Grit as a predictor of risk of attrition in surgical residency

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A R T I C L E   I N F O

Article history:
Received 5 April 2016
Received in revised form 2 September 2016
Accepted 20 October 2016

Keywords:
Grit
Attrition
Well-being
Depression
Burnout

A B S T R A C T

Background: Grit, a measure of perseverance, has been shown to predict resident well-being. In this study we assess the relationship between grit and attrition.

Methods: We collected survey data from residents in a single institution over two consecutive years. All residents in general surgery were invited to participate (N = 115). Grit and psychological well-being were assessed using validated measures. Risk of attrition was measured using survey items.

Results: 73 residents participated (63% response rate). Grit was positively correlated with general psychological well-being (r = 0.30, p < 0.05) and inversely correlated with depression (r = −0.25, p < 0.05) and risk of attrition (r = −0.37, p < 0.01). In regression analyses, grit was positively predictive of well-being (B = 0.77, t = 2.96, p < 0.01) and negatively predictive of depression (B = −0.28, t = −2.74, p < 0.01) and attrition (B = −0.28, t = −2.53, p < 0.05).

Conclusions: Attrition is a costly and disruptive problem in residency. Grit is a quick, reliable measure which appears to be predictive of attrition risk in this single-institution study.

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1. Introduction

Surgical residency is stressful and detrimental to medical training. Surgery residents experience burnout and depression to a greater degree than do members of the general public. The long hours, lack of control over one’s schedule, and acuity of patients are all factors that may make residency training particularly challenging. For these and other reasons, the attrition rate in general surgery is higher than that of other specialties at approximately 20%. 2–6

Attrition is costly to both individuals and the programs in which they matriculate. Previous research has shown that fatigue and poor well-being, such as depression, may be contributors to attrition. Specifically, those who have more positive feelings are less likely to quit their jobs and experience burnout. Conversely, workplace stress is associated with absenteeism and reduced productivity. Thus, it may be that improving resident well-being can improve retention.

Grit, defined as perseverance and passion for long-term goals, may also be associated with lower rates of attrition. This could happen in two ways. First, previous data has suggested that grit is positively associated with psychological well-being, which may thus in turn be associated with lower rates of attrition. Second, grit may directly make it less likely that someone would quit residency.

In this study, we aim to understand whether grit, in and of itself, may be a predictor of one’s desire to quit residency. In addition, we aim to replicate prior findings that have shown a positive correlation between grit and psychological well-being. We hypothesize that grit will be positively associated with psychological well-being and that it will be a predictor of risk of attrition.

2. Materials & Methods

After obtaining approval from the Stanford University Institutional Review Board, in the context of a larger longitudinal study we administered a survey to assess residents’ perseverance, burnout, psychological well-being, depression, and risk of attrition. The Short Grit Scale was used to measure perseverance. Burnout was measured using the Maslach Burnout Inventory (MBI). Psychological well-being was measured using the Dupuy Psychological General Well-Being (PGWB) scale. Depression was measured using the short form of the Beck Depression Inventory (BDI). Risk of attrition was measured using two items: “At this point in time, how likely is it that you will complete residency training in your current program?” and “Do you see yourself staying in your current program for ...”
specialty?” and “In the past month, how often have you thought about leaving your current residency program?” These two items have face validity as measures of risk of attrition but have not undergone explicit validation studies. We also measured true attrition about leaving your current residency program?

Residents in the general surgery program (including preliminary residents going into orthopedics, plastic surgery, urology, neurosurgery and those who were non-designated preliminary residents; N = 115) were invited to participate in the study in the spring of 2014 and the spring of 2015. Participants were recruited during mandatory department education meetings. Some participants responded to both surveys. Rather than including these individuals in analyses twice, we retained data from their first set of responses only.

Our analytic strategy was to combine data from all three types of residents (categorical general surgery, designated preliminary residents, and non-designated preliminary residents) for outcome measures which showed no differences by group. This was the case for all measures except for the item regarding likelihood of leaving your current residency program.

In regression analyses, controlling for age, gender, ethnicity, and marital status, we found that grit was a significant positive predictor of general psychological well-being ($B = 0.77, t = 2.96, p < 0.01$). Grit was not a significant predictor of depersonalization ($B = -0.28, t = -2.74, p < 0.01$). For both general psychological well-being and depression, gender was also a significant predictor ($B = -0.59, t = -2.65, p < 0.05$, $B = 0.18, t = 2.10, p < 0.05$, respectively) such that women were associated with lower general psychological well-being and higher levels of depression than men. (This association was only found in these regressions. Direct comparisons [t tests] did not reveal a significant difference in any well-being measure by gender.) The interaction terms (gender x grit) were not significant predictors of well-being or depression.

### 3. Results

#### 3.1. Well-being

Seventy-three unique residents participated (63% response rate) in the study. Table 1 shows the demographic data for the participants. We first analyzed the descriptive data. We then sought to understand the relationship between grit and well-being. The relationships we found were consistent with our hypotheses. As shown in Fig. 1, we found that there was a significant positive association between grit and general psychological well-being ($r = 0.30, p < 0.05$). Figs. 2 and 3 show that there was a significant negative association between grit and the depersonalization scale of the MBI ($r = 0.24, p = 0.05$) as well as the BDI ($r = -0.25, p < 0.05$). There was no significant association between grit and the emotional exhaustion scale of the MBI ($r = -0.21, p = 0.09$).

In regression analyses, controlling for age, gender, ethnicity, and marital status, we found that grit was a significant positive predictor of general psychological well-being ($B = 0.77, t = 2.96, p < 0.01$). Grit was not a significant predictor of depersonalization ($B = -0.57, t = -1.33, p = 0.19$) or emotional exhaustion ($B = -0.76, t = -1.82, p = 0.08$). Grit was significantly negatively predictive of depression ($B = -0.28, t = -2.74, p < 0.01$). For both general psychological well-being and depression, gender was also a significant predictor ($B = -0.59, t = -2.65, p < 0.05$, $B = 0.18, t = 2.10, p < 0.05$, respectively) such that women were associated with lower general psychological well-being and higher levels of depression than men. (This association was only found in these regressions. Direct comparisons [t tests] did not reveal a significant difference in any well-being measure by gender.) The interaction terms (gender x grit) were not significant predictors of well-being or depression.

### Table 1

Demographic data.

<table>
<thead>
<tr>
<th>Gender</th>
<th>Number (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>42 (58)</td>
</tr>
<tr>
<td>Female</td>
<td>31 (42)</td>
</tr>
<tr>
<td>Post-graduate year (PGY)</td>
<td></td>
</tr>
<tr>
<td>PGY 1</td>
<td>45 (62)</td>
</tr>
<tr>
<td>PGY 2</td>
<td>10 (14)</td>
</tr>
<tr>
<td>PGY 3</td>
<td>9 (12)</td>
</tr>
<tr>
<td>PGY 4</td>
<td>4 (5)</td>
</tr>
<tr>
<td>PGY 5</td>
<td>2 (3)</td>
</tr>
<tr>
<td>Research</td>
<td>3 (4)</td>
</tr>
<tr>
<td>Marital Status</td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>27 (42)</td>
</tr>
<tr>
<td>Widowed</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Divorced</td>
<td>3 (5)</td>
</tr>
<tr>
<td>Separated but married</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Single, never married</td>
<td>34 (53)</td>
</tr>
<tr>
<td>Ethnicity</td>
<td></td>
</tr>
<tr>
<td>White</td>
<td>33 (52)</td>
</tr>
<tr>
<td>Black or African-American</td>
<td>1 (2)</td>
</tr>
<tr>
<td>Hispanic or Latino</td>
<td>3 (5)</td>
</tr>
<tr>
<td>Native American</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Middle Eastern</td>
<td>0 (0)</td>
</tr>
<tr>
<td>Asian/Pacific Islander</td>
<td>23 (37)</td>
</tr>
<tr>
<td>Mixed Race</td>
<td>3 (5)</td>
</tr>
<tr>
<td>Other</td>
<td>0 (0)</td>
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<tr>
<td>Specialty</td>
<td></td>
</tr>
<tr>
<td>Categorical General Surgery</td>
<td>32 (52)</td>
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<tr>
<td>Designated Preliminary Resident</td>
<td>22 (36)</td>
</tr>
<tr>
<td>Non-Designated Preliminary Resident</td>
<td>7 (11)</td>
</tr>
</tbody>
</table>

*Not all totals add up to 73 because not all participants answered all demographic questions.*
grit) in the regressions were not significant, nor were any other variables.

3.2. Attrition

We then evaluated the relationship between grit and risk of attrition as measured by our two survey items. We found a significant positive correlation between grit and how likely residents thought they were to complete their current residency (r = 0.31, p < 0.05) along with a significant negative correlation between grit and how often residents thought about leaving their residency (r = −0.37, p < 0.01).

In regression analyses controlling for age, gender, ethnicity, and marital status, we found that grit was not significantly predictive of likelihood of completing residency (B = 0.49, t = 1.81, p = 0.08) but was significantly negatively predictive of frequency of thoughts of leaving residency (B = −0.99, t = −2.53, p < 0.05). There was no statistically significant relationship between grit and true attrition (B = 85.83, z = 0.00, p = 0.999). Interestingly, there was no statistically significant difference between those who quit and all other residents for grit (t = 0.37, p = 0.71), psychological well-being (t = −0.11, p = 0.91), depersonalization (t = −0.66, p = 0.51), emotional exhaustion (t = −0.40, p = 0.69), depression (t = 0.66, p = 0.51), likelihood of completing residency (t = 1.20, p = 0.23), or frequency of thoughts of leaving (t = −1.96, p = 0.055).

4. Discussion

The findings of this study are similar to prior data which have shown that grit is predictive of psychological health in surgical residents. Unlike the previous study, we did not find a significant relationship between grit and the emotional exhaustion subscale of the MBI. However, similar to the prior study we did find a significant negative relationship between grit and the depersonalization subscale of the MBI in correlational analyses. Although this relationship was not consistent in regression analyses, this may be due to the smaller number of participants in this study. Further investigation will have to be done to see if this relationship exists and we did not detect it here or if, rather, there is no significant relationship between burnout and grit.

We found grit to be positively predictive of general psychological well-being and negatively predictive of depression as measured by the BDI. These findings are consistent with our previous data. The finding that gender is associated with psychological well-being and depression is new in this study and is of unclear significance. Population studies have shown no difference in general psychological well-being between men and women. Prior data has suggested that women are more prone to depression than men. However, more recent data suggests that this does not reflect a difference in the incidence of depression, rather that it is more likely to be diagnosed in women than in men. The absolute levels of psychological well-being and depression were not statistically different between men and women in this study. Thus, it is difficult to draw any meaningful conclusions without further data.

With regard to attrition, we found data supporting the idea that those with more grit are less likely to quit. This was true in the well-being data which suggests that those who have more grit have better well-being and may thus be at lower risk for attrition. This was also true for the questions assessing risk of attrition since we found that those with more grit were more likely to think they would complete their current residency. Those with more grit also thought about leaving their residency less often. While the relationship between grit and likelihood of completing residency was not significant in regression analyses (p = 0.08), the trend was in the expected direction. It is possible that with a larger number of participants grit would have been predictive of this outcome as well. Thus, we would caution against drawing conclusions such as mindset (growth vs. fixed) and self-control. Duckworth and Yeager have argued that the same is true for other non-cognitive assessments such as mindset (growth vs. fixed) and self-control. Thus, we advocate that grit could potentially be used as an aid to identify individuals who may benefit from additional support as they strive to become surgeons.

5. Conclusions

This work extends our previous work on the relationship of grit and well-being. We found further evidence that there is an association such that more grit is associated with better well-being. We also found that those with more grit were less likely to have thoughts of leaving their current residency. We did not find a relationship between grit and true attrition. Further work is needed to try to understand whether there is a causal relationship between grit and well-being. In addition, it would be useful to design an intervention aimed at improving grit to determine whether the observed relationships are causal in nature.
Financial disclosures

None of the authors have relevant financial disclosures to report.

Acknowledgements

We would like to thank Jennifer Tran for her assistance in collecting data for this study.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.amjsurg.2016.10.012.

References