acceptances obtained. Descriptive statistical analyses assessed acceptance rates, MCAT averages, and GPA averages, stratified by applicant's family income and parents' education. Low income was defined as reporting a childhood family income <$75,000, and first-generation status was defined as having no parent with a bachelor's degree. Multivariate regression analysis modeled the effects of MCAT, GPA, race/ethnicity, first-generation status, and low-income status on acceptance to at least 1 MD program.

Results/Outcomes: AMCAS data from 312,898 applicants were analyzed. Of the total, 34.3% (107,396/312,898) were low-income and 19.3% (60,328/312,898) were first-generation applicants. The overall acceptance rate over the study period was 42.3%. Low-income applicants and first-generation applicants’ acceptance rates were 36.0% (38,674/107,396) and 32.7% (19,701/60,328), respectively. On univariate analysis, acceptance was negatively associated with both family income (OR: 0.602; P < .001; CI: 0.592, 0.612) and parental education (OR: 0.581; P < .001; CI: 0.570, 0.592). On multivariate analysis, among those with MCAT2015 scores (n = 142,961), medical school acceptance was most affected by average science GPA (OR: 6.63; P < .001; CI: 6.345, 6.918), underrepresented in medicine (UIM) identity (OR: 5.119; P < .001; CI: 4.923, 5.323), and MCAT score (OR: 1.186; P < .001; CI: 1.184, 1.189). Low-income status (OR: 0.968; P < .05; CI: 0.938, 0.999) was negatively associated with acceptance; however, first-generation status (OR: 0.994; P = .758) was not significantly associated with acceptance.

Discussion: These results reveal that first-generation and low-income medical school applicants have a markedly lower rate of acceptance than the general applicant population. Furthermore, both first-generation and low-income status are significantly negatively associated with medical school acceptance. This effect is mediated by UIM identity and GPA and MCAT metrics. Notably, UIM identity status had a significant effect size in predicting medical school acceptance, which is potentially reflective of beneficial race-conscious admissions practices. Furthermore, the miniscule effect size of first-generation college status and low-income status serves as evidence that disadvantaged backgrounds are not widely considered among admission practices as recommended by the Liaison Committee on Medical Education (LCME) Standard on Diversity. Additionally, one study’s analysis of group differences in scores on the latest version of the MCAT revealed disparities in scores and use of preparatory materials depending on an applicant attending a school with more or fewer resources. Therefore, first-generation college and low-income applicants’ relatively poorer acceptance rates may be mitigated by early academic support and access to cost-prohibitive MCAT preparatory materials.

Significance: First-generation college and low-income applicants experience lower medical school acceptance rates, but high grades and test scores mediate the effect, in combination with UIM status. These applicant populations require increased support and mentorship to achieve proportional representation among medical students.

Correspondence should be addressed to Neha Vapiwala, University of Pennsylvania Perelman School of Medicine, 3400 Civic Center Blvd., Philadelphia, PA 19104; email: neha.vapiwala@pennmedicine.upenn.edu.

Author affiliations: C. Williams, M.A. Perez, N. Vapiwala, J.A. Shea, Perelman School of Medicine, University of Pennsylvania.

Funding/SUPPORT: None reported.

Other disclosures: None reported.

Ethical approval: This research was deemed exempt from ethics approval by the institutional review board of the University of Pennsylvania.

References

Understanding Agency in Shared Decision Making: A Qualitative Analysis of Clinical Encounters and Patient–Physician Interviews

Catherine Takacs Witkop, MD, MPH, Dario M. Torre, MD, PhD, MPH, and Lauren A. Maggio, PhD

Purpose: Shared decision making is highly encouraged in patient-centered care but can be difficult to implement in practice. Although lack of training has been implicated as an obstacle to successful shared decision making, consensus has not been reached about the most effective educational interventions. We propose that the coconstruction of clinical decisions is a complex activity, requiring patient and relational agency, and cultural historical activity theory (CHAT) can be used as a framework to help health professions researchers and educators understand and teach shared decision making. The objective of this qualitative study was to use CHAT to explore, through analysis of clinical encounters and focused interviews, both patient and provider perspectives of the contracptive decision-making process. A better understanding of shared decision making can inform more effective educational interventions for our learners and potentially improve patient outcomes.

Approach/Methods: We recruited female patients between the ages of 17 and 45 who used a contraceptive decision aid mobile application (app) before a visit to a walk-in contraceptive clinic. Physicians providing care to these women in the clinic were also recruited. We audio-recorded the clinical encounter and, following the encounter, we conducted semistructured interviews with each patient and physician separately. We used template analysis to analyze the 63 transcripts (interviews and clinical recordings). For each patient, we considered the collection of their interview, the provider’s interview, and the clinical recording as a single case. Analysis was conducted within and across cases. The initial template was created to guide the identification of elements of CHAT, tensions within and between accounts of the patients, physicians and the clinical encounter, and evidence of patient and relational agency. The template was modified iteratively.
Influence of Emotion on Cognitive Load Experienced by Trainees While Performing Patient Handoffs

John Q. Young, MD, MPP, PhD, Karen A. Friedman, MD, MA, Justin L. Sewell, MD, MPH, PhD, Krima Thakker, Maju John, MS, PhD, Jeroen J.G. van Merrienboer, PhD, and Patricia S. O’Sullivan, EdD

Introduction: Patient handoffs remain a significant patient safety challenge. Researchers have used cognitive load theory (CLT) to unpack the complexity of health professions workplace learning tasks including handoffs.1 When the cognitive load of a handoff exceeds the working memory capacity of the trainee, learning and performance suffer. CLT focuses on the development of instructional strategies that match intrinsic load (IL) to the developmental stage of the learner, decrease extraneous load (EL), and optimize germane load (GL). CLT strategies have traditionally focused on modifying the complexity of the task, the knowledge of the learner, and/or the design of the instruction. CLT researchers have given little attention to how the learner’s emotions influence cognitive load.2 Yet, we know that emotion modulates learning through numerous cognitive processes including motivation, attention, working memory, and long-term memory.3 To address this gap, this study explores how emotion influenced the IL, EL, and GL imposed upon the working memory of trainees performing patient handoffs.

Methods: From January to March 2019, we administered a cross-sectional survey to 1,807 residents and fellows from a large 24-hospital health system in the United States. Participants completed the survey after performing a handoff. The survey included questions about features of the learner, task, and instructional environment. IL, EL, and GL were measured with the 16-item Cognitive Load Inventory for Handoffs.4 Emotions were assessed with an 8-item scale based on the circumplex model of affect.5 The authors used factor analysis to identify the core dimensions of emotion and then explored the relationship between emotion and cognitive load with 3 types of analyses. First, bivariate correlational analyses examined the relationship between the emotion factors and learner, task, and environment features known to predict cognitive load. Second, we conducted univariate regression analyses to investigate whether emotion factor scores predicted IL, EL, and GL. Third, multivariate regression determined whether the addition of the emotion factors to models including these previously established predictors of cognitive load types increased the variance explained ($\Delta R^2$).

Results: Six hundred and ninety-three (38.7%) of 1,807 residents and fellows completed a survey. Exploratory and confirmatory factor analysis identified 2 dimensions of emotion representing positive activation (labeled invigoration) and positive deactivation (labeled tranquility). The correlational analyses revealed that higher invigoration was