piedmont, McCrae, and Costa (1991) found the Adjective Check List (ACL) (Gough & Heilbrun, 1965, 1983) scale of Change to be related to Extraversion (.58) and Openness to Experience (.45). For the California Psychological Inventory (CPI) (Gough, 1990), Deniston and Ramanaiah (1993) tested the FFM and found that Extraversion related positively to the CPI constructs of Sociability (.89), Self-Acceptance (.84), Dominance (.74), Social Presence (.66), Capacity for Status (.54), Empathy (.49), and Independence (.43) and related negatively to Self-Control (-.44). Neuroticism correlated positively to Independence (.49) and Good Impression (.46) and neg-

atively to Femininity/Masculinity (−.45). Openness to Experience correlated positively to Achievement via Independence (.49) and Flexibility (.41). Conscientiousness correlated negatively to Flexibility (−.58). Agreeableness did not correlate significantly to any CPI variable.

A study by Byravan and Ramanaiah (1995) showed relations between the Sixteen Personality Factor Questionnaire (16PF; 5th ed.) (Cattell, Cattell, & Cattell, 1993) and the FFM. Neuroticism correlated positively to the factors of Privatness (.70) and Perfectionism (.65) and correlated negatively to Emotional Stability (−.67). Extraversion correlated positively to the factors of Social Boldness (.70), Warmth (.60), Liveliness (.62), and Dominance (.43) and correlated negatively to Abstractedness (−.48) and Openness to Change (−.56). Conscientiousness was correlated positively to Self-Reliance (.72) and Rule-Consciousness (.52) and negatively correlated with Vigilance (−.57). Openness to Experience correlated positively to Apprehension (.64), Vigilance (.45), and Tension (.43), whereas Agreeableness correlated negatively to Dominance (−.52).

For the Myers-Briggs Type Indicator (MBTI) and the FFM, McCrae and Costa (1989a) reported the following for individuals classified by the MBTI: introverted types (I) scored higher on Neuroticism and lower on Extraversion; intuitive types (N) scored higher on Openness to Experience; feeling types (F) scored higher on Neuroticism, Extraversion, and Agreeableness and lower on Conscientiousness; and perceiving types (P) scored higher on Extraversion and Openness to Experience and lower on Conscientiousness.

MEDICAL SPECIALTIES AND PERSONALITY

Personality has been reported to be related to medical career choice (Walton, 1987). The idea that distinct personality types may exist for physicians in different specialty areas has been examined using different personality inventories. Following is a review of medical specialties that have been investigated using personality inventories. The results of these studies are interpreted using the FFM.

Anesthesiologists

Gough, Bradley, and McDonald (1991) used the CPI with first-year anesthesiology residents. Results showed that anesthesiology residents were self-confident, had superior interpersonal skills, and were goal seeking as evidenced by high scores on the CPI scales of Dominance, Social Presence, and Achievement via Independence, respectively. Despite large differences in the representation of males and females in this study, these findings suggest that anesthesiologists are extraverted because they are dominating and high on Social Presence. They are open to experience because they are high on Achievement via Independence.

Being high on Openness to Experience suggests that anesthesiologists could be described similarly to surgeons with regard to their imagination, curiosity, and need for variety.

Reeve (1980) used the 16PF to compare anesthetists to general practitioners. He reported that anesthetists were more intelligent, self-sufficient, dominant, tense, and introverted compared to general practitioners. Interpreting the findings of Reeve suggests that anesthesiologists were lower on Agreeableness and Extraversion because they are dominating and were higher on Conscientious and Openness to Experience because they are self-sufficient and tense. Using the FFM to formulate a description of anesthesiologists suggests that they are less sympathetic, cooperative, and sociable but more organized, persistent, imaginative, and curious. It is important to note that the study conducted by Reeve used a sample of anesthetists not anesthesiologists. Translating the findings of Reeve's study using the FFM model should be approached with caution given inherent differences in training and practice between anesthetists in the United Kingdom and anesthesiologists in the United States.

Borges and Osmon (2001) used the 16PF to investigate personality differences among anesthesiologists compared to family practitioners and surgeons. They found that anesthesiologists appear to have a different level of suspiciousness and skepticism, or Vigilance as measured by the 16PF, than the other two specialty groups. Differences in findings of studies by Reeve (1980) and Borges and Osmon may be partially attributed to different versions of the 16PF used for data collection.

Using the MBTI, Myers and Davis (1976) showed that anesthesiologists were characterized as introverted-sensing-thinking-perceiving (ISTP) and introverted-sensing-feeling-perceiving (ISFP) types. Anesthesiologists (Myers & Davis, 1976) share the dimension of introversion (I), and according to the FFM, these specialists could be described as able to experience negative affect and as less sociable and dominating. These descriptors correspond to Neuroticism and Extraversion, respectively. Translating the overall findings of the above studies using the FFM suggests that anesthesiologists are mostly characterized by the Big-Five factors of Extraversion and Openness to Experience and less so by Neuroticism, Agreeableness, and Conscientiousness.

Family Practitioners

Borges and Osmon (2001) used the 16PF and found that family physicians differed significantly from general surgeons and anesthesiologists with regard to Rule-Consciousness and Abstractedness. Family practitioners perceived themselves as strict followers of rules and principles and revealed that they pay more attention to thoughts and imagination than to practical matters and were more idea oriented than the other two medical specialties. Despite a small sample size, this study presented results using the 16PF (5th edition), whereas previous studies of other specialists have been reported in 4th edition form. With regard to the

FFM, interpreting Borges and Osmon's finding that family practitioners were more rule conscious suggests that they are higher on Conscientiousness and thus more organized and persistent, which is in agreement with Taylor's (1993) description of family practitioners. Family practitioners could also be described as low on Extraversion because of a negative correlation with Abstractedness.

Studies of family physician personality have used the MBTI and yielded mixed results. Myers and Davis (1976) reported that the most common type among general practitioners was the extroversion-sensing-thinking-judging (ESTJ) type, whereas Friedman and Slatt (1988) found that those who entered family medicine tended to score high on sensing-feeling-judging (SFJ). In 1980, Taylor, Clark, and Sinclair (1990) collected MBTI profiles from 778 family practice residents in 30 residency programs. The most common personality types included the dimensions of intuitive (N) and feeling (F). This finding suggests that family physicians concentrate on challenges and responsibilities (N) and prefer to make decisions based on subjective values (F). The profiles were compared to profiles of general practitioners obtained in the 1950s who were predominately sensors (S), thinkers (T), and perceivers (P) and to profiles of family practice residents obtained in 1978 who were sensors (S) and judges (J). Taylor et al. appear to be the first to suggest that the personalities of family practitioners may have changed from the 1970s to 1980s. They noted that sensing-judging (SJ) types were more common among family practitioners in the 1970s and that intuitive-feeling (NF) types were more predominant among family practitioners during the 1980s. It is possible that family medicine now attracts different types of individuals than in the previous decade. Changes in medical school curriculum, and possibly managed care, may be contributing to this change.

Comparison studies have also been conducted to determine differences between residents and physicians. For example, Harris and Ebbert (1985) used the MBTI to examine differences in personality types between first-year family practice residents and rural primary care physicians. Results showed that the residents were significantly more intuitive (N) as opposed to sensing (S) and more feeling (F) as opposed to thinking (T). In comparison, physicians were more sensing (S) than intuitive (N). The authors concluded that family practice residents differed from rural primary care physicians in how they gather information. Residents may perceive the present realities, whereas physicians envision future possibilities. A cautionary note is necessary when interpreting these findings given that the comparison group of primary care physicians may have included other specialists besides family practitioners. Threats to internal validity regarding selection may have influenced the results.

A more recent study by Stilwell, Wallick, Thal, and Burlison (2000) compared preference for primary care versus non-primary care specialties among 3,987 medical students. The authors created a database of MBTI types and corresponding specialty for students who graduated from 12 medical schools between 1983 and 1995. The large size and geographic representation of the sample separates it from other studies, but selection bias and inconsistencies in

data collection methods are among the limitations. Results showed that physicians who scored high on either feeling (F) or introversion (I) were more likely to be in primary care specialties, whereas those scoring high on thinking (T) or extraversion (E) were equally likely to choose either primary care or non–primary care specialties. Within primary care, family practitioners displayed a feeling (F) dimension, as opposed to thinking (T) dimension, as part of their type compared with those who selected other primary care specialties, such as pediatrics and internal medicine. Non–primary care specialties were classified as surgical versus nonsurgical specialties. Those in nonsurgical specialties had either a feeling (F) or introversion (I) dimension as part of their type, whereas physicians in surgical specialties had either a thinking (T) or extraversion (E) dimension.

Despite their abundance, it is difficult to draw conclusions about the MBTI studies because of variations in the sample and the research design. On the whole, the most consistent finding from MBTI studies of medical specialists is that family practitioners are more likely to have a feeling (F) dimension as part of their type (Friedman & Slatt, 1988; Harris & Ebbert, 1985; Stilwell et al., 2000; Taylor et al., 1990) and, therefore, would use values compared to logic when making decisions. Individuals with a feeling (F) preference can be described as appreciative, empathic, having a desire for harmony, and being concerned with people (McCaulley, 1990), which is consistent with Coombs's (1978) description of family practitioners. Family practitioners also tend to rely on their intuitive (N) perception rather than sensing (S) perception when gathering information (Friedman & Slatt, 1988; Harris & Ebbert, 1985; Myers & Davis, 1976; Taylor et al., 1990). Some family practitioners, therefore, deal with abstractions and try to form associations and relationships that pertain to the future, whereas others focus on the real and immediate aspect of a problem. It is important to interpret the findings of Friedman and Slatt (1988) with caution. These authors' findings were significant but not to a large magnitude.

Using the classification provided by McCrae and Costa (1989a) to convert the finding that family practitioners have a feeling (F) dimension as part of their MBTI type (Friedman & Slatt, 1988; Harris & Ebbert, 1985; Stilwell et al., 2000; Taylor et al., 1990) to the FFM suggests that these specialists can be described as able to experience negative affect and less organized and persistent but sympathetic, cooperative, and altruistic. These descriptors correspond to high levels of Neuroticism, Extraversion, and Agreeableness and a low level of Conscientiousness. Furthermore, family practitioners score high on the intuitive (N) dimension (Friedman & Slatt, 1988; Harris & Ebbert, 1985; Stilwell et al., 2000; Taylor et al., 1990) and, thus, could be described as imaginative, curious, and having a need for variety, which corresponds to the factor of Openness to Experience.

In summary, family physicians are characterized by Agreeableness and Conscientiousness but may vary regarding Openness to Experience. Family practice physicians may show more Conscientiousness than physicians in other specialties. With regard to Agreeableness, family practice physicians can be characterized as sympathetic, trusting, cooperative, and altruistic. For example, family

practice residents exhibit less Openness to Experience compared to primary care physicians who have completed a residency.

Internists

Chowdhury, Channabasavanna, Prabhu, and Sarmukaddam (1987) used the 16PF with a sample of residents in internal medicine. The results showed that internal medicine residents scored low on Schizothymia, suggesting that internal medicine residents have a tendency to be stiff, cool, skeptical, and aloof and that they prefer working with things rather than people. This result, however, should be interpreted with caution given the small sample size ($N = 27$) of the study. Using Byravan's and Ramanaiah's (1995) correlational model to interpret the findings of Chowdhury et al. shows that internists were higher on Conscientiousness because of their high self-reliance, suggesting that they are organized and persistent, but lower on Extraversion because of their focus on the inner world of ideas rather than social interaction.

Friedman and Slatt (1988) used the MBTI and found that those who entered internal medicine yielded less distinctive MBTI types. It is surprising that with the abundance of studies that have used the MBTI to study physician personality, studies surveying internists are lacking. It is difficult to determine, however, whether other studies that have used the MBTI with primary care practitioners included internists as part of their sample. In addition, there are many subspecialties of internal medicine, such as cardiology, endocrinology, and nephrology. However, most of the research using the MBTI has been on personalities of family practitioners.

Obstetricians and Gynecologists

Personality characteristics of obstetricians and gynecologists have been described using the MBTI only. Myers and Davis (1976) reported that obstetricians were more likely to display extroversion (E) and sensing (S) as part of their psychological type. In addition, findings of a longitudinal study using the MBTI (McCaulley, 1978) showed that obstetrics and gynecology attracted individuals with a sensing (S) dimension, whereas Friedman and Slatt (1988) found that medical students who entered obstetrics and gynecology tended to score high on sensing-thinking-judging (STJ).

Using the interpretive model suggested by McCrae and Costa (1989a) regarding the MBTI and the FFM, medical students who chose obstetrics and gynecology can be characterized as highly Conscientious and, thus, can be described as organized, persistent, scrupulous, and achievement oriented. Lower scores on Openness to Experience and Agreeableness also characterize them. As with other specialties, exhibiting less Openness to Experience appears to be more prominent in medical students compared to residents or practicing obstetricians and

gynecologists. Medical students who chose obstetrics and gynecology may be less sympathetic, trusting, cooperative, and altruistic when compared to medical students attracted to family medicine or psychiatry.

Pediatricians

There is a lack of information regarding personality of pediatricians that resulted in only including two studies in this review. Both of these studies used the MBTI. Myers and Davis (1976) reported that pediatricians showed a large proportion of extroversion-sensing-feeling-judging (ESFJ) and introverted-sensing-feeling-judging (ISFJ) types, whereas Friedman and Slatt (1988) found that medical students choosing pediatrics yielded less distinctive MBTI types. Translating these findings using McCrae and Costa's model (1989a) suggests that the feeling (F) dimension of the MBTI type corresponds to higher Neuroticism, Extraversion, and Agreeableness but less Conscientiousness among pediatricians. The model by McCrae and Costa does not provide an interpretive mechanism for the sensing (S) or judging (J) dimension, which also comprise the MBTI type for pediatricians.

Physiatrists

Physiatrists, or physicians whose specialty is physical medicine and rehabilitation, have also been studied using the MBTI. Sliwa and Shade-Zeldow (1994) compared personalities of 30 physical medicine and rehabilitation medical residents to 48 graduates of their training program. The following results should be interpreted with caution due to study design issues relating to generalizability and sample selection. Intuition (N) was followed by thinking, sensing, and feeling (TSF) for graduates and by feeling, thinking, and sensing (FTS) for residents. Residents differed significantly from the graduates on two MBTI dimensions, with graduates being more introverted (I) and judging (J) than current residents. Residents, however, were more likely to make decisions based on values and by considering what matters to others (F). Intuition (N) was the dominant dimension for graduates and residents. According to McCrae and Costa (1989a), this suggests that physiatrists could be described as high on Openness to Experience. The researchers concluded that physical medicine and rehabilitation physicians resemble physicians in people-oriented specialties such as internal medicine, general practice, psychiatry, and pediatrics.

Psychiatrists

Chowdhury et al. (1987) used the 16PF with a sample of residents in psychiatry. Psychiatry residents scored higher on Ego Strength, which is characterized

by greater frustration tolerance, emotional maturity, stability, and reality orientation. Psychiatry residents were more tender minded, whereas internal medicine residents tended to be more realistic and practical. Psychiatry residents showed a high level and capacity for abstract thinking, faster learning, and a quicker grasp of ideas. Threats to external validity, specifically generalizability of findings, are apparent in this study in addition to the small sample size.

Using Byravan and Ramanaiah's (1995) correlational model to interpret the findings of Chowdhury et al. (1987) shows that psychiatrists were lower on Neuroticism because of their high Emotional Stability, suggesting that they are less likely to experience negative emotional affect. Psychiatrists were also higher on Extraversion, which can be described as social and active because of their focus on social interaction rather than objects and things.

Friedman and Slatt (1988) used the MBTI and found that medical students who entered psychiatry tended to score high on introversion-feeling-perceiving (IFP). Friedman and Slatt found that psychiatrists share the dimension of introversion (I), and according to the FFM, these specialists could be described as able to experience negative affect and as less sociable and dominating.

Psychiatrists appear to be Open to Experience and Agreeable but may vary regarding Conscientious. They can be described as being imaginative, curious, needing variety, and experiencing feelings deeply. In addition, psychiatrists appear to be sympathetic, trusting, cooperative, and altruistic. They exhibit traits associated with Conscientiousness such as being organized, persistent, scrupulous, and achievement oriented but to varying degrees.

Surgeons

The personality of surgeons has been studied using a variety of measures. Coombs, Fawzy, and Daniels (1993) used the ACL and the CPI to compare surgical and nonsurgical specialists, testing the participants at the onset of medical school (14 surgical and 43 nonsurgical) and 4 years later at graduation (12 surgical and 27 nonsurgical). Attrition accounts for the difference in sample size and suggests that threats to internal validity are present. Participants were classified as surgical or nonsurgical based on the residency they entered. Results for the ACL showed similarities with regard to personality for both groups; however, developing surgeons were found to be more adaptive to change than nonsurgical physicians when assessed at graduation. This difference was not noted between the groups when assessed at the beginning of medical school. With regard to the FFM, a study by Piedmont et al. (1991) found the ACL scale of Change to be related to Extraversion (.58) and Openness to Experience (.45). Interpreting the study by Coombs et al. in light of these findings suggests that at the beginning of their training, surgeons compared to other nonsurgical specialists could be described as Extraverted and Open to Experience. The minimal differences reported by Coombs et al. conflict with several other studies, each of which

reported sharp personality differences between surgical and nonsurgical specialties. We reconcile this anomaly by suggesting, as these authors did, that personality differences between medical specialists might actually intensify or maybe even emerge after residency. That is to say that certain characteristics may be more or less pronounced as medical students emerge into physicianhood and as they adapt to different training and practice environments specific to their specialty. For example, surgeons are often called for emergencies and must immediately stop whatever they are doing and respond to the task at hand. Other nonsurgical specialists have more control over interruptions and, therefore, may not be as adaptive to change. From a study design perspective, threats to internal validity for longitudinal studies, such as maturation, may also provide a plausible explanation for the results.

For the CPI, results showed no personality differences between surgical and nonsurgical specialties when tested at graduation. However, surgeons were found to be more flexible than nonsurgical physicians when assessed at the beginning of medical school. Using Deniston and Ramanaiah's (1993) correlational model to interpret the findings of Coombs et al. (1993) shows that surgeons could be described as Open to Experience because they are more flexible. This suggests that surgeons could be described as imaginative, curious, and having a need for achievement, which is consistent with the FFM interpretation of the findings for the ACL. Given the study design used by Coombs et al., results should be interpreted with caution. The two groups studied by Coombs et al. had large differences in sample size, and confounding factors may have influenced the longitudinal findings of this study.

A more recent study by Borges and Osmon (2001) used the 16PF to investigate personality differences among surgeons. General surgeons were more tough minded, resolute, and unempathic than anesthesiologists and family practitioners. Compared to the other two specialty groups, general surgeons may be more predictable, prefer well-defined situations, and seek a life that is well organized and consistent. With regard to the FFM, interpreting Borges and Osmon's finding that surgeons were less rule conscious suggests that they are lower on Conscientiousness and thus less organized and persistent.

The MBTI was used by Myers and Davis (1976) who found that surgeons were more likely to display extroversion (E) and sensing (S) as part of their psychological type, whereas Friedman and Slatt (1988) found that students choosing surgery yielded less distinctive MBTI types. A few years later, findings of a longitudinal study (McCaulley, 1978) showed that the surgical subspecialties of general, orthopedic, and obstetrics/gynecology, which deal with straightforward problems requiring technical skill, attracted individuals with a sensing (S) dimension. In comparison, neurological, plastic, and thoracic surgeries, which deal with more specialized or complex problems, attracted individuals with an intuitive (N) dimension.

The relatively firm conclusion one can draw from MBTI studies is that surgeons are extroverted (E) (McCaulley, 1978; Myers & Davis, 1976; Stilwell et al.,

2000), suggesting that they are sociable and active. It appears that there are differences in how surgical subspecialists prefer to gather information. The sensing (S) dimension is common among obstetricians (McCaulley, 1978; Myers & Davis, 1976), general surgeons, and orthopedic surgeons (McCaulley, 1978). Neurological, plastic, and thoracic surgeons (McCaulley, 1978) score high on the intuitive (N) dimension and thus could be described as imaginative, curious, and having a need for variety.

Translating these studies using the FFM suggests that surgeons at graduation can be described by the Big-Five factors of Extraversion and Openness to Experience, whereas developing surgeons can be described by Extraversion but also as less Open to Experience. One study reported that surgeons were less agreeable and more antagonistic than other specialists. Surgeons, as a group, seem to be social, active, and dominant, yet their level of Openness to Experience, described as imaginativeness, depth of feeling, curiosity, and need for variety, may depend on their level of training and education. It is plausible that Openness to Experience may be developmentally based and, therefore, affected by level of training and experience.

Support Specialists and Summary

Support specialties, such as pathology and radiology, have received less attention in the literature. Only two studies were uncovered for this review, both of which used the MBTI. Myers and Davis (1976) reported that pathologists tended to display introversion (I), intuitive (N), and thinking (T) dimensions, whereas Friedman and Slatt (1988) found that students choosing pathology yielded less distinctive MBTI types. Profiles for those choosing radiology were not distinguishable. Pathology (Myers & Davis, 1976) shares the dimension of introversion (I), and according to the FFM, these specialists could be described as able to experience negative affect and as less sociable and dominating.

In summary of this review, the major categories of specialties have been studied with regard to personality but to varying degrees. Family practitioners and surgeons appear to have been studied using a variety of personality measures, whereas pediatricians, psychiatrists, and obstetricians/gynecologists predominately have been studied using the MBTI. Research in personality and medical specialty has traditionally focused on differentiating between rather than within specialty groups. Fewer studies have investigated subspecialties of internal medicine, such as cardiology, nephrology, and endocrinology, and, thus, a large void exists in the literature. Last, the research has not been consistent in describing specialists by groups; the subspecialists comprising primary care or surgical specialties vary among studies.

With regard to the FFM, the factor of Neuroticism is rarely apparent among specialty groups, whereas Openness to Experience is present in the majority of specialists. In addition, Agreeableness, albeit to varying degrees, was also readily apparent among most specialists.

DISCUSSION

Translating the results of each of these studies using the FFM provides a way to conceptualize personality characteristics of physicians in different medical specialties regardless of the instrument used in the studies. The major conclusion of this literature review is that no specialty can be characterized by a unique pattern of Big-Five personality factors. In terms of personality characteristics, most medical specialties generally require the same pattern of personality characteristics, with tolerance wide enough to allow a variety of personality types in each specialty. When a personality trait or factor does seem to distinguish a specialty from others, there are always a few related specialties in which the trait or factor also appears to be prominent. For example, as a whole, family practitioners, obstetricians, and gynecologists can be described as more Conscientious according to the FFM. Anesthesiologists, surgeons, and psychiatrists share the factor of Openness to Experience; however, this factor may relate to level of medical training with residents and practicing physicians being more Open to Experience than medical students. Obstetricians/gynecologists, regardless of level of training, appear to be less Open to Experience, and family practitioners seem to be mixed regarding this factor. Anesthesiologists and surgeons appear to resemble each other regarding their Extraversion. Family practitioners and psychiatrists appear more Agreeable, whereas obstetricians/gynecologists and surgeons may be less Agreeable.

Given the homogeneity in personality factors across the medical specialties, it is not surprising that our literature review revealed several inconsistent findings. These inconsistencies probably result from measurement error and sampling idiosyncrasies. None of the studies reviewed used a random sample, possibly resulting in an under- or overrepresentation of subsets of the population. Also, a selection bias was present in each of the studies because the individuals who chose to participate in the study may have personality types that attract them to psychological inventories. What is surprising was the conclusion that some stereotypes about the personalities of medical specialists were not supported by empirical research. For example, family practitioners are commonly described as "people-oriented" (Taylor, 1993), but the literature reviewed did not support the Big-Five factor of Extraversion as a personality descriptor for family practitioners. This review did find family practitioners to be Agreeable, which corresponds with Coombs's (1978) description of family practitioners as generous, warmhearted, and friendly.

With regard to anesthesiologists, Taylor (1993) described them as team players. Team players are usually people who work and interact well with others and, thus, have personality factors that correspond to Agreeableness. This study, however, did not attribute the Big-Five factor of Agreeableness to anesthesiologists. According to the FFM and the studies reviewed, dominance associates with Extraversion, which is a personality descriptor for both surgeons and anesthesiol-

ogists. Surgeons have previously been described as domineering (Coombs, 1978), whereas anesthesiologists were described as shy and withdrawn (Coombs, 1978) yet more dominant than general practitioners (Reeve, 1980). Surgeons have been described as extraverted (Stilwell et al., 2000) and outgoing (Mowbray & Davies, 1971), whereas Reeve (1980) reported that anesthesiologists were more introverted.

Obstetricians and gynecologists use technical skills to treat patients who require medical attention for concrete problems and often do not require chronic care (Taylor, 1993). Being technique oriented compared to people oriented coincides with the results of this literature review, which found that obstetricians and gynecologists are less Agreeable and, thus, may not be as empathetic, friendly, or altruistic as other specialists. Unlike obstetricians and gynecologists, psychiatrists are thought to be more interested in people than things (Mowbray & Davies, 1971). Psychiatrists treat patients in need of chronic care (Taylor, 1993) and would be expected to be Agreeable and interact with their patients in an empathic, friendly, and altruistic manner, which does coincide with the findings of this review.

In summary, the present review of research literature indicates a loose relation between a few personality factors and particular medical specialties. However, there is more variation in personality traits within medical specialties than between them. Accordingly, one must conclude that all personality types appear in all specialties and then assert that more than one medical specialty fits the personality of any particular medical student. This should not be interpreted to mean that personality assessment should not be included in specialty counseling. Personality should still be included as one of the many factors that students consider in choosing a specialty (Bland et al., 1995). The underlying purpose in using personality assessment in medical specialty counseling has been to help medical students increase their self-knowledge. Self-exploration of this kind is a useful part of the decision-making process. The results of self-analysis can also be used effectively to narrow the number of specialties to explore. Medical students involved in choosing a specialty might be advised to first identify three or four specialties that generally fit their personalities, that is, implement their self-concepts, attract their interests, meet their needs, and achieve their values. The preferred specialties should have requirements, routines, and rewards that allow a student to become the person she or he wishes to be. Then other factors such as the practice situation, economics, environment, and lifestyle may be used to specify a choice from among the group of preferred alternatives. Having selected a specialty, the student could then again use personality matching to choose a specific residency, wherein she or he will be able to adapt to the organizational culture and establish good working relationships with colleagues and patients.

These suggestions accord with the view in organizational psychology that jobs consist of two components (Borman & Motowidlo, 1993). For physicians, the first component deals with using biotechnical competencies to perform specific tasks that distinguish their specialty. The second component deals with the con-

text of task performance and involves maintenance of the social and organizational network that surrounds the tasks. This suggests the possibility that personality traits may relate differentially to the two components of physicians' work. Personality may relate more to contextual performance than task performance. This means that, despite doing similar tasks, physicians in a particular specialty may exhibit variations in contextual performance that reflect a wide range of personality traits. This would explain why personality measures would not be particularly effective in predicting medical specialty choice. It also suggests that future research on medical specialty selection should concentrate on task performance by measuring skills, self-efficacy, attitudes, and aptitudes rather than personality.

Related to this two-component model, Van Scotter and Motowidlo (1996) suggested that contextual performance could be subdivided into "interpersonal facilitation" and "job dedication." These components correspond to the vocational development tasks of establishing congenial coworker relationships and maintaining good work habits and attitudes. Future research could investigate whether Big-Five traits of Agreeableness and Extraversion relate to interpersonal facilitation and Conscientiousness relates to personal job dedication. Alternatively, Conscientiousness may relate to task performance and Agreeableness and Extraversion to contextual performance. In either case, the characterization of medical specialties would become more complex and accurate if specialties are described by unique tasks performed and the range of practice contexts are described by adaptive interpersonal and personal traits that fit them.

With regard to suggestions for future research on personality and medical specialties, we recall Zimny and Thale's (1970) comment that the practical goal of research concerning selection of medical specialty should be to provide medical students with objective information about medical specialties. In pursuit of this goal, we have three suggestions for future research. First, the results of this literature review suggest that it will be difficult, if not impossible, to directly link medical specialties to unique personality traits because of the heterogeneity of personality traits within each specialty. Accordingly, we suggest that researchers begin using the person approach. The person approach emphasizes the concept of individuality (Magnusson, 1988). It uses quantitative methods—in this case, score profiles from personality inventories—and then combines the results for individuals who share similar profile patterns into homogenous subgroups that represent qualitative differences in personality. Attention shifts from the scale scores as variables to score profiles representing higher order interactions among the variables that form personality patterns. A pattern strategy, the variable approach with its regression models, can identify critical variables that characterize a particular medical specialty, but it does not identify whom in the sample has this trait or how the trait is nested among other traits. The person strategy, in contrast to the variable strategy, would assess the patterns of personality traits that occur frequently within each specialty instead of assessing specialties on variables such as conscientiousness.

Reitzle and Vondracek (2000) recommended using techniques such as configural frequency analysis (Von Eye, 1990) and correspondence analysis (Greenacre & Blasius, 1994) to analyze variables simultaneously, not singularly, and map them in a common social space. For example, configural frequency analysis can identify personality patterns that occur in a medical specialty more or less frequently than can be explained by chance. The more frequent patterns are called types, whereas the less frequent patterns are called antitypes. Types and antitypes can be used to describe each medical specialty as well as to predict which specialties are likely to fit a medical student's pattern of individuality. Type inventories seem particularly well suited for use in the person approach, and this may be why they are popular in specialty choice counseling. However, at this point in time, there are insufficient data with which to characterize the medical specialties by personality patterns and types.

The second recommendation for future research is to study how personality patterns interact with medical specialty work environments. We would like to see studies that examine how different personalities succeed in the same specialty. For example, the research question would be "*how* do different personality types flourish in family medicine?" not "*which* personality types fit family medicine?" We hypothesize that personality type influences how physicians shape their practice of family medicine. An introverted, thinking type with realistic interests may not be the modal personality pattern in family medicine, but maybe this personality type would thrive in a rural setting, possibly one that provides some opportunities to engage in sports medicine and treat occupational injuries.

The third suggestion for future research is to focus on how personality traits and patterns influence the career decision-making process and affect choices. The goal of such research would be to identify personal styles and strategies for coping with the tasks of choosing a specialty and deciding on a residency program. Different personality types prefer different kinds of exploratory activities, decisional approaches, and problem-solving techniques. Better understanding of the relation between personality and decisional processes could help counselors facilitate the career development of medical students.

The question, however, remains as to which personality inventories best suit the study of medical specialty choice. The easiest answer is to say it does not matter, just agree to use the same one or, at least for the one you use, agree to report how the variable scores convert to the FFM or a particular personality typology. We recommend that researchers who study medical specialty choice and personality consider using the Revised NEO Personality Inventory (NEO-PI) (Costa & McCrae, 1992), which is widely used to measure the Big-Five factors (Soldz & Vaillant, 1999). This would allow medical specialty researchers to mesh their findings with the mainstream in personality research. The present literature review conceptualizes medical specialty personality using the Big-Five factors, but it does not include a single study that directly measured these personality factors. Using the Revised NEO-PI provides a way to empirically test the framework of the FFM of medical specialty personality proposed in this article, and more

important, it might be a common instrument in diverse studies of the personality and the decision-making process medical students use to choose their specialties. Given the small number of researchers who investigate this topic, it is critical to knowledge accumulation that they collaborate in designing and reporting their studies. Although not new (Oliver & Spokane, 1988), we consider this recommendation to be the most important outcome of the literature review.

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