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Better Health Care Outcomes: A Review of Conceptual Frameworks to Aid Understanding and Decision-Making

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ABSTRACT

This article presents readers an overview of three recently articulated conceptual frameworks for (1) intelligence, (2), moral development in ethical decision-making, and (3) practical wisdom with the aim of giving useful guidance for understanding and improving health care decision-making. The first framework conception is the notion of "learnable intelligence," how we acquire "mindware," ways of thinking that are analogous to software subroutines on a computer. Sometimes, however, important mindware is missing or malfunctioning, and this prevents wise decision-making and requires that the relevant mindware be repaired or installed. The second framework concerns the development of moral rules and how the moral rules have the aim of reducing the *harms* we experience. A process for justifying the moral rules is provided, and this framework also includes permitting violations of those moral rules in exceptional circumstances by giving a decision guide for how to justify those violations. There is evidence presented that this framework comports with the psychology of moral development. The third framework examines a conceptualization of practical wisdom and presents examples of how it can be related to health care decision-making. Finally, we survey the global problem of widespread misinformation about science in general and health care in particular, such as misconceptions of vaccine safety and efficacy. We outline current efforts made to understand this phenomenon and to deal with the problems misinformation causes, in part by improving the mindware of decision makers. Finally, we discuss suggestions for further research and practice.

Introduction

In the United States, we are living in unprecedented times regarding health care decision-making. An extraordinary letter from six former U.S. Surgeons General in the October 7, 2025, *Washington Post*, warned the public about dangerous misinformation being spread by the Secretary of the Department of Health and Human Services (HHS), Robert Kennedy Jr.[1] And 12 former Commissioners of the Food and Drug Administration (FDA) in the December 3, 2025, issue of the *New England Journal of Medicine* sent a similar warning about the risk of misinformation coming from the FDA.[2] One might set these warnings aside as limited to complaints about one government's officials, but there has been a broader global erosion of trust in established institutions, including those committed to ensuring public health. This erosion manifests itself, among other ways, through decreased vaccination rates. In the United Kingdom (UK), the Chief Medical Officer was concerned to note in his annual report of 2025 "gradually declining coverage of routine vaccinations in children and young adults over the last decade"[3] (p. 7), while in the European Union (EU), the European Society of Medicine (ESMED) produced a report "Addressing Undervaccination in Europe."[4]

Declining trust in institutions has, of course, a multitude of contributing factors. This article presents readers an overview of three recently articulated conceptual frameworks for (1) intelligence, (2) moral development in ethical decision-making, and (3) practical wisdom with the aim of giving useful guidance for understanding and improving healthcare decision-making. First, the framework for thinking about intelligence begins with the work of evolutionary psychologist Cecelia Heyes,[5] who explains how we develop "cognitive gadgets" when our experiences of the natural and social worlds interact with fundamental aspects of human psychology. This then leads to a notion, inspired by David Perkins[6] and Keith Stanovich[7] of *learnable intelligence*, where we operate with various pieces of *mindware*, some of which may be absent or be "malware." And some of our mindware is used in ethical decision making.

The next framework concerns moral development, and the initial focus is on Bernard Gert's[8] depiction of the moral rules as fundamentally concerned with harm reduction. Gert clarifies the notion of *harms* and the related notion of *goods,* outlines the process for justifying proposed moral rules, and importantly makes note of how there can be justifiable violations of the rules and moral disagreements that take place within a larger space of agreement. This is followed by a look at studies of moral development in children by psychological researchers, Shtulman[9] and Creane[10] among others, that comport with Gert's explication of the moral rules.

The third framework involves recent advances in the study of practical wisdom as an essential component of human decision-making psychology, and one that is therefore directly relevant to ethical decision making. Special attention is given to the work of The Jubilee Centre for Character and Virtues at the University of Birmingham (UK) that is ably described by Kristjansson and Fowers.[11] In their conception practical wisdom, knowledge of the right thing to do, how to do it, and when to do it, is a psychological reality having four distinct aspects: (1) moral perceptiveness, (2) emotional regulation, (3) a "blueprint" of how one conceives of one's value priorities, and (4) the ability to integrate the variety of relevant ethical considerations in making a decision where those values might pull in different directions. The four aspects interact, but also have a degree of independence and so may be developed to differing extents. This suggests that there are a variety of practices to consider when trying to enhance people's practical wisdom.

Finally, we call attention to a number of those practices that relate to combatting the misinformation and conspiracy theories that increase the risk of bad health care decision making. For instance, there are efforts such as those by Norman[12] and others to "inoculate" individuals with specific mindware to help them fight off infectious misinformation. And there are an increasing number of serious recommendations from groups such as ESMED[4] and the National Academies of Sciences, Engineering, and Medicine (NASEM)[13] that suggest mobilizing groups dedicated to addressing the spread of misinformation and to shoring up trust in the institutions that we rely on for genuine health care information.

In sum, our goals are to inform health care workers with several frameworks that, based upon our combined backgrounds, we deem important for research and better ethical decision-making.

I. Intelligence

The best way to understand intelligence has been the subject of widespread debate. For instance, there is the debate whether intelligence is better understood in a unified capacity (general intelligence, or *g*) or as a matter of multiple intelligences. In this paper, we begin with the work of evolutionary psychologist Cecelia Heyes, who describes acquired mental machinery she calls "cognitive gadgets":

> We human beings have created not just physical machines … but also mental machines; mechanisms of thought embodied in our nervous system … These distinctively human cognitive mechanisms include causal understanding, episodic memory, imitation, mindreading, normative thinking, and many more. They are 'gadgets' rather than "instincts" … because, like

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> many physical devices, they are products of cultural rather than genetic evolution.[5] (pp. 1-2).

(Note for later her reference to *normative thinking*.) She further explains that these cognitive gadgets are not innate but arise from societal development during infancy and childhood: "At the heart of the cognitive gadgets theory, of cultural evolutionary psychology, is the idea that social interaction in infancy and childhood produces new cognitive mechanisms; it changes the way we think."[5] (p. 18).

Heyes recognizes that these "cognitive gadgets" require an underlying "starter kit" that is transmitted genetically:

> The genetically inherited differences between our minds and those of our ancestors are small but very important. They enable the development of Big Special cognitive mechanisms in three ways. First, genetically inherited changes in *temperament* helped to make us remarkably social primates. … Second, genetically inherited *attentional biases* ensure that the attention of human infants is locked-on to other agents from birth. We are driven from early infancy to look at biological motion and faces, to listen to human voices. … Finally, humans have uniquely powerful *central processors*: mechanisms of learning, memory, and control that extract, filter, store and use information.[5] (p. 53)

Having identified these mechanisms as fundamental, Heyes characterizes how these three mechanisms operate in human cognitive psychology:

> Each of these processors is domain-general, crunching data from all input domains using the same set of computations, and taxon-general, present in a wide range of animal species. However, humans genetically inherit central processors with unprecedented speed and capacity. Shaped and fed throughout development by the torrents of information flowing in from other agents, domain-general processors not only capture this information but use it to build new, domain-specific cognitive mechanisms—the Big Special mechanisms that make human such peculiar animals. Thus, the Big Special mechanisms are designed by cultural evolution, but they are built in the course of development by souped-up genetically inherited mechanisms of learning and memory, using raw materials that are, from birth, channeled into infant minds by genetically inherited temperamental and attentional biases.[5] (pp. 53-54)

With this view of evolutionary cognitive psychology as a backdrop, we next consider the concept of *learnable intelligence*. In his book *Outsmarting IQ: The Emerging Science of Learnable Intelligence*,[6] David Perkins coined the term "mindware," which treats acquired cognitive processing skills as analogous to computer subroutines, and this approach to intelligence was further refined by the work of Keith Stanovich.[7] Heyes' "cognitive gadgets" fit neatly into this concept as the subroutines that would comprise the mindware. Proponents of critical-thinking training like John Eigenauer deem the concept of mindware to be useful in that training. To Eigenauer, using the concept of mindware helps to break down critical thinking into modular processes: "Conceptualizing critical thinking modularly would allow people to frame cognitive achievement realistically, in the same way that we acknowledge that there are levels of expertise in wealth management, weight training, or calligraphy."[14] (p. 3)

A relevant example, highlighted by the work of Kahneman and Tversky,[15] is our tendency toward "base rate neglect." Neglecting a base rate of, for example, the occurrence of a disease condition in a particular population can lead to mistaken conclusions about the informative value of a test for that condition. Thus, learning to avoid this fallacy has become a staple of medical education. Despite that, the general population does not commonly understand this fallacy, leading to widespread misinformation about benefits and drawbacks of various medical tests. This example demonstrates how helpful pieces of mindware may be missing or even so flawed that they become "malware."

Thinking of intelligence in this modular fashion can help us better understand how moral development takes place. In his book, *Moral Development and Reality, 4th* ed., John Gibbs tells us about a young man named "Mac" in a juvenile corrections center who appears to suffer not so much from absent mindware, but from the active presence of *flawed* mindware. Mac had resisted and yelled profanities at a staff member who, following institutional policy, was trying to inspect a bag he was carrying. In a meeting with a mutual help group of Mac's peers and a staff member, the peer group sought to identify the thinking errors underlying Mac's behavior:

> Mac explained that the bag contained something very special and irreplaceable—photographs of his grandmother—and that he was not going to let anyone take the photos from him. Mac's peers understood his point of view but saw it as one-sided: Mac thought only of safeguarding his photos, without considering for a moment the staff member's perspective or the facility's necessary rules. … [The staff member] was only carrying out institutional policy concerning possible contraband. Nor did Mac consider that she was not abusive and that he had no reason to assume that the photos would be confiscated. Generating the anger and overt behavior identified as an Authority Problem, then, were "Self-Centered" and "Assuming the Worst" thinking errors.[16] (p. 203)

Mindware issues like these are often not apparent to the person suffering them. In this example, the peer support group helps Mac realize that he has these erroneous thinking patterns so that he can begin to repair or

replace them. If, in contrast, well-functioning mindware can lead us to make better, more explainable decisions—both in general and in our ethical decision-making in particular--then learnable intelligence can help us explain the development of morality.

II. Moral Development: A Conception of Morality

Any serious consideration of moral development must employ some guiding conception of morality, and over the centuries, various thinkers have championed a variety of conceptions: Divine Command Theory, Cultural Relativism, Emotivism, and more. Two of the most influential perspectives in thinking about morality are (a) some form of Utilitarianism, inspired by the work of Jeremy Bentham and John Stuart Mill, which focuses on the consequences of our decisions and (b) a rule-governed Respect for Persons view inspired by Immanuel Kant, which focuses on whether the intent behind our actions conforms to the famous Categorical Imperative, that "we should never act in such a way that we treat humanity, whether in ourselves or in others, as a means only but always as an end in itself."[17] These two perspectives have greatly influenced thinking in medical ethics; for example, the use of the notion of "Quality Adjusted Life Years" in considering the consequence of various treatment options is a utilitarian-flavored construct, while the emphasis in recent decades upon clearly communicating options to patients and securing their explicit consent embodies the Kantian ideal of respect for persons as persons, as rational decision makers. (See Subrami & Biller-Adorno[18] for further specifics of what this may involve in clinical practice or hospital settings.)

The conception of morality that we will describe here stems from the work of Bernard Gert in *The Moral Rules*.[8] His work melds utilitarian consideration of consequences with Kantian attention to persons as rational decision makers, while also adding some helpful new twists. In one such twist, Gert shies away from trying to determine some single *summum bonum* or highest good as the aim of morality. Instead, he focuses on the evils or harms that can befall us.

Gert defines as *evils* all those items that it would be crazy to want for yourself without some special reason—for instance, death, pain, disability, loss of freedom, and loss of opportunity.[8] (pp. 44-46). Note carefully that this does *not* say that it is *always* crazy to want to die, etc. There might be a special reason, like being in intolerable pain that nothing could stop, that would make wanting to die a reasonable wish. But absent a special reason, such things are "evils" because *they interfere with your efforts to do what you want to do*. Needless to say, death interferes drastically with one's plans, and being ill or confined or in pain makes it more difficult to carry out one's plans. So those things are evils that harm our accomplishing our purposes.

In contrast, Gert defines *goods* to be those things that generally aid us in accomplishing our purposes. Thus, things like health, intelligence, knowledge, strength, power, wealth, and liberty count as goods. Rather than try to arrive at some conclusion about what is the ultimate good, Gert focuses on the *means* that either hinder or help us to achieve our purposes—whatever those purposes might be. Importantly, this approach throws cold water on skepticism about our knowledge of good and evil. While it may be quite difficult, perhaps even impossible, to know whether a particular thing will be good or bad for a specific person, especially one we do not know, we can still judge what things *in general* people avoid as hindrances and what things *in general* they seek because those things are helpful. If our general knowledge of good versus evil were fatally flawed, then we simply could not live in association with other people.

Gert then sets forth the underpinning of the rules of common morality: *the point of morality is to lessen the occurrence of evils*. Because the moral rules prohibit inflicting evils, one would presumably *advocate publicly* that others follow those rules in dealing with oneself and those persons that one cares for. But to get other rational people to agree to the rules, one must advocate that the rules be obeyed by all people with respect to all other people. Gert defines *the rational person's public stance* toward each of the moral rules as follows: "Everyone is to obey the rule with regard to everyone else except when he would publicly advocate violating it. Anyone who violates the rule when he would not publicly advocate such a violation may be punished."[8] (p. 96) So far this resonates with Kant's approach to ethics. Several unsurprising moral rules that pass this test include:

(1) Don't kill.
(2) Don't cause pain.
(3) Don't disable.
(4) Don't deprive of freedom or opportunity.
(5) Don't deprive of pleasure.[8] (p. 86)

Of course, this list could be expanded—for instance, by adding "Don't steal" and "Don't deceive"—but the point is not so much to give a complete list, but rather *to set the standard for how to evaluate candidates for being proclaimed and enforced as moral rules*.

Gert's analysis may strike a chord for those familiar with the ancient adage *primum non nocere*—first do no harm—but, consonant with utilitarianism and its emphasis on consequences, Gert stresses that, since the point of the moral rules is to lessen the occurrence of evils, there can be occasions when breaking a moral rule and inflicting an evil on someone leads to lessening the overall occurrence of evils. On those occasions, there can be a *justifiable violation* of a moral rule, and there can even be *unjustified keeping* of a moral rule. This does not void the rule as a general requirement on people's conduct, but allows specific circumstances to dictate when general rules should not be followed. In Gert's view, *the violation*

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must be the sort that one can publicly advocate considering these factors: (a) the amount of evil the violation will cause versus the amount it will prevent, (b) the desires of the person(s) upon whom the evil is to be inflicted, and (c) the effect that this violation, *if publicly allowed,* would have on encouraging further violations that *are not as justifiable*.[8](pp. 125-126)

To see the power of insisting that any prospective violation needs to follow this process, imagine a "Robin Hood" figure claiming that the stealing they do is justifiable because they "steal from the rich and give to the poor." Immediately, one can imagine what would likely happen in any attempt to publicly justify this exception. Who decides who is "rich" enough to be a legitimate target of theft and who is "poor" enough to be a worthy recipient of the stolen goods? What evil does this violation prevent? What would happen if every one of us were allowed to steal from those we consider to be rich because they are materially better off than we are? And so on. This process illuminates the central role of and the need for *transparency* in ethical decision making.

Ruminations like these also highlight a consideration that is *not* relevant to publicly justifying the violation of a moral rule; namely, when the motive is simply to obtain some good for oneself or anyone for whom one is concerned. "Thus, all killing and torturing for pleasure or profit is clearly immoral, whereas, killing and torturing to prevent greater killings and torturing may sometimes be allowed by public reason."[8] (p.100)

Gert does acknowledge that, using this framework, there will be *genuine moral disagreements*. Rational people with the best will in the world may still disagree about the factors noted above; namely, (a) the relevant consequences, (b) the state of mind of the person(s) upon whom the harm will fall, and (c) the likelihood that this particular violation will lead to other, less-justifiable violations (the "slippery slope" problem). For instance, rational people of good will can disagree about whether one should assist in the death of a terminally ill, conscious, and rational patient who wishes to die. But these disagreements will occur within a larger framework of agreement—even when public reason may justify violating a moral rule in a specific circumstance, the rule remains nonetheless a rule.

Beyond these moral rules, Gert notes that there are *moral ideals* that stress the need for us to act on occasion to bring about some good for certain people.[8](pp.128–36) A notable example of acting on a moral ideal would be those physicians who volunteer to work in conflict zones for Doctors Without Borders in order to prevent death and relieve suffering. Moral ideals can also be present in smaller ways with simple acts of human kindness, like someone extending a helping hand with no likelihood of any return.

The discussion above is an architect's sketch of the edifice of morality. Gert has refined this sketch in more detail in response to critics and from his work in applied ethics.[19,20] And Gert's view about the foundation of morality being to lessen harm is not without controversy. For example, Jonathan Haidt claims, "Moral judgment is a kind of perception, and moral science should begin with a careful study of the moral taste receptors."[21] (p. 136) Haidt's presentation is worth notice in part because he makes extensive use of empirical findings. On the other side of the ledger is the recent work of Kurt Gray, a psychologist and neuroscientist who critically reviews Haidt's experimental paradigm. Gray's view is that "every fight about morality comes down to one thing: competing perceptions of harm."[22] (p. 3) The interested reader can, in effect, put Haidt's and Gray's books side-by-side to see how their arguments develop.

III. Connecting Moral Development to Intelligence: Evocative Findings from Psychology

How might the account of intelligence be connected specifically to moral development? Let us start by recalling what we ascertained earlier from Heyes about "the starter kit" for development of our standard set of "cognitive gadgets":

> First, genetically inherited changes in *temperament* helped to make us remarkably social primates. . . Second, genetically inherited *attentional biases* ensure that the attention of human infants is locked-on to other agents from birth. We are driven from early infancy to look at biological motion and faces, to listen to human voices. . . Finally, humans have uniquely powerful *central processors*: mechanisms of learning, memory, and control that extract, filter, store and use information.[5] (p. 53)

Here we call attention to some recent work, inspired in part by Harlow,[23] that involved observing baby chimps clinging to their caregivers in the wild in the Gombe National Preserve in Tanzania. From her observations Maria Botero inferred that touch is the principal means of communication between caregiver and infant, and relatively seldom are visual cues involved. One subheading in Chapter 6 asserts, "Mothers are the Bridge to the Social Life of the Infant."[24] (pp. 157–65) This work should remind us that the foundation for our social and moral behavior often develops without any explicit awareness of that development by the infant or caregivers. As discussed in a recent study by Yarlagadda, Sandbulte, and Downs, the importance of touch to development appears in the prevalence of "kangaroo care" in the Neonatal Intensive Care Unit (NICU), where skin-to-skin contact with a caregiver has been shown to aid in the development of premature infants.[25] Casio, Moore, and McGlone also have reviewed the impact of social touch throughout the course of human development. [26]

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Although touch has been recognized as important to primate development generally, a powerful case has been made in recent years about species-specific developmental influences on humans. Michael Tomasello, one of the pioneers of this work, puts it this way: "The basics of humans' unique skills and motivations of shared intentionality all emerge before 3 years of age."[27] (p. 4) This shared intentionality, this ability to focus on the same stimulus at the same time, makes possible species-specific cooperative teaching and learning starting at an early age.

The connection between these observations and moral development can be seen in the research of Andrew Shtulman. Shtulman surveys a wide variety of evidence about how various imagination-expanding factors work across a variety of domains such as history, science, religion, mathematics, and ethics. He looks at the way examples, principles, and models can expand children's developing imaginations and thus guide their moral development:

> Our moral imagination is initially characterized by parochiality and self-interest and may remain so if not for moral instruction …. [W]e will explore the development of three principled distinctions in moral imagination: [1] that bad outcomes are not always caused by wrongdoing, [2] that the way things are is not always the way they ought to be, and [3] that an equal distribution of resources is not always an equitable distribution. *These distinctions are a far cry from the higher-order principles that define modern ethics … but they are prerequisites for learning such principles.*[9] (pp. 147–48) [Numbers and emphasis added.]

Here, Shtulman is reporting research with preschool children whose "cognitive gadgets" have given them a capacity to learn prerequisites for a later, more advanced grasp of the moral rules.

To expand on this, Michael Creane reports on developmental research with school-age children, the results of which relate well to Gert's view that moral rules have justifiable violations:

> 100% of 7–8-year-old children judged it was *wrong* to deceive a teacher who commanded that the student ***not*** harm others, while 82% of 7–8-year-olds, *positively* endorsed deceiving the teacher when the teacher commanded one student to harm another. This again highlights that deception, while it is a potential tool when needed to address injustice, is not used as a blanket or preferred strategy by most children.[10] (p. 172)

These school-age students—in a definite advance in understanding over preschoolers—make moral decisions comporting with Gert's view of how to justify violating a moral rule.

Wagner, Johnson, Fair, and Fasko suggest that, since humans tend to cooperate more than many other species, they can benefit from cooperative learning to develop moral rules and to understand both moral principles and their culture's morality.[28] This is not just imbibing the moral rules prevalent in one's society, but, as urged by Raimo Tuomela, developing moral awareness.[29] According to Wagner et al., "Moral awareness leads humans—when at our best—to think critically about what rules, customs, and policies … are put in place … [And] getting this right is a difficult intellectual challenge."[28] (p. 36) Moreover, "We should think slowly and critically if we intend to get these matters right."[28] (p. 37) This is especially true in health care decisions where someone's life may be on the line.

Educators in medical schools and other health professions programs have ethical principles to abide by, such as "Do no harm." In essence, as Chew[30] suggests, educators are called upon to exhibit a moral and ethical responsibility that Wagner et al. describe as "a conscientious reflection in the face of moral challenges."[28] (p. 39) One must have some sort of intelligence to meet this challenge, and we would hope that anyone matriculating into medical school or any other health profession program can, with the right training and experience, develop the *practical wisdom* needed to meet those moral challenges. And that is where we turn next.

IV. A Thought-Provoking Recent Conception of Practical Wisdom

Moral rules, however appropriate and well taught, are only part of good decision-making. Here, the ancient Greeks made a distinction that remains useful today. They distinguished theoretical wisdom (*sophia*), which today we would call scientific knowledge, from practical wisdom (*phronesis*), which is knowing in each situation the right thing to do and the right way and time to do it. (Think of the concept of "street smarts.") The Greeks distinguished both these forms of wisdom from the kind of "know how" that a skilled practitioner of a particular craft must have (*techne*). Examples of *techne* in medicine would include the skills of a surgeon operating or the trained gaze of a radiologist interpreting images.

With these distinctions in mind, we will focus our attention on practical wisdom. An example of the necessity for practical wisdom in medicine is determining how best to communicate with patients when their prognosis is dire, as discussed in the article "Misunderstandings about Prognosis: An approach for palliative care consultants when the patient does not seem to understand what was said."[31]

One person whose work, together with his colleagues, should be credited with bringing wisdom alive as a topic of investigation is Robert Sternberg. Sternberg and collaborators have mapped out a theory of what wisdom entails. A useful summary of that theory can be found in Sternberg and Glück's *Wisdom: The Psychology of Wise*

Thoughts, Words, and Deeds.[32] In their definition, wisdom is inherently ethical because it is:

> the application of one's world knowledge and skills toward (1) attaining a common good; by (2) balancing one's own, others', and larger interests; over the (3) long-term as well as the short-term, through (4) the use of positive ethical values, in order to (5) adapt to, shape, or select environments.[32] (pp. 1–2)

The book's last chapter contains an assessment tool to provoke guided reflection on the answer to the chapter title "Am I Wise?" Here are examples of reflection prompts:

(1) The "Empathy" prompt asks "When you are faced with a difficult conflict, how often do you try to put yourself in the shoes of everyone involved, even if your immediate feelings clearly place you on one side?"[32] (p. 180)
(2) The "Openness" prompt asks "Think about how you deal with new points of view and new experiences. How often are you open to doing things in a new way?"[32] (p. 181)

Another aspect of wisdom is presented in Chapter 6, "How Do We Cultivate Wisdom?" There they first discuss important cognitive fallacies that impede the exercise of wisdom, such as the *sunk cost* fallacy and the fallacy of *confirmation bias*. An especially relevant fallacy to the concept of moral development discussed above is the fallacy of *egocentrism*, where we are so caught up with self-centered concerns that we become foolish. As Sternberg and Glück view it, "wise people balance their interests with those of others" while "foolish people see other people as existing only to serve their own egocentric interests."[32] (p. 131) To guard against egocentrism, Sternberg and Glück contend that two kinds of thinking are needed: (1) *dialogical thinking*, which means "seeing multiple perspectives on problems"[32] (p. 131), and (2) *dialectical thinking*, which means an awareness that "as perspectives change over time, what people view as correct or appropriate changes as well."[32] (p. 132) Thus, practices that enhance dialogical or dialectical thinking are wisdom-enhancing practices.

While Sternberg's work is important and undeniably influential, a group of scholars at the Jubilee Centre for Character and Virtues at the University of Birmingham (UK) have further conceptualized practical wisdom. (See, for example, McLoughlin's "Do We Value What We Think We Value"[33].) Their work has led to the development and validation of a measure for practical wisdom and to an exploration of the possibilities of developing practical wisdom (*phronesis*) as part of ethics training for various professions, such as medicine, teaching, and policing. For more detail, see Kristjansson and Fowers, *Phronesis: Retrieving Practical Wisdom in Psychology, Philosophy, and Education*.[11] In their view, practical wisdom is a complex, multi-sided psychological reality involving four distinct and interacting components.

The first component is the *constitutive* component. That is, "[p]hronesis involves the cognitive discriminatory ability to perceive the ethically salient or central aspects of a situation and to appreciate these as calling for specific kinds of responses."[11] (p. 37) This component can be thought of as *moral sensitivity* or *moral perception*.

The second component is *emotional regulation*. The practically wise person will feel emotions in reaction to a situation that motivates making a decision, but will reflect on whether the emotions are appropriate and proportionate. In this view, emotions are not so much suppressed by reason, but rather emotions are *infused with reason*.

The third component is the *blueprint* component. According to Kristjansson and Fowers: "The agent's own ethical aims and aspirations, her understanding of what it takes to live and act well, and her need to live up to the standards that shape and are shaped by her understanding and experience of what matters. This amounts to what we call a blueprint of flourishing."[11] (p. 41) We can understand this component by considering the contrast in ethical decision-making between police officers who know that they want to be good and effective officers, versus those who simply enjoy exercising power over their fellow citizens.

Finally, the fourth component is the *integrative* component. Imagine a situation in which *honesty* might move you to tell a friend about the unfaithfulness of their partner, but your friend is terminally ill, and thus *compassion* might urge you to say nothing lest you add to your friend's suffering. As Kristjansson and Fowers put it:

> An individual integrates different virtue relevant considerations, via a process of checks and balances, especially in circumstances where different ethically salient, or different kinds of virtues or values, appear to be in conflict and agents need to negotiate a dilemmatic space.[11] (pp. 44–45)

Although these four components interact with one another, when viewed from a developmental standpoint they have a degree of independence that allows for some components to be more fully present than others in a particular individual. This independence has implications for developing wisdom-enhancing practices.

Such practices may impact any of the four components, but often the impact will be on the constitutive component (moral sensitivity) through enabling someone to see as salient situational aspects that had not previously been evident to them. An evidence-supported practice that can

do this involves (1) small group discussions of (2) situations with ethical dimensions (3) where the discussants are equals and (4) there is no penalty for an honest and forthright exchange of views. (For relevant background, see Fair and Fasko, "Intelligence and moral development: a critical historical review and future directions."[34] And see the Mac story earlier.[16])

As one healthcare-based example, a group called "The Clinical Problem Solvers," which has the goal of "democratizing clinical reasoning education," hosts a series of video discussions called "Virtual Morning Reports (VMR)." (A sample VMR can be found on their website at https://clinicalproblemsolving.com/virtual-morning-report-march-18-2026-2/, with further examples at https://clinicalproblemsolving.com.) The same website hosts a podcast, one episode of which (#451) was about physicians' experiences with burnout. The podcasters contrasted burnout from fatigue, overwork, and stress, which they termed "circumstantial burnout," from "existential burnout," in which the physicians' "blueprint"—their sense of who they are—conflicts with the work they are doing. A quote from an article by Talbot and Dean cited in the podcast sums up this concept of existential burnout:

> Continually being caught between the Hippocratic oath, a decade of training, and the realities of making a profit from people at their sickest and most vulnerable is an untenable and unreasonable demand. Routinely experiencing the suffering, anguish, and loss of being unable to deliver the care that patients need is deeply painful. These routine incessant betrayals of patient care and trust are examples of "death by a thousand cuts." Any one of them, delivered alone might heal. But repeated on a daily basis, they coalesce into the moral injury of health care.[35]

The seriousness and ubiquity of burnout is the subject of well-regarded studies by Shanafelt and colleagues that relate different drivers of burnout to both organizational-level solutions and individual-level solutions. For example, West, Dyrbye, and Shanafelt[36] link the driver "lack of work-home integration" with both (a) an organizational-level solution of respect by the organization for home responsibilities in setting schedules for work and (b) an individual-level solution of "Reflection on life priorities and values."[36] (p. 522) Another example is the risk of burnout is when pediatricians must interact with parents opposed to vaccination. Pediatricians who try to try to persuade mistrustful parents to do what is medically endorsed and scientifically sound for their child's welfare can suffer real moral injury when those parents discount their expert opinion.

V. Systemic Issues Affecting Health Care Decision-Making

Currently, we face new challenges in creating and maintaining "guardrails" for wise decision-making. As one example, a warning published recently in the *Proceedings of the National Academy of Sciences* (PNAS) discusses the problems created by the increased use of unvetted algorithms for public dissemination of information:

> In sum, we are offloading our evolved information-foraging processes onto algorithms. But these algorithms are typically designed to maximize profitability, with often insufficient incentive to promote an informed, just, healthy, and sustainable society. Efforts to develop an appropriate scientific or ethical oversight and understanding are still in their infancy, and the black-box and proprietary nature of many algorithms slows down this process. As a result, we have little insight into how the millions of seemingly minor algorithmic decisions that shape information flows every second might be altering our collective behavior.[37] (p. 5)

The pernicious impact these black-box algorithms can have on our collective behavior is becoming ever clearer. For example, see Robertson, del Rosario, and van Bavel who cite studies showing that as people scroll through the many information sources on the web, they make bad inferences:

> [T]hese inferences are often based on the most extreme opinions from the most extreme voices. Being overexposed to the most extreme opinions from the most extreme people can have real consequences. Believing that one's political outgroup endorses extreme political positions may lead to biased meta-perceptions, pluralistic ignorance, and false polarization.[38] (p. 5)

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The added background of polarization can make people vulnerable to being led Into dismal conspiracy theories and, even worse, a "conspiracism" that dispenses with the need for evidence, but relies instead on the repetition of innuendo and verbal gestures like "Rigged!" (See Muirhead and Rosenblum's *A Lot of People Are Saying*, p. 3.[39]) The result in too many cases can be paranoid suspicions and conspiracy theories, which are not really developed theories but can have the effect of *discrediting in advance* with claims of "fake news" standard sources of information like the free press, government agencies, physicians, and scientists, and this in turn leads to deepening partisan divides, spreading misinformation and resulting in poorer decision-making.

There are noteworthy efforts to counteract these trends. For instance, Caulfield and Wineburg provide readers a step-by-step-process with a multitude of current

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examples demonstrating in detail how "to use the web to *check* the web."[40] (p. 5) Or take the work of Norman and colleagues at the Mental Immunity Project (MIP) on "cognitive immunology" articulated in *Mental Immunity: Infectious Ideas, Mind-Parasites, and the Search for a Better Way to Think*.[12] (Consult https://mental-immunityproject.org for further information.)

While it is heartening to see people taking steps to counter misinformation, we should be wary of accepting the non-skeptical attitude expressed by two Australian researchers. After dissecting the flaws in studies purporting to show bad health effects on people living near wind turbines, they conclude, "But no one benefits from bad science."[41] (p. 3) Unfortunately, that last statement is too often false. As Oreskes and Conway document in *Merchants of Doubt,* many corporations, starting with the cigarette companies and continuing to some fossil fuel companies, have devoted considerable resources to manufacturing doubt about science when they thought their bottom lines were threatened.[42] One question that should always be asked about the spread of scientific misinformation is *cui bono*—"Who benefits?" That question can lead us to legislation or other measures to rein in those entities—just as years ago the cigarette companies were reined in, but only after hundreds of thousands of people died of cancers that could otherwise have been avoided. *In so many cases, doing this work is literally as urgent as matters of life and death.*

VI. Recommendations for Action

Misinformation does not respect political boundaries, so efforts to counteract it must be organized and active across various fields. One such effort is from the ESMED 2024 report "A New Approach to Addressing Undervaccination in Europe"[4] cited earlier, which lays out in succinct fashion the state of the problem and proposes a framework for action. That framework recommends several commonsense steps, such as: (1) national vaccine information campaigns, (2) mandatory vaccination policies such as for school attendance or for being a health care worker, and (3) social media monitoring and response teams (SMMRTs) who would scan social media channels for misleading content and, once a serious problem is noted, "would engage in real-time, deploying accurate information and counternarratives through the same channels."[4] (p. 15) This is an interesting proposal, although the details of how the SMMRTS would be funded, how they would be staffed, and how they would operate would need to be developed.

In the US, the National Academies of Science, Engineering, and Medicine (NASEM) formed a study committee to address scientific misinformation, and the committee's substantial report, *Understanding and Addressing Misinformation About Science*[13] carefully illuminates the problem's dimensions. The report draws conclusions and proposes 13 recommendations to thwart misinformation. For example, here is one recommendation:

> Recommendation 4: To promote the dissemination of and broad access to evidence-based science information, funders of scientific research (e.g., federal science agencies, non-profit and philanthropic foundations) and non-partisan professional science organizations should establish and fund an independent, non-partisan consortium that can identify and curate sources of high-quality (e.g., weight of evidence—quantity and quality) science information on topics of public interest. The consortium should also frequently review the science information from these sources for accuracy, needs, and relevance.[13] (p. 221)

This report can be downloaded for free at https://www.nationalacademies.org/projects/DBASSE-BOSE-21-02/publication/27894, and it is well worth the time of anyone seriously concerned about this problem.

One important area for action, cited both in the ESMED report and the NASEM report, is education. The NASEM report states in Recommendation 11 that "Teaching people about common manipulation techniques by propagators of misinformation about science is also effective."[13] (p. 232) A report from a group led by Jonathan Osborne of Stanford University, *Science Education in an Age of Misinformation*, provides a developed account of what this educational effort can involve.[43] Their report calls for a significant rethinking of the way schools teach science, by asking a basic question: "How can the scientific community expect to be trusted when it does not ask its teachers to explain what justifies science's claims to authority?"[43] (p. 18) Osborne et al.'s report stresses that, in addition to science education focused on fundamentals of biology, chemistry, and physics, there should be a stress on science as a community endeavor where producing knowledge is not the work of an isolated investigator in a lab:

> Contrary to the stereotypical image, [science] is a *suite of social practices* that is critical for transforming a tentative scientific claim into a generally accepted and unproblematic fact. In short, reciprocal criticism, detecting error, and resolving disagreement through ongoing investigation, communication, and publication, together with other practices to construct an agreed consensus.[43] (p. 18)

To make this concrete, the report provides four example lessons, one of which, perhaps unsurprisingly, covers Robert F. Kennedy Jr.'s "Children's Health Defense" website where Kennedy headlines "It's Time to Follow the Science: COVID Vaccines."[43] (pp. 32-33) In response, the lesson encourages students to do "lateral reading" about the scientific expertise (or the lack thereof in this case) of the information providers on this website. And lessons could be prepared that deal with the efforts to clarify and make concrete the pursuit of evidence-based medical decisions. A useful starting source for this work is Helen Pearson's *Beyond Belief: How Evidence Shows What*

Really Works where she begins her account of the rise of the evidence-based medicine movement with a tragic story about ill-founded pediatric advice that led to an increase in the incidence of Sudden Infant Death Syndrome (SIDS).[44]

One approach to educating students about scientific misinformation is to present scenarios or scripts depicting a conflicted matter, followed by a group discussion that can start with pairs of students exchanging their views and then sharing them with the larger group. Such educational practices are empirically supported as having positive effects on our mindware. (See "Intelligence and Moral Development"[34] by Fair and Fasko, pp. 24-27, for details, and see also Wagner et al.[28])

Finally, more research is needed on the topic of this article. One area that could be researched further is the impact of neglecting empirical evidence (e.g., by anti-vaxxers) on health decisions. Indeed, the NASEM report has a section "Directions for Future Research," one of which is "Validating Impacts of Misinformation About Science."[13] (p. 239) Another research area is determining how to "Bolster the Efficacy of Interventions Against Misinformation About Science."[13] (pp. 239–41) We would suggest a third specific area of research: how to prevent people from developing baseless conspiracy theories that undermine their trust in the legitimacy and reliability of science and other institutions, (e. g., the CDC). For a start on this topic, one can consult *A Lot of People are Saying* by Muirhead and Rosenblum.[39]

VII. Conclusion

We conclude by echoing the NASEM report: "[I]ndividual actions will be insufficient to make progress in this space given the confluence of forces known to shape the dynamics of misinformation about science."[13] (p. 243) Collaborations across disciplines and across political boundaries are needed—now as never before. Improved mindware is needed to inoculate many of us against the baleful pathogen of misinformation.

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Conceptual Frameworks

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