

Social Belonging as a Predictor of Surgical Resident Well-being and Attrition



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OBJECTIVE: In light of the predicted shortage of surgeons, attrition from surgical residency is a significant problem. Prior data have shown that those who are happier are more productive, and those who are less well have higher rates of absenteeism. This study sought to identify the role of social belonging and its relationship to well-being and risk of attrition.

DESIGN: Surgical residents were invited to participate in an online survey containing measures of social belonging (a 10-item scale adapted from previous studies), well-being (the Dupuy Psychological General Well-Being Scale, Beck Depression Inventory Short Form, and Maslach Burnout Inventory), and risk of attrition (indicated by frequency of thoughts of leaving the program).

SETTING: We surveyed residents at 2 tertiary care centers, Stanford Health Care (2010, 2011, and 2015) and Washington University in St. Louis (2017).

PARTICIPANTS: Categorical general surgery residents, designated preliminary residents going into 7 surgical subspecialties, and nondesignated preliminary residents were included.

RESULTS: One hundred sixty-nine residents responded to the survey for a response rate of 66%. Belonging was positively correlated with general psychological well-being ($r = 0.56$, $p < 0.0001$) and negatively correlated

with depression ($r = -0.57$, $p < 0.0001$), emotional exhaustion ($r = -0.58$, $p < 0.0001$), and depersonalization ($r = -0.36$, $p < 0.0001$). Further, belonging was negatively correlated with frequency of thoughts of leaving residency ($r = -0.45$, $p < 0.0001$). In regression analysis controlling for demographic variables, belonging was a significant positive predictor of psychological well-being ($B = 0.95$, $t = 8.18$, $p < 0.0001$) and a significant negative predictor of thoughts of leaving ($B = -1.04$, $t = -5.44$, $p < 0.0001$).

CONCLUSIONS: Social belonging has a significant positive correlation with well-being and negative correlation with thoughts of leaving surgical training. Lack of social belonging appears to be a significant predictor of risk of attrition in surgical residency. Efforts to enhance social belonging may protect against resident attrition. (J Surg Ed 76:370–377. © 2018 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: social belonging, burnout, well-being, attrition, residency

COMPETENCIES: Interpersonal and Communication Skills

INTRODUCTION

Research has shown a steady decline in the number of general surgeons in the United States.¹ Based on current training rates and population growth models, there is an even greater projected shortage of general surgeons in the future.^{2,3} A contributing factor to the shortage is the high attrition rate in training programs. It has been estimated that as many as 20% of those who start surgical residency do not complete it.^{4,5} One reason for this high attrition rate could

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TABLE 1. Belonging Scale Items

| Number | Question Text |
|--------|---|
| 1 | How often do you feel like you belong in your specialty? |
| 2 | How often do you feel like you belong at [institution]? |
| 3 | How often do you feel like people in your specialty accept you? |
| 4 | How often do you feel like an outsider in your specialty? |
| 5 | How often do you feel like people in your specialty are similar to you? |
| 6 | How often do you feel like people at [institution] are similar to you? |
| 7 | How often do you feel like you know what you need to do to succeed in your specialty? |
| 8 | How often do you feel like there is someone in your specialty you can count on? |
| 9 | How often do you feel different from the other residents in your specialty? |
| 10 | How often do you feel different from other residents at [institution]? |

be related to poor resident well-being as previous research has shown that fatigue and depression may contribute to attrition.⁶ Thus, improving well-being and reducing burnout could subsequently decrease attrition rates.⁷

While work-hour regulations mandated by the Accreditation Council for Graduate Medical Education (ACGME) may decrease fatigue and depression, data have not yet shown lower rates of burnout with the 80-hour work-week.^{8,9} A longitudinal investigation found that 1 in 7 surgical interns had thoughts about leaving their program weekly.¹⁰ Additionally, a large multicenter study found that 58% of surgical residents seriously considered leaving during their residency.¹¹ This study found that the 3 most common reasons for remaining in residency were: support from family and significant others, support from other residents, and the perception of getting more rest. While the latter response seems to be addressed by the work-hour regulations, the former responses are social in nature and are likely unrelated to the work-hour regulations. As of yet, there is not a clear understanding of what specific factors lead to attrition in surgical residency. In this study, we aim to understand the relationship between attrition and a social-psychological factor, belonging, which we hypothesize may protect against attrition.

Belonging is a basic human need which is conceptualized as the feeling of social connectedness or a sense of positive association with others.¹²⁻¹³ In other fields, researchers have found strong connections between belonging and attrition. This study seeks to assess the relationship between social belonging and psychological well-being as well as thoughts of attrition among surgical residents. We hypothesize that social belonging is associated with better psychological well-being and is a predictor of attrition.

MATERIAL AND METHODS

Following Institutional Review Board approval, surgical residents from 2 academic medical centers were invited

to participate in an online survey. Data collection was part of an ongoing, yearly survey and took place at the first institution in 2011, 2014, and 2015.³ Data from the second institution were collected in 2017. Categorical general surgery residents as well as designated preliminary residents going into cardiothoracic, otolaryngology—head and neck surgery, vascular surgery, orthopedics, plastic surgery, urology, and neurosurgery and nondesignated preliminary residents were included ($n = 169$).

Belonging was assessed using a 10-item scale adapted from prior rigorous work on social belonging.¹³⁻¹⁶ These items were customized to suit the context of surgical training while maintaining the scale's internal reliability and specifically seeking to measure perceived belonging within the surgical specialty. The text of each item in the belonging scale is presented in Table 1. The responses were graded on a 5-point scale (1 = always to 5 = never) and scored such that a larger value represented a greater sense of belonging ($\alpha = 0.84$).

Overall well-being was assessed using a complement of 3 measures: the 22-item Dupuy General Psychological Well-Being Scale,¹⁷ the 13-item Beck Depression Inventory Short Form,¹⁸ and the 22-item Maslach Burnout Inventory.¹⁹⁻²⁰ The emotional exhaustion and depersonalization subscales of the Maslach Burnout Inventory were used in analyses as these are the most clinically relevant.

Attrition was measured in 2 ways. Risk of attrition was measured with a self-report item which asked, "In the past month, how often have you thought about leaving your current residency program?" Response options ranged from 1 ("Never") to 5 ("Very often"). Actual attrition was recorded for any residents at the first institution who left their program during the time of the study. There was no

^a Twenty-one residents took the survey in both 2014 and 2015. In order to eliminate redundancy, their scores from the first year were used in analyses.z

actual attrition from the second institution, but little time has elapsed since data collection at this site.

Three different types of residents—nondesignated preliminary, designated preliminary, and categorical general surgery—were surveyed. Nondesignated preliminary residents ($n = 23$) were invited to participate in the study along with the other residents in order to minimize perceptions of exclusion or inferior social status. However, their data were excluded from further analyses because the temporary nature of their contracts may affect their sense of belonging and risk of attrition. In other words, since they did not have permanent contracts, we would expect them to have lower levels of belonging. Designated preliminary residents were included because the survey items asked about their experience as relates to their primary specialty, not general surgery. To evaluate for nonresponder bias, we performed a wave analysis comparing the responses of late responders (those who responded after the last email reminder) to early responders (those who responded to the first email).²¹ We found no statistical differences in any of the examined variables between these 2 groups.

Data were first analyzed using Pearson correlations among all the key variables. Then, these relationships were investigated further using linear regression analyses. We tested for differences in the well-being outcomes by gender using t tests. ANOVAs were performed to test for differences by type of resident (nondesignated preliminary, designated preliminary, and categorical general surgery). Statistical significance was defined at the level of $p = 0.05$, and all tests of significance were 2-tailed. The analyses were conducted in SPSS Version 22 (IBM Corp, Armonk, NY) and SAS Version 9.4 (SAS Institute, Cary, NC).

RESULTS

The overall response rate was 66% (169 residents). Twenty-three of these residents were nondesignated preliminary residents, thus leaving 146 residents in our final sample. Participants' postgraduate years (PGY) at recruitment ranged from 1 to 5 ($M = 2.0$, $SD = 1.6$). The residents' average age was 30.4 ($SD = 3.2$). Full demographics are reported in Table 2.

Preliminary Analyses

A subgroup analysis was performed to compare data across different types of residents to assess whether the categories could be collapsed into one. Figure shows the level of belonging, general psychological well-being, depression, emotional exhaustion, depersonalization,

TABLE 2. Demographics

| Variables | n (%) |
|------------------------------------|-----------|
| Gender | |
| Female | 71 (42.0) |
| Male | 98 (58.0) |
| Age | |
| 25-26 | 10 (5.9) |
| 27-29 | 55 (32.5) |
| 30-32 | 37 (21.9) |
| 33+ | 31 (18.3) |
| Unknown | 36 (21.3) |
| Ethnicity | |
| Caucasian | 93 (55.0) |
| African-American | 9 (5.3) |
| Hispanic/Latino | 11 (6.5) |
| Asian/Pacific Islander | 44 (26.0) |
| Middle Eastern | 6 (3.6) |
| Mixed | 5 (3.0) |
| Unknown | 1 (0.6) |
| Postgraduate year | |
| 1 | 96 (56.8) |
| 2 | 34 (20.1) |
| 3 | 10 (5.9) |
| 4 | 8 (4.7) |
| 5 | 10 (5.9) |
| Research/professional development | 11 (6.5) |
| Type of resident | |
| General surgery categorical | 80 (47.3) |
| Designated preliminary resident | 66 (39.1) |
| Nondesignated preliminary resident | 23 (13.6) |

and frequency of thoughts of leaving by type of resident. Of all the outcome measures reported here, belonging was the only one that varied significantly by type of resident. There were statistically significant differences in level of belonging among the three groups ($F_{2, 146} = 7.00$, $p = 0.0013$) such that nondesignated preliminary residents had lower levels of belonging ($M = 3.3$, $SD = 0.1$) than did either the categorical general surgery residents ($M = 3.8$, $SD = 0.1$, $t = 3.63$, $p = 0.0011$) or the designated preliminary residents ($M = 3.7$, $SD = 0.1$, $t = 3.32$, $p = 0.0032$). There was no significant difference in belonging between categorical general surgery residents and designated preliminary residents ($t = 0.26$, $p = 0.9646$). There were no significant differences in psychological well-being, depression, burnout, or thoughts about leaving residency among the 3 groups of residents (general surgery categorical, designated preliminary, and nondesignated preliminary; p values ≥ 0.10).

Additionally, we assessed whether any of the well-being outcomes differed by gender. We found a statistically significant difference in emotional exhaustion, with women having higher emotional exhaustion

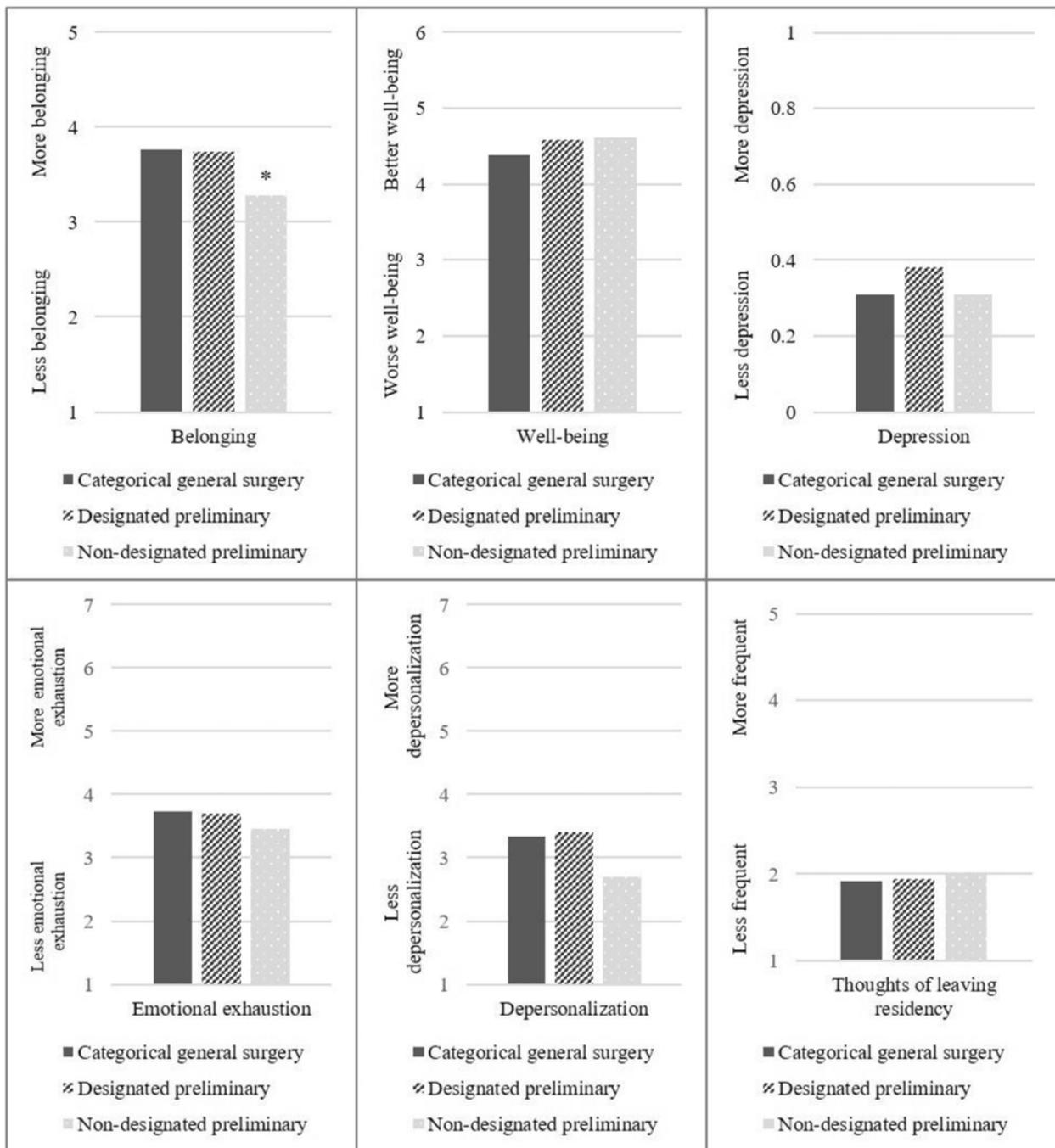


FIGURE. Well-being and risk of attrition by resident type.

*Level of belonging was significantly lower for nondesignated preliminary residents than categorical or designated preliminary residents ($p < 0.01$).

compared to men ($t = -2.51, p = 0.0131$). We found no significant differences by gender in belonging, psychological well-being, depression, depersonalization, or thoughts of leaving residency (p values ≥ 0.1354).

Because nondesignated preliminary residents' contracts are by definition short term, it is not meaningful

to assess their responses regarding risk of attrition. Also, as expected, their level of belonging differed significantly from those in general surgery categorical or designated preliminary positions. Thus, all further analyses were performed only on the subset of general surgery categorical and designated preliminary residents.

TABLE 3. Correlations Among Key Variables*

| | Belonging | Well-Being | Depression | Emotional Exhaustion | Depersonalization | Thoughts of Leaving |
|-------------------------------|--------------------|--------------------|-------------------|----------------------|-------------------|---------------------|
| Belonging | 1 | | | | | |
| Well-being | 0.56 [‡] | 1 | | | | |
| Depression | -0.57 [‡] | -0.80 [‡] | 1 | | | |
| Emotional exhaustion | -0.58 [‡] | -0.77 [‡] | 0.68 [‡] | 1 | | |
| Depersonalization | -0.36 [‡] | -0.51 [‡] | 0.55 [‡] | 0.71 [‡] | 1 | |
| Thoughts of leaving residency | -0.45 [‡] | -0.56 [‡] | 0.46 [†] | 0.63 [‡] | 0.48 [‡] | 1 |

*The analytical sample includes only categorical general surgical and designated preliminary residents.

[†] $p < 0.001$.

[‡] $p < 0.0001$.

Correlations Among Variables

The correlations among the main variables are shown in Table 3. As expected, belonging was significantly positively associated with well-being as measured by general psychological well-being ($r = 0.56$, $p < 0.0001$). It was also significantly negatively associated with outcomes signifying resident distress such as depression ($r = -0.57$, $p < 0.0001$), emotional exhaustion ($r = -0.58$, $p < 0.0001$), and depersonalization ($r = -0.36$, $p < 0.0001$). Belonging was also negatively correlated with risk of attrition as measured by frequency of thoughts of leaving residency ($r = -0.45$, $p < 0.0001$). Lastly, there were 7 residents at the first institution who left residency during the study period (7.53%). Five were general surgery categorical residents, and 2 were designated preliminary residents. The point-biserial correlation between belonging and actual attrition was non-significant ($r = 0.15$, $p = 0.1846$).

Regression Analyses

Next, controlling for gender, age, ethnicity, and PGY, regression analyses found that belonging was a significant positive predictor of general psychological well-being ($B = 0.95$, $t = 8.18$, $p < 0.0001$). Furthermore, while controlling for the same variables, belonging was a significant negative predictor of depression ($B = -0.27$, $t = -3.49$, $p = 0.0014$). In similar analyses, belonging was a significant negative predictor of emotional exhaustion ($B = -1.34$, $t = -6.90$, $p < 0.0001$) and depersonalization ($B = -0.86$, $t = -3.76$, $p = 0.0003$). Thus, belonging was positively predictive of a desirable outcome (general psychological well-being) and negatively predictive of undesirable outcomes (depression, emotional exhaustion, and depersonalization). In the multivariable analyses, gender was not a significant predictor of any of the well-being outcomes ($p \geq 0.0612$).

We also analyzed whether belonging predicted risk of attrition in multivariable regression. Table 4 shows that, while controlling for the same demographic variables, belonging was negatively associated with frequency of thoughts of leaving residency ($B = -1.04$, $t = -5.44$, $p < 0.0001$). The covariates gender, age, and PGY were not significantly associated with belonging in the regression model.

DISCUSSION

In this study examining social belonging in the context of surgical training, we demonstrate 2 main findings: (1) that social belonging is associated with well-being and (2) that a surgical resident's lack of social belonging is associated with more thoughts of leaving surgical training. The correlation between social belonging and well-being suggests that increasing belonging may improve the well-being of residents. Our second major finding suggests that efforts to cultivate and enhance social belonging may protect against residency attrition. As the research on physician well-being shifts from focusing on individual characteristics (such as resilience) and starts to examine systemic and institutional interventions,²² our data suggest that efforts should at least in part be aimed at increasing connectedness and belonging.

Several studies have examined the association between belonging and factors that may influence risk of attrition and group dynamics. Notably, in a series of elegant studies, Walton and Cohen have demonstrated how a threat to social belonging in an academic setting can lead to negative outcomes for participants.¹⁴ Specifically, minority students who felt low social connectedness or sense of belonging also felt low perceived fit and lower potential. The researchers subsequently performed interventions to create a sense of belonging in these students which resulted in better subjective well-being (e.g., happiness) as well as health benefits (e.g., improved perceived health and fewer doctor visits).¹³

TABLE 4. Regression Analysis of Thoughts of Leaving Residency on Belonging Controlling for Age, Gender, Ethnicity, and PGY (n = 105)*

| Variable | Coefficient | t | P |
|------------------------|-------------|-------|---------|
| Belonging | -1.04 | -5.44 | <0.0001 |
| Age | -0.00 | -0.02 | 0.9833 |
| Gender (female) | 0.08 | 0.39 | 0.6943 |
| Ethnicity | | | |
| African-American | -0.42 | -0.71 | 0.4776 |
| Hispanic or Latino | 0.34 | 0.73 | 0.4649 |
| Asian/Pacific Islander | 0.03 | 0.13 | 0.9001 |
| Middle Eastern | 1.07 | 1.04 | 0.2993 |
| Mixed race | 1.24 | 2.40 | 0.0186 |
| PGY | | | |
| PGY 2 | 0.15 | 0.46 | 0.6437 |
| PGY 3 | 0.27 | 0.68 | 0.4966 |
| PGY 4 | -0.83 | -1.71 | 0.0912 |
| PGY 5 | -0.61 | -1.48 | 0.1422 |
| Research | -0.14 | -0.40 | 0.6909 |
| Constant | 5.88 | 4.09 | <0.0001 |

*The analytical sample includes only categorical general surgical and designated preliminary residents.

In a large multisite investigation of undergraduates in STEM fields researchers found a strong link between the sense of belonging and engagement.²³ Taken together, these results add to a growing body of literature that shows that social belonging has positive influence on members of a group.²⁴

Cultivating a sense of belonging among trainees may be more important now than it has been in the past. Clinical care in the modern era is more isolating than ever before.²⁵ As physicians spend more time in front of computers, there are fewer opportunities to interact with colleagues. Current efforts to improve physician well-being have focused mainly on individual strategies such as increasing resilience and mindfulness.²⁶⁻²⁸ While important, these strategies fail to recognize the fundamental human need to feel connected to others.¹⁴ Opportunities, such as Balint groups, that bring physicians together may be protective against burnout²⁹ by giving physicians a venue in which to engage with each other in a meaningful way. Our data are consistent with these findings and suggest that interventions aimed at increasing engagement and connectedness may be associated with better well-being and lower risk of attrition.

Although the reasons for which surgical residents leave their programs may be varied and complex, belonging appears to be a factor that is predictive of how often these thoughts occur. This, in turn, may be predictive of true attrition. Certainly, multiple other factors, such as lifestyle and job satisfaction, likely contribute to trainees' decisions to leave their residencies. We were unable to demonstrate a significant link between belonging and actual attrition, and the study is underpowered to examine this end point in such a small sample. Nonetheless, while elements such as the

work environment and job requirements are not likely to change in the short term, interventions aimed at improving residents' well-being should be further investigated.³⁰ We have shown here that belonging is a factor that is highly correlated with well-being and thus presents itself as a promising target for effective intervention.

Of note, some degree of attrition may be appropriate. Not everyone who enters surgical training, or any other field, will or should stay in it. However, the attrition rate in general surgery is higher than that of other specialties, and it seems appropriate to attempt to bring this in line with other specialties. For example, the annual rate of attrition in ophthalmology, orthopedic surgery, otolaryngology, head and neck surgery, and urology is approximately 1.5%.³¹ General surgery, then, with an annual attrition rate of 5% (overall 20% over the 5 clinical years of training) is clearly an outlier.

An interesting null finding in this study was the lack of gender differences in most of the raw well-being measures. Population data have suggested that women are more likely to be depressed than men.³² Furthermore, women may be more at risk for leaving the surgical specialties than men.³³⁻³⁷ The data here show, however, that there is no difference in any of the well-being measures by gender besides emotional exhaustion. In regression analyses, gender was not predictive of any of the well-being outcomes. The relationship between gender and psychological well-being is complex and is not accounted for simply by gender itself. For example, previous research has shown less stereotyping and more perceived equality in specialties such as general surgery when there are roughly equal numbers of male and female residents.^{30,38} In this sample, there was a

relatively high percentage of women (42%), which may explain the lack of differential well-being outcomes by gender.

There were several limitations to the present study. First, this is a study conducted at only 2 academic institutions, limiting the generalizability of our conclusions. Additional work, ideally multi-institutional in nature, is needed to confirm the veracity of our findings. Second, postgraduate year 1 and 2 residents made up a significant portion of the sample, reflecting the higher proportion of junior to senior residents in the training programs. However, residents who quit typically do so in the initial or professional development years.³⁹ Therefore, the fact that the study sample contains a higher representation of these residents may actually be beneficial. Lastly, the survey item measuring attrition risk has yet to be validated. However, given the yearly attrition rate, this would only be feasible in a large longitudinal multi-institution study.

To conclude, our findings indicate that social belonging and connectivity are important factors that influence not only resident well-being but also the desire to leave residency training. As programs try to ensure their residents' well-being and satisfaction to improve retention, this research suggests that efforts should focus specifically at improving residents' sense of belonging within their program. Future research should focus on examining belonging as it relates to actual attrition, as well as designing and investigating social belonging interventions in order to effectively optimize well-being and retention among surgical trainees.

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