Epistemic Humility: An Overarching Educational Philosophy for Clinical Psychology Programs

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Abstract: Doctoral programs in clinical psychology and allied fields have long struggled with the task of developing a coherent teaching and training philosophy. We propose that epistemic humility (humility regarding one’s knowledge) — a rubric premised on the notion that we are all susceptible to biases and that science is the best means of compensating for them — provides a core unifying framework for educating both clinical researchers and practitioners. This framework is compatible with all three major historically defined training models in psychology (scientist-practitioner, scholar-professional, clinical science). An emphasis on epistemic humility may help to provide greater thematic coherence to graduate training, bridge the sizeable gap between science and practice, diminish resistance toward evidence-based practice, and enhance the quality of graduate coursework and training from bench to bedside.

The real purpose of the scientific method is to make sure nature hasn’t misled you into thinking you know something you actually don’t know. Robert Pirsig (1928-2017), 1974, p. 108.

The field of clinical psychology continues to struggle to find its voice: What are our unique competencies, and what exactly makes us distinctive? Our longstanding identity crisis is mirrored in perennial confusion regarding our optimal model of graduate education. Despite innumerable articles, discussions, conferences, and the founding of an entire American Psychological Association journal dedicated to the topic (Training and Education in Professional Psychology), the field of clinical psychology has had an exceedingly difficult time settling on a coherent model of how to teach and train its students (Benjamin & Baker, 2009; Eby, Chin, Rollock, Schwartz, & Worrell, 2011).

At the risk of painting with an overly broad brush, clinical psychology’s modal model of graduate education has been something of a grab-bag, featuring required core courses (e.g., assessment, psychopathology, psychotherapy, research methods, professional ethics, diversity), supplemented by several courses in relevant disciplines abutting clinical psychology, such as social psychology, developmental psychology, neuroscience, and cognition. The specific content and even delivery method (e.g., lecture versus student presentations) of both the core and “broad and general” courses are left largely or entirely to instructors’ discretion. As a consequence, there is minimal assurance that graduate students receive exposure to shared overarching conceptual or methodological themes that have animated our discipline (Lilienfeld & O’Donohue, 2009). O’Donohue and Boland (2012) likened the typical graduate curriculum in clinical psychology to a Rube Goldberg contraption, named after the American inventor famous for designing bewilderingly convoluted, multipart devices that output a simple action (such as dropping a ball into a hole). They may have been charitable, as at least Goldberg’s gadgets were carefully planned and consistently yielded the desired outputs.

In this article, we endeavor to find clinical psychology’s fundamental voice. In doing so, we propose an overarching model of education for graduate students in clinical psychology and allied mental health fields (e.g., counseling psychology, mental health counseling, social work, psychiatry, psychiatric nursing), which we term epistemic humility, meaning modesty regarding one’s own knowledge. The notion of epistemic humility is a key intellectual virtue (de Sousa, 1999) that helps students with the task of forming rational beliefs. More broadly, it is an epistemic duty — that is, an ethical duty to know (O’Donohue & Henderson, 1999). One such duty, we contend, is the ethical responsibility to know what one does not know. Consistent with this duty, the epistemic humility model strives to inculcate a thoroughgoing “scientific attitude” (Gauld, 1982) toward research and clinical evidence in all students.

As we later delineate in more detail, the epistemic humility framework is premised on two assumptions that are robustly supported by research: (a) clinical psychologists, be they researchers, clinicians, or both, are prone to certain biases merely by virtue of being human, and (b) science is the best set of safeguards developed by the human species for minimizing or overcoming such biases. As a consequence, a keen awareness of our vulnerability to error is ultimately our best hope for achieving high-quality patient care and high-quality psychopathology research, which in conjunction ostensibly comprise the raison d’être of clinical psychology.

Before proceeding further, two caveats are in order. First, epistemic humility is a pedagogical philosophy and orientation, not a pre-specified didactic rubric. Hence, we do not present specific courses, nor specific competency benchmarks (Fouad et al., 2009) for graduate education. Instead, we lay out a unifying ethos that slices across core clinical coursework as well as therapeutic and assessment training. Second, the epistemic humility framework is intended to supplement rather than supplant the three major training models for clinical psychology graduate programs, namely (a) the scientist-practitioner (Boulder) model, (b) the scholar-professional (Vail) model, or (c) the clinical science
model. This framework is in principle compatible with all three models, at least as these models were initially envisioned. Indeed, one might even contend that the epistemic humility framework merely makes explicit what all three models in their original incarnations have largely (but not entirely; see McFall, 1991) left implicit.

The Science-Practice Gap

We trust that we need not persuade most readers of the challenges posed by the science-practice gap, the substantial discrepancy between the research support for clinical procedures and modal clinical practices in “real-world” settings (Lilienfeld, Lynn, & Lohr, 2014; Reese et al., in press; Tavris, 2014). Largely as a consequence of this gap – which is perhaps better described as a canyon – many individuals with mental disorders receive grossly suboptimal treatment, or no treatment at all (see Layard & Clark, 2014, for a review that should be required reading for all clinical psychologists). At the same time, because some scholars (e.g., Breckler, 2010; Shedler, 2015) have raised questions regarding the magnitude and perhaps even existence of this gap, a few sobering reminders may be in order.

Survey evidence reveals that large proportions of practitioners are not implementing the best supported interventions for specific psychological conditions, are using empirically unsupported interventions, or both (Baker, McFall, & Shoham, 2008; Lilienfeld, Ritschel, Lynn, Cautin, & Latzman, 2013). To take just a few examples, in surveys of U.S. psychotherapists, 26% reported never or rarely administering exposure therapy for obsessive compulsive disorder (OCD: Freibet, Vye, Swan, & Cady, 2004), 73% reported not using therapist-guided exposure for OCD (Hipol & Deacon, 2013), and 83% reported never or rarely administering prolonged exposure therapy for posttraumatic stress disorder (Becker, Zayfert, & Anderson, 2004), even though exposure treatments are the scientifically-based interventions of choice for these conditions (Abramowitz, Taylor, & McKay, 2009). Even among cognitive-behavioral therapists in the Netherlands, who do frequently use exposure therapy for anxiety disorders; many of the therapeutic practices appear to be suboptimal; for example, only 39% of therapists use interoceptive exposure for patients with panic disorder (Sars & van Minnen, 2015). Among Canadian community practitioners who treat eating disorders, 21% and 44%, respectively, reported administering cognitive-behavioral therapy (CBT) and interpersonal therapy either sometimes or never, even though these are the two best established interventions for these conditions. Moreover, even among practitioners purporting to practice CBT, majorities or large minorities reported not using standard CBT techniques, such as cognitive restructuring, homework assignments, self-monitoring, or stimulus control techniques, raising questions regarding treatment fidelity (von Ransom, Wallace, & Stephenson, 2013). Perhaps even more worrisome, nontrivial proportions of mental health professionals continue to practice techniques that may place clients at risk for psychological harm. In a survey of licensed clinical social workers in the United States, Pignotti and Thyer (2012) found that 24% used critical incident stress debriefing (CISD) during the past year. This figure is troubling given that CISD has been found in controlled studies to be at best ineffective and perhaps iatrogenic for victims of trauma (Wei, Szumilas, & Kutcher, 2010).

The yawning divide between science and practice is not limited to the discrepancy between research evidence and routine clinical practice. Instead, this schism manifests itself in myriad ways in many and perhaps most clinical psychology graduate programs. In such programs, students routinely report receiving one set of messages in their coursework and research - namely, to prioritize the scientific evidence base concerning therapy outcome and process - but a competing set of messages in their clinical training - namely, to prioritize their own informal observations above scientific evidence (McFall, 1991). This bifurcation is perhaps most pronounced in clinical programs that emphasize psychotherapy, such as Psy.D. programs, but it is evident in many research-oriented Ph.D programs as well. Furthermore, over time, research-oriented and clinically-oriented graduate students frequently pursue different intellectual paths, and eventually find themselves traveling in largely distinct circles. More often than not, the former students spend much of their time in laboratories, whereas the latter students spend much of their time in clinical training sites, accruing hours for clinical internships. Indeed, Donald Peterson (2004), one of the doyens of modern clinical psychology, referred to our dual roles of clinical profession as “hermaphroditic” (p. 206), and this science-practice schism surely extends to graduate education as well.

Clinical Psychology’s Dirty Little Secret

Anyone who has taught in a clinical psychology graduate program for any extended period of time is well aware of a dirty little secret. In reality, this “secret” is a secret only because it is rarely discussed publicly. The secret is that, despite our best efforts as clinical psychology faculty instructors and mentors, many and perhaps most of our graduate students are not especially interested in becoming researchers. A few of these students were never especially interested in becoming researchers in the first place but portrayed themselves as such to gain admission to graduate programs; many were ambivalent about becoming researchers at the outset of graduate school (Gelso, 1993); and still others – although typically a minority (Perl & Kahn, 1983) – were initially interested in research, but found this interest dissipating as they progressed through graduate school. To be certain, many graduating students remain keenly interested in both research and clinical practice, but even research-oriented students with active interests in clinical work often report feeling an implicit – and at times explicit - pressure to keep their clinical interests to themselves, lest they risk being maligned by their research
supervisors.

Psychological Sources of the Dirty Little Secret

In retrospect, this dirty little secret should not have been especially surprising. Research using the Science-Practice Inventory (Leung & Zachar, 1991; see also Holmes & Beins, 2009) demonstrates that although interest in conducting research and interest in engaging in practice tend to be moderately positively correlated among undergraduates, they tend to be moderately negatively correlated among graduate students in general. That is, the more graduate students report being interested in conducting research, the less they tend to report being interested in clinical work, and vice-versa. The reasons for the apparent reversal in correlation from undergraduate to graduate years is unclear, but it may reflect the gradual self-selection of students into separable interest tracks. Furthermore, many or most graduates of clinical and counseling psychology doctoral programs express a low level of interest in statistics and research design (Zachar & Leong, 2000).

Research on the relations between interests and attitudes, although necessarily correlational and not affording conclusive inferences regarding causality, may shed light on the sources of the dirty little secret. Data indicate that whereas research-oriented graduate students tend to receive high scores on the investigative sector (reflecting interests in discovering things about the world) and low scores on the social sector (reflecting interests in helping others) of Holland’s (1985) hexagon of interests, practice-oriented graduate students tend to display the opposite pattern of interests (Zachar & Leong, 1992). This interest pattern is not limited to graduate students in clinical psychology; Mallinckrott, Gelso, and Royalty (1990) found that only 16% of students in counseling psychology doctoral programs scored highly on a measure of investigative interests.

The often unappreciated association between interests and intellectual aptitudes may further foster the split between students with primarily practice interests and those with primarily research interests. For example, individuals with social interests tend to perform somewhat more poorly in mathematics than do those with non-social interests (Ackerman & Heggestad, 1997), perhaps contributing to the “statistics phobia” familiar to virtually all psychology instructors (Chew & Dillon, 2014). Over time, weaker performance in mathematics and statistics courses seems likely to spill over into greater dislike of scientific research, further amplifying the divide between practice-oriented and research-oriented students.

The two groupings of individuals probably also differ in their cognitive styles. Mental health professionals who specialize in practice tend to report a higher reliance on intuition than do those who specialize in research, whereas those who specialize in research tend to report a higher need for cognition (a drive to engage in effortful thinking) than do those who specialize in practice. Furthermore, whereas need for cognition tends to be modestly associated with positive attitudes toward the use of empirically supported therapies (ESTs), a preference for intuition tends to be modestly associated with negative attitudes toward ESTs (Seligman et al., 2016). Leong, Zachar, Conant, and Tolièver (2007) similarly found that need for cognition is associated with psychology majors’ interests in pursuing research, but not practice, careers. The implications of these findings have received insufficient attention in discussions of graduate education. To the extent that some students in clinical psychology programs prefer to rely on intuitive thinking in their decision-making, they may be reluctant to jettison their gut hunches and clinical observations when confronted with scientific research that runs counter to these more informal evidentiary sources (Lilienfeld et al., 2013).

As a field, we have done little to address the dirty little secret. This neglect is unwise, as this secret makes it more challenging to find common ground between research-oriented and practice-oriented students. Most often, as instructors, we simply ignore this problem and pretend that it does not exist. Alternatively, we may try to persuade students with strong practice interests to embrace research. This approach is rarely successful, largely because research and practice interests appear to stem largely from differing personality and interest-related dispositions that are temporally stable (Zachar & Leong, 1992). In still other cases, we strive to inculcate a scientific attitude among our practice-oriented students. Although laudable, this effort may meet with limited success given that as a field, we have rarely articulated the epistemic essence of such an attitude. In particular, we have rarely attempted to identify a core theme that can unite both research-oriented and practice-oriented students in their goal of enhancing mental health. Fortunately, there may be a way of culting the Gordian knot.

Science as a Prescription for Humility

Philosophers of science have long debated the boundaries and essential characteristics of science (see Pigliucci & Boudry, 2013; O’Donohue, 2013, for a range of perspectives), and we do not intend to resolve this exceedingly complex issue here. These intriguing discussions notwithstanding, a compelling argument can be advanced that the essence of science is the tireless effort to combat confirmation bias (Nickerson, 1998), the ubiquitous propensity to seek out and selectively interpret evidence that is consistent with our preconceptions, and to deny, dismiss, and distort evidence that is not (Lilienfeld, Ammirati, & Landfield, 2009). Philosopher of science Sir Karl Popper (1957) similarly suggested that science is a critical method in which researchers should strive to find error in their theories by constructing risky tests to falsify these theories. Put somewhat differently, we can conceptualize science as a prescription for epistemic humility (Lilienfeld, 2010; McFall, 1991).

Science reminds us that our intuitive beliefs about the world are often erroneous (Schulman, 2017), and that we require finely honed research methods to distinguish well tested from poorly supported assertions. As social psychologists Carol Tavris and Elliott Aronson (2007) noted, science is a method of "arrogance control," as it helps us honest or, in the words of Nobel-prize winning physicist Richard Feynman (1985), science is – or at least ought to be – a bending over backwards to try to prove ourselves wrong. As Carl Sagan and
Anne Druyan (see Sagan, 1995) observed, all good scientists hear a voice in their heads that insistently intones, “you might be wrong.”

Of course, as the replicability crisis of the past decade has taught us, science is far from infallible, largely because it is practiced by fallible creatures (Ioannidis, 2005; Lilienfeld & Waldman, 2017). At the same time, the beauty of science, when practiced well, is its capacity for perpetual self-renewal and self-correction. Much as the replication crisis has been a sobering wake-up call for psychology and other disciplines, it is has forced us to develop better procedures, such as prereregistration of hypotheses and analyses, to defend against p-hacking, HARKing (hypothesizing after results are known), and other questionable research practices (QRPs) that can lead to mistaken scientific conclusions.

In the domain of clinical practice, research methods are invaluable, albeit imperfect, bulwarks against a host of causes of spurious therapeutic effectiveness (CSTEs), which are reasons why we can be fooled into believing that ineffective treatments are effective, CSTEs in clinician judgment, the mean placebo effects, spontaneous remission, effort justification, multiple treatment interference, demand characteristics, and maturation (see Beyerstein, 1997; Lilienfeld, Ritschel, Cautin, & Lutzman, 2014). A key point, which is insufficiently emphasized in graduate education, is that psychotherapy research methods, such as randomization of participants to conditions, pre-test measures, blinding of observations, and attention-placebo conditions, help to control for one or more CSTEs. Furthermore, an understanding of these methods is essential if we hope to make sense of psychotherapy outcome studies.

A scientific approach to clinical psychology does not imply that our intuitions are invariably in error; it implies that science is needed to sort out which of our intuitions are more versus less accurate. More controversially and perhaps counterintuitively to some readers, a scientific approach also implies that a primary reliance on intuition in clinical decision-making runs counter to epistemic humility. The practitioner who proclaims with scarce qualification that his or her clinical expertise should be valued above systematic research evidence is in essence saying “Trust me.” Such a clinician is also neglecting to acknowledge his or her inherent propensity toward fallibility in clinical inference (see Croskerry, 2003; Dawes, 1994, for discussions). The same holds for researchers who advance highly confident claims that are not backed by sufficient evidence or a propensity that has become far too common in many psychological domains (Lilienfeld, 2017; O’Donohue, Snipes, & Soto, 2016).

Some readers may be puzzled by our contention that science is a prescription for humility. After all, many scientists are notorious for being pigheaded and arrogant. To some degree, research bears out this cultural stereotype. Data suggest that, at least among researchers in the “hard” sciences, the most eminent scholars tend to be rated by others as competitive, vain, and hostile (Feist, 1983). Furthermore, scientists, including those in psychology, have often been less than generous in their recognition of the value of others’ work. Although these characteristics may not be typical of all scientists, the lion’s share of research in psychology and other domains is generated by a relatively small cadre of researchers who have the most influence on the field.

In proposing the epistemic humility framework, we begin with a straightforward assumption that should be noncontroversial: Essentially all clinical graduate students, regardless of their interests in research versus practice, sincerely want to help others,
The epistemic humility framework affords clinical psychology programs considerable flexibility for implementation at the curricular level. Nevertheless, this framework does impose certain general constraints with respect to curricular coverage and clinical training, as it requires instructors and clinical supervisors to consistently inculcate an attitude of modesty in their students across all phases of student education. In Table 1, we delineate some provisional recommendations for how to accomplish this goal in the context of required clinical coursework. Needless to say, these initial recommendations are hardly exhaustive, and we encourage readers to elaborate on these suggestions in discussions with their colleagues and in future writings. In anticipation of the criticism that “Well, most clinical psychology programs do these things already,” we would be remiss not to observe that this appears not to be the case. For example, only a minority of clinical psychology graduate programs provide formal coverage of research literature concerning biases and heuristics, problems in clinical judgment and prediction, or methods of enhancing clinical decision-making (Harding, 2007).

Table 1 underscores a broader recommendation that may not be self-evident: A deep understanding of the history of clinical psychology and allied disciplines is valuable, and perhaps essential, to communicating the importance of epistemic humility. This history imparts the lesson that scientific psychology can be viewed in part as a bumpy road of corrected mistakes (Wood & Nezworski, 2005). By exposing graduate students to the errors of the past, such as disastrous treatment mistakes (see Scull, 2007 and Offit, 2017, for disturbing examples), they can better appreciate (a) well-intentioned psychological (and psychiatric) scholars’ propensities toward error, (b) the perils of overreliance on unguided intuition in clinical-decision making (e.g., Grove & Meehl, 1996), (c) the need for sophisticated research methods as safeguards against error, and (d) the self-correcting engine of science. Regrettably, the history of psychology appears to have been deemphasized in graduate psychology education over the past few decades (Benjamin & Baker, 2009). Even in clinical psychology programs, in which some coverage of history of psychology is mandated, this coursework is often spotty and unsystematic. We hope that this article plays a modest role in reversing that trend.

Epistemic Humility: Relation to the Clinical Science Model

Of all prominent models of clinical psychological graduate training, the clinical science model (McFall, 1991, 2000) is perhaps the most compatible with the epistemic humility framework. At least in its initial formulation, the clinical science model wisely conceptualizes clinical doctoral education along two
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<tr>
<th>Core Clinical Course</th>
<th>Sampling of Recommended Content</th>
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<tr>
<td><strong>Statistics</strong></td>
<td>How we can be fooled by spurious statistical claims; the “new statistics” (e.g., confidence intervals, effect sizes, meta-analysis) as safeguards against error; the significance testing controversy</td>
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<td>The replication (reproducibility) crisis; the dangers of p-hacking, HARKING, and other questionable research practices (QRPs); preregistration, adversarial collaboration, open data, and open materials as partial safeguards against QRPs; logical fallacies in interpreting research; research methods as safeguards against biases (e.g., confirmation bias, hindsight bias, illusory correlation); ways of incentivizing higher-quality and more replicable research</td>
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<td><strong>Research Methods</strong></td>
<td>Differing levels of explanation in the etiology of mental illness; the dangers of focusing excessively only one level of explanation; erroneous theories of the etiology of mental disorders and what we have learned from them; debates regarding the boundaries of mental disorder; controversies regarding models of the classification and diagnosis of mental illness; cultural differences in the manifestation of mental disorders</td>
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<td><strong>Psychopathology</strong></td>
<td>The clinical-statistical debate; heuristics and biases; errors in clinical judgment and prediction, and safeguards against them; base rates and Bayes theorem; reasons why even invalid psychological tests may appear to be useful; response biases in psychological testing; structured interviews as partial safeguards against halo and confirmation biases; potential gender and ethnic biases in psychological tests; past and present misuses of intelligence tests; role of potentially corrective collateral information and ecological momentary assessment; evaluating and selecting appropriate assessment measures</td>
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<td><strong>Assessment</strong></td>
<td>The history of unsupported interventions and what we have learned from them; the dangers of iatrogenic interventions; causes of spurious therapeutic effectiveness and how research methods help to compensate for them; errors in evaluating therapeutic process and outcome; controversies regarding the roles of specific versus nonspecific factors in therapy outcome; the role of EBP as a safeguard against errors in decision-making; the use of forcing functions and decision-making aids in clinical practice</td>
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<td><strong>Psychotherapy</strong></td>
<td>The ways in ethnic and cultural variables set boundary conditions on psychological conclusions; the difficulties in disentangling cultural from genetic influences; the importance of becoming aware of one’s own biases; debates regarding the role of implicit bias in influencing behavior; the need for intellectual and ideological diversity in psychological science; finding a balance between recognizing ethnic diversity and engaging in ethnic stereotyping</td>
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<td><strong>Diversity</strong></td>
<td>The importance of informed consent in psychotherapy; the extent to which science can, and cannot, inform ethical decisions; ethical dangers of clinician underconfidence and overconfidence; the fallibility of suicide and violence risk prediction; the ethics of clinical research</td>
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<td><strong>Professional and Ethical Issues</strong></td>
<td>Using the research literature to inform clinical decisions; using therapeutic feedback to improve client outcomes; obtaining sources of information to rule out CSTEs; using ESTs to enhance client care; disconfirming hypotheses, considering alternative explanations; sharing rewards/costs and evidence base of alternative treatments with clients</td>
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Conceptually orthogonal dimensions: (a) science versus nonscience and (b) research versus practice. From this perspective, the goal of clinical psychology teaching and training is to produce scientifically-minded scholars. Furthermore, the two-dimensional scheme of the clinical science model reminds us of the necessity of distinguishing science from research, as one can perform research in either a scientific or nonscientific fashion. Just as important, one can practice clinically in either a scientific or a nonscientific fashion. Being a scientist is not a matter of whether one works in a laboratory and publishes articles; it is a matter of how one thinks about evidence. The epistemic humility framework wholeheartedly embraces these crucial distinctions, and it complements the clinical science model by further articulating the internal logic of a scientific approach to evidence.

The Psychological Clinical Science Accreditation System (PCSAS), which has been proposed as an additional and perhaps alternative accreditation system to that adopted by the American Psychological Association (Bootzin & Treat, 2015), was inspired by the clinical science model but departs from it in several ways that have received insufficient discussion. Most notably, PCSAS is at present intended to accredit only programs whose primary goal is the production of clinical researchers; as a consequence, programs...
whose primary function is to train practitioners are excluded from accreditation. This stipulation appears to run counter to the spirit of the clinical science model, which rightly emphasized that one can operate simultaneously as a clinician and as a scientist. In contrast, the epistemic humility framework is explicitly designed to encompass both research-oriented and practice-oriented clinical programs, including both Ph.D. and Psy.D. programs, and to recognize programs that train students to think scientifically regardless of their eventual career placements (see also McFall, 1991). As noted earlier, this framework is also in principle applicable to students in other mental health disciplines, such as psychiatry, mental health counseling, psychiatric nursing, and social work.

In addition, PCSAS strongly prioritizes student outcomes, with lesser emphasis on the content of graduate education. Specifically, PCSAS’s criteria for accreditation focus primarily on whether programs are producing researchers who are active contributors to the clinical science literature. Although perhaps defensible, this criterion strikes us as potentially problematic on two grounds. First, it may imply that active contributors to the published psychological literature are necessarily conducting high-quality science. If recent debates regarding difficulties with the replicability of psychological findings under the umbrella of QRPs has taught us anything, it is that this assumption is doubtful (Ioannidis et al., 2014; Tackett et al., in press). Moreover, even students who generate a large volume of peer reviewed publications may possess an insufficient perspective on the field at large to appreciate the boundary conditions and other limitations of their conclusions. Second, this criterion may overweight criterion validity at the expense of content validity. In contrast to PCSAS, the epistemic humility framework places substantial emphasis on the content of coursework, as well as of clinical and research training. In particular, it imposes a heavy onus on programs to provide students with adequate breadth and depth of knowledge regarding the fallibility of human inference and the indispensable role of science in compensating for this fallibility and more broadly, the essential epistemological attitude of science (see also O’Donohue, 1989, for a discussion of the “even Bolder model”).

Concluding Thoughts and Future Directions

Space constraints preclude us from a fuller elaboration of the epistemic humility framework and pragmatic details of its implementation. Such constraints also preclude us from providing specific resources, including recommended readings and websites, which may be helpful to instructors and clinical supervisors by bringing this framework to fruition. Needless to say, such resources will evolve and expand over time.

Up to this point, we have conspicuously neglected to address a key question: How would we know whether our proposed model is working? We would hypothesize that the epistemic humility framework, if successful, should contribute to certain measurable outcomes. On the clinical front, this framework should eventuate in, higher levels of openness to EBP and a greater willingness to monitor client outcomes using standardized measures (e.g., Lambert, 2013), as well as other quality improvement procedures. Ultimately, these clinician behaviors should hopefully translate into greater client improvement. In addition, this framework should result in an enhanced reliance on assessment instruments with well-supported psychometric properties, as well as a better understanding of how to evaluate and select such measures for clinical use. On the research front, this framework should contribute to decreased engagement in QRPs, a greater endorsement and use of data and hypothesis preregistration along with other open science reforms, and the generation of research with higher levels of quality and replicability (see Schimmack, 2014, for an introduction to the R index, a quantitative metric of replicability).

In the spirit of modeling our own epistemic humility, we should acknowledge that this framework at present remains a promissory note. If this framework, when adequately implemented, fails to yield the anticipated outcomes we have outlined, we would be forced to reconsider it or at least entertain significant modifications to it. Whether it can deliver on its ambitious promises remains to be seen. But in view of compelling evidence that we are all prone to biases in decision-making (Kahneman, 2011) and that science is our best hope for overcoming them, it would seem to be well worth a concerted effort.

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