Errors/Biases in Clinical Decision Making

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In the mid 1980s, Nadean Cool entered psychotherapy with a psychiatrist, Dr. Kenneth Olson. She was suffering from clinically significant but relatively mild and common psychological problems, such as depression, family conflict, and eating disorder symptoms. Dr. Olson was an established physician who had performed his residency at the prestigious Mayo Clinic in Rochester, Minnesota. Seemingly determined to find evidence that Cool's difficulties stemmed from early abuse, Dr. Olson used hypnosis and other suggestive techniques to unearth purportedly long-repressed memories of trauma; he also performed an exorcism on Cool in an effort to rid her of malevolent spirits. Following five years of therapy, Cool emerged with over 120 "alter" personalities, including demons, angels, children, and a duck, as well as other symptoms of multiple personality disorder, now termed dissociative identity disorder. Dr. Olson also persuaded Cool that she had been a member of a satanic cult, and that she had engaged in ritual sacrifices and the cannibalism of babies. Dr. Olson used these suggestive methods despite overwhelming evidence, well known even in the 1980s, that human memory is highly fallible and prone to error, especially in the face of suggestive influences (Loftus & Palmer, 1974).

This troubling example illustrates a crucial point: even intelligent, well-intentioned, and well-trained mental health professionals can fall prey to disastrous errors in thinking. This entry surveys the large and burgeoning research literature on errors in clinical judgment (see Garb, 1998, for a thorough, albeit somewhat dated, review). In doing so, this entry does not attempt to be comprehensive. Instead, it focuses on selected errors and biases that are especially relevant to clinical practice, including assessment, diagnosis, and psychotherapy. It also briefly discusses how clinicians may be able to compensate for these errors in their everyday practice.

Before examining specific errors in clinical judgment, it is useful to address two widespread but understandable misconceptions. First, many people presume that a focus on errors in clinical judgment implies that practitioners are somehow ignorant or inept. Nothing could be further from the truth, as the errors that we highlight are hardly unique to clinicians; they are errors to which virtually all of us are prone. Indeed, researchers are at least as vulnerable to most or all of these errors (Mahoney & DeMonbreun, 1977). Moreover, research suggests that these errors are largely or entirely uncorrelated with general intelligence (Stanovich, 2009), so they are not an indication of weak cognitive ability. To the contrary, in some cases, highly intelligent people may be especially prone to these mistakes (Shermer, 2002), perhaps because they assume erroneously that they are immune to them (Sternberg, 2004). Second, many people assume that errors in clinical judgment reflect the operation of purely maladaptive psychological processes. To the contrary, these errors are cut from the same cloth as adaptive psychological processes (Gilovich, 1991; Kahneman, 2011). Hence, a predisposition to these mistakes may be part and parcel of our cognitive apparatus. Nevertheless, the good news is that we may be able to find ways of overriding them.

Heuristics

Let us begin with a quick question. If you needed to get from Wichita, Kansas to Fort

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Lauderdale, Florida, in what compass direction would you travel? Before reading on, take just a few seconds to answer.

If you are a North American, the odds are high that you responded correctly, even if you have never been to Wichita or Fort Lauderdale (the right answer is southeast). And if you did, it is probably because you relied on a heuristic: a mental short-cut or rule of thumb. In this case, the heuristic you probably used can be described crudely as "Kansas is in the middle of the country, and Florida is near the ocean toward the bottom of the country, so I guess you need to go southeast."

Now try this one. If you needed to get from Reno, Nevada to San Diego, California, in what direction would you travel? Again, do not spend much time pondering the answer. If you are like most North Americans, you would answer "southwest." And again, that is almost surely because you relied on a heuristic. Nevada is north of California and Nevada is not on the ocean, but California is, so you would need to go southwest—that is, down and toward the Pacific coast. In this case, however, you would be wrong: The correct answer is south*east* (if you do not believe us, consult a map). Here is the problem: the heuristic you used is only approximately right, because although most of California is indeed west of Nevada, the bottom portion is actually east of Nevada.

Heuristics come to us quickly and naturally, and comprise a good deal of what people loosely call "gut hunches" or rapid insights (indeed, "heuristic" has the same root as the word "eureka"). Beginning with the pioneering work of psychologists Amos Tversky and Daniel Kahneman in the 1970s (Tversky & Kahneman, 1974; see also Nisbett & Ross, 1980), researchers have identified a large number of heuristics, some of which bear important implications for clinical judgment. As with the Wichita to Fort Lauderdale example, most heuristics work well most of the time and lead to approximately correct answers (Gigerenzer, 2007). Yet, as with the Reno to San Diego example, heuristics can lead to mistakes when misapplied or used carelessly (Kahneman, 2011; Stanovich & West, 2000). The take-home message is that people should generally rely on heuristics when in a pinch, but should be prepared to override them when necessary.

Availability

One important heuristic uncovered by Tversky and Kahneman is *availability*. This heuristic estimates the probability of an occurrence by using the ease or accessibility with which it comes to mind. If a clinician working in an inpatient Veterans Affairs hospital were asked, "Are there more patients on your unit with posttraumatic stress disorder (PTSD) than with trichotillomania (hair-pulling disorder)?" she could generate the correct answer—which is almost certainly "yes"—quickly even though she does not have access to the precise prevalence of these disorders on her unit. She can do so by consulting her memory of patients she has seen on her unit, and recalling that she has seen many patients with PTSD but very few patients with trichotillomania. In other cases, however, heuristics can lead us astray. Imagine a clinician working in an outpatient anxiety disorders clinic, and the last five patients with panic disorder the clinician has seen all happen to suffer from co-occurring eating disorder symptoms. If a student supervisee were to ask the clinician, "what percentage of patients with panic disorder exhibit eating disorder symptoms?" it is likely that she would provide too high an estimate because the recent influx of panic disorder patients with eating disorder problems is fresh in her mind.

Misapplications of availability can render us susceptible to *illusory correlation*, which is a perception of a statistical association in its absence (Chapman & Chapman, 1967). For example, a practitioner or researcher may readily recall instances in which her patients with schizophrenia experienced unpleasant or neglectful childhoods as these instances may be vivid or memorable. In contrast, she may tend to forget instances in which patients with schizophrenia had largely uneventful upbringings. As a consequence, she may perceive

a largely nonexistent association between schizophrenia and unhappy childhoods. In fact, research dating back decades suggests that the childhoods of patients with schizophrenia are often no more troubling or traumatic than those of non-psychiatric individuals (Schofield & Balian, 1959). Similarly, many other likely instances of illusory correlation, such as the lunar lunacy effect—the false belief that there is a heightened rate of strange behaviors (e.g., psychosis, suicides, homicides) during full moons (Rotton & Kelly, 1985)—also probably reflects a misapplication of the availability heuristic. People are more likely to recall instances when a strange behavior occurred during a full moon than when little or nothing of important occurred during a full moon. As a consequence, they tend to overestimate the frequency of the former co-occurrences.

Representativeness

A second key heuristic is *representativeness*. This heuristic adopts the guideline of "like goes with like." As the old saying goes, "if it walks like a duck and quacks like a duck, it's probably a duck." If a practitioner working in an inpatient psychiatric institution mostly comprising patients with psychotic disorders were asked to guess the most likely diagnosis for a newly admitted patient who displays strange beliefs, peculiar thinking, and auditory hallucinations, she would probably guess schizophrenia—and she would probably be correct. The description of the patient matches her prototype of the patient with schizophrenia, and the representativeness heuristic served her well. At the same time, representativeness does not always lead to correct answers, because books do not always resemble their covers. If the same practitioner worked in a college counseling center, where the base rate of schizophrenia is much lower than in an inpatient psychiatric unit, her reliance on a representativeness heuristic could lead her astray. Although the patient matches her prototype of a classic patient with schizophrenia, she needs to recognize that the probability that the patient meets criteria for schizophrenia may be relatively low given that it is extremely rare in her clinical setting.

As the previous example illustrates, a misapplication of the representativeness heuristic can result in a serious error: *base rate neglect*, the tendency to underweight the base rate of a characteristic, such as a disorder, in a sample. Clinicians can become so struck by the similarity of the client to a prototype that they can readily forget that the base rate of the patient's condition in their sample is low. The patient's symptoms are dramatic and vivid; they lie in our mental foreground. In contrast, the base rate of the patient's disorder in the clinic tends to be far less dramatic and vivid; it lies in our mental background. As a consequence, clinicians tend to accord it insufficient emphasis. For example, if a patient reminds a clinician of other suicidal patients he has encountered in the past, he may conclude that his patient is at imminent risk of suicide. Yet if he works in a setting in which the risk of completed suicide is extremely low, such as a graduate clinical psychology training clinic in which clients who express suicidal ideation are referred to other clinicians, he may well be mistaken.

Another manifestation of the representativeness heuristic is the *regression fallacy*. Because of the representativeness heuristic, clinicians typically expect scores of a psychological measure, such as a measure of depression, administered at one time point to be similar to scores on that measure administered at a later time point, say a few weeks later. Nevertheless, because of a well-known but often overlooked statistical principle termed *regression to the mean*, which states that extreme scores tend to become less extreme upon retesting, there is a good chance that the score will be less extreme at the second time point. Yet because individuals tend to overlook regression to the mean as an explanation for the change in scores, they may impute spurious causal significance to such change, thereby giving rise to the regression fallacy. This error has a host of clinical implications. Among other things, it can lead unwary practitioners and researchers to conclude that an ineffective or

even harmful treatment is effective. If a patient enters psychotherapy severely distressed, the odds are high that she will be less depressed in a few months, *regardless of treatment*. Nevertheless, clinicians may neglect to consider this explanation, and erroneously attribute the patient's improvement to treatment. Indeed, regression to the mean is an especially thorny problem in psychological treatment because clients are likely to seek out psychotherapy when their symptoms are at their worst, and thence regression effects are maximized. One of the principal advantages of randomized controlled trials is that when rigorously conducted, they eliminate regression to the mean as an explanation for improvement in the treatment group relative to the control group, as the likelihood of regression effects are roughly equated in both groups given a sufficiently large sample size.

Anchoring

The anchoring heuristic, more technically called anchoring and insufficient adjustment, refers to the tendency to be overly influenced by initial information, such as first impressions. When a person engages in anchoring, she fails to modify her evaluations of individuals on the basis of new information. First impressions of individuals, including snap judgments, often contain at least some accurate information (Ambady & Rosenthal, 1992), so anchoring can at times be a modestly helpful mental shortcut when other information is unavailable. Several popular books, including Malcolm Gladwell's (2006) *Blink: the power of thinking without thinking,* underscore the utility of rapidly acquired first impressions in interpersonal perceptions.

Nevertheless, these books may insufficiently emphasize a critical caveat: the anchoring heuristic can lead practitioners to draw diagnostic conclusions on the basis of insufficient information. For example, classic studies on the phenomenon of *premature closure* demonstrate that many clinicians develop fairly firm diagnostic impressions within 30 to 60<t#>s of viewing a videotaped interview with a client (Gauron & Dickinson, 1969). Such impressions may be misleading if they are not altered by later, contradictory information. People should attend to their first impressions but not be imprisoned by them.

Affect

Another mental shortcut that bears implications for clinical practice is the *affect heuristic*: the tendency to evaluate the validity of a claim on the basis of an emotional (affective) reaction to it (Slovic, Finucaine, Peters, & MacGregor, 2007). As in other cases of heuristic reasoning, this heuristic often produces correct answers. For example, imagine that I were to ask you whether it would be morally acceptable to conduct a randomized controlled trial on the effectiveness of harsh physical punishment (punching, kicking) for improving the social skills of children with autism spectrum disorder. You would probably experience an emotional revulsion to this idea, and you would rightly judge this study to be unethical.

In other cases, however, the affect heuristic can be misleading. For example, if a demanding or argumentative psychotherapy client arouses negative feelings in a clinician (what psychoanalytic therapists term a negative countertransference), the clinician may be inclined to assume that this client meets *DSM-5* criteria for borderline personality disorder (BPD). Indeed, data suggest that many clinicians readily affix the BPD diagnosis to their clients largely on the basis of their being difficult, bad, or unpleasant (Sulzer, 2013). Yet, because only a small minority of psychiatric patients who are difficult meet criteria for BPD, the affect heuristic can lead to erroneous diagnostic conclusions in this case.

Biases

Psychologists typically define biases as *systematic* errors. Certain errors, such as the scattering of darts around a bull's-eye, are largely or entirely random; in statistical terms, they are uncorrelated with each other. In contrast, biases are nonrandom or correlated; they lead people to err consistently in one direction,

such as to overestimate the rates of a history of child abuse among individuals with major depression or to underestimate the proportion of patients with bipolar disorder who exhibit improvement following an episode of their illness.

Confirmation Bias

Perhaps the "mother of all biases" is confirmation bias, a deeply ingrained error to which we are all prone (Lilienfeld, Ammirati, & David, 2012; Nickerson, 1998). Confirmation bias can be summed up with the words "seek and ye shall find." It is the tendency to seek out evidence that is consistent with one's hypotheses, and to deny, dismiss, or distort evidence that is not. Some psychologists regard confirmation bias as a variant of the anchoring heuristic, in which one focuses unduly on initial information and does not adjust away from it sufficiently in light of conflicting information.

Confirmation bias is potentially hazardous in clinical settings as it can predispose clinicians to screen out information that challenges their initial beliefs. For example, Kenneth Olson may have fallen prey to confirmation bias when he probed repeatedly for a history of suspected child abuse in Nadean Cool. As this example illustrates, confirmation bias can sometimes engender a self-fulfilling prophecy as it can lead practitioners to find evidence that is seemingly consistent with their hunches, even when this evidence is fallacious. Confirmation bias can present a serious problem in research, too, as classic work on the experimenter expectancy effect demonstrates (Rosenthal, 1994). Specifically, investigators who are insufficiently cognizant of confirmation bias may inadvertently design studies to surrender the results they fervently desire. Alternatively, they may overanalyze their data until they seem to corroborate their hypotheses, or subtly "cherry pick" the outcomes they are seeking, reporting only those outcomes that support these hypotheses.

Hindsight Bias

Another cognitive bias with important clinical implications is hindsight bias (Fischoff, 1975). Less formally, this bias is known as "the I knew it all along effect." Hindsight bias is the propensity to overestimate the predictability of events. Once the outcome of a series of events is known, such as a patient's life history, this outcome often seems inevitable. For example, after learning that a patient with schizophrenia went on a fatal shooting rampage, one might ask, "How could people who knew him not have seen that coming?" Yet, had anyone been asked to forecast the outcome, based on knowledge of the patient and his life history, the odds are high that no one would have been able to do so.

Hindsight bias has been documented in a number of studies of medical diagnosis, and almost surely applies to psychiatric diagnosis as well. In such investigations, one group of physicians is typically provided with a description of a patient's medical symptoms. The symptoms are selected so that they are vague and potentially consistent with multiple diagnoses. These physicians are asked to estimate the likelihood of each diagnosis (Arkes, 2013). An alternative group of physicians is given the same ambiguous set of symptoms but informed of the correct diagnosis, and they are then asked to estimate how likely they would have been to have made that diagnosis. More often than not, these investigations demonstrate that physicians in the latter group provide much higher estimates of the diagnosis compared with those in the former group. The knowledge of the correct diagnosis biased their estimate of how self-evident it was.

Hindsight bias can foster a related bias named *overconfidence*. Overconfidence effects have been demonstrated on a number of clinical tasks, including those in which psychologists are asked to make predictions regarding their clients' prognoses (Smith & Dumont, 1997). Hindsight bias may lead mental health professionals to overestimate their predictive capacities because the correct answers to difficult clinical questions often seem obvious in retrospect.

Neglect of Missing Data

Other important clinician biases stem from the tendency to neglect or underweight missing data. Missing data are easily overlooked, of course, because the human mind tends to be insensitive to the absence of events. As a consequence, it is easy to forget that such data exist. For example, because psychotherapists by necessity are selectively exposed to individuals with psychological difficulties, they may end up with a skewed estimate of the prevalence of these difficulties in the general population. This misestimate may stem in part from an availability heuristic, but it probably also reflects a propensity to overlook data on the prevalence of psychological problems among individuals who do not seek treatment.

One manifestation of this error is the *clinician's illusion* (Cohen & Cohen, 1984), the mistake of overestimating the chronicity of a psychological condition. For example, for many decades psychologists and psychiatrists believed that schizophrenia was essentially always marked by a progressive, deteriorating course. Nevertheless, later controlled studies disconfirmed this widespread assumption, demonstrating that many patients with schizophrenia in the community remain stable or even improve over time. This discrepancy is understandable. Practitioners tend to see the "revolving door cases," that is, the patients with schizophrenia who experience repeated relapses. In contrast, they are less frequently exposed to patients with schizophrenia who are functioning reasonably well, as these individuals require only periodic psychiatric attention.

Bias Blind Spot

As important as all of these biases are, it is important to mention another exceedingly important bias: *bias blind spot*. Bias blind spot differs from the other biases because it is a meta-bias, that is, a bias concerning a bias. Specifically, bias blind spot refers to the fact that most people are unaware of their own biases although they can readily spot corresponding biases in others (Pronin, Lin, & Ross, 2002). This meta-bias is sometimes termed the "not me fallacy," as it implies that virtually everyone but ourselves is susceptible to bias. As a consequence of bias blind spot, practitioners may assume that they are largely immune to errors in thinking that afflict others. For example, a psychologist may be aware of the literature demonstrating that actuarial prediction (forecasts based on empirically derived formulas) tends to be superior or at least equal to clinical prediction (forecasts based on informal aggregation of data in "one's head"), and that the former predictive method is almost invariably more efficient and less costly (Dawes, Faust, & Meehl, 1989). Yet she may insist that although the clinical predictions of her colleagues are fallible and prone to bias, her predictions are uncannily accurate and largely unbiased. She would almost certainly be mistaken because the biases delineated here are endemic to the human condition.

Minimizing Errors in Clinical Judgment

It is broadly true that psychological researchers have spent far more time documenting errors in clinical judgment than identifying ways to overcome or compensate for them (Lilienfeld, Ammirati, & Landfield, 2009). As a consequence, psychologists know relatively little about how to minimize errors in clinical judgment.

Nevertheless, some evidence suggests that certain "debiasing" strategies—those designed to counteract biases in thinking—can sometimes be helpful. For example, several researchers have found that strategies such as "consider the opposite" or "consider an alternative" (Galinsky & Ku, 2004) can be modestly helpful in combating confirmation bias. Such strategies encourage individuals to generate rival hypotheses to the one they had in mind and to envision alternative explanations. For example, using a "consider an alternative" strategy, a researcher who is certain that his findings on neurotransmitter functioning in

schizophrenia offer strong support for a strictly biological explanation for the disorder could be asked to entertain thoughtfully psychosocial explanations for these findings. It is not known, however, whether these strategies are helpful for debiasing individuals against errors in clinical settings.

More broadly, adopting an "outsider perspective" can sometimes be useful as an antidote against certain biases (Kahneman & Lovallo, 1993). Using this perspective, individuals are asked to simulate the view of an external individual when approaching a problem. For example, a practitioner may assume that he is particularly skilled at predicting violence among psychiatric patients, even though research suggests that the capacity of clinicians to forecast physical aggression is typically quite limited (Skeem & Monahan, 2011). Hence, when confronted with a given client suffering from a severe mental illness, he may be unduly confident that he can accurately gauge the client's violence risk. Yet, if asked to "step outside of himself" for a moment to estimate how accurate the average clinician supplied with the same information would be in predicting the client's violence risk, he might realize that forecasting this risk is not as straightforward as it initially seemed.

Research has examined the effectiveness of debiasing strategies against hindsight bias as well. At least some data suggest that asking practitioners to consider the plausibility of alternative scenarios may be helpful in this regard. For example, Arkes, Faust, Guilmette, and Hart (1988) found that encouraging neuropsychologists to entertain and explain diagnoses other than the diagnosis they selected may diminish hindsight bias and overconfidence. This intervention may work because it helps practitioners to realize that diagnoses other than those they initially considered are also viable. Nevertheless, more research is needed to examine the effectiveness of debiasing techniques against hindsight bias in other domains of psychological assessment.

In many ways, we can think of cognitive errors, including biases and the misuse of heuristics, as akin to visual illusions. Indeed, some researchers refer to these errors as cognitive illusions (Piatelli-Palmarini, 1989). Like visual illusions, cognitive illusions are byproducts of fundamentally adaptive psychological processes. Just as our brains continue to experience visual illusions even after repeated exposure to them (for example, even after viewing the famous Müller-Lyer illusion hundreds of times, we will still perceive the horizontal line connected to two outward-pointing arrows as longer than the horizontal line connected to two inward-pointing arrows even though the two lines are equal in length), our brains always remain susceptible to cognitive illusions even after we learn about them. Nevertheless, by becoming cognizant of our propensity to cognitive illusions, we can often learn to override these errors and thereby provide more accurate and evidence-based clinical judgments.

SEE ALSO: Clinical versus Statistical Prediction; Illusory Correlation

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