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The relationship between self-efficacy and well-being among surgical residents

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Abstract

Objective: Residency is a challenging time in the lives of physicians. In this study, we examined the relationship between general self-efficacy, defined as the belief in one's own capabilities in a variety of situations, and burnout and psychological well-being in a sample of surgical residents.

Design: In the context of a larger study, a cross-sectional survey was administered to residents. The survey included measures of general self-efficacy, the emotional exhaustion and personal accomplishment domains of burnout, and general psychological well-being. We examined correlations between self-efficacy and these well-being outcomes and used multivariable linear regression models that controlled for age, gender, post-graduate year, ethnicity, and the interaction between gender and self-efficacy.

Setting: We surveyed residents at Stanford Health Care, a tertiary care center, between the fall of 2010 and the spring of 2013.

Participants: 179 residents from 9 surgical sub-specialties responded to the survey for a response rate of 76%.

Results: Residents reported high levels of self-efficacy, and over a third reported high emotional exhaustion. Eighty-nine percent of residents had average or high personal accomplishment. In adjusted regression analyses, general self-efficacy was negatively predictive of emotional exhaustion ($B = -0.43$, $p = 0.0127$) and positively predictive of personal accomplishment ($B = 0.33$, $p = 0.0185$) and general psychological well-being ($B = 0.34$, $p = 0.0010$). There was no interaction between gender and general self-efficacy in regression analyses ($p = 0.6776$).

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Conclusions: Among other factors, self-efficacy appears to be significantly predictive of resident well-being. High self-efficacy suggests that residents feel prepared and capable. Interventions to improve residents' general self-efficacy should be explored as a possible mechanism to improve well-being.

Keywords

Self-efficacy; burnout; well-being; residency; medical education

Introduction

High levels of anxiety,¹ burnout,^{2,3} and depression⁴ have been found in physicians, particularly in residents. In addition to the inherent importance of physicians' well-being, their having good psychological and physical health is crucial because of the association between physicians' well-being and patient care outcomes. Research has demonstrated links between personal stressors to physicians and poorer patient care, such as medical mistakes and irritability with patients.^{5,6} In particular, burnout and depression have both been associated with medical errors.⁷⁻⁹ Thus, physician well-being must be a top priority in order to optimize patient care.

General self-efficacy is defined as "individuals' perception of their ability to perform across a variety of situations."¹⁰ Self-efficacy has been shown to be correlated with many important qualities including self-esteem,¹⁰ conscientiousness, goal setting, and goal commitment.¹¹ It has been suggested that self-efficacy most closely captures the idea of confidence,¹² which has been the subject of much discussion in surgical training particularly since the introduction of the 80-hour work week.¹³⁻¹⁵ One common argument is that surgical residents have less confidence in their ability to practice independently since the work hour restrictions went into effect. Although confidence lacks a shared definition in the literature and is difficult to measure,¹² self-efficacy can be employed as an easily quantifiable proxy for the more subjective term confidence. Thus, measuring self-efficacy among surgical residents is an important contribution to this conversation.

There is reason to suspect that self-efficacy and well-being are related.¹⁶ Intuitively, the more capable a person feels, the better that person feels about him- or herself. In this study, we examine the relationship between general self-efficacy, burnout, and psychological well-being in a sample of surgical residents. Our primary hypothesis is that self-efficacy will be associated with better well-being.

Material and methods

Setting

In the context of a larger study, we surveyed residents from 9 surgical sub-specialties at one academic medical center from fall 2010 to spring 2013. All instruments were administered during each data collection. Data collection occurred both in the spring and in the fall. If a resident responded more than once, only the resident's first set of responses was included in

analyses. All post-graduate years as well as residents on research/professional development time were represented in the sample.

Measures

Residents responded to a validated general self-efficacy scale¹⁷ consisting of eight Likert-type items with answers ranging from “Strongly disagree” to “Strongly agree.” Table 1 contains the text of all eight items in the scale. The self-efficacy scale ranges from 1 to 5, with higher values indicating more self-efficacy.

Burnout was measured using the Maslach Burnout Inventory.¹⁸ The inventory includes 22 items, each of which has 7 answer choices: “Never,” “A few times a year or less,” “Once a month or less,” “A few times a month,” “Once a week,” “A few times a week,” or “Every day.” There are three main sub-scales of the Maslach Burnout Inventory, and in this study we examine one negative aspect of burnout, emotional exhaustion, and one positive aspect, personal accomplishment. Each subscale is represented as an average of the items rated from 1 to 7 that form the subscale. Higher values indicate more emotional exhaustion or personal accomplishment, respectively. Burnout is characterized by high levels of emotional exhaustion and low levels of personal accomplishment. Values of the subscales are classified into high, average, and low experienced burnout based on the tertiles of the normative distribution among medical workers, which includes physicians and nurses.¹⁹ For the emotional exhaustion scale, scores of 4.00 out of 7 or higher indicate high burnout, scores of 2.78 or lower indicate low burnout, and scores between the cut-off points are classified as average burnout. Using the personal accomplishment subscale, scores of 5.71 or lower indicate high burnout, scores of 6.71 or higher indicate low burnout, and scores between the cut-off points are classified as average burnout.

We used the Dupuy Psychological General Well-Being Index (WBI) to measure the general psychological well-being of each of the residents.²⁰ This measure consists of 22 items, each with six possible responses, and is scored such that higher values indicate better psychological well-being. Here we present values of the WBI as the average of the 22 items.

Demographic information, including race/ethnicity, gender, and age were collected. In regression analyses, race was dichotomized into non-Hispanic white vs. non-white. Additionally, each resident’s current post-graduate year and surgical specialty were recorded.

Data analysis

Descriptive statistics for demographic variables, with numbers and percentages, and for the scales and performance data, with means and standard deviations, were calculated. Bivariate associations were assessed using Spearman’s correlations between self-efficacy and the continuous variables. We compared men and women using *t*-tests. We compared levels of self-efficacy in different surgical specialties and different post-graduate years using analysis of variance (ANOVA). Next, multivariable regression analysis was used to determine the relationship between self-efficacy and several outcomes while controlling for gender, post-graduate year, age, and race. Interactions between self-efficacy and gender were also analyzed. All statistical analyses were done using SAS (Version 9.4, SAS Institute, Cary,

NC). The research protocol was approved by the Institutional Review Board (IRB) at Stanford University.

Results

Preliminary analyses

179 residents participated in this study (response rate 76%). Table 2 presents demographic information for the sample. The majority of participants were male (63%), and slightly under a half (46%) were White. A third of the sample reported their race as Asian/Pacific Islander (33%). Half of the residents were junior residents (32% and 18% of the sample were PGY 1 and PGY 2, respectively), and 21 residents (12%) were engaged in a year dedicated to research or professional development. The residents were from 9 different specialties, the most common of which was general surgery (30%).

Table 3 shows descriptive statistics for self-efficacy and the outcomes of interest. The mean self-efficacy in the sample was 4.27 out of 5 with a standard deviation of 0.68. Compared to validity studies of the self-efficacy scale, where the mean general self-efficacy was 3.87 in undergraduates and 4.14 in a sample of managers¹⁷, the residents' self-efficacy was high. The mean emotional exhaustion among the residents was 3.56 out of 7 with a standard deviation of 1.19. Based on the emotional exhaustion subscale, thirty-five percent (63/179) of residents experienced high burnout, 38% (68/179) experienced average burnout, and 27% (48/179) experienced low burnout. The mean personal accomplishment was 5.74 out of 7 with a standard deviation of 0.91. Based on the personal accomplishment subscale, only 11% (20/179) of residents experienced high burnout while 50% (89/179) experienced average burnout and 39% (70/179) experienced low burnout. While 45% of the residents reported high burnout as indicated by either high emotional exhaustion or low personal accomplishment, only 1% (2/179) experienced both high emotional exhaustion and low personal accomplishment.

The mean value for general psychological well-being was 4.64 (standard deviation 0.72), which is similar to a reference population (reference mean 4.68).²¹ We found statistically significant differences between women and men in emotional exhaustion ($t = -2.19$, $df = 177$, $p = 0.0299$) and general psychological well-being ($t = 2.05$, $df = 177$, $p = 0.0416$) such that women had higher emotional exhaustion (3.82 versus 3.42) and lower general psychological well-being (4.50 versus 4.72) than men. There were no gender differences in either self-efficacy or personal accomplishment ($p = 0.14$). We found no differences in self-efficacy by specialty ($F(8, 170) = 0.95$, $p = 0.48$) or by post-graduate year ($F(5, 173) = 0.73$, $p = 0.60$).

Burnout

In our analyses of correlations between self-efficacy and burnout, we found a significant inverse correlation between self-efficacy and emotional exhaustion (Table 4; $r_s = -0.28$, $p = 0.0002$) such that greater self-efficacy was associated with less emotional exhaustion. We found a significant moderate, positive correlation between self-efficacy and personal

accomplishment ($r_s = 0.37$, $p < 0.0001$) such that greater self-efficacy was associated with a greater sense of personal accomplishment.

Regression analyses were consistent with our correlational findings. In separate adjusted regression analyses controlling for gender, age, ethnicity, post-graduate year, and the interaction between self-efficacy and gender, self-efficacy was significantly negatively predictive of emotional exhaustion (Table 5; $B = -0.43$, $p = 0.01$). In a second model controlling for the same factors, there was a positive, statistically significant association between self-efficacy and personal accomplishment ($B = 0.33$, $p = 0.02$). We found no evidence of an interaction between gender and self-efficacy in regression analyses predicting burnout ($ps = 0.68$). Non-white race was associated with a lower sense of personal accomplishment ($B = -0.28$, $p = 0.05$), but it was not predictive of emotional exhaustion. Additionally, gender, age, and post-graduate year were not significant covariates in either of the burnout models ($ps = 0.12$).

Psychological well-being

We found a significant moderate, positive correlation between self-efficacy and general psychological well-being ($r_s = 0.35$, $p < 0.0001$) such that greater self-efficacy was associated with better psychological well-being.

In the adjusted regression analyses, there was a positive, statistically significant association between self-efficacy and general psychological well-being ($B = 0.34$, $p = 0.001$). As in the models for burnout, we found no evidence of an interaction between gender and self-efficacy in the model predicting general psychological well-being ($p = 0.81$). Additionally, gender, age, and race were not significant covariates in the model predicting general psychological well-being ($ps = 0.17$). In regression analysis, it appears that post-graduate year was significantly predictive of general psychological well-being ($F(5, 158) = 2.88$, $p = 0.02$), and that second-, third-, fourth-year, and research residents had significantly different general psychological well-being compared to residents in post-graduate year 1 ($ps = 0.0483$). However, post-hoc analyses adjusted for multiple comparisons indicate the only significant pair-wise difference in general psychological well-being was between those in post-graduate year 1 and those in post-graduate year 3, with higher self-efficacy amongst first year residents (adjusted mean psychological well-being = 4.89 versus 4.37, $p = 0.0214$). No other pairwise comparisons of general psychological well-being between post-graduate years were statistically significant ($ps = 0.11$).

Discussion

In this study, we examined the association between self-efficacy and three indicators of well-being: emotional exhaustion, personal accomplishment, and general psychological well-being. We found an inverse association between self-efficacy and emotional exhaustion such that higher self-efficacy was associated with lower emotional exhaustion. Positive associations existed between self-efficacy and personal accomplishment and general psychological well-being. The associations between self-efficacy and the well-being outcomes persisted after controlling for gender, age, race, and year of residency. Finally, we found no evidence of an interaction between gender and self-efficacy, meaning that the

relationship between self-efficacy and the well-being outcomes does not seem to differ by gender.

Almost half of the residents in our sample experienced either high emotional exhaustion or low personal accomplishment, but this was driven primarily by residents reporting high emotional exhaustion. Additionally, only one percent of the sample showed both high emotional exhaustion and low personal accomplishment. Thus, it is noteworthy that residents found their work fulfilling. This finding was contrary to that described in a previous study of medical students who showed matching levels of high emotional exhaustion along with low personal accomplishment.²² Interestingly, the authors of that study noted that personal accomplishment increased over the years in medical school, which would be consistent with our findings of higher personal accomplishment in residency. Our findings indicate that the surgical residents have a similar level of emotional exhaustion, but they also have a stronger sense of personal accomplishment compared to medical students.

There is some literature measuring burnout among surgical residents specifically. A survey of orthopedic surgery residents found high emotional exhaustion,²³ and a longitudinal study of general surgery residents reported 50% of surgery residents had high emotional exhaustion.²⁴ A cross-sectional study from 2016 of general surgery residents found that 69% of residents met the criteria for burnout on at least one of the burnout subscales.²⁵ A review of burnout in residents reported high levels of emotional exhaustion among residents in a variety of surgical and non-surgical programs.² A study of internal medicine residents found that 76% met the criteria for burnout, and those residents who were experiencing burnout were more likely to report providing suboptimal patient care.²⁶ Moderate rates of emotional exhaustion and low to moderate rates of lack of personal accomplishment have also been documented in family practice residents.²⁷ Our work adds to this body of literature and demonstrates consistent findings in a group of residents from several surgical specialties.

In the context of high burnout rates and poor psychological well-being, it is important to explore factors that can improve mental health. Here we have shown that self-efficacy is positively associated with well-being. This is meaningful because self-efficacy is malleable and can thus be improved. Researchers have implemented interventions to improve self-efficacy in a variety of populations,^{28,29} but studies specifically targeting increasing self-efficacy in surgical residents are limited. One study focused on improving self-efficacy for surgeons training in minimally invasive techniques proposed several practical suggestions that can be applied in a surgical setting.³⁰ These included both physical changes such as eliminating distractions in the surgical environment and psychological changes such as learning strategies for coping with complex tasks and reducing anxiety. They also suggested using different methods to enhance self-efficacy depending on an individual's perceived and actual capabilities. A review found strong evidence of an association between self-efficacy and work performance and suggested that interventions to improve self-efficacy may be particularly effective in improving performance.³¹ However, the study found that task complexity moderated the relationship between self-efficacy and performance such that the association was weaker for high complexity tasks. Finally, an interventional study examined change in self-efficacy and performance in a group of surgical trainees and recent fellows using simulation sessions challenging non-technical skills.³² They also examined the effects

of the intervention on those with particularly high or low reported self-efficacy because having perceived ability greater than or less than actual ability is potentially problematic. While they found no significant difference in self-efficacy overall, the intervention had positive effects in terms of modifying inflated or depressed self-efficacy.

This research also contributes to the existing literature on confidence among surgical residents. Despite the perception that residents who train in the new era of work hour restrictions have less confidence than those who preceded them, there is little precise data. A review of 15 studies on confidence in general surgery residents found that a third of studies on the topic had positive or neutral conclusions and the remaining studies reported low confidence or readiness to practice.¹² However, the author notes that while many of the articles expressed a sense of a deterioration of confidence over time, particularly since the implementation of the duty hour restrictions, there is no directly comparable historical data. Using the more precise measure of self-efficacy, our data indicate that residents may feel prepared and capable. In addition, it may be that the messages residents hear about their lack of preparedness for independent practice lowers self-efficacy and is harmful.¹² Research has found that residents expressed worry that those teaching them, who trained before the restrictions, have doubts about their ability to succeed.³³ It is reasonable that hearing these messages about the inferiority of current training would lead residents to be less confident.

It is important to note that the measure of self-efficacy used in this study captures general self-efficacy rather than surgery-specific self-efficacy. In this population, it is not unreasonable to believe that there could be differences between general self-efficacy and surgical self-efficacy. The scores using the general self-efficacy scale indicate the residents believe themselves to be generally competent in their performance, and indeed all the residents have successfully progressed through medical school into a competitive residency program. But it is possible that while they have a strong perception of their ability to perform generally in life, they could have different levels of self-efficacy in the surgical domain. Because there is currently not a method to assess surgery-specific self-efficacy, development of such a tool is a direction for future research. An additional future direction would be a longitudinal study of changes in residents' self-efficacy over the course of their residencies. As the study sample includes residents of all post-graduate years and multiple surgical sub-specialties, the heterogeneity may be viewed as both a strength and a weakness. Other limitations of this study include a single site and modest sample size.

Conclusions

We found an inverse relationship between self-efficacy and emotional exhaustion among a sample of surgical residents. We also found positive associations between self-efficacy and psychological well-being and feelings of personal accomplishment. While the correlations do not imply causality, our research suggests that interventions to improve self-efficacy may be effective tools to address physicians' well-being.

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References

1. Baldwin PJ, Dodd M, Wrate RM. Young doctors' health -- II. Health and health behaviour. *Soc Sci Med* 1997;45(1):41–44. doi:10.1016/S0277-9536(96)00307-3. [PubMed: 9203269]
2. Thomas NK, IS N, JJ C, et al. Resident Burnout. *JAMA* 2004;292(23):2880. doi:10.1001/jama.292.23.2880. [PubMed: 15598920]
3. Shanafelt TD, Balch CM, Bechamps GJ, et al. Burnout and Career Satisfaction Among American Surgeons. *Trans. Meet Am Surg Assoc* 2009;127:107–115. doi:10.1097/SLA.0b013e3181ac4dfd.
4. Lin DT, Liebert CA, Esquivel MM, et al. Prevalence and predictors of depression among general surgery residents. *Am J Surg* 2016;213(2):313–317. doi:10.1016/j.amjsurg.2016.10.017. [PubMed: 28017297]
5. Firth-Cozens J Interventions to improve physicians' well-being and patient care. *Soc Sci Med* 2001;52(2):215–222. [PubMed: 11144777]
6. Wallace JE, Lemaire JB, Ghali WA. Physician wellness: a missing quality indicator. *Lancet* 2009;374(9702):1714–1721. doi:10.1016/S0140-6736(09)61424-0. [PubMed: 19914516]
7. West CP, Huschka MM, Novotny PJ, et al. Association of Perceived Medical Errors With Resident Distress and Empathy. *JAMA* 2006;296(9):1071. doi:10.1001/jama.296.9.1071. [PubMed: 16954486]
8. Shanafelt TD, Balch CM, Bechamps G, et al. Burnout and Medical Errors Among American Surgeons. *Ann Surg* 2010;251(6):995–1000. doi:10.1097/SLA.0b013e3181bfdab3. [PubMed: 19934755]
9. Fahrenkopf AM, Sectish TC, Barger LK, et al. Rates of medication errors among depressed and burnt out residents: prospective cohort study. *BMJ* 2008;336(7642):488–491. doi:10.1136/bmj.39469.763218.BE. [PubMed: 18258931]
10. Judge TA, Erez A, Bono JE. The Power of Being Positive: The Relation Between Positive Self-Concept and job Performance. *Hum Perform* 1998;11(2–3):167–187. doi:10.1080/08959285.1998.9668030.
11. Erez A, Judge TA. Relationship of core self-evaluations to goal setting, motivation, and performance. *J Appl Psychol* 2001;86(6):1270–1279. doi:10.1037//0021-9010.86.6.1270. [PubMed: 11768067]
12. DM E Confidence crisis among general surgery residents: A systematic review and qualitative discourse analysis. *JAMA Surg* 2016;151(12):1166–1175. doi:10.1001/jamasurg.2016.2792. [PubMed: 27603429]
13. Fonseca AL, Reddy V, Longo WE, Gusberg RJ. Graduating general surgery resident operative confidence: Perspective from a national survey. *J Surg Res* 2014;190(2):419–428. doi:10.1016/j.jss.2014.05.014. [PubMed: 24908164]
14. Foley PJ, Roses RE, Kelz RR, et al. The State of General Surgery Training: A Different Perspective. *J Surg Educ* 2008;65(6):494–498. doi:10.1016/j.jsurg.2008.04.001. [PubMed: 19059183]
15. McKenna DT, Mattar SG. What is wrong with the training of general surgery? *Adv Surg* 2014;48(1):201–210. doi:10.1016/j.yasu.2014.05.010. [PubMed: 25293616]
16. Caroli ME De, Generalized Sagone E. Self-efficacy and Well-being in Adolescents with High vs. Low Scholastic Self-efficacy. *Procedia - Soc Behav Sci* 2014;141:867–874. doi:10.1016/j.sbspro.2014.05.152.
17. Chen G, Gully SM, Eden D. Validation of a New General Self-Efficacy Scale. *Organ Res Methods* 2001;4(1):62–83. doi:10.1177/109442810141004.
18. Maslach C, Jackson SE. The measurement of experienced burnout. *J Organ Behav* 1981;2(2):99–113. doi:10.1002/job.4030020205.
19. Maslach C, Jackson SE, Leiter MP. *Maslach Burnout Inventory: Third Edition.*; 1997. doi:10.1017/S0033291798257163.

20. Dupuy H The Psychological General Well-Being (PGWB) Index. In: Wenger N, Mattson M, Furberg C, Elinson J, eds. *Assessment of Quality of Life in Clinical Trials of Cardiovascular Therapies* New York: Le Jacq Publications; 1984:170–183.
21. Dimenäs E, Carlsson G, Glise H, Israelsson B, Wiklund I. Relevance of norm values as part of the documentation of quality of life instruments for use in upper gastrointestinal disease. *Scand J Gastroenterol Suppl* 1996;221:8–13. doi:10.3109/00365529609095544. [PubMed: 9110389]
22. Dyrbye LN, Thomas MR, Huntington JL, et al. Personal life events and medical student burnout: a multicenter study. *Acad Med* 2006;81(4):374–384. doi:10.1093/academic/81.4.374 [pii]. [PubMed: 16565189]
23. Sargent MC, Sotile W, Sotile MO, Rubash H, Barrack RL. Stress and coping among orthopaedic surgery residents and faculty. *J Bone Joint Surg Am* 2004;86-A(7):1579–1586. <http://www.ncbi.nlm.nih.gov/pubmed/15252111>. [PubMed: 15252111]
24. Gelfand D V Effect of the 80-Hour Workweek on Resident Burnout. *Arch Surg* 2004;139(9):933. doi:10.1001/archsurg.139.9.933. [PubMed: 15381609]
25. Elmore LC, Jeffe DB, Jin L, Awad MM, Turnbull IR. National Survey of Burnout among US General Surgery Residents. In: *Journal of the American College of Surgeons* Vol 223; 2016:440–451. doi:10.1016/j.jamcollsurg.2016.05.014. [PubMed: 27238875]
26. Shanafelt TD, Bradley KA, Wipf JE, Back AL. Burnout and self-reported patient care in an internal medicine residency program. *Ann Intern Med* 2002;136(5):358–367. doi:10.1093/ajcp/136.5.358 [pii]. [PubMed: 11874308]
27. Lemkau JP, Purdy RR, Rafferty JP, Rudisill JR. Correlates of burnout among family practice residents. *J Med Educ* 1988;63(9):682–691. doi:10.1097/00001888-198809000-00003. [PubMed: 3418671]
28. Moshki M, Mohammadzadeh F, Dehnoalian A. The effectiveness of a group-based educational program on the self-efficacy and self-acceptance of menopausal women: A randomized controlled trial. *J Women Aging* 2017;1–16. doi:10.1080/08952841.2017.1366753.
29. Long JAD, Stevens KR. Using technology to promote self-efficacy for healthy eating in adolescents. *J Nurs Scholarsh* 2004;36(2):134–139. doi:10.1111/j.1547-5069.2004.04026.x. [PubMed: 15227760]
30. Risucci D a Wolfe KC, Kaul A. Promoting self-efficacy in minimally invasive surgery training. *JSL* 2009;13:4–8. <http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=3015897&tool=pmcentrez&rendertype=abstract>. [PubMed: 19366532]
31. Stajkovic AD, Luthans F. Self-efficacy and work-related performance: A meta-analysis. *Psychol Bull* 1998;124(2):240–261. doi:10.1037/0033-2909.124.2.240.
32. Pena G, Altree M, Field J, et al. Surgeons' and trainees' perceived self-efficacy in operating theatre non-technical skills. *Br J Surg* 2015;102(6):708–715. doi:10.1002/bjs.9787. [PubMed: 25790065]
33. Veazey Brooks J, Bosk CL. Remaking surgical socialization: Work hour restrictions, rites of passage, and occupational identity. *Soc Sci Med* 2012;75(9):1625–1632. doi:10.1016/j.socscimed.2012.07.007. [PubMed: 22863331]

Highlights

- Residents had high levels of general self-efficacy and personal accomplishment
- A third of residents reported high burnout as measured by emotional exhaustion
- In adjusted regression analyses, general self-efficacy predicted well-being
- There was no difference in self-efficacy by gender

Table 1.

Components of the self-efficacy scale

Item	Question
1	"I will be able to achieve most of the goals that I have set for myself."
2	"When facing difficult tasks, I am certain that I will accomplish them."
3	"In general, I think that I can obtain outcomes that are important to me."
4	"I believe I can succeed at most any endeavor to which I set my mind."
5	"I will be able to successfully overcome many challenges."
6	"I am confident that I can perform effectively on many different tasks."
7	"Compared to other people, I can do most tasks very well."
8	"Even when things are tough, I can perform quite well."

Table 2.

Descriptive statistics for sample demographics

Characteristic	<i>n</i> (%)
Gender	
Female	66 (36.87%)
Male	113 (63.13%)
Post-graduate year	
1	57 (31.84%)
2	32 (17.88%)
3	25 (13.97%)
4	21 (11.73%)
5	23 (12.85%)
Research/PD	21 (11.73%)
Specialty	
Cardiothoracic	7 (3.91%)
General surgery	55 (30.73%)
Neurosurgery	17 (9.50%)
ENT	19 (10.61%)
Ophthalmology	11 (6.15%)
Orthopedics	27 (15.08%)
Plastics	21 (11.73%)
Urology	19 (10.61%)
Vascular	3 (1.68%)
Race/ethnicity (<i>N</i> = 175)	
White	80 (45.71%)
Black or African-American	8 (4.57%)
Hispanic or Latino	11 (6.29%)
Asian/Pacific Islander	57 (32.57%)
Native American	0 (0.00%)
Middle Eastern	10 (5.71%)
Mixed race	9 (5.14%)
Marital status (<i>N</i> = 175)	
Single, never married	99 (56.57%)
Married	72 (41.14%)
Divorced	4 (2.29%)
Separated but married	0 (0.00%)
Widowed	0 (0.00%)

Table 3.

Descriptive statistics for self-efficacy and well-being scales

Measure	Mean (SD)			<i>p</i> -value ^a
	Overall	Women	Men	
Self-efficacy ^b	4.27 (0.68)	4.17 (0.77)	4.33 (0.63)	0.1350
Emotional exhaustion ^c	3.56 (1.19)	3.82 (1.06)	3.42 (1.25)	0.0299
Personal accomplishment ^c	5.74 (0.91)	5.77 (0.88)	5.72 (0.93)	0.7475
WBI ^d	4.64 (0.72)	4.50 (0.74)	4.72 (0.70)	0.0416

^aTest for difference between women and men^bScaled 1 = lowest to 5 = highest^cScaled 1 = lowest to 7 = highest^dScaled 1 = lowest to 6 = highest

Table 4.

Correlations between self-efficacy and well-being

Measure	<i>N</i>	<i>r_s</i>	<i>p</i> -value
Emotional exhaustion	179	−0.28	0.0001
Personal accomplishment	179	0.37	<0.0001
WBI	179	0.35	<0.0001

Table 5.Linear regression analyses predicting well-being scales ($N = 164$ for all models)

	Outcome					
	Emotional exhaustion		Personal accomplishment		WBI	
	<i>B</i>	<i>p</i> -value	<i>B</i>	<i>p</i> -value	<i>B</i>	<i>p</i> -value
Self-efficacy	-0.42	0.0127 *	0.33	0.0185 *	0.34	0.0010 **
Female gender ^a	0.54	0.6405	-0.29	0.7592	-0.40	0.5705
Self-efficacy × female gender	-0.03	0.9171	0.09	0.6776	0.04	0.8072
Non-white race ^b	0.12	0.4756	-0.28	0.0488 *	-0.14	0.1714
Age	-0.01	0.9100	0.01	0.1175	-0.00	0.6307
PG year ^c						
2	0.05	0.8488	-0.12	0.5847	-0.31	0.0483 *
3	0.75	0.0077 **	-0.30	0.2217	-0.53	0.0018 **
4	0.32	0.2709	-0.12	0.6297	-0.36	0.0414 *
5	0.03	0.9153	0.28	0.2252	-0.32	0.0572
Research/PD	0.17	0.5558	-0.42	0.0811	-0.45	0.0106 *

*
 $p < 0.05$ **
 $p < 0.01$ ^a Male is the reference group^b White is the reference group^c PGY 1 is the reference group