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The Three Faces of Overconfidence

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Abstract:

Overconfidence has been studied in three distinct ways. Overestimation is thinking that you are better than you are. Overplacement is the exaggerated belief that you are better than others. Overprecision is the excessive faith that you know the truth. These three forms of overconfidence manifest themselves under different conditions, have different causes, and widely varying consequences. It is a mistake to treat them as if they were the same, or to assume that they have the same psychological origins.

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The Three Faces of Overconfidence

The study of overconfidence is hampered by vague terminology. Many of the key terms have numerous different meanings in the vernacular, several of which lack the clarity we expect of scientific constructs. When David Brooks (2015) called Donald Trump overconfident, what exactly did he mean? Did he mean that Trump is overly optimistic about his chances of winning the presidential election? Was he objecting to Trump's shameless self-aggrandizement? Did it have to do with the size of Trump's hands? As scholars, we should strive to steer clear of the quagmire created by vague terminology. In the interests of clarity, we begin this review with a few definitions.

Overconfidence, as we will use the term, is being more confident than reality justifies; measuring overconfidence necessitates a comparison between beliefs and reality. There is a great deal of work on confidence, self-efficacy, self-esteem, optimism, and related concepts that falls short of this standard because there is no accuracy benchmark against which beliefs can be compared. The research that *does* compare beliefs with reality to assess overconfidence has usually employed one of three measures: overestimation, overplacement, or overprecision. Overestimation is thinking that you're better than you are. Donald Trump's claim to be worth $10 billion (White, 2016) represents an overestimate relative to a more credible estimate of $4.5 billion by *Forbes* magazine (Peterson-Withorn, 2016). A second measure of overconfidence is overplacement: the exaggerated belief that you are better than others. When Trump claims to be more popular than Hillary Clinton despite poll results showing the opposite (Enten, 2016), he is overplacing himself relative to his general-election opponent. A third form of overconfidence is overprecision: being too sure you know the truth. When Trump claimed certainty that thousands of Arab Americans in New Jersey publicly celebrated the fall of the World Trade Center on September 11th, 2001, he asserted excessive precision in that belief, given the lack of evidence supporting his assertion (Fox News, 2015).

In 2008, Moore and Healy reviewed the literature on overconfidence. At the time, we estimated that 46% of the 511 papers we reviewed focused on overestimation; overplacement accounted for 32% of the papers; and overprecision was roughly 22%. A search of Google Scholar for studies of overconfidence published since then identified 134 new papers. Roughly 60% of them examined overestimation in some form, 21% emphasized overplacement, and 19% focused on overprecision.

Overestimation

It is widely assumed that wishful thinking drives overestimation, especially when it comes to optimistic forecasts for the future (Sharot, 2011; Taylor, 1989). According to this logic, people self-servingly overestimate the amount or likelihood of desirable outcomes. This claim is problematic for practical, conceptual, and empirical reasons. Practically, it is unclear that self-deception is really self-serving. Holding biased or false beliefs can lead to worse decisions and worse outcomes—hardly in one's self-interest (Chance, Norton, Gino, & Ariely, 2011). Falsely believing that everybody loves you, for instance, can make you an insufferable jerk (Anderson, Srivastava, Beer, Spataro, & Chatman, 2006). Overconfident athletes, students, and contestants may fail to prepare sufficiently for the test and therefore perform worse than they would have otherwise (Vancouver, More, & Yoder, 2008). Believing that you are invulnerable can lead you to take actions that shorten your life expectancy (Loughran, Paternoster, Piquero, & Fagan, 2012). While feeling confident may, by itself, be gratifying (Killingsworth & Moore, 2016), any such utility must be weighed against the costs of making decisions based on incorrect information (Bazerman & Moore, 2013; Epley & Dunning, 2006).

The conceptual problem for the claim that wishful thinking drives overestimation is that wishful thinking requires self-deception. Optimistic bias implies that people misinterpret the facts to allow themselves to hold biased beliefs (von Hippel & Trivers, 2011). This raises the question of which part of

the self is deceiving which other part of the self. Which self knows the truth, and how can it get away with fooling the other self? Some have characterized the operations of the unconscious mind as organizing a chaotic and incomplete set of information for the conscious mind, filling in gaps and resolving disquieting ambiguities (Gazzaniga, 2011; Greenwald, 1980). Could the unconscious mind act as a sort of benevolent overlord who builds a Potemkin village in which the conscious mind can live in blissful overconfident ignorance?

This possibility implies that the conscious self can enjoy happy self-delusion if the unconscious self can successfully pull off its deceptive trick. But is the conscious interpretation of facts, in fact, where emotional responses originate? There is stronger scholarly consensus around the notion that mood and emotion arise primarily outside of conscious awareness (Pinker, 1997; Rolls, 2005). Could the unconscious mind be trying to fool the conscious mind about both the facts and how to feel about them? This explanation comes up a bit short on parsimony. Why not just fool the conscious mind into happiness and preserve the ability to make well-informed decisions? Moreover, it does not comport well with the evidence that, while there is undoubtedly unconscious cognition, the unconscious mind is not its own separate identity, with subversive goals and secret schemes - neither a benevolent overlord nor a naughty child (Wilson, 2002). The operations of the unconscious mind appear simpler and more straightforward than that (Greenwald, 1992).

The empirical problem with the claim that wishful thinking drives overestimation is that the evidence for self-deception is weak. For one thing, research has trouble distinguishing true self-deception from attempts to deceive others (be that the researcher or others), because even when the incentives for honest reporting are strong, they cannot eliminate impression management motives (for an attempt to do so, see Simmons & Massey, 2012). Additionally, research suggests overestimation does not require self-deception, as participants less skilled in a task can show even greater overestimation than their peers, perhaps due to a lack of awareness regarding what they do and do not know (Ehrlinger, Johnson, Banner, Dunning, & Kruger, 2008; Miller & Geraci, 2011). Another empirical challenge to wishful thinking is that the evidence for its existence is not strong (Gur & Sackheim, 1979). Wishful thinking would predict that the more desirable an outcome the more likely it is perceived to be. Reviews of the literature have concluded that wishful thinking effects are often difficult to detect (Krizan & Windschitl, 2007). When it can be identified at all, wishful thinking seems to operate under limited conditions, such as when all outcomes are equally likely (so that biased predictions carry little consequence and there is little basis to predict one outcome over another) (Bar-Hillel & Budescu, 1995; Krizan & Windschitl, 2009). Moreover, there is evidence showing the opposite—that desirability reduces an event's perceived likelihood (Benoît, Dubra, & Moore, 2015; Vosgerau, 2010).

In contrast to the widespread perception that the psychological research is rife with evidence of overestimation (Sharot, 2011), the evidence is in fact thin and inconsistent. Most notably, it is easy to find reversals in which people underestimate their performance, how good the future will be, or their chances of success (Moore & Small, 2008). Indeed, when a task is easy, research finds that people tend to underestimate performance (Clark & Friesen, 2009). If you ask people to estimate their chances of surviving a bout of influenza, they will radically underestimate this high probability (Slovic, Fischhoff, & Lichtenstein, 1984). If you ask smokers their chances of avoiding lung cancer, they will radically underestimate this high probability (Viscusi, 1990).

The powerful influence of task difficulty (or the commonness of success) on over- and underestimations of performance has long been known as the hard-easy effect (Lichtenstein & Fischhoff, 1977). People tend to overestimate their performance on hard tasks and underestimate it on easy tasks. Any attempt to explain the evidence on overestimation must contend with the powerful effect of task difficulty; it is not easy to do so parsimoniously with a motivational explanation. Fortunately, there are plausible theories that can explain the existing evidence fairly well, although they do not posit an important role for motivation or self-enhancement (Erev, Wallsten, & Budescu, 1994).

Are there literatures in which research has identified consistent overestimation? Two stand out: the illusion of control and the planning fallacy. Research on the illusion of control finds that people overestimate how much control they have over future outcomes (Presson & Benassi, 1996). Closer examination of this literature makes this result less impressive, however, because it generally comes from chance tasks in which actual control is zero. Just as difficult tasks predictably produce overestimation of performance, if people make any errors estimating their control when they have none, they can only overestimate it. Other paradigms produce less consistent evidence for overestimates of control (Charness & Gneezy, 2010; Li, 2011). In fact, research paradigms that give people a great deal of control find that people tend to underestimate control (Gino, Sharek, & Moore, 2011).

Evidence on the planning fallacy does indeed present consistent evidence that people overestimate how quickly they will be able to get things done, especially for large, ambitious, or novel projects (Flyvbjerg & Sunstein, 2016). However, the literature also documents ample evidence of reversals in which people underestimate, especially for short tasks (Halkjelsvik & Jørgensen, 2012; Roy & Christenfeld, 2008). This constellation of results is of course consistent with the hard-easy effect, in which people underestimate performance on difficult tasks with long completion times and overestimate performance on easy tasks with short completion times. It is also worth noting that the literature tends to explain the planning fallacy by reliance on cognitive biases such as memory biases, temporal construal, or inside vs. outside views (Buehler & Griffin, 2015). It is harder to characterize the planning fallacy evidence as motivated or self-serving overconfidence since the planning fallacy has such obvious penalties in the form of overcommitment, overscheduling, stress, frustration, and ultimate disappointment.

Overplacement

The evidence for "better-than-average" beliefs is so voluminous that it has led a number of researchers to conclude that overplacement is nearly universal (Beer & Hughes, 2010; Chamorro-Premuzic, 2013; Dunning, 2005; Sharot, 2011; Taylor, 1989). However, closer examination of this evidence suggests it suffers from a few troubling limitations (Harris & Hahn, 2011; Moore, 2007). Most of the studies measuring better-than-average beliefs use vague response scales that make it difficult to compare beliefs with reality. The most common measure asks university students to rate themselves relative to the average student of the same sex on a 7-point scale running from "*Much worse than average*" to "*Much better than average*." Researchers are tempted to conclude that respondents are biased if more than half claim to be above average. But this conclusion is unwarranted (Benoît & Dubra, 2011). After all, in a skewed distribution the majority will be above average. Over 99% of the population has more legs than average.[1] Harris and Hahn's (2014; 2011) damning critiques of the sloppy methods used by so much of the research on better-than-average effects suggests some straightforward methodological improvements.

It helps, for instance, to use a less ambiguous response scale. Svenson's (1981) survey of American and Swedish drivers, which has become the most celebrated evidence of overplacement, asked participants to place themselves in deciles and found that 93% of American drivers rated themselves above the median. (While the majority can be above average, it is statistically impossible for more than half the population to be above the median.) Evidence like Svenson's might be more impressive if he had clarified what it meant to be a good driver (van den Steen, 2004). It ought not be a surprise that people disagree about what makes a good driver. So long as there are idiosyncratic differences between people, then people will seek to develop different sets of skills. It follows that they will rate themselves as better than others when they are allowed to define the criteria (Dunning,

[1] Thanks to Shane Frederick for this excellent example.

Meyerowitz, & Holzberg, 1989). If everyone has a different construal of what constitutes good driving, then everyone can believe that they are the best in the world, and be right (at least according to their own idiosyncratic standards). They can hold these beliefs even while acknowledging that others may not agree (Roy & Liersch, 2013).

There are methods that do not suffer from this ambiguity. Some researchers ask participants to compare themselves on specific quantifiable measures against other participants in that same experiment. If we narrow the set of studies to focus on these studies, some of them do find that people expect to be better than others (Benoît et al., 2015; Camerer & Lovallo, 1999; Williams & Gilovich, 2008). Newer methods include eliciting 'belief distributions' across quantiles from participants, differentiating overplacement from rational information processing (Merkle & Weber, 2011). But there is another methodological issue which few studies address: self-selection. As Hogarth and Karelaia (2012) pointed out, self-selection can lead to apparent overconfidence. They couch their argument in the context of entrepreneurial entry, and start with a few plausible premises: many people have ideas for potential businesses; there is uncertainty about their chances for success; and those who overestimate their chances are the most likely to enter a new market to compete. The same process can operate in many settings (Cain, Moore, & Haran, 2015). Overconfident job-seekers are more likely to apply for jobs. Overconfident students are more likely to sign up for difficult courses of study. Overconfident runners are more likely to compete (Krawczyk & Wilamowski, 2016). And overconfident candidates are more likely to run for office.

Within the small set of studies not vulnerable to these critiques, the prevalence of overplacement shrinks. Indeed, underplacement is rife. People think they are less likely than others to win difficult competitions (Moore & Kim, 2003). When the teacher decides to make the exam harder for everyone, students expect their grades to be worse than others' even when it is common knowledge that the exam will be graded on a forced curve (Windschitl, Kruger, & Simms, 2003). People believe they are worse jugglers than others, that they are less likely than others to win the lottery, and less likely than others to live past 100 (Kruger, 1999; Kruger & Burrus, 2004; Moore, Oesch, & Zietsma, 2007; Moore & Small, 2008). These underplacement results are striking, not only because they vitiate claims of universal overplacement, but also because they seem to contradict the hard-easy effect in overestimation, which finds that people most overestimate their performance on difficult tasks.

Moore and Small (2007) proposed a simple reconciliation of this apparent inconsistency. Their differential regression explanation focuses on uncertainty and noise in people's beliefs about performance. If people make any errors estimating how well they have done (or will do) then it stands to reason that they are more likely to overestimate a low score and more likely to underestimate a high score. That is the hard-easy effect. As long as people have more uncertainty about others' scores, they will tend to make even more regressive estimates of others than of self. The consequence would be that they overestimate others even more than themselves on difficult tasks and come to believe that they are worse than others. The opposite would hold for easy tasks: people would underestimate others more than themselves, and wind up believing that they are better than others. The evidence is consistent with this set of predictions (Moore & Healy, 2008; Moore & Klein, 2008).

The result is that across a set of tasks that vary in difficulty, overestimation and overplacement will be negatively correlated. That is a natural consequence of the fact that task difficulty has opposite effects on overestimation and overplacement. However, it is surprising because the correlation between overestimation and overplacement tends to be so strong within tasks. It is also at odds with the simple conceptualization of overconfidence as a single unified construct; this simplistic conceptualization fails to sufficiently distinguish between its different manifestations.

The differential regression account is not inconsistent with a rational Bayesian explanation. It is, however, worth noting that there is another less rational explanation for overplacement and underplacement. This explanation posits that people focus on themselves without really thinking much

about others (Chambers & Windschitl, 2004; Giladi & Klar, 2002; Kruger, Windschitl, Burrus, Fessel, & Chambers, 2008). Egocentric self-focus can help account for the persistence of overplacement (on easy tasks) and underplacement (on difficult tasks) even in some circumstances when people do not know more about themselves than they do about others (Windschitl, Rose, Stalkfleet, & Smith, 2008). It cannot, however, account for the hard-easy effect in over- and underestimation. Moreover, it is worth pointing out that neither the egocentrism account nor the differential regression account leaves much room for motivated or self-serving processes.

Overprecision

Overprecision is the excessive faith that you know the truth. Let's say you ask your research participants to estimate the size of Donald Trump's hands. Your participants probably will not know the answer exactly, but if all they give you is a best guess, it is impossible to tell how sure they were. The most common approach to the study of overprecision to ask people to specify a confidence interval around their estimates, such as a confidence interval that is wide enough that there is a 90% chance the right answer is inside it and only a 10% chance the right answer is outside it (Alpert & Raiffa, 1982). Results routinely find that hit rates inside 90% confidence intervals are below 50%, implying that people set their ranges too precisely—acting as if they are inappropriately confident their beliefs are accurate (Moore, Tenney, & Haran, 2016). This effect even holds across levels of expertise (Atir, Rosenzweig, & Dunning, 2015; McKenzie, Liersch, & Yaniv, 2008). However, one legitimate critique of this approach is that ordinary people are unfamiliar with confidence intervals (Juslin, Winman, & Olsson, 2000). That is not how we express confidence in our everyday lives, so maybe unfamiliarity contributes to errors.[2]

Another research paradigm employs item-confidence judgments (González-Vallejo & Bonham, 2007; Koehler, 1974). Item-confidence judgments ask participants to specify the right answer and then indicate how confident they are (in percent) that their answer is correct. This is at least closer to how people are sometimes asked to express confidence in everyday life. But this approach is problematic because it stacks the deck in favor of finding overprecision. The problem is that the measure conditions on the belief about which the respondent is most sure. It's a bit like testing whether the highest bidders on eBay wind up paying too much. Focusing on the beliefs that people claim to be surest of, researchers are more likely to find that accuracy will fall below confidence.

Overprecision is the most pervasive but least understood form of overconfidence. Unfortunately, researchers use just a few paradigms to study it, and these studies might stack the deck in favor of finding overprecision. There have been some attempts to employ novel approaches to the study of overprecision in recent years, such as measuring effects on gambling behavior (Andrade, 2011). Another such attempt employs a behavioral measure that also parallels everyday decisions (Mamassian, 2008). In everyday decisions with asymmetric loss functions, uncertainty will lead people to shift their responses to one side or the other of their best guess. So, for example, if you're not sure how much money is left in your checking account but you want to make sure not to bounce a check, you should spend less. If you're not sure how wide your car is, you should avoid driving close to the parked cars on the side of the road. In each of these situations, the less sure you are, the more cautious you should be, shifting away from risk.

Mamassian's (2008) approach uses a task with an asymmetric loss function. He rewarded his participants for pushing a button at the exact moment the third light in a sequence came on. Sometimes it was worse to push the button too early; sometimes too late. Given the error variance in participants' responses, Mamassian could compute what the optimal shift in responses should be, given the shift in incentives. In fact what he found was that people shifted too little, implying overprecision. Mannes and Moore (2013) applied Mamassian's paradigm to explicit verbal judgments, asking

[2] That wouldn't explain why people consistently err in one direction, but we won't worry about that just yet.

participants to estimate the high temperature on randomly selected days in the past. The results replicated Mamassian's: too little shifting, consistent with overprecision.

However, this behavioral shift paradigm shares weaknesses with the confidence intervals and item-confidence paradigms: It is only possible to assess overconfidence over a set of items and the test requires the researcher to assume that all the test items are comparable to one another. In the behavioral shift paradigm, the researcher must compute an error variance and assume it applies similarly across items. In the confidence interval paradigm, the researcher computes an average hit rate and assumes that uncertainty and accuracy are similar across items. This assumption is likely to be unwarranted and may bias the researchers' conclusions (Soll & Klayman, 2004).

Another annoying limitation of these paradigms is that since the researcher cannot know exactly the information in the respondent's head, it is difficult to specify what they *should* believe. Moore, Carter, and Yang (2015) sought to address this limitation by studying chance events for which the researcher could specify what the actual probability distribution was. The results replicated findings of overprecision using traditional measures of hit rate. However, this was not because subjective probability distributions were narrower than true probabilities. In fact, the opposite was true. The probability distributions that participants reported were far wider than the actual distribution. Furthermore, they were not wide enough given participants' own error distributions. This perplexing result raises deep questions about overprecision and what it means to be certain of one's knowledge. These questions merit further study.

Could Overconfidence be Useful?

As a rule, decisions are best when based on the most accurate information (Bazerman & Moore, 2013). People who overestimate their chances of success may not be sufficiently motivated to invest in preparation and practice (Stuart, Windschitl, Smith, & Scherer, 2015; Vancouver et al., 2008). In fact, those who envision the most desirable outcomes may actually be the worse for it (Kawada, Oettingen, Gollwitzer, & Bargh, 2004; Oettingen, Mayer, & Portnow, 2016). There would have to be real benefits of overconfident beliefs for people to choose them (either consciously or unconsciously) over accurate beliefs.

Here, we consider two possible benefits of overconfident beliefs: intrapersonal and interpersonal. Intrapersonal benefits of overconfident beliefs derive from the simple fact that believing in yourself can feel good. Although correlational evidence is consistent with the notion that confidence is associated with subjective well-being (Killingsworth & Moore, 2016), people are more likely to endorse overconfidence because they claim to believe that optimistic beliefs increase actual outcomes (Armor, Massey, & Sackett, 2008). However, people are at least sometimes overly optimistic about the performance benefits of optimism (Tenney, Logg, & Moore, 2015). In sum, the evidence for intrapersonal benefits of overconfidence is weak.

The evidence for interpersonal benefits of overconfidence is stronger. A number of researchers have documented ways in which the display of confidence increases interpersonal influence in potentially beneficial ways. Confidence makes people more persuasive and influential (Radzevick & Moore, 2011). It also increases their attractiveness (Murphy et al., 2015). Confidence may make political candidates, including Donald Trump, more persuasive and compelling (Magee & Frasier, 2014; Zullow & Seligman, 1990). More confident people are more likely to be elevated to positions of status and authority in groups (Anderson, Brion, Moore, & Kennedy, 2012). While a preference for confident leaders may make sense if there is a correlation (however weak) between confidence and competence, there is real risk in selecting overconfident leaders (Malmendier & Tate, 2005; Schrand & Zechman, 2012; Simon & Houghton, 2003).

Individual differences

Some people, including some politicians, do seem more overconfident than others. Are there stable individual differences in overestimation, overplacement, or overprecision? Perhaps the most notable claim has been that men overplace themselves more than women (Barber & Odean, 2001; Jonsson & Allwood, 2003; Niederle & Vesterlund, 2007; Pulford & Colman, 1997). But male overplacement is far from universal (Nekby, Thoursie, & Vahtrik, 2008; Sharma & Shakeel, 2015), and numerous studies fail to find gender differences (Acker & Duck, 2008; Deaves, Lüders, & Schröder, 2010; Mannes & Moore, 2013; Moore & Swift, 2010).

There are other findings of individual difference. Schaefer et al. (2004) report a correlation between extroversion and overprecision. Narcissism predicts overestimation in some studies (Ames & Kammrath, 2004; John & Robins, 1994) and overprecision in another (Campbell, Goodie, & Foster, 2004). Paulhus's (2003) over-claiming measure seems designed to assess overprecision. And Paulhus and John (1998) identify desirable responding as a measure of trait self-enhancement.

Moore and Dev (2017) included these measures, along with others, in a pre-registered study of individual differences in overconfidence. Their results fail to replicate any of the original findings that inspired their design. This failure echoes a similar failure in a larger project that measured overestimation, overplacement, and overprecision across 18 trivia quizzes and tested for correlations with 17 different individual difference measures, including self-esteem, the generalized sense of power, perspective-taking, and others (Moore & Swift, 2010). The failure to replicate published findings of individual differences in overconfidence should undermine belief in the link between overconfidence and individual differences.

It is possible, of course, that overconfidence is correlated with personality, but that the tasks we used failed capture it. No doubt, tasks vary in the degree to which they activate motives toward self-enhancement. Paulhus and John (1998), for instance, distinguish egoistic from moralistic biases. Trivia questions probably have few moral or ethical implications. As such, maybe we should not be surprised that the BIDR, which Paulhus and John identify as a measure of moralistic bias, is not correlated with overconfidence on trivia quizzes.

However, narcissism is a measure of egoistic self-deception that should predict overestimation (John & Robins, 1994). If it predicts overestimation in some domains (Ames & Kammrath, 2004) but not others (Moore & Dev, 2017), it would appear that additional research will be necessary to identify the circumstances under which each of these individual differences affects which types of overconfidence and in which domains. However, another possibility is that the empirical record includes false-positive results that will not replicate. Some of the published reports of individual-difference correlates of overconfidence might not be robust to replication.

We doubt that there are stable and general individual differences in overestimation or overplacement. By contrast, overprecision does seem to demonstrate more intra-individual consistency (Moore & Swift, 2010), leaving open the possibility that there are meaningful individual differences in the degree to which people are sure that they know the truth. On the other hand, intra-individual consistency in overprecision may prove to be little more than individual differences in numeracy or understanding of confidence intervals.

Conclusions

If this review has a single point, it is this: Overconfidence is not a single unitary construct. Overestimation, overplacement, and overprecision differ from each other in numerous ways, large and small. They are not affected the same way by different conditions. For instance, overestimation and overplacement respond in opposite ways to task difficulty, whereas overprecision is generally unaffected by it. If this review has a second point, it is this: vague terminology and research methods have undermined the value of too much prior research. It behooves scholars interested in studying overconfidence to employ clear measures immune from the critiques that have hobbled traditional

research methodologies. Many interesting research questions remain to be answered. If those studies are worth doing, they are worth doing properly, using clear measures that allow researchers to unambiguously identify the existence of overconfidence.

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