



Cognitive Influences on Complex Performance Assessment: Lessons from the Interplay between Medicine and Psychology



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The assessment of healthcare professionals is a critical determinant of patient safety and healthcare quality, playing both a gatekeeping function and a path toward performance improvement. Given the complexity of physician–patient interactions and the inadequacy of self-assessment for judging one’s own strengths and weaknesses, medicine exemplifies a domain in which adequate assessment is dependent on the perceptions and perspectives of observers. Such perspectives are susceptible to influences that range well beyond the performance itself, offering an opportunity to consider how cognitive psychology can guide improved practices and how examination of psychological processes in real-world environments can inform thinking about cognition. In this target article I will provide an overview of the challenges facing health professional educators, the insights that have been gained from the application of cognitive psychology toward deriving solutions, and some reflections on the current state of the science and ongoing needs. These efforts lead to the conclusion that performance assessment protocols stand a better chance of success when they are designed to accommodate limitations of attentional capacity, working memory, and the idiosyncratic influence of prior experience rather than striving to change these fundamental aspects of human cognition through rater training or response form alterations.

General Audience Summary

To ensure a healthcare system is operating safely and effectively it is critical to have highly functioning assessment protocols that evaluate the professional competence of those who deliver healthcare. Such protocols not only play a quality assurance role, but they also offer a means through which quality can be improved. Establishing highly functioning assessment practices, however, is filled with challenge. Proficient performance by health practitioners involves the integration of many different skill sets including the abilities to communicate effectively, operate within a healthcare team, and bring expert knowledge to bear on the situation encountered. Further, what behaviours constitute successful use of those skill sets is dependent on the specifics of the situation. As a result, determining the quality of performance is highly dependent on the judgment of observers. As in any walk of life, judgment regarding competence is fallible with considerable idiosyncrasy of opinion and susceptibility to influence by many factors that extend well beyond the quality of the performance observed. This paper highlights ways in which research techniques and findings from cognitive science have led to the conclusion that assessment protocols in medicine can be improved to a greater extent by design that takes limitations of human cognition into account than by efforts to fundamentally alter the way in which raters form impressions.

Keywords: Cognitive psychology, Judgment and decision-making, Rater-based assessment, Medical education, Competency-based education, Performance evaluation

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The effectiveness of healthcare is determined, in part, by the competence of its practitioners. Assuring such competence results in millions of dollars being spent annually to develop and run intramural assessments, licensing and certification examinations, and maintenance of competence programs. The majority of these practices are narrowly focused, testing whether or not clinicians know what they should know rather than assessing the many qualities required to function well in modern healthcare systems. It is increasingly recognized, however, that adequate care is not solely dependent on the knowledge possessed by individual practitioners (Anderson, 2011). To work effectively and safely, health professionals must be proficient at a wide range of skills that enable patients to become active participants in solving their health concerns while also promoting collaboration with other health professionals, with patients' families, and with evolving technological supports (Balogh, Miller, & Ball, 2015). Determining whether or not an individual has developed capacity for the various competencies required, however, is no easy matter.

In this regard, medicine is not unique. It is easy to imagine the impact of poor decisions about who should be trusted to work as a physician because the outcomes matter and negative results are harsh. In any walk of life though, ranging from social judgments about who we want to befriend, through extending employment offers, to choosing between political candidates who will become our nations' leaders, we make assessments about who maintains the right balance of qualities that will optimize the likelihood of success (however defined) and minimize the risk of unacceptably negative consequences. Sometimes these assessments of competence are right; sometimes they go horribly wrong. In this target article I will use the assessment of medical trainees and professionals as an example to summarize much of what is known about complex performance assessment and the ways in which it is being improved. Medicine is a rich domain for that purpose because the stakes are high enough that there is a long history of prioritizing research in this area (Epstein, 2007), yielding more empirical study than has been conducted in most applied contexts. That history is rife with efforts to draw upon studies from basic psychology in a way that provides an interesting case study for the interplay between an applied field and an academic discipline. To explore that case, I will provide an overview of the challenges facing health-professional educators, the insights that have been gained from the application of cognitive psychology toward deriving solutions, and some reflections on the current state of the science and ongoing needs that might be fed back into the fundamental study of cognition.

Complex Performance Assessment in Medicine

Imagine the medical resident (i.e., senior trainee) who enters an examining room in the emergency department to meet a crying child with a blackened eye and badly bruised forehead who is being held by a nearly hysterical mother who speaks English poorly. Clearly there are diagnostic issues that need to be resolved fairly efficiently: Are any bones broken? Has the child's eye been damaged? Is he likely to be concussed or haemorrhaging internally? Accurately assessing the clinician's knowledge

regarding what diagnoses need to be considered, what tests will help rule out important clinical conditions, and what key steps need to be taken to treat the patient (whatever the underlying problem happens to be) is relatively straightforward. There is a lot that needs to be understood by the physician even in a fairly simple scenario such as this one (e.g., anatomy, physiology, risk, the predictive value of tests that could be performed, and the costs/benefits of taking particular actions). Well-written multiple choice or short answer exams, however, can adequately capture the strength of one's knowledge base (Case & Swanson, 2002). In fact, in some circumstances they have been shown capable of predicting real patient outcomes including cardiac mortality rates (Ramsey et al., 1989) and other important clinical measures (Wenghofer et al., 2009) a decade after the physician is examined.

Enabling a positive outcome for this child and his family, however, is not simply a matter of knowing how to categorize the presenting problem by assigning a diagnostic label (Ilgen, Eva, & Regehr, 2016). Interpersonal skills, including the capacity to communicate effectively with the patient and his mother, are required not only to gain a proper understanding of the patient's condition and its cause, but to defuse the situation so the mother can understand and get the child the support he needs (Menichetti, Libreri, Lozza, & Graffigna, 2016). A team-based approach and the skills required to enact it are necessary to coordinate the various stages of work-up and follow-up needed not just by this patient, but also for triaging this interaction relative to the other problems that continue to flow into the clinic (Abu-Rish et al., 2012). Determining the cause of the injury and reducing the likelihood that it will happen again may require considerable care and advocacy on the part of the physician, especially if abuse is suspected, again with steps taken to lead a coordinated effort toward prevention of future problems (Hubinette, Dobson, & Regehr, 2015). And, all of this must be done while demonstrating the altruism, honesty, and respect for diversity that contribute to defining the professionalism expected of all healthcare professionals (Kelly, Mullan, & Gruppen, 2016).

In the latest iteration of the CanMEDS framework, a model designed by the Royal College of Physicians and Surgeons of Canada that has been used to guide physician training in many parts of the world, 7 roles are listed that "describe the abilities physicians require to effectively meet the healthcare needs of the people they serve": Collaborator, Communicator, Leader, Health Advocate, Medical Expert, Professional, and Scholar (Frank, Snell, & Sherbino, 2015). These roles encapsulate 27 "key competencies" that are further subdivided into 93 "enabling competencies." Assessment of most of them requires deliberate efforts at observation in real-world scenarios (Wass, van der Vleuten, Shatzer, & Jones, 2001) with considerable need for inferences to be drawn regarding the extent to which the behaviour observed is representative of the skillset desired (Kogan, Conforti, Bernabeo, Iobst, & Holmboe, 2011).

There is no such thing as "ground truth" in such domains because there are multiple pathways to positive outcomes in most clinical situations (Eva, 2005) and an imperfect correlation between pathway and outcome in all cases (Zwaan & Singh, 2015); because context has been shown to be a robust

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