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Identification of promotion and prevention associated surgeon behaviors in the operating room to facilitate resident self-regulated learning

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ABSTRACT

Background: The regulatory focus theory (RFT) posits that people can pursue goals with a promotion or prevention focus. Greater alignment of RFT motivational styles between faculty and residents may enhance resident operative autonomy. This study establishes a set of faculty behaviors residents can identify to infer faculty motivational styles.

Methods: 10 behaviors associated with promotion and prevention motivational styles were identified. General surgery residents rated faculty on how strongly they exhibit these behaviors. Faculty conducted a self-assessment of how strongly they exhibit these behaviors.

Results: There is a positive correlation between resident and faculty ratings for the promotion-associated behaviors of “works quickly,” “high energy,” and “mostly provides broad oversight,” and for the prevention-associated behaviors of “works slowly and deliberately,” “quiet and calm,” and “preference for vigilant strategies.”

Conclusion: Residents can observe faculty operative behaviors to infer faculty motivational styles. Residents may use this knowledge to adjust to faculty motivational styles and enhance operative interactions.

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Introduction

Fostering trust between faculty and residents can greatly enhance the educational experience of residents in the operating room.¹ Residents can receive greater supervised autonomy when faculty demonstrate entrustment by incrementally providing trainees with greater operative responsibility and when residents demonstrate entrustability by exhibiting personal reliability.² Supervised autonomy is critical for the achievement of resident

operative independence upon graduation.^{3–5} Minimal entrustment in the operative dyad can slow the development of resident autonomy and shift the burden of fostering independence to either immediately before or after graduation when newly minted physicians must engage with patients on their own.^{6–10}

Previous surgical education work has explored the association between intraoperative entrustment and faculty-resident motivational styles based on the regulatory focus theory (RFT).^{2,11} The RFT distinguishes between promotion and prevention motivational styles, where the former is described as “playing to win” and the latter is described as “playing not to lose.”^{12,13} Most individuals tend to identify more with either a promotion or a prevention style.¹⁴ Motivational style congruency between the operative dyad results in faculty awarding greater entrustment to the surgical resident, whereas motivational style incongruency results in decreased entrustment.¹¹ Although studies have illustrated methods to enhance entrustment between faculty and residents in

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the operating room for improved resident education and patient safety, few studies have sought to improve resident self-regulated learning, or devise strategies to help residents drive their own learning forward, by facilitating increased entrustment.^{2,15–18} Only recently have frameworks for self-regulated learning in surgical education emerged.^{19–21}

Identifying faculty motivational styles as expressed by their behaviors in the operating room could help residents adjust their own behaviors to improve their own educational experience. We hypothesize that there is a high degree of alignment between faculty self-perception of their behaviors and resident perception of faculty behaviors. The purpose of this pilot study is to discern which intraoperative faculty behaviors associated with motivational styles are most frequently identified by both faculty and residents. Residents can use this information as a part of their self-regulated approach to learning. By appropriately adjusting their own behaviors to improve motivational style alignment between themselves and the faculty, residents may gain more entrustment and receive greater supervised autonomy in the operating room.

Material and methods

The study was conducted at the Michigan Medicine Department of Surgery, a university hospital. This cross-sectional study was conducted under the approval of the University of Michigan Institutional Review Board. While participation in the study was voluntary, a \$5 coffee voucher was provided to residents as an incentive to complete the survey. The surveys in this study were distributed to participants from July 2019 to October 2019.

Selection of reactor panel

A reactor panel, which consists of participants with a diverse range of experiences in the field, was identified to serve as evaluators in the survey design process. The reactor panel consisted of 3 mid-level residents and 3 faculty and staff in the surgery department with previous experience using the regulatory focus questionnaire.²²

Selection of promotion-associated and prevention-associated behaviors

Literature searches on the RFT and the regulatory focus questionnaire were undertaken to obtain a comprehensive list of 48 behaviors associated with promotion and prevention orientation. The 48 items were selected and agreed upon by the study team. Searches were conducted on 315 publications from December 1996 to May 2019 in PubMed, Embase, ABI Inform, and PsycINFO to ensure the inclusion of literature in the health sciences, business, and psychology.

The 48 behaviors were sent to the reactor panel to aggregate expert opinions and shorten the list of behaviors. The panel was selected for their familiarity with the regulatory focus questionnaire; however, a common definition of promotion and prevention orientation was reached through discussion with panel members. The panel was asked to select the behaviors most closely associated with RFT motivational styles and most relevant to interactions in the operating room. As a result, the list was shortened to 10 behaviors. The condensed list was reviewed by the reactor panel a second time to ensure the phrasing of the behaviors was appropriate for operative terminology. The five promotion-associated behaviors selected were “works quickly,” “open to alternative operative approaches,” “high energy,” “willing to take risks,” and “mostly provides broad oversight.” The five prevention-associated behaviors selected were “works slowly and deliberately,” “quiet

and calm,” “sticks to known ways of doing things,” “preference for vigilant strategies,” and “mostly provides close instruction.”

Resident survey design

The resident survey was designed to assess resident perceptions of how strongly the faculty exhibited the ten behaviors in the operating room. The survey was distributed using Qualtrics software (Qualtrics, Provo, UT) to all 45 general surgery residents within the Department of Surgery. Residents were randomly distributed into 8 groups, and each group was randomly assigned 5 faculty members to assess during the survey. Residents were not required to submit answers to the survey if they were unfamiliar with the faculty member, although most residents were familiar with all faculty members. Residents evaluated the extent to which each faculty demonstrated each trait using a scale ranging from “Never or Seldom” (1) to “Very Often” (5). The content of the survey in relation to motivational constructs was reviewed by members of the reactor panel, providing additional validity evidence for the development and use of the survey.

Faculty survey design

The faculty survey was designed to assess faculty self-perceptions of how strongly they exhibited the ten behaviors in the operating room. Surveys were distributed using Qualtrics software (Qualtrics, Provo, UT) to the 39 faculty who were rated by the residents within the Michigan Medicine Department of Surgery. A purposive sample of 39 faculty was selected based on previous completion of the regulatory focus questionnaire during faculty development. Faculty evaluated the extent to which they believed they demonstrated each trait using a scale ranging from “Never or Seldom” (1) to “Very Often” (5). As with the resident survey, the content of the faculty survey in relation to motivational constructs was reviewed by members of the reactor panel to provide additional validity evidence for the development and use of the survey.

Statistical analysis

Sample and behavior characteristics are reported as number of observations and percent for categorical variables and mean and standard deviation for continuous variables. Pearson's correlation coefficient was used to assess the strength and direction of the relationship between resident-perceived and faculty self-rated behaviors. All analyses were conducted in STATA 15 and significance was set at $p < 0.050$.²³

Results

Sample characteristics are reported in Table 1. 41 residents and 38 faculty completed the survey, for a response rate of 91% and 97%, respectively. The resident sample was 44% female and was primarily White (71%). The training level of residents ranged from postgraduate year (PGY) level 2 to PGY level 5, with the highest proportion of the sample at PGY level 3 (44%) followed by PGY level 5 (32%). The faculty sample was primarily male (68%) and White (74%). Faculty years of experience ranged between 0 and > 20 years. Approximately 39% had 0–5 years of experience, 13% had 6–10 years and the rest had more than 11 years of experience.

Descriptive statistics for each behavior are reported in Table 2. The highest scoring promotion-associated behavior among residents was “works quickly” (mean = 3.63; standard deviation (sd) = 0.78 and the lowest was “mostly provides broad oversight” (mean = 3.24; sd = 0.82). Similarly, faculty self-perceived scores were highest for “works quickly” (mean = 3.62; sd = 0.92) but the

Table 1

Resident and faculty sample characteristics.

Resident Characteristics	
	N(%)
PGY Level	
1	0 (0)
2	7 (17)
3	18 (44)
4	3 (7)
5	13 (32)
Gender	
Female	18 (44)
Male	23 (56)
Race	
White	29 (71)
Racial/Ethnic Minority	12 (29)
Total Residents	N=41
Faculty Characteristics	
	N(%)
Years of Experience	
0-5	15 (39)
6-10	5(13)
11-20	12 (31)
>21	6 (16)
Gender	
Female	13 (32)
Male	26(68)
Race	
White	28 (74)
Racial/Ethnic Minority	10 (26)
Total Faculty	N=38

lowest was for “willing to take risks” (mean = 2.48; sd = 1.02). On the prevention side, the highest scoring behavior among resident perceptions was “sticks to known ways” (mean = 3.76; sd = 0.61) whereas “preference for vigilant strategies” (mean = 4.0; sd = 0.94) was highest for faculty. “Works slowly and deliberately” had the lowest score among both resident (mean = 3.12; sd = 0.70) and faculty perceptions (2.73; sd = 1.10).

The 10 behaviors were evaluated using correlation analysis. There were strong positive correlations between resident perception of faculty behaviors and faculty self-reported behaviors for the promotion-associated behaviors of “works quickly” ($r = 0.48$, $p = 0.006$), “high energy” ($r = 0.63$, $p < 0.001$), and “mostly provides broad oversight” ($r = 0.51$, $p = 0.003$) (Fig. 1). There were weak correlations for the promotion-associated behaviors of “open to alternative operative approaches” ($r = 0.26$, $p = 0.166$) and “willing to take risks” ($r = 0.29$, $p = 0.110$).

There were strong positive correlations for the prevention-associated behaviors of “works slowly and deliberately” ($r = 0.41$, $p = 0.022$), “quiet and calm” ($r = 0.59$, $p < 0.001$), and “preference for vigilant strategies” ($r = 0.53$, $p = 0.002$) (Fig. 1). There was a weak correlation for the prevention-associated behavior of “mostly provides close instruction” ($r = 0.27$, $p = 0.143$). The prevention-associated behavior of “sticks to known ways of doing things” displayed the lowest correlation ($r = 0.20$, $p = 0.275$) between resident and faculty perceptions.

Discussion

This study finds strong positive correlations between residents' perception of faculty operative behaviors and faculty self-reported operative behaviors. The findings suggest that these behaviors are readily observable by both individuals in the operating room.

Table 2

Descriptive statistics for resident and faculty perceptions of promotion and prevention oriented behaviors.

	Resident Perceptions of Faculty	Faculty Self-Perceptions
	Mean (SD)	Mean (SD)
Promotion		
Works quickly	3.63 (0.78)	3.62 (0.92)
High Energy	3.51 (0.92)	3.46 (0.93)
Mostly provides broad oversight	3.24 (0.82)	2.89 (0.99)
Open to alternative approaches	3.32 (0.82)	3.35 (1.11)
Willing to take risks	3.11 (0.74)	2.48 (1.02)
Prevention		
Works slowly and deliberately	3.12 (0.70)	2.73 (1.10)
Quiet and Calm	3.31 (0.91)	3.59 (1.04)
Preference for vigilant strategies	3.51 (0.58)	4.0 (0.94)
Mostly provides close instruction	3.43 (0.58)	3.46 (0.90)
Sticks to known ways	3.76 (0.61)	3.67 (0.94)

SD: standard deviation.

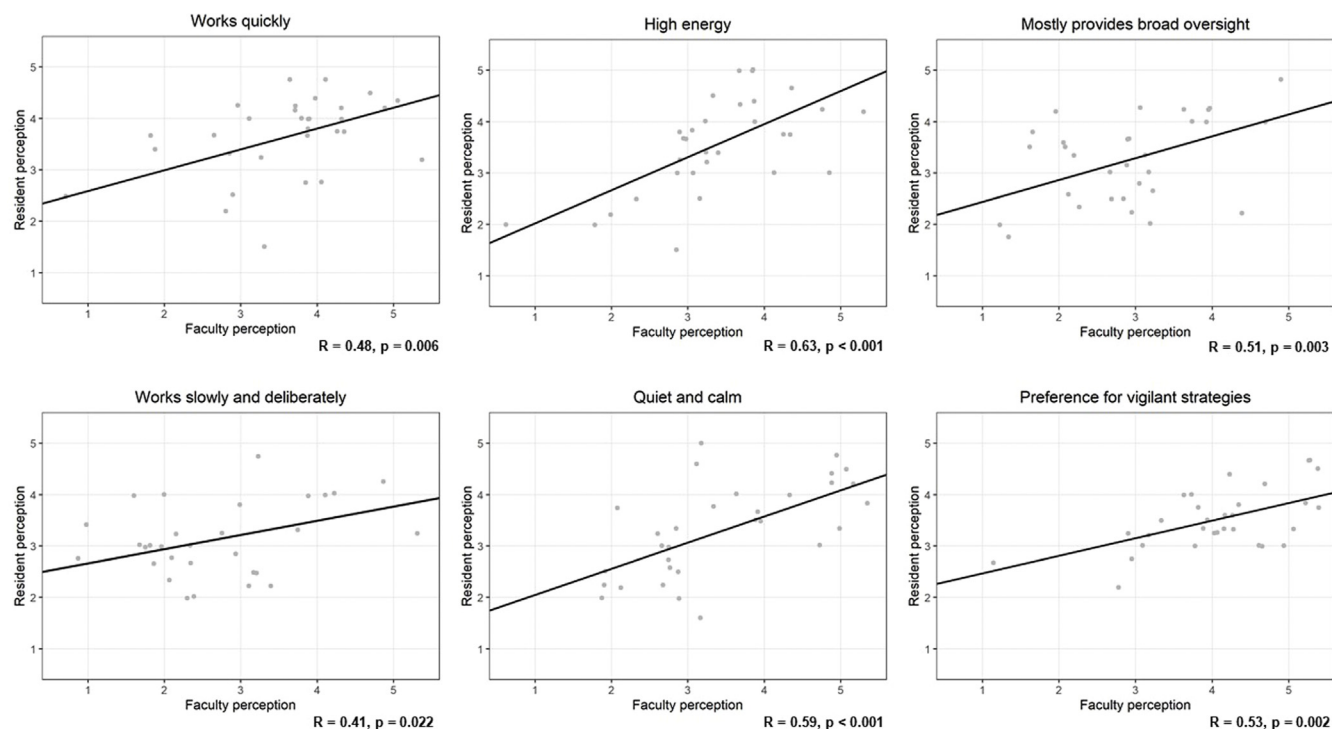


Fig. 1. Scatterplots and Pearson's Correlation Coefficients of Resident Perceived and Faculty Self-reported behaviors.

Residents classify faculty as promotion-oriented if the faculty “works quickly,” is “high energy,” or “mostly provides broad oversight.” In a similar vein, residents classify faculty as prevention-oriented if the faculty “works slowly and deliberately,” is “quiet and calm,” and has a “preference for vigilant strategies.” This knowledge can be used by residents to self-adjust their behaviors in the operating room to amplify motivational style congruencies or compensate for motivational style incongruencies. These modified behaviors could enable an increase in intraoperative entrustment.²

While motivational style congruency between faculty and residents has been shown to align with increased intraoperative entrustment, residents work with a broad range of faculty with differing RFT motivational styles.¹¹ Thus, it is important for residents to develop strategies that allow them to adapt to the personalities demonstrated by physicians. To help residents retain agency over their own education and promote self-regulated learning, we focused on elucidating intraoperative faculty behaviors. Understanding faculty characteristics as detected by residents and acknowledged by the faculty themselves has the potential to provide insights into developing educational strategies that support optimizing entrustment in the operating room. Better understanding promotion and prevention orientation in the operating room also expands on existing literature on the application of psychometric tests, such as the Myers-Briggs Type Indicator (MBTI), in medical education.²⁴ This proof of concept study sets the stage for a more comprehensive exploration of the potential use of motivational styles in resident education.

Further research is necessary to identify evidence-based practices residents can exercise to enhance entrustment in the operating room *after* inferring a faculty's motivational styles. We suggest several strategies residents can implement to align their behaviors to complement promotion-oriented and prevention-oriented faculty (Table 3). If a resident perceives a faculty member to be promotion-oriented, they can share the goals they wish to accomplish, provide suggestions to demonstrate forward-thinking,

and focus on achievement during the procedure. A faculty member who is perceived as prevention-oriented would be better approached by asking what is reasonable for a resident to work on for this procedure, how to accomplish each task safely, and articulating risks before advancing to the next critical step. These approaches help align the resident to the faculty's motivational focus and predominant channel of communication. When residents and faculty are communicating on the same channel, there will likely be better opportunities for improved performance and entrustment, which may ultimately improve resident operative autonomy.^{2,14}

Not all behaviors tested showed a strong positive correlation. The prevention-associated behavior of “sticks to known ways of doing things” showed the least correlation. We suspect that behaviors where there is room for wide interpretation may be misidentified by residents with limited experience in the operating room. For example, residents may not be able to determine whether a faculty “sticks to known ways of doing things” or not, unless they can sufficiently distinguish between standard operative approaches and miscellaneous, perhaps riskier, alternatives.

As a pilot study, the results will be enhanced by repeating the same procedure for residents instead of faculty (i.e. identifying observable resident behaviors associated with promotion and prevention orientation in the operating room). Because attaining supervised autonomy for residents is a joint responsibility between faculty and residents, it is important to evaluate the effect of adjusting for motivational style incongruencies in the operating room. Furthermore, continuing to investigate the relationship between self-perception of motivational behaviors, identification of those behaviors by others, and entrustment in the operating room will contribute to growing insights and influences on effective surgical education.¹

Our study has limitations. First, because the study was conducted with a small sample size at a single academic institution, the results may not be generalizable to other institutions. In addition, the survey taken by residents and faculty was used for the first time

Table 3
Resident Self-Regulated Learning based on Faculty Motivational Style.

Faculty behaviors detected by the resident	Implied faculty motivational style	Resident behavioral response
Works quickly High energy Mostly provides broad oversight	Promotion	Share goals with faculty that they hope to accomplish Provide suggestions to demonstrate forward-thinking Focus on achievement during the procedure
Works slowly and deliberately Is quiet and calm Prefers vigilant strategies	Prevention	Negotiate what is reasonable for a resident to work on for this procedure Discuss how to accomplish each task safely Articulate risks before advancing to the next critical step in operation

in this study. However, extensive literature search, inclusion of expert opinion, and ensuring similarity of the questions to the regulatory focus questionnaire help minimize errors resulting from a newly designed survey. Finally, recall bias may have influenced the outcome of the survey distributed to residents, as some residents may have incomplete recollections of faculty member characteristics.

Conclusions

There is a high degree of alignment between faculty self-perception of motivations style behaviors and resident perception of these behaviors. Residents have shown they can actively identify these operative traits in faculty to decide whether a faculty member is promotion or prevention oriented. Residents can use this information to accommodate for motivational style congruencies and incongruencies, which may enhance entrustment and lead to residents receiving greater supervised autonomy.

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Data statement

Survey respondents were assured raw data would remain confidential and would not be shared. Data not available./The data that has been used is confidential.

Declaration of competing interest

None.

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