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Cognitive Dissonance:

How Self-Protective Distortions Can Undermine Clinical Judgment

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Abstract

Context

When errors occur in clinical settings, it is important that they are recognized without defensiveness so that prompt corrective action can be taken and learning can occur. Cognitive dissonance—the uncomfortable tension we experience when we hold two or more inconsistent beliefs—can hinder our ability to respond optimally to error.

Aim

The aim of this paper is to describe the effects of cognitive dissonance, a construct developed and tested in social psychology. We discuss the circumstances under which dissonance is most likely to occur, provide examples of how it may influence clinical practice, discuss potential remedies and suggest future research to test these remedies in the clinical context.

Methods

We apply research on cognitive dissonance from social psychology to clinical settings. The factors that make dissonance most likely to occur are examined. We illustrate the power of cognitive dissonance through two medical examples: one from history and one that is ongoing. Finally, we explore moderators at various stages of the dissonance process to identify potential remedies.

Results

We show that there is great opportunity for cognitive dissonance to distort judgments, delay optimal responses and hinder learning in clinical settings. We present a model of the phases of cognitive dissonance, and suggestions for preventing dissonance, reducing the distortions that can arise from dissonance and inhibiting dissonance-induced escalation of commitment.

Conclusion

Cognitive dissonance has been studied for decades in social psychology but has not had much influence on medical education research. We argue that the construct of cognitive dissonance is very relevant to the clinical context and to medical education. Dissonance has the potential to interfere with learning, to hinder coping effectively with error, and to make accepting change difficult. Fortunately, there is the potential to reduce the negative impact of cognitive dissonance in clinical practice.

Introduction

Imagine a student who thought they did very well on their first-year exams but receives poor scores. Consider an intern who was praised by a reputable specialist during morning rounds for making an excellent diagnosis, but then views the results of a scan indicating the diagnosis is incorrect. Or a senior surgeon who reads a new study suggesting that a surgical procedure they often perform has been found to not have beneficial patient outcomes.

These situations are all likely to produce what social psychologists refer to as *cognitive dissonance*: the uncomfortable tension we experience when we hold two or more inconsistent beliefs, or our behavior is inconsistent with our beliefs.¹ Our first-year medical student is likely to believe that they are intelligent, have strong academic abilities and prepared well for the exam. These beliefs are discrepant with the knowledge that the exam performance was poor. The intern might believe they were very astute in their diagnostic abilities, which is inconsistent with the scan findings that the diagnosis was erroneous. The senior surgeon, who feels very proficient in their chosen procedure and believes that their interventions have brought relief to hundreds of patients, is now faced with information that suggests patients have been subjected to unnecessary suffering.

In 1957, Leon Festinger published his theory of cognitive dissonance,¹ generating hundreds of studies since that time. Cognitive dissonance has been viewed as one of the most influential theories in social psychology.^{2,3} Decades of research tells us that when we experience dissonance, a negative emotional response is generated,⁴ and we are strongly motivated to remove this source of distress.⁵ There are many avenues to reducing the discomfort of dissonance, including self-justification, motivated reasoning and defensive

selective perception.⁶ Unfortunately, these processes can distort our thinking, propel us to blame others for our own errors, lead to the escalation of commitment to an incorrect course of action, and inhibit our ability to learn from our mistakes.^{7,8}

While little research on cognitive dissonance has been conducted in the clinical setting, work in other domains suggests that dissonance is likely to be prominent in medicine. Having responsibility for a decision and making decisions where there are potentially negative consequences for getting it wrong are characteristics of many medical decisions, and studies find that these factors can make dissonance more intense.^{9,10}

When Dissonance is Most Likely to Occur

Research finds that there are particular circumstances in which cognitive dissonance is most likely to occur. Those most relevant to medical practice are when we make a decision, or when we encounter information or do something that contradicts our beliefs.³ In all of these cases we are vulnerable to a threat to our self-esteem. If we make the wrong decision, we might feel stupid, if we encounter information that suggest we are wrong, we may feel that our judgment is poor, and if we do something that goes against our beliefs, we might feel hypocritical or even immoral. Studies find that at the crux of dissonance is the threat to a sense of ourselves as good, competent people. We will defend mightily against this threat to our identity by performing all sorts of mental gymnastics to avoid or reduce dissonance and to protect our self-esteem.^{11,12}

Making a Decision

When we make a decision, we often consider the pros and cons of different options. Once we have chosen an alternative, the negatives of the option we chose and the positives of the foregone alternatives could cause us dissonance. Thus, we will tend to ignore or downplay the negatives of our chosen option, enhance our view of its positives, and do the opposite for the non-chosen options. This phenomenon is known as a “dissonance spread” because the gap between a chosen and forgone option becomes wider after we make the choice.^{13,14}

When a doctor chooses among a set of treatment options, they may see the chosen treatment path as more optimal, and the other options as less optimal after the decision has been made. Similarly, a favored treatment path may come to be seen as clearly and substantially the best

option over time, simply because it has been chosen numerous times in the past, and not because the evidence suggests that it is truly the best option. This makes it less likely that the doctor will change their mind about the best treatment, even when a revision of this judgment might be prudent. In fact, the desire to reduce dissonance can lead to the escalation of commitment, where the doctor becomes even more committed to their chosen course of action.¹⁵

Encountering Information Contradictory to Beliefs

When we learn something new that is in opposition to already existing beliefs, we may experience dissonance. To reduce this dissonance, we can change our initial belief, but if that belief is deeply held, we will find other alternatives. A tool for relieving dissonance is the confirmatory bias, which leads us to seek information that fits what we expect or desire, weight confirming information more heavily than disconfirming information, remember confirmatory information better, and interpret ambiguous information as being supportive of our beliefs and wishes.^{16,17}

When a doctor feels certain of a diagnosis, dissonance might be induced by information that emerges suggesting the diagnosis is incorrect. To reduce this dissonance, the doctor might engage in the confirmatory bias by seeking out and believing information that supports their initial diagnosis, discounting the validity of information not supporting the diagnosis, or by interpreting ambiguous information, such as unclear test results, as consistent with the diagnosis.¹⁸ In this way, our need to protect ourselves in the face of dissonance can result in the distortion of pertinent critical information.

Actions That Contradict Beliefs

Dissonance is aroused when our actions and beliefs are inconsistent. To reduce this dissonance, we will engage in self-justification by generating thoughts and arguments that rationalize our behavior.¹⁹ For example, a junior doctor who administers the wrong dosage of a medication will likely experience dissonance because this behavior is inconsistent with the desired self-perception of a careful and caring doctor. If possible, they are likely to justify their actions by noting they were following a senior doctor's sloppily written medication order, or that there were too many patients to attend to in too short a time. The self-serving bias—our tendency to take personal credit when things go well, but to blame outside factors when things go poorly—is a convenient tool for reducing dissonance.²⁰ Research finds that

blaming outside factors is a typical response to making a medical error. For example, trainees commonly justify errors, redefine them as non-mistakes, or blame external factors such as colleagues, patients or extenuating circumstances.²¹ All of these would be handy dissonance reduction strategies.

Cognitive Dissonance in Medicine: Two Examples

We present two examples of how cognitive dissonance affects medical judgment. In both cases, new scientific knowledge confronts existing beliefs and behaviors. This generates cognitive dissonance and leads to self-justification processes that create a powerful barrier to medical progress, perpetuating unhelpful—even dangerous—practices. The first example comes from history, and the second is contemporary.

Isnac Semmelweis and the Prevention of Puerperal Fever

Cognitive dissonance is a likely culprit in resistance to innovation over the course of medical history. While the role of hand hygiene in the prevention of infection has been known for over 150 years, compliance rates with handwashing in modern hospitals is disturbingly low.²² While time pressures and forgetting may contribute to this lack of compliance, perhaps dissonance also plays a role.

The impact of dissonance is clear to see in early attempts to change clinical hygiene habits. In the mid 19th century, Isnac Semmelweis, an obstetrician of Vienna General Hospital, discovered that unclean hands contributed significantly to the occurrence of puerperal (childbed) fever in women who had recently given birth. Semmelweis believed that the practice of doing autopsies on victims of childbed fever, and then treating patients in labor just after, was causing the spread of the disease. He insisted that clinicians entering his ward scrub their hands with a chlorine solution, and the incidence of the disease dropped dramatically.²³

Semmelweis' sanitation practices met a great deal of resistance. Even in his own ward, Semmelweis faced vigorous opposition to his theory, with colleagues refusing to believe that their own hands had brought death to so many patients. Some of this resistance was likely due to cultural norms and the importance of the hierarchy in medicine, but there are also clear

signs that dissonance was operating. Semmelweis' most ardent opponent was his supervisor, Johann Klein, who had instituted the practice of morning autopsies. The senior doctor refused to believe that young Semmelweis' views had merit. In his telling of this history, Nuland²³ wrote of Klein:

And being human, he was having difficulty facing the increasing evidence that Semmelweis had discovered something truly valuable that might save many lives, something that his own refusal to change an outmoded viewpoint had prevented him from seeing. And if that something was as true as the evidence was every passing month confirming it to be, then Klein himself had been the purveyor of death for thousands of women whose lives were lost because of the methods he had instituted. ...he was, after all, a physician and deeply affected by the carnage on the obstetric wards. Like many others, he could not face his own culpability. It was easier on the conscience if he did not remove his dark spectacles and take the cotton wool from his ears; this was the time to entrench his position... (p.109).

Nuland has described a profound example of cognitive dissonance with all of the right precipitating conditions: new beliefs were conflicting with long-held ideas and behaviors, the decisions Klein made were unequivocally under his control and clearly his own responsibility, and the consequences of his actions—if Semmelweis is right—were horrific. We can see why he clung so firmly to his views, arriving at numerous alternative explanations for the high rates of puerperal fever before handwashing began: an epidemic in the city, poor conditions of ward walls, the presence of “mother’s milk” in the abdomen, and even contact with foreign medical students. When infection rates dropped after the introduction of hand hygiene, Klein attributed the change to a new ventilation system.²³ The cognitive distortions he employed were a testament to his need to avoid the dissonance that would result from acknowledging the truth.

While Klein’s dissonance-avoiding arguments were not helpful to his patients, they were likely what allowed him to sleep at night and get out of bed the next morning. Another doctor in Semmelweis’ sphere was not so fortunate. Gustav Michaelis was one of the first to institute handwashing practices in response to the new evidence coming from Vienna. The

results in his own clinic were so profound, and his feelings of guilt so deep, that the already melancholy Michaelis committed suicide in 1848.²⁴

Somewhere between the reactions of Klein and Michaelis lies a healthy response to cognitive dissonance—one that should be encouraged in medical training. We will discuss this after presenting a modern example of how dissonance may be underlying the persistence of suboptimal practices in medicine.

The Perseverance of Arthroscopic Surgery

The application of arthroscopic surgery for patients with osteoarthritis of the knee is the most common ambulatory orthopedic procedure in the USA and has been routine practice for over two decades.²⁵ The nature of this surgery has included debridement (removal of ragged cartilage) and lavage (flushing out of the joint). This practice has been widespread, but evidence of its efficacy has been lacking.²⁶⁻²⁸ In 2002, Moseley and colleagues published a randomized sham-controlled study that demonstrated that neither the debridement nor lavage procedures resulted in a significant effect on knee-specific pain after 12 months.²⁶

Imagine the response to this study by a surgeon who has practiced these procedures for many years. These skills were difficult to obtain and required years of training. The surgeon has conducted hundreds of these procedures, but now learns from a newly published article that instead of helping patients, patients may have been exposed to unnecessary risk and pain. Will this surgeon think, “Well, I guess I need to find a new way to treat osteoarthritis of the knee!”? For a typical member of the human species, this is unlikely. Dissonance is stronger with greater investment of time and effort.³ Thus, truly acknowledging the new research is likely to cause strong dissonance. Instead the surgeon will likely leap into a dissonance reduction process to eliminate negative emotional arousal.

Dissonance reduction usually proceeds along the path of least resistance,²⁹ and our surgeon has many potential paths to take. Among other options, they can judge the research as poorly conducted, the journal as having poor standards for publication, or the sample utilized in the study as not relevant to their own practice. Because the paper is published in the *New England Journal of Medicine*, rationalizing that the paper appeared in a weak journal is not an option. Optimal research design, however, is more open to interpretation, as is the correct

recruitment of a patient sample. In fact, the Moseley study was criticized for its male patient bias and single surgeon approach and was, to some extent, ignored as a consequence.³⁰

The surgeon may also employ confirmatory bias to combat dissonance by recalling many patients who improved after the procedure (which does produce a substantial placebo effect as demonstrated in the sham control conditions of the Moseley study²⁶). They may also recall patients who did not improve but blame their lack of progress on poor compliance with physical therapy. All of these justifications may allow the surgeon to disregard the new findings and continue on with practice as usual. But a more difficult hurdle will be faced in six years' time when Kirkley and colleagues publish a similar sham-controlled study with a more gender balanced population that again demonstrates no benefit to the patient.²⁷ In a testament to the Herculean power of dissonance, the surgeon may continue using the procedure even after the publication of the 2012 study by Bohensky and colleagues that demonstrated little if any effect of arthroscopy in a national context.²⁸ They continue even after subsequent studies have further confirmed these results. Psychologists have found that people can become entrapped in continuing down a suboptimal previously chosen path, escalating their commitment to a choice even in the face of evidence that outcomes are poor.³¹ This may explain why there has been only a slow reduction in the practice of arthroscopic surgery for patients with osteoarthritis of the knee, and the procedure continues to be used by many orthopedic surgeons today.³²

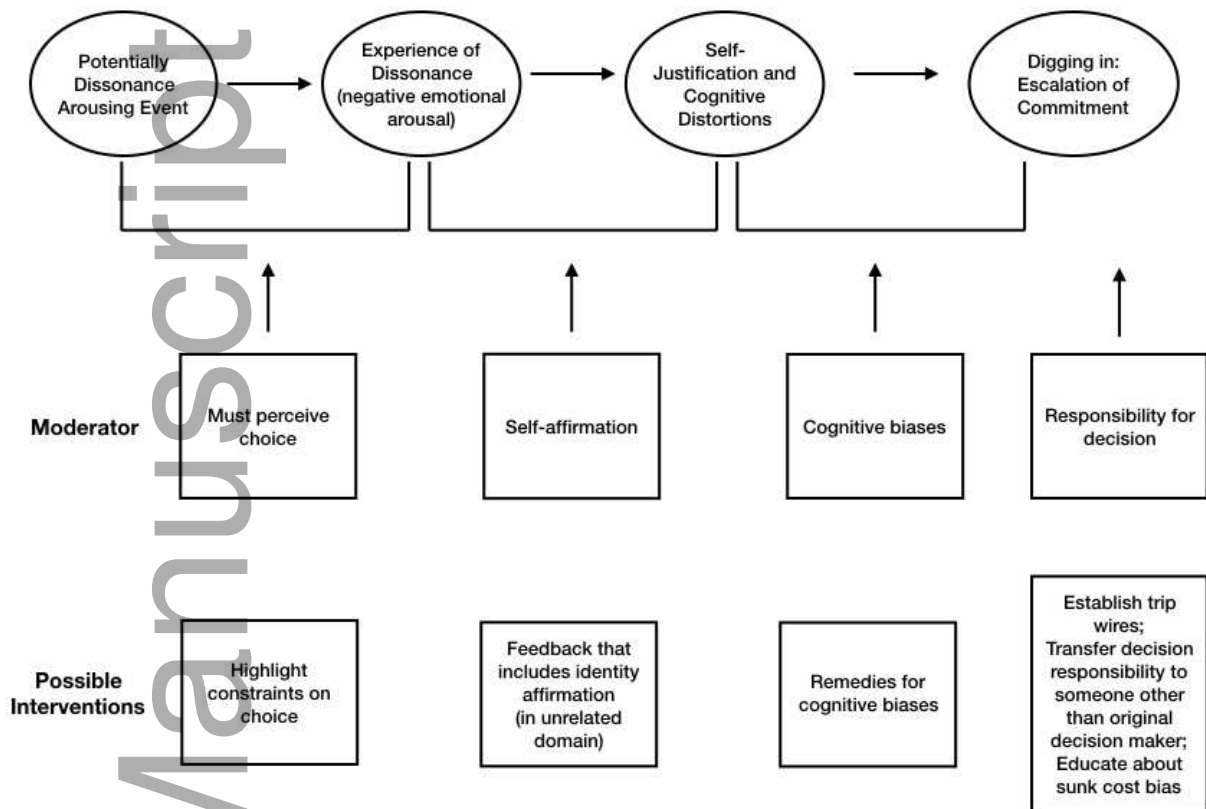
Both of our examples demonstrate how medical decision making can be influenced by the need to reduce cognitive dissonance, to the detriment of patients and to progress in medicine. As outlined above, dissonance can contribute to many other problems in patient care as well. In medical education, dissonance could cause students to defend against negative feedback and educators to be slow to acknowledge that favorite teaching methodologies might not be state-of-the-art. Given the powerful effects of dissonance on our judgments, it is worthwhile to consider how medical training might provide doctors with tools for dealing with dissonance without resorting to elaborate distortions.

Potential Remedies for Cognitive Dissonance

While remedies for cognitive dissonance have not yet been tested in the clinical context, there has been an abundance of research in other settings on the factors that can reduce the experience of dissonance and its accompanying distortions. We set these out here, with suggestions for applying these findings to medicine and medical education, as well as recommendations for research into the robustness of these possible remedies within clinical settings.

At the start, it is helpful to understand that dissonance plays out in stages.¹⁹ We have broken down the dissonance process in Figure 1, with relevant moderators and potential medical education interventions identified.

Figure 1: Phases of Dissonance, Moderators and Possible Interventions



Preventing Dissonance: The Importance of Individual Choice

Early research established that cognitive dissonance only occurs when a person believes their decisions and actions are freely chosen.³³ This finding has been replicated many times since,¹⁴ with only one study in medicine, which found that trainees experienced more dissonance about an incorrect decision to admit or discharge an ER patient when the trainee chose the option compared to when a senior doctor made the decision.⁹ While more research needs to be done in the clinical context, this research suggests that reduced choice in a diagnostic decision reduces the likelihood of dissonance occurring. For example, if there is an adverse patient event when a trainee is following an established checklist or diagnostic algorithm, one would expect that dissonance would be less likely to occur. By extension,

pointing out the situational constraints on a trainee's judgment (for example, that key symptoms had not yet appeared or that time constraints required a best guess, provisional opinion) might be helpful in preventing or reducing the experience of dissonance so that learning can be optimized. For the surgeon confronting research suggesting that a favored procedure is not efficacious, a reminder that the decision to use that procedure in the past was based on the best available evidence at the time—that is, they really didn't have much choice—could be helpful.

Preventing the Self-Justifications and Distortions Arising from Dissonance

Once dissonance is experienced, people are motivated to reduce the dissonance, and self-justification and distortion are often-used tools for doing so. Research points to several factors that can reduce this rationalization process. For example, ample research finds that when the arousal caused by dissonance is attributed to another source (such as an anxiety-inducing medication they have taken), the effects of dissonance are reduced.¹⁴ Other research suggests that a dissonant behavior must lead to a foreseeable aversive consequence for distortions to occur.³⁴ For the sake of brevity, we will focus here on self-affirmation, a key moderator of the effects of dissonance, and one in which potential interventions through medical education are easily applicable.

At the heart of the experience of cognitive dissonance is a threat to one's identity or self-esteem. Distortions that occur in the wake of dissonance represent an attempt to reduce this threat.^{7,35} But these distortions are not the only route to identity repair: research has shown that when one encounters an identity threat (such as that caused by dissonance), the threat can be accepted without distortion by affirming some other important quality of the self that reinforces self-esteem.^{36,37} A series of studies have examined the role of self-affirmation in response to cognitive dissonance. For example, in one study students ranked 10 record CDs and then chose to receive either their 5th or 6th ranked choice. The participants—some of whom had identified science as their most important value, and others who had identified science as an unimportant domain—were then given a white lab coat to wear. A typical dissonance distortion finding would be that the chosen CD would be ranked higher and the forgone option ranked lower than they had been before the choice was made. This was the case for all of the groups, except for the science-oriented students wearing the white lab coat.

The opportunity to affirm a treasured aspect of the self replaced the need to reduce dissonance through distortion.³⁸

Research shows that when dissonance is experienced, people may already be searching for an opportunity to self-affirm by focusing on core values.³⁹ This represents a potential opportunity for medical educators to provide feedback about a mistake that includes identification of an important value that the student is displaying in their work. By providing this affirmation, self-justifications are less likely to occur, and learning can be optimized. But we need to be careful about which value we emphasize: research finds that highlighting a value that is strongly related to the dissonant behavior can backfire, and in fact increase justification and defensiveness.^{6,40} For example, if a trainee made a mistake that could have harmed a patient, highlighting the trainee's value of protecting patient safety may actually increase cognitive dissonance. However, citing the trainee's value of learning, such as by saying "I've noticed that you put a lot of effort into learning and taking every opportunity to improve the way you practice," may affirm the trainee's identity and increase receptiveness to feedback. Because these types of interventions have not been tested in the clinical setting, future research can examine the efficacy of specific forms of identity-affirming feedback.

Reducing the Self-Justifications and Distortions Arising from Dissonance

Self-justifications are often achieved through cognitive biases, such as the confirmatory bias and self-serving attributions, two key tools that reduce the aversive emotions of dissonance.¹¹ A full discussion of remedies for cognitive biases and the debate around the effectiveness of these remedies in medical education⁴¹ is beyond the scope of this paper. But some research does suggest promising avenues, particularly when remedies are specific rather than general admonishments to be more thoughtful or careful in reasoning. For example, the confirmatory bias is found to be reduced in criminal investigations by considering why a hypothesis might be wrong⁴² and similarly, bias in clinical diagnoses are reduced by using the "consider the opposite" technique.⁴³ Clearly there is much more work to be done in understanding the effects of bias and remedy training in medical education. A valuable potential outcome of this endeavor is the narrowing of possible avenues for the justifications and distortions that can arise from dissonance.

Making Escalation of Commitment More Difficult

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A final opportunity to intervene in the dissonance process depicted in Figure 1 is to prevent or stop the escalation of commitment that can result from self-justification. Research suggests that reducing the sunk-cost bias (the tendency to make future decisions based on past investments) can reduce escalation of commitment,¹⁹ and other research suggests that the sunk cost bias can be reduced through education about how to focus only on future costs and benefits in decision-making.⁴⁴

But once a doctor has escalated their commitment to a treatment method or surgical procedure, personal change can be difficult to achieve, and organizational mechanisms might be necessary. Hospitals can design “trip wires” into their processes, whereby decisions are made ahead of time about the information and evidence needed to end a given practice.⁴⁵ A critical aspect of preventing escalation of commitment is that someone other than the person responsible for the original decision take responsibility for deciding about the continuation of a practice.⁴⁶ Thus, the surgeon who continues to believe in the efficacy of arthroscopic surgery is not the best person to decide whether to continue the practice. Thus, the regulatory and funding environment may be critical in changing the behavior of practitioners. Health systems are increasingly applying the principles of “value-based” care in which efficacy, adverse events and cost are considered in the context of a specific intervention.⁴⁷ Jurisdictions vary in their approach to application of value-based care, but the withdrawal or reduction of funding for specific procedures may have the strongest effect on practice.⁴⁸

Modeling a Healthy Response to Mistakes

The hidden curriculum in medical training communicates powerful messages to students and shapes their behavior and beliefs. Pipel et al. have characterized this process as one that “denies uncertainty, de-legitimizes error, and conveys magical notions of absolute knowledge”.⁴⁹ Further, this learning can lead to denial and blaming others,²¹ rationalizations akin to those found in response to the experience of dissonance. Consistent with recent trends to more openly discuss error as part of medical training,^{50,51} and calls to make hidden curriculum messages more conducive to desired professional behavior,⁵² perhaps modeling a healthy response to dissonance-inducing situations can also play a constructive role in improving clinical culture. A study of medical student perceptions of senior doctor responses to error showed that students admired and wanted to emulate

supervisors who were honest and open about errors.⁵³ As medical educators, we can teach students about cognitive dissonance and then model an openness to errors and setbacks, rather than display defensiveness. We can discuss our own struggles in coming to grips with a diagnostic error, a sub-optimally performed procedure, or news that a favored treatment approach is now outdated. One approach is to take this advice from Tavris and Aronson¹¹ and say to ourselves “When I, a decent, smart person make a mistake, I remain a decent, smart person and the mistake remains a mistake. Now how do I remedy what I did?” Saying this aloud to our students may help them develop an enlightened approach to coping with error.

Conclusion

Cognitive dissonance can cause self-protective distortions in our judgments leading to diagnostic errors, resistance to acknowledging and taking responsibility for mistakes, persistence with ineffective treatments, and defensiveness in response to negative feedback. Medical decisions are difficult, complex, and evolving, and procedures can be arduous and unpredictable. No one can expect a 100% success rate. But we can develop the ability to recognize and acknowledge mistakes quickly and honestly, and we can continue to change the medical culture so that openness to error becomes the norm.

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