

Does Clinical Training Affect Medical Students’ Tolerance for Ambiguity?

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Abstract

Because ambiguity is inherent in medicine, tolerance for ambiguity (TFA) is an invaluable skill for physicians. It has been shown to affect practice behaviors as well as specialty choice. For example, low TFA is associated with increased testing usage and a failure to follow evidence-based guidelines (Evans & Trotter, 2009), the likelihood to withhold negative testing results, and a likelihood to pursue careers in specific specialties (Geller et al., 1993). Some of the same relationships between TFA levels and various variables in physicians have also been observed in medical students. However, there is lack of research, particularly longitudinal studies, of TFA in medical students (Caulfield, 2014).

Hence, a TFA scale was used to measure the effects of two years of clinical training, which provided exposure to the ambiguity inherent in many medical specialties, on students’ TFA levels. Overall, students’ TFA levels remained essentially unchanged after their clinical training, suggesting that several years of exposure to the ambiguity in the clinical domain may be insufficient to affect this skill.

Background

While uncertainty and ambiguity are inherent in medical practice, physicians’ tolerance for ambiguity (TFA) affects both medical practice and specialty choice. Physicians with low tolerance for ambiguity (TFA) evidence increased testing usage and a failure to follow evidence-based guidelines (Evans & Trotter, 2009), a tendency to withhold negative test results, and a likelihood to prefer specific medical specialties (Geller et al., 1993). Some of the same relationships between physicians’ TFA and various variables have also been observed in medical students, along with several additional ones that are relevant to physician workforce issues (e.g., Wayne et al., 2011, found a relationship between students’ TFA and attitudes towards the underserved). Whether this trait is determinate or can be developed remains controversial, especially given the lack of longitudinal studies with medical students (Caulfield et al., 2014; Weissenstein et al., 2014). To determine the effects of clinical education, which provides exposure to the ambiguity inherent in many medical specialties, on students’ TFA levels, we measured this trait before and after their two years of undergraduate clinical training.

Objectives

• Determine whether medical students’ TFA scores change over the course of their two years of clinical training.
• Explore the relationship of TFA to selected demographic and personal variables.

Methods

At the end of their MS2 and MS4 training years, students were asked to complete surveys that included a seven-item TFA scale that uses a six-point rating system to reflect agreement levels with the statements (i.e., ranging from strongly disagree to strongly agree) that is commonly used with medical students. Usable repeated measures were obtained from 108 students. Cronbach’s alpha was used to assess the internal consistency of the TFA scale used with these subjects. The relationship between TFA and gender and age was examined. Due to the risk of inflated type I error rate, the effects of gender and age on TFA change were analyzed separately. Effect sizes were calculated for paired-samples t-test between Year 2 and Year 4 TFA.

Results

The TFA scale evidenced good reliability with our subjects (seven items; α = .82). Overall, students did not evidence a significant change in TFA levels after two years of clinical training (t(108) = .80, p = .424). While TFA scores were higher for older students and males, gender did not have a significant effect on TFA at either training level or on change over time (p > .05). However, age did have a significant effect on TFA among fourth year students (F2,105) = 7.116, p = .001; specifically, those over 26 years of age evidenced a mean gain of .34 in TFA at the end of the their clinical training, corresponding to a medium effect size (Cohens’d = .52). Of the 18 students with TFA scores in the top quartile, the three specialties to which most students in this group matched were psychiatry (33%), emergency medicine (28%), and pediatrics (22%).

Tolerance for Ambiguity

<table>
<thead>
<tr>
<th>Variable</th>
<th>n</th>
<th>MS 2</th>
<th>MS 4</th>
<th>Mean difference</th>
<th>Cohen’s d</th>
<th>95% CI of d</th>
</tr>
</thead>
<tbody>
<tr>
<td>All Students</td>
<td>108</td>
<td>24.36 ± 6.60</td>
<td>23.76 ± 7.06</td>
<td>-0.60</td>
<td>-0.09</td>
<td>-0.47 to 0.29</td>
</tr>
<tr>
<td>Gender</td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>Male</td>
<td>62</td>
<td>25.05 ± 6.80</td>
<td>24.08 ± 7.64</td>
<td>-0.97</td>
<td>-0.13</td>
<td>-0.63 to 0.36</td>
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<tr>
<td>Female</td>
<td>46</td>
<td>23.43 ± 6.28</td>
<td>23.33 ± 6.24</td>
<td>-0.11</td>
<td>-0.02</td>
<td>-0.59 to 0.56</td>
</tr>
<tr>
<td>Age group</td>
<td></td>
<td></td>
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<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 24</td>
<td>53</td>
<td>23.36 ± 5.81</td>
<td>21.96 ± 6.24</td>
<td>-1.40</td>
<td>-0.23</td>
<td>-0.77 to 0.31</td>
</tr>
<tr>
<td>24-26</td>
<td>40</td>
<td>25.10 ± 7.39</td>
<td>24.05 ± 7.38</td>
<td>-1.05</td>
<td>-0.14</td>
<td>-0.76 to 0.48</td>
</tr>
<tr>
<td>&gt; 26</td>
<td>15</td>
<td>25.93 ± 6.67</td>
<td>29.33 ± 6.24</td>
<td>+3.40</td>
<td>0.52</td>
<td>-0.51 to 1.55</td>
</tr>
</tbody>
</table>

95% CI = 95% Confidence interval

Conclusions

The observed relationships between students’ TFA levels and selected demographic variables concur with those reported by other researchers and fail to resolve the controversy over whether TFA is immutable or amenable to change. Two years of clinical training in our educational system did not affect students’ TFA development. Subjects with higher TFA levels were male and older, and opted for specific medical specialties, suggesting that TFA may be useful in student advising efforts and targeting specific physician manpower goals. Further studies on the effects of age and educational programming on medical students’ TFA are warranted, especially since researchers from other fields suggest that this trait may be malleable. Regardless of whether TFA is immutable or amenable to development, it would be useful for clinical faculty to individually and overtly discuss the ambiguity and uncertainty encountered in their clinical practices as well as the strategies used to deal with these states. As faculty mentor and enculturate medical students into the profession, dialogue regarding the ambiguity and uncertainty inherent in medical practice could enhance the value of clinical training.

References


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