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Dr. Congeniality: Understanding the Importance of Surgeons' Nontechnical Skills Through 360° Feedback

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OBJECTIVE: Physician performance is a complex construct that is broadly defined by technical and nontechnical components. The primary aim of this study was to identify which Big Five personality traits (openness, conscientiousness, extraversion, agreeableness, and emotional stability) in surgeons were related to patient satisfaction and teamwork performance in a surgical setting. A secondary aim of this study was to examine the specific perceptions of physician behavior related to patient satisfaction and teamwork performance.

DESIGN: Orthopedic surgeons received anonymous multisource 360° feedback from managers, colleagues, nurses, technicians, and trainees. Personality traits were categorized with a modified Delphi Consensus technique using the Big Five framework. Patient satisfaction was measured using retrospective Clinician & Group—Consumer Assessment of Healthcare Providers and System (CG-CAHPS) data. Teamwork performance was measured using the Quality PULSE 360 Teamwork Index.

SETTING: Research was performed at a large academic medical center in the northeastern United States.

PARTICIPANTS: Participants in this study included a sample of 24 orthopedic surgeons.

RESULTS: Backward stepwise regressions were used to determine which model with the most variance used the fewest explanatory variables. Personality traits acted as predictor variables in the regression models and patient satisfaction and teamwork performance were utilized as outcome variables. The higher the physicians' emotional stability, the higher patients' overall satisfaction ($\beta = 0.41$, $p = 0.04$) and willingness to recommend them to other patients ($\beta = 0.45$, $p = 0.03$). Furthermore, high emotional stability was related to effective surgical teams as rated by team members ($\beta = -0.75$, $p = 0.00$) such that the more emotionally stable physicians were, the higher their teamwork rating by colleagues.

CONCLUSIONS: Both physicians-in-training and in-practice physicians may benefit from engaging in empathic and constructive behaviors with patients and team members. (J Surg Ed ▮:▮▮▮-▮▮▮. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: surgeon, 360-degree feedback, personality, patient satisfaction, teamwork

COMPETENCIES: Interpersonal and Communication Skills, Patient Care, Professionalism

INTRODUCTION

Over a decade ago, the Institute of Medicine published a report highlighting the importance of making fundamental changes to the U.S. health care system in order to improve the quality of health care delivery for Americans.[1] This report established six goals for 21st century health care, one of which was implementing patient-centered care that would be more responsive to patient preferences and needs. As a consequence of this, recent U.S. legislative changes like the Patient Protection and Affordable Care Act (PPACA) of 2010 have mandated patient satisfaction measures as a means of improving patient-centered care.

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In 2017, physician performance became tied to financial incentives for those doctors who take on Medicare patients as a means of improving patient-centered care.[2] Despite the tenuous status of the PPACA, one survey of hospital C-suite executives conducted after the 2016 election found that even if the PPACA is amended or repealed, 68% of executives were interested in keeping incentives related to expanded Medicaid coverage,[3] which includes measures of physician performance.[4] Physician performance is a complex construct that can be broadly defined by both technical and nontechnical components.[5-7] Technical components, such as declarative knowledge, technical skills, decision making, and cognitive ability, are often promoted as important predictors of clinical performance for both physicians-in-training and in-practice physicians. However, nontechnical components such as teamwork and personality are less frequently recognized for their importance despite preliminary research indicating their importance for patient satisfaction.[8-10]

One common method of describing personality is through the Big Five model of personality traits (Table 1).[11,12] Open people are intellectual and adventurous. Conscientious individuals are highly achievement oriented and have high levels of impulse control. Extraverts are outgoing and tend to feel more energized after being around others. Agreeable individuals are altruistic and prefer to get along with others. Lastly, people high in emotional stability do not get easily distressed and are less vulnerable to stress.

TABLE 1. Descriptions of the Big Five Model of Personality Traits

Trait	Description
Openness	Are intellectual, curious, adventurous, have deep conversations, enjoy new ideas, and tend to be more open to their emotions and feelings.
Conscientiousness	Have a tendency to self-regulate, successfully complete tasks, do not neglect duties, are highly achievement oriented, and follow planned schedules well.
Extraversion	Are outgoing, social, captivating, and assertive; extraverts warm up quickly to others, tend to feel more energized after being around a group of people, and do not stay in the background.
Agreeableness	High levels of altruism, trustworthiness, compassion, and generosity; these individuals accept others as they are and prefer to get along with others.
Emotional stability	Are relaxed, calm, and confident; do not get easily distressed or panicked, do not have mood swings, and are less vulnerable to stress and frustration.

Note. Examples are adapted from the 100-item IPIP for measuring Big Five personality traits.[22]

Given the complex role of a surgeon as a diagnostician and a customer service provider,[13] it is vital to understand how the full range of these personality traits may affect physician performance.[14,15] According to the Big Five model of personality traits, surgeons are more conscientious, extraverted, and emotionally stable than other specialties, and less agreeable and less open.[16,17] Other studies have found similar perceptions of surgeons as being excitable, less inhibited, and even aggressive in their interactions with nursing staff.[18] Surgeon personality traits do appear to change throughout their career, potentially owing to training and experience, but as a group surgeons tend to conform less to rules and regulations, and exhibit less empathy when compared to family practitioners and anesthesiologists.[19] Unfortunately, little research has examined the impact of these personality traits on job outcomes. In other words, why should it matter what type of personality a surgeon has? What role does personality play in patient satisfaction and effective teamwork for surgeons? Prior research has demonstrated the importance of emotional intelligence as a predictor of patients' satisfaction ratings as well as colleague/staff ratings of teamwork.[20] This study builds upon prior research[20] to further evaluate the relationship between how physicians interact with their team members and how they treat their patients. Specifically, we sought to identify the aspects of physician personality that were most impactful to qualitative perceptions of teamwork. This analysis should provide an avenue for identifying behavioral teaching points. This study expands on that previous research by exploring how personality traits, which are key predictors of behavior, relate to patient satisfaction and teamwork performance. By understanding how qualitative comments related to personality traits affect others' perceptions of a surgeon's behavior, we can better inform surgeons/surgeons-in-training about how to effectively self-monitor their behavior and approach interactions with others.

The purpose of the present study was to evaluate two research questions: (1) Are open-ended feedback-based on the Big Five personality traits related to measures of patient satisfaction and teamwork performance? and (2) What specific physician behaviors as described in open-ended feedback are predictive of patient satisfaction and teamwork performance?

MATERIAL AND METHODS

Research Ethics

Approval was received from the university's institutional review board.

Design

A mixed (qualitative and quantitative) correlational research design was used utilizing the data of $N = 24$ orthopedic

surgeons from a large academic medical center in the northeastern United States. The current study employed retrospective data that was collected as part of professional development activities for faculty members within the department of orthopedic surgery (PULSE 360 survey data) and routine hospital operations (CG-CAHPS survey data).

All 24 orthopedic surgeons who participated in the Physicians Universal Leadership-Teamwork Skills Education (PULSE) 360 initiative were men with at least 5 years of experience practicing as an attending physician. The 24 surgeons represented the physicians who were full-time attendings within their department. Baseline (first-time participating) PULSE 360 survey data were collected for all 24 surgeons by inviting the physician peers and clinical/administrative health care team members with whom each surgeon worked most often, selected by both the surgeon as well as by the chief, to provide qualitative feedback about their perceptions of the leadership, teamwork, and clinical practice style of that surgeon. Colleagues, peers, managers, nurses, technicians, and trainees who had worked in the department for at least a year were recruited by physicians to anonymously complete the Quality PULSE 360 between 2013 and 2014, providing their perceptions of the surgeon's behavior based on their last 12 months of interaction with that surgeon. The mean number of PULSE raters per surgeon was 22 (standard deviation = 11). The CG-CAHPS satisfaction survey data were a composite for each surgeon of all available data obtained by phone survey for outpatient visits from February 2008 through June 2013. These dates were chosen because the facility did not begin collecting data for this department until 2008. All CG-CAHPS and PULSE 360 data were coded so that the surgeon could not be identified and only the principal investigator had access to the key. Physician personality traits were measured using a modified Delphi Consensus technique.[21] There are four components to this technique: a panel of experts, anonymous feedback, two or more rounds, and statistical consensus. Four expert raters, the authors, received a list of open-ended comments provided to the orthopedic surgeons by their physician peers and surgical team members during participation in a 360° feedback survey process. During the feedback process, anonymous raters were asked to provide orthopedic surgeons with feedback regarding the behaviors that they would like the surgeon to "start doing," "stop doing," and "keep doing." Raw comments for each surgeon were reviewed by the raters and scored for personality-related markers. One facilitator, also one of the expert raters, developed the scoring system for personality-related markers based on the International Personality Item Pool (IPIP). The IPIP is a widely researched and validated measure based on the Big Five model of personality traits.[22] Using the questions from the 100-item version of the IPIP as a reference, the authors independently reviewed and scored key words within each comment in terms of their perceived relation to one or more of the five personality traits (e.g., "Be more mindful of scheduling and time management;" "scheduling;" and "time management" are indicators of conscientiousness-related behaviors based on the IPIP). The facilitator then aggregated the raters' results. For the second feedback round, all four raters met to review their nonanonymized scoring, discuss differences, revise their responses when justified, and reach consensus when possible. Across the $N = 1367$ comments reviewed (mean $N = 56.9$ comments per surgeon), there was an average agreement of 78% in author scoring of personality-related markers. Therefore, approximately 3 of 4 authors agreed on the personality-related scoring for each comment. This qualitative scoring produced a percentage score of comments related to each of the five personality traits for each surgeon in each comment area (i.e., start doing, stop doing, and keep doing behaviors; Table 2). This scoring method was used to provide a context for evaluating the open-ended comments written about the surgeons in a systematic and quantifiable manner, but should not be considered a valid measure of personality until additional research on its convergent validity with extant personality measures is conducted. We consider this approach a measure of personality-relatedness of comments from raters' perspectives, which are both subjective and situational. The value of analyzing comments in this manner is that we are better able to understand what raters perceive to be important behaviors for surgeons to engage in/avoid during day-to-day interaction with health care team members.

Patient satisfaction was measured using the Clinician & Group—Consumer Assessment of Healthcare Providers and System (CG-CAHPS) 2.0 survey; this is a program of the U.S. Agency for Healthcare Research and Quality and is commonly used to assess the patient's experience and perception of care in the ambulatory medical office setting.[23,24] It is a 28-item survey that provides patient feedback on their access to care, doctor communication, courteous/helpful staff, overall doctor rating, and willingness of recommending the doctor. Despite concerns and uncertainty over the use of patient outcomes as a measure of physician performance,[25] the CG-CAHPS remains a valid and reliable tool of patient experience. The CG-CAHPS measured overall satisfaction with doctor ($N = 8064$ patients), their willingness to recommend the doctor to family and friends ($N = 8021$ patients), how much the doctor showed respect ($N = 7318$ patients), and patient satisfaction with the doctor's communication ($N = 7449$ patients). The inconsistency in patient rating counts for each item was the result of missing data. Patient satisfaction outcomes are scored such that a higher score indicates higher levels of patient satisfaction.

Teamwork performance was measured using a subscale of the Quality PULSE 360 survey (a composite contextual performance score), which consisted of 44 questions scored on a Likert-type extent scale. The PULSE 360 is a widely-

TABLE 2. Surgeon Means and Standard Deviations on Research Variables

	Mean	SD	Min	Max
Surgeon personality comment based percentages (%)				
Conscientiousness—"start doing" behaviors	53.6	21.1	7.1	100
Agreeableness—"start doing" behaviors	38.3	22.6	0.0	77.8
Extraversion—"start doing" behaviors	35.7	24.0	0.0	100
Emotional stability—"start doing" behaviors	5.7	9.0	0.0	32.3
Openness—"start doing" behaviors	20.4	19.0	0.0	71.4
Conscientiousness—"stop doing" behaviors	23.7	15.5	0.0	54.5
Agreeableness—"stop doing" behaviors	22.1	19.7	0.0	72.2
Extraversion—"stop doing" behaviors	13.6	14.4	0.0	50.0
Emotional stability—"stop doing" behaviors	19.8	22.3	0.0	83.3
Openness—"stop doing" behaviors	4.1	5.3	0.0	15.4
Conscientiousness—"keep doing" behaviors	53.5	14.1	31.3	83.3
Agreeableness—"keep doing" behaviors	63.3	15.2	31.3	85.7
Extraversion—"keep doing" behaviors	53.5	12.7	25.0	76.2
Emotional stability—"keep doing" behaviors	16.9	9.3	0.0	38.1
Openness—"keep doing" behaviors	24.0	11.6	0.0	46.2
CG-CAHPS				
Overall patient satisfaction with surgeon, $N = 8064$ patients	9.1	0.42	7.8	9.7
Willingness to recommend surgeon, $N = 8021$ patients	3.8	0.14	3.4	4.0
Rating of surgeon respect, $N = 7318$ patients	5.5	0.18	5.0	5.8
Impression of diagnosis explanation, $N = 7449$ patients	5.4	0.2	4.9	5.7
Quality PULSE 360 data				
Teamwork Index Score	79.2	13.9	46.2	92.5

Note. Surgeon $N = 24$. SD = standard deviation; Min = minimum score; Max = maximum score.

used 360° feedback instrument that provides physician leaders and physicians with a behaviorally anchored multisource assessment. The PULSE 360 survey ratings are organized into 10 composite scores; this study focused on the teamwork index score as a measure of teamwork performance. The teamwork index score is a proprietary index calculated using both motivating and discouraging behaviors; it measures behaviors such as listening to others before interrupting, treating others with respect, and being open to suggestions. Among health care professionals, the PULSE 360 shows strong internal consistency with alphas greater than 0.70 for all scales. Additionally, interrater agreement is also high with intraclass correlations above 0.50 across rater groups.[20,26]

Statistical Analysis

The Statistical Package for the Social Sciences (SPSS) v. 23 program was used to analyze data. We conducted a post-hoc power analysis using G*Power v. 3.0.10, which revealed that for 1-tailed bivariate correlational analyses with $\alpha = 0.05$, large effect sizes ($p = 0.50$) can be detected when power = 0.80; the preferred sample size is 23 participants.[27] As a first step, Pearson bivariate correlations explored the relationships between comment-based physician personality scores, CG-CAHPS patient satisfaction outcomes, and the PULSE 360 teamwork index score (Table 3). Personality traits acted as predictor variables in the regression models and CG-CAHPS patient satisfaction measures and teamwork performance were utilized as outcome variables. To address the first research question, multivariate linear regression analyses were conducted including physician personality scores in the model for each CG-CAHPS patient satisfaction outcome variable as well as the teamwork performance outcome variable. Each model was then reduced by backward stepwise regression to determine the model with the most variance explained using the fewest explanatory variables. This stepwise regression approach involves starting with all candidate variables, testing the deletion of each variable using a chosen model fit criterion, deleting the variable (if any) whose loss gives the most statistically insignificant deterioration of the model fit, and repeating this process until no further variables can be deleted without a statistically significant loss of fit.[28]

RESULTS

Demographic variables (age, years in practice) were not related to teamwork scores, patient satisfaction scores, or frequency of open-ended comments related to each of the 5 personality traits based on bivariate analyses.

In regard to research question 1, multivariate analyses indicated that perceptions of emotional stability are related to both patient satisfaction ratings and colleague/staff ratings of teamwork. In the regression model for the

TABLE 3. Bivariate Analyses Between Physician Personality, Patient Satisfaction, and Teamwork

	CG-CAHPS Scores								Quality PULSE 360 Score	
	Overall Patient Satisfaction With Surgeon		Patients' Willingness to Recommend the Surgeon		Patient Rating of Surgeon Respect		Patient Impression of the Surgeon's Diagnosis Explanation		Teamwork Index Score	
Physician Personality Comment Based Percentage Scores	**Pearson *r***	**p value**	**Pearson *r***	**p value**	**Pearson *r***	**p value**	**Pearson *r***	**p value**	**Pearson *r***	**p value**
Conscientiousness—"start doing"	−0.19	0.38	−0.17	0.42	0.08	0.71	−0.12	0.59	0.26	0.21
Agreeableness—"start doing"	−0.01	.97	−0.03	0.87	−0.24	0.26	−0.22	0.31	**−0.49**	**0.02**
Extraversion—"start doing"	0.05	0.81	0.01	0.95	−0.21	0.33	−0.29	0.17	−0.21	0.33
Emotional stability—"start doing"	−0.15	0.47	−0.11	0.62	−0.25	0.25	−0.08	0.70	**−0.60**	**<0.001**
Intellect/imagination—"start doing"	0.07	0.76	0.08	0.70	0.06	0.79	0.05	0.82	0.12	0.58
Conscientiousness—"stop doing"	−0.25	0.24	−0.26	0.22	−0.07	0.75	−0.12	0.59	−0.16	0.47
Agreeableness—"stop doing"	−0.31	0.15	−0.32	0.13	−0.11	0.62	−0.13	0.55	**−0.56**	0.01
Extraversion—"stop doing"	−0.20	0.36	−0.21	0.34	−0.14	0.52	−0.30	0.15	−0.29	.17
Emotional stability—"stop doing"	−0.36	0.08	−0.36	0.08	−0.34	0.11	−0.30	0.16	**−0.75**	**<0.001**
Intellect/imagination—"stop doing"	−0.38	0.07	−0.32	0.12	−0.30	0.16	−0.22	0.29	**−0.59**	**<0.001**
Conscientiousness—"keep doing"	−0.08	0.71	−0.10	0.64	−0.01	0.97	−0.00	0.99	−0.35	0.09
Agreeableness—"keep doing"	−0.14	0.51	−0.11	0.61	−0.12	0.59	−0.07	0.74	−0.05	0.80
Extraversion—"keep doing"	−0.02	0.94	0.02	0.93	0.16	0.46	0.21	0.33	0.10	0.66
Emotional stability—"keep doing"	**0.44**	**0.03**	**0.45**	**0.03**	0.23	0.28	0.30	0.16	0.24	0.26
Intellect/imagination—"keep doing"	**−0.45**	**0.03**	**−0.43**	**0.04**	−0.07	0.75	−0.04	0.86	−0.34	0.10

Note. Pearson *r* = bivariate correlation; *p*-value = level of significance. Bolded values indicate statistical significance.

CG-CAHPS measure of overall patient satisfaction rating of the physician, high emotional stability was predictive of the overall satisfaction rating ($\beta = 0.41$, p = 0.02) and accounted for 24% of the variance (Table 4) while accounting for shared variance with all other personality traits. In other words, physicians who scored higher in emotional stability received higher overall ratings by patients. In the regression model for the CG-CAHPS measure of patient willingness to recommend the treating physician to others, only high emotional stability was predictive of patient recommendations ($\beta = 0.45$, p = 0.03) and accounted for 20.3% of the variance. The regression models for the CG-CAHPS measures of surgeons showing respect to patients and family members (p = 0.31) as well as explaining their diagnosis well (p = 0.16) were nonsignificant; there were no personality traits that accounted for these patient satisfaction outcomes. The regression model for Quality PULSE 360 Teamwork Index score was related to low emotional stability accounted for 56.0% of the variability ($\beta = -0.75$, p = 0.00). In other words, surgeons who were perceived to be low in emotional stability had a negative effect on their teamwork performance.

Research question 2 examined specific behaviors noted by team members that related to surgeon-patient satisfaction scores and teamwork. When surgeons were calm, cool, pleasant, and positive with team members, their patients reacted positively to these behaviors in their CG-CAHPs ratings. Given that surgeon emotional stability was the only personality trait related to

TABLE 4. Multivariate Regression Analyses of Physician Personality on Patient Satisfaction and Teamwork

Outcome	Personality-Related Perception Measures	B	SE (B)	β	*t*	Adj. R^2
Overall patient satisfaction with surgeon	Constant	8.92**	0.18			
	% of Keep doing comments related to emotional stability	0.02*	0.01	0.41	2.23	0.24
Patients' willingness to recommend the surgeon	Constant	3.67**	0.06			
	% of keep doing comments related to emotional stability	0.01*	0.00	0.45	2.37	0.20
Teamwork Index Score	Constant	88.47**	2.60			
	% of stop doing comments related to emotional stability	−0.47**	0.09	−0.75	−5.29	0.54

Note. B = unstandardized coefficient; SE = standard error; β = standardized coefficient; *t* = *t*-statistic; Adj. R^2 = proportion of variance accounted for in outcomes by personality-related perception measures; *$p < .05$; **$p < .01$.

*p < 0.05

**p < 0.01.

patient and teamwork outcomes when accounting for all Big Five traits simultaneously, only behaviors describing this personality trait are discussed. High emotional stability behaviors such as "Keep having a positive attitude," "Keep having your [calm] temperament," and "Keep dealing successfully with the frustrations of working" were all related to CG-CAHPS patient satisfaction outcomes. When physicians behaved in a manner related to low emotional stability (e.g., "Stop making a big deal about small things," "Stop seeming withdrawn," "Stop acting immaturely," and "Stop being stubborn"), physician peers and surgical team members rated their teamwork skills lower.

DISCUSSION

Given the complex role of a surgeon as a diagnostician and a customer service provider[13] and the recent implementation by the Centers for Medicare & Medicaid Services of value-based programs that adjust reimbursements based on patient satisfaction scores,[29] it is beneficial to understand the effects of surgeon personality traits on patient satisfaction and teamwork performance.[8-10] Prior research has demonstrated that emotional intelligence is an important predictor of patients' satisfaction ratings as well as colleague/staff ratings of teamwork.[20] The goal of this study was to extend the previous research examining the relationship between 360° feedback and patient satisfaction by examining how personality traits are related to patient satisfaction and teamwork performance among orthopedic surgeons. The current study extends upon those findings by providing insight into the types of behaviors that physicians need to be mindful of and potentially modify through training and professional development. Specifically, we sought to categorize surgeon personality traits and examine their relationships with patient satisfaction and teamwork outcomes. The current study suggests that the more emotionally stable surgeons were, the higher their patients' overall satisfaction and willingness to recommend them to other patients. Furthermore, high emotional stability was related to effective surgical teams, as evidenced by ratings of the surgeon on teamwork-related skills and clinical style behaviors.

The personality traits of conscientiousness and extraversion were not related to patient satisfaction or teamwork. These results differ from previous studies and suggest that there may be differences in regard to patient expectations and satisfaction among physician specialties. For example, patients who seek out a surgeon are doing so because there is a need for surgical intervention, which is most often owing to a serious health concern. These patients may seek a higher level of empathy and concern from a surgeon than patients who are being cared for by a primary care physician for routine health management.[15] In regard to teamwork, the only personality trait related to teamwork was emotional stability. Emotional stability has been found to play a key role in high-functioning teams.[30] However, the complex and dynamic nature of teamwork suggests that in the health care setting, where interdisciplinary teams are typical, efforts aimed at improving teamwork should take multiple factors into consideration at the individual and team level.[31,32] Some personality traits that predict job performance in physicians (i.e., conscientiousness)[6] had no relationship with patient satisfaction or teamwork outcomes in our sample of surgeons. Personality traits that predict patient satisfaction for some specialties likely do not generalize and suggest that medical school programs should continue to train well-rounded physicians by focusing on both technical and nontechnical skills in order to create well-functioning medical teams that improve both patient satisfaction and clinical outcomes.

Limitations

The Big Five model of personality traits is the current gold standard of personality measurement, and demonstrates consistency and reliability across age, sex, and self- and other-reports.[33] One major limitation of this study was categorizing personality based on feedback from colleagues, which may not be an accurate representation of personality when compared to using self-report data. We recognize that

this approach is a weakness, but categorizing behaviors based on the IPIP was done to give structure to the behavioral comments. There is evidence that other-reports of personality can be accurate at determining job performance as well,[34] though the accuracy is lower on personality traits that are more difficult to detect such as emotional stability. Given that other-ratings of personality are partly a function of acquaintance, using team members' ratings still provides a more accurate representation of personality than using strangers or patients. This study was meant to be exploratory, and suggests that surgeon personality traits as perceived by colleagues are related to patient satisfaction outcomes. Based on this, future research should utilize validated self-report measures of personality to determine if these findings remain consistent and personality traits do indeed affect patient outcomes.

Another limitation was the small sample size of 24 surgeons, which may explain why personality traits were not significantly related to the patient satisfaction outcomes of showing respect to patients and family members and explaining the diagnosis well. Because these surgeons represented one clinical setting in the northeast, these results may not generalize to other settings and locations. However, the value of conducting this type of study in 1 setting is the large amount of rater overlap among physicians. This rules out the argument that differences among physicians are owing to unique raters. All raters were required to have at least 1 year of experience working in the department. Given that the hospital setting, staff, procedures, and providers were held constant, there is little reason for us to believe that patients scoring one physician lower than another is being driven by anything other than personality and physician behaviors. However, given the limited research on surgeon personality and clinical outcomes, this study represents a preliminary investigation into the effects of personality on the surgeon-patient relationship and future research should examine other settings and larger, more diverse sample sizes as well. Nevertheless, surgery remains a male-dominated field,[35] so this study is a fairly accurate representation of a typical orthopedic surgery unit.

Finally, using retrospective patient satisfaction data makes it difficult to determine the causal effects of personality traits on patient satisfaction, so future research should consider using a multiwave approach to clarify if this trend remains.

CONCLUSIONS

The stereotypical "surgeon personality" of an aggressive and dominant individual appears to be somewhat overstated in regard to its impact on patient perceptions.[18] However, understanding the implications of these personality differences is still an ongoing area of research. Surgeons tend to be more antagonistic and less sentimental than other specialties,[36] and patients and colleagues respond positively when surgeons are more confident and constructive, do not make a big deal about small things, and do not get frustrated with colleagues. This is in line with previous research that physicians who are more empathic are better able to understand the feelings of others and can modify their interactions with others accordingly,[37] even if surgeons only have limited interactions with their patients when compared to primary care physicians.

Perceptions of personality traits like emotional stability may negatively affect physicians' colleagues and patients, so future training initiatives should focus on self-awareness, emotional intelligence, and maintaining a cool demeanor while finding solutions rather than allowing immediate emotional reactions to manifest. If physicians are not aware of how they appear to colleagues and patients, medical schools and hospitals may benefit by considering personality differences when selecting and training physicians.

AUTHOR CONTRIBUTIONS

Study concept and design: P.J.G., M.E.M., and L.H. Analysis and interpretation of data: P.J.G., M.E.M., J.L., and L.H. Drafting and revising of the manuscript: J.L., P.J.G., M.E.M., and L.H. All authors approved the final version.

CONFLICT OF INTEREST STATEMENT

Two of the authors (P.J.G., L.H.) are employees of the Physicians Development Program/PULSE 360 Program, Miami, FL.

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