The Effect of Surgical Resident Learning Style Preferences on American Board of Surgery In-Training Examination Scores

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BACKGROUND: There is a growing body of literature that suggests that learners assimilate information differently, depending on their preferred learning style. The VARK model categorizes learners as visual (V), aural (A), read/write (R), kinesthetic (K), or multimodal (MM). We hypothesized that resident VARK learning style preferences and American Board of Surgery In-Training Examination (ABSITE) performance are associated.

METHODS: The Fleming VARK learning styles inventory was administered to all general surgery residents at a university hospital–based program each year to determine their preferred learning style. Resident scores from the 2012 and 2013 ABSITE were examined to identify any correlation with learning style preferences.

RESULTS: Over a 2-year period, residents completed 53 VARK inventory assessments. Most (51%) had a multimodal preference. Dominant aural and read/write learners had the lowest and highest mean ABSITE scores, respectively ($p = 0.03$).

CONCLUSION: Residents with dominant read/write learning preferences perform better on the ABSITE than their peers did, whereas residents with dominant aural learning preferences underperform on the ABSITE. This may reflect an inherent and inadvertent bias of the examination against residents who prefer to learn via aural modalities. (J Surg 72:726-731. © 2015 Association of Program Directors in Surgery. Published by Elsevier Inc. All rights reserved.)

KEY WORDS: learning styles, ABSITE, surgical education, surgical residents, VARK

COMPETENCY: Medical Knowledge

INTRODUCTION

One of the many challenges currently facing surgical educators is a "time crunch." Duty-hour restrictions on surgical residents limit the amount of time available for learning,[1] while external pressures on faculty to increase both clinical and research productivity place constraints on their available time and have led to subjectively decreased faculty-resident interactions and faculty teaching.[2-5] Meanwhile, medical innovation, breakthroughs in research, and regulatory requirements have increased the amount of knowledge that residents are expected to master during their training. Owing to these converging forces, there is a clear need for surgical educators to increase teaching and learning efficiency. One possible strategy to accomplish this is by leveraging the concept of learning styles.

The theory of learning styles asserts that learners have distinct preferences for how they receive, process, and assimilate knowledge.[6] This is in contrast to the traditional paradigm of surgical training that assumes that residents learn and progress in a similar fashion and pace. There is some evidence that teaching methods can be tailored to a trainee's learning style preferences and thereby maximize learning efficiency.[7] This strategy can be likened to targeted therapies in the clinical realm, such as the use of trastuzumab for the treatment of HER2-positive breast cancer.

A model of learning styles that has been proposed is the VARK model, initially developed by Fleming in 1987.[8] The VARK model categorizes learners by their preferred sensory modalities: visual (V), aural (A), read/write (R), and kinesthetic (K). Learners can have preferences for a single dominant modality of learning (unimodal) or have preferences for a combination of sensory modalities, in what is termed a multimodal (MM) learning preference. There is a

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broad spectrum of validity evidence for the VARK model across a variety of learner populations,[9-15] including our group's pilot study examining the VARK model in a general surgical residency.[16]

However, the application of learning styles in the realm of surgical education is as yet underinvestigated. Before a strategy can be developed to apply learning styles to the surgical resident population, we must first determine and understand how learning styles affect surgical trainees at baseline. Therefore, to determine the effect of learning styles on the core competency of medical knowledge, we examined VARK learning style preferences and their effect on the American Board of Surgery In-Training Examination (ABSITE) scores. Our previous study revealed that residents' read/write (R) learning style preferences had higher ABSITE scores, but this association was not statistically significant.[16] Because this pilot study was likely underpowered, we decided to extend our study over a 2-year period. We hypothesized that read/write (R) learning style preferences would be associated with higher ABSITE scores and that aural (A) learning style preferences would be associated with lower ABSITE scores.

METHODS

The study protocol was reviewed by the Institutional Review Board of the Louisiana State University Health Sciences Center in Shreveport and was determined to be exempt from approval. All residents at a university hospital–based general surgery residency program were administered the VARK learning styles inventory each year over a 2-year period from 2012 to 2013. The VARK questionnaire (http://www.vark-learn.com/english/index.asp) comprises 16 multiple-choice questions, each with 4 possible responses. Per the VARK administration instructions, residents were instructed to select 1, more than 1, or none of the 4 possible responses for each question. Responses were scored to determine the learning style preferences for each resident; they were classified as having a dominant unimodal preference for visual (V), aural (A), read/write (R), or kinesthetic (K) learning style or as having a multimodal preference (MM). The MM classification encompasses all possible combinations of 2, 3, or 4 of the learning styles.

A sample-size calculation based on our preliminary study's results was performed. Assuming mean ABSITE scores for residents with R preferences and those with other preferences of 61 and 35, respectively, with a 2-sided significance of 0.05 and a power of 0.8, a total sample size of 40 residents would be required.

Resident ABSITE scores for the 2012 and 2013 examinations were analyzed for association with VARK learning style preferences. Basic demographic information was collected, including gender and postgraduate year (PGY) level.

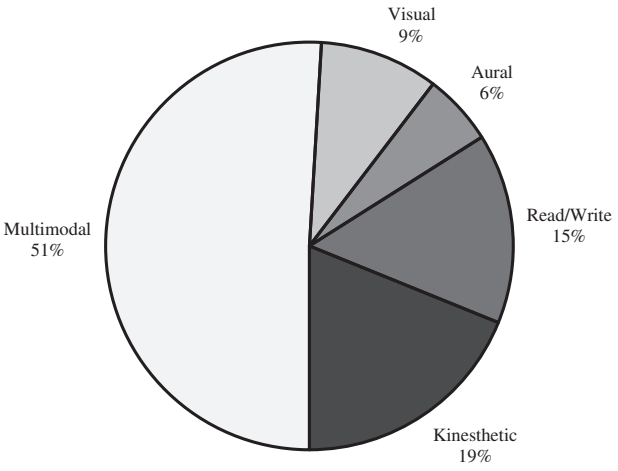

FIGURE 1. Distribution of resident learning style preferences.

Statistical analysis included Student *t* test, chi-square analysis, and analysis of variance. $p < 0.05$ was considered statistically significant.

RESULTS

Over the 2-year study period, 56 VARK responses were collected from general surgery residents. Because of failure to complete the VARK inventory, 1 resident was excluded; the overall response rate was 98%. Moreover, 2 VARK responses were excluded because the residents did not take the ABSITE that year. In total, 53 completed resident VARK inventories were included for analysis.

The distribution of learning style preferences among the resident population is shown in Figure 1. Most residents had a multimodal (MM) preference (51%). Among residents with unimodal preferences, those with kinesthetic (K) preference represented the largest proportion (19%). Residents with aural (A) preference were the smallest group, at 6%.

The demographic characteristics of residents with MM and unimodal preferences are listed in the Table. There were no statistically significant differences between the 2 groups in terms of gender distribution ($p = 0.34$) or PGY level ($p = 0.32$).

TABLE. Demographic Characteristics of Residents With Multimodal and Unimodal Learning Style Preferences

	Multimodal ($n = 27$)	Unimodal ($n = 26$)	p Value
Gender			
Male	19 (70%)	15 (58%)	0.34
Female	8 (30%)	11 (42%)	
PGY level			
1-3	14 (52%)	17 (65%)	0.32
4-5	13 (48%)	9 (35%)	