



Mindset theory in medical education

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Research in elementary and secondary education has shown that a learner's self-efficacy, or self-perception of learning ability, is predictive of academic success.¹ In fact, a learner's perception of their ability to learn may be more predictive of performance than testing or prior academic performance.¹ Self-efficacy is also predictive of resilience: how a learner behaves when challenged.^{2,3} Importantly for educators, a learner's self-efficacy is directly shaped by the feedback that they receive.⁴

Professor Carol Dweck demonstrated that a student's mindset about their own intelligence is

central to resilience.^{2,5} She described two opposing mindsets observed in learners: those with a *fixed* mindset, who generally feel that their intelligence cannot change; and those with a *growth* mindset, who generally perceive that their intelligence can improve. Learners engaging in a fixed-mindset approach tend to focus on performance goals that allow them to demonstrate their intelligence, which has implications for the learner's willingness to engage with a challenge, receive feedback and rebound from mistakes. For instance, fixed-mindset learners tend to avoid constructive feedback, challenging tasks and effortful learning, because effort and poor

performance are perceived as deficits in their intelligence, and self-worth.⁴ Conversely, learners with a growth mindset tend to focus on the process of learning as the goal, with the effort being equated with the expansion of understanding. As a result, growth-mindset learners are more likely to perceive feedback as an opportunity for personal development.

Although the mindset theory has only been sparsely described in adult education, and is almost completely absent from medical education literature, the theory can and should be extrapolated. Feedback and coaching are heavily used in medical training, and the

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Framing feedback on practice-based learning attributes rather than fixed traits may encourage a growth mindset

Table 1. Examples of feedback language

Competencies	Fixed-mindset feedback	Growth-mindset feedback
Patient care	'You are a strong intern; you are really skilled at creating differential diagnoses even for complicated patients.'	'That case was really complicated, I like how you thought out loud to interpret data and develop a broad differential diagnosis.'
Medical knowledge	'You are really smart; your medical knowledge is fantastic.'	'Reading about your patients is really paying off; your fund of knowledge is getting really strong.'
Systems-based practice	'You are a naturally gifted leader and role model for the team.'	'I love that you are working hard to role-model good behaviours like communicating to outpatient providers.'
Practice-based learning	'You take feedback really well.'	'You must have reflected a lot on the feedback I gave you; your bedside manner has significantly improved.'
Professionalism	'You have great intuition knowing what the patient's needs are.'	'You acknowledge the needs of the patient when you make management decisions, you must spend a lot of time and effort considering the patient.'
Communication skills	'Developing rapport with your patients seems like it comes easy for you.'	'I like the way you tried different strategies to develop rapport with the patient.'

literature has shown that fixed or growth mindsets are shaped predominantly by feedback. For example, praising learners for being 'smart' sends a message that appearing 'smart' is the goal. In response, the learner focuses on the outcome of looking intelligent rather than learning as the ultimate goal. Although adult learners may matriculate into residency training with an already formed mindset, medical educators can still encourage or discourage a growth mindset by the type of feedback provided during training.

Our institution adapted faculty development programmes to encourage clinical coaching by incorporating growth-mindset theory. Experientially we, as clinician educators, found that praising fixed attributes, such as intelligence, is unfortunately the most common form of positive

feedback encountered, but can negatively affect learners: 'Nick, that interaction with your patient was excellent, you are a natural communicator'. Instead, we encourage faculty members to praise processes and to focus on effort in order to promote a growth mindset: 'Nick, that interaction with your patient was excellent; you must have worked hard building rapport with her'. Feedback in this way changes the perception of the learner from focusing on outcomes (perception as a natural communicator) to the process (hard work). Consequently, we have found that medical trainees like Nick are more likely to focus on further developing their communication skills rather than being perceived as a naturally gifted communicator.

Furthermore, framing feedback on practice-based learning

attributes rather than fixed traits may encourage a growth mindset (Table 1). For instance, we promote praising a learner's willingness to seek challenges and overcome hardship, or reinforce processes such as a learner's critical thinking, problem solving or curiosity. Most importantly, we emphasise recognising when a learner is engaging in a fixed mindset in order to redirect them towards a growth mindset.

Even more simply, inserting the word 'yet' following a learner's reflection about struggling can have a powerful impact. For example. Nick: 'I am not good at putting together information quickly and presenting a plan on my feet...'. Educator: 'Yet'. The power of 'yet' is gaining increased recognition in secondary education and can easily be adopted in medical training.⁵ Imagine a clinical competency committee articulating to a trainee that they are 'not there yet' rather than communicating that they are not meeting milestones. The signal to the resident is that learning is a continuous process and progression is the goal.

Transition periods, such as starting an intern year, are particularly vulnerable times for self-efficacy and can uncover fixed-mindset learners who are at risk of struggling. Educators can develop a growth mindset to nurture resilience by providing positive feedback focused on processes. The goal is to reframe effort as a positive attribute, which encourages professional growth. Recognising this vulnerability in our learners resulted in the development of a clinical coaching programme for early-year trainees at our institution.

Although further investigations into the cognitive science of mindset in medical education accumulate, there is little harm, and potentially much to gain, by developing mindset curricula for matriculating interns and faculty

members. In fact, recent literature suggests an association between self-efficacy and self-directed learning among medical trainees.⁶ Augmenting competency-based assessments with process outcomes that enforce a growth mindset may not only potentiate self-directed learning, receptiveness to feedback and a culture of transparency, but may also advance learner resilience.

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