



The Cocksure Conundrum: How Evolution Created a Gendered Currency of Corporate Overconfidence

Richard Ronay¹ · William W. Maddux² · William von Hippel³

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Abstract

Biological differences between men and women mandate that women's obligatory investment in reproduction is significantly greater than that of men. As a result, women have evolved to be the “choosier” of the two sexes and men have evolved to compete for female choice. To the degree that overconfidence is an effective tool for attracting mates and driving away competitors, greater competition among men suggests that they should express more overconfidence than women. Thus, sexual selection may be the primary reason why overconfidence is typically more pronounced in men than it is in women. Sexual selection may also be a distal, causal factor in what we describe as a cult of overconfidence pervading modern organizations and institutions. Whereas overconfidence was once regulated and constrained by features of ancestral life, levels of social mobility and accountability in contemporary society and modern organizations make it increasingly difficult to keep this gendered bias in check.

Keywords Overconfidence · Sexual selection · Evolutionary psychology · Gender · Competition · Risk taking

“Confidence is very sexy, don’t you think?”

–Jack Palance, actor, 1994 TV commercial for men’s aftershave

Overconfidence, or the tendency to perceive one’s own skills and abilities as greater than they actually are (for a review, see Moore & Healy, 2008), is a robust human bias. The expression of overconfidence is moderated by cultural context – for

✉ Richard Ronay
r.ronay@uva.nl

¹ University of Amsterdam Business School, Plantage Muidergracht 12, 1018 TV Amsterdam, The Netherlands

² University of North Carolina at Chapel Hill, McColl 4419A, CB 3490, Chapel Hill, NC 27599-3490, USA

³ University of Queensland, St Lucia, QLD 4072, Australia

example, East Asians are less prone to displays of overconfidence than are North Americans or Western Europeans (e.g., Markus & Kitayama, 1991; Yates et al., 1997) – but the tendency toward self-enhancement and overconfidence is common worldwide (expressed in culturally acceptable ways; Sedikides et al., 2003). Importantly, overestimation of one's own ability is not simply a matter of intentional bluff; many people genuinely believe themselves to be more attractive, skilled, intelligent, and capable than they actually are (Epley & Whitchurch, 2008; Kruger & Dunning, 1999; von Hippel & Trivers, 2011a).

Overconfidence in one's skills, knowledge, or abilities differs from a high level of well-calibrated confidence, which is high confidence that matches a high level of skill, knowledge, or ability. Nonetheless, the allure of overconfidence may derive from the fact that it hijacks the information value exuded by accurately high confidence. In other words, although confidence and overconfidence are conceptually distinct, they manifest themselves in the same set of behavioral displays – strong opinions, defined ideas, a calm and relaxed bearing, and a general demeanor of self-assurance (Anderson & Kilduff, 2009) – which appear to be largely indistinguishable from each other when observed in the cut-and-thrust of social exchange (Anderson et al., 2012).

Why are People Overconfident?

Psychological explanations for the widespread tendency towards self-aggrandizement have focused primarily on intrapersonal hedonic benefits, such as higher self-esteem for those who believe they are better than others, and reduced reactivity to stressful events (e.g., Dunning et al., 1995; Taylor & Brown, 1988). An alternative possibility, however, is that overconfidence may be an evolved strategy of considerable utility for achieving status and other types of social currency, such as alliance formation, persuasion and influence, romantic attraction, and ultimately reproduction (von Hippel & Trivers, 2011a).

Individual differences in traits that lead to differential “fitness” within a given ecology result in reproductive variance (i.e., natural selection; Darwin, 1859; Andersson & Iwassa, 1996)). As a result, certain individuals' expressed traits enable them to leave a greater genetic footprint than that of others. Across generations, this process leads to a proliferation of whatever genes assist in survival and reproduction. And so the footprint grows. The pan-cultural nature of the overconfidence bias (Sedikides et al., 2003) suggests that it may well be one such adaptive trait, selected for over many thousands of generations (Johnson & Fowler, 2011), likely predating the separation of our hominin ancestors from the ancestors of modern chimpanzees (e.g., Moore et al., 2009; Noë et al., 1980). Indeed, Daniel Kahneman speaks of overconfidence as being fundamentally built into the structures of human reasoning (Shariatmadari, 2015).

Given that overconfidence can lead to faulty assessments of one's circumstances, and hence potentially perilous decisions, it seems odd that overconfidence might have provided an advantage in the context of natural selection. Believing oneself single-handedly capable of bringing down a woolly mammoth was unlikely to have been a winning attitude for our ancestors. Nonetheless, in

competitive settings marked by uncertainty, overconfidence has the potential to maximize individual outcomes, so long as the associated costs of failure are outweighed by the benefits of possible success (Johnson & Fowler, 2011; Számadó, 2000). In other words, when the potential gains of achieving a particular goal outweigh the potential costs of failing, risky strategies such as overconfidence have adaptive utility (Adams & Mesterton-Gibbons, 1995; Számadó, 2003).

This perspective is consistent with Error Management Theory (Haselton & Buss, 2000), which predicts the emergence of psychological biases when; (1) the decision had recurrent impacts on fitness (reproductive success), (2) the decision is based on uncertain information, (3) the costs of false positives and false negatives were recurrently asymmetrical over evolutionary time. Overconfidence in one's abilities meet these criteria quite well under many circumstances.

First, overconfidence potentially impacts fitness by helping individuals compete for sexual opportunity (Murphy et al., 2015) as well as other material and social resources that contribute to reproduction, such as status, prestige, and material rewards (e.g., Henrich & Gil-White, 2001). Second, uncertainty would have been a necessary condition for overconfidence to evolve, as certainty does away with the need for competition and signaling. In such cases, the strongest or most obviously qualified rival simply takes the desired resource. Indeed, as the uncertainty of contested outcomes increases, so too does the utility of overconfidence (Johnson & Fowler, 2011). Third, the costs in lost opportunities associated with being underconfident, or even accurate, are often greater than the costs associated with being overconfident, particularly when people compete with each other over limited resources (Soldà et al., 2021).

As a result of these processes, in situations where the potential gains of overconfidence outweigh the potential risks of overclaiming, overconfident individuals may have an advantage. If so, then overconfident displays may be a functional adaptation that help individuals acquire material and social benefits, depending on the relative magnitude of the risks and rewards that a given situation affords (Adams & Mesterton-Gibbons, 1995; Számadó, 2000, 2003). Consistent with the above reasoning, overconfident people gain a host of social and material benefits, such as increased perceptions of competence and a rise in social status and perceived leadership potential (Anderson et al., 2012; Ronay et al., 2019). As status increases, physiological markers of stress such as cortisol decrease (Sherman & Mehta, 2020) and dopamine sensitivity increases (Morgan et al., 2002), providing proximate, secondary mechanisms for the relationship between overconfidence and the maintenance of positive affect in response to social stressors (Ronay et al., 2019). Thus, it comes as no surprise that overconfidence is selected for in CEO appointments, despite the higher probability of overconfident leaders initiating value-destroying investments (Goel & Thakor, 2008) and financial reporting fraud (Schrand & Zechman, 2012). And perhaps, as we outline below, no surprise that fewer than 5% of CEO positions in the US and Europe are held by women (Edgecliffe-Johnson, 2018).

Why are Overconfident People So Often Men?

This distally focused, status-enhancing account of overconfidence has at least one important moderating factor: The available evidence strongly suggests that men tend to be more overconfident than women. For example, men exhibit more overconfidence than women in academic achievement (Bengtsson et al., 2005), finance and trading (Cueva et al., 2019; Prince, 1993), conflict and competitions (Johnson et al., 2006; Niederle & Vesterlund, 2007), science and mathematics (Ehrlinger & Dunning, 2003; Hyde et al., 1990), past performance (Reuben et al., 2012), intelligence (Steinmayr & Spinath, 2009), and on general knowledge and cognitive tasks (O’Laughlin & Brubaker, 1998; Pallier, 2003). By way of example, in one study, 70% of men and 30% of women, overestimated their work performance and professional skills (Lindeman et al., 1995). While under-confidence is generally the exception, it is more often women than men who err on the side of excessive humility (Lenney, 1977; Small et al., 2007), underestimating their chances of success across various outcomes (Erkut, 1983; Mura, 1987). Even successful women are more likely to attribute their triumphs to external causes, such as others in their team, or luck, rather than to personal aptitude (Campbell & Hackett, 1986; Haynes & Heilman, 2013; LaNoue & Curtis, 1985).

One potential origin of these observed gender differences is biased sampling, in that prior research has often assessed overconfidence in what are considered traditionally masculine domains. However, we argue that overconfidence is not a direct product of domain importance, expertise, or even stereotypicality; rather it is a product of the desire to persuade others of one’s competence in a given domain (Hoffman & Yoeli, 2022; von Hippel & Trivers, 2011a). As such, it is not so much the male-bias of the domains that matters, but the degree to which perceived ability in the domain can help people compete with members of the same sex or attract members of the opposite sex.

Thus, our theorizing also suggests that in contexts that stimulate competition between women, we might see stronger expressions of female overconfidence. For instance, given the importance of social support to female reproductive success (Campbell, 2004; Taylor et al., 2000), we might expect greater female overconfidence in domains related to emotional intelligence, such as empathy (Muthukrishna et al., 2018). And given that attractiveness is a primary dimension of competition for women (Blake et al., 2018; Buss, 1989), we might also see greater overconfidence in attractiveness among women than among men. A finding that is potentially consistent with this possibility is that the correlation between self- and other-ratings of physical attractiveness is substantially lower for women ($r=0.29$) than it is for men ($r=0.53$) (Marcus & Miller, 2003; see also Pereira et al., 2019).

Despite these possibilities, there are two important caveats that suggest male overconfidence is more important than female overconfidence in attracting a mate. First, with greater variability on a trait, competition for that trait becomes more important. In short-term mating the playing field among females is much more equal than it is among males (Brooks, 2021), suggesting that overconfidence is more likely to be wielded by males than females in short-term mating contexts. In long-term mating, competition among females is more focused on male traits that

confer status, and as such, we might expect female status competition to increase with greater variability in male status and income. Support for this prediction can be seen in the finding that women's self-sexualization occurs to a greater extent in environments that are economically unequal (Blake et al., 2018). Maximizing one's beauty is a fruitful strategy for attracting high-status male partners (Udry & Eckland, 1984), which historically, has been an important strategy (indeed, sometimes the only strategy) for female survival and social mobility (Blake & Brooks, 2019).

But this possibility leads to our second point, which is that competition among females for long term mates is more focused on male traits that are not directly observable and hence can only be detected with greater uncertainty (e.g., the capacity to gain resources and assist in parental care giving; Taylor et al., 2000). As noted above, uncertainty magnifies the impact of overconfidence. As a consequence, overconfidence has more potential to enhance perceptions of important male traits (such as competence) than it does to enhance perceptions of important female traits (such as physical attractiveness). Perhaps for this reason, Blake (2018) finds that expenditure at beauty salons and women's clothing stores also covaries with economic inequality, as adornments may be a more viable means of amplifying physical attractiveness than overconfidence. Women's relative overuse of image-enhancing filters and photo editing (Dhir et al., 2016) may stem from similar motivations. The bottom line here is that males' internal assets are more readily distorted via overconfident claims.

These differences in adaptive pressures are not unique to humans, and although cognitive tools such as language, theory of mind, and episodic foresight have dramatically enhanced the scope of human deception (Dor, 2017; Suddendorf et al., 2022), false signaling in the context of sexual competition is widespread. For instance, Noë et al. (1980) examined the role of dominance in explaining social rank within chimpanzee hierarchies, identifying three categories of dominance displays – agonistic, bluff, and competitive. They found that male chimpanzee's social rank to be tied to displays of agonistic dominance (direct physical dominance) and bluff displays (closest to overconfidence). Females social rank was linked only with dominance in competition for space – such as giving way when another is approaching; and social competition – such as refraining from interacting with another partner because another chimp usually acts as partner to the third. Consistent with the human data, overconfidence has the greatest utility in the context of agonistic confrontations and bluff displays.

We can see similar effects further afield from our genetic roots: consider male fig wasps who signal their fighting ability during territorial competitions by displaying their impressive mandibles (Moore et al., 2009). Wasps with large mandibles are intimidating as they can inflict significant damage on opponents. Capitalizing on this advantage, there is an atypical male phenotype that develops mandibles 50% larger than expected for body size. These males are competitive signalers and engage in fewer fights than typical males but have higher mating success. Nonetheless, when compelled to combat, they fare poorly and incur more injuries than a typical male. Taken together, these examples from our near and distant cousins suggest that male sexual competition frequently takes the form of exaggerated signaling, a strategy that may be well served by self-deceptive overconfidence (see Angilletta et al., 2019).

Gendered Footprints in Time Trivers' (1972) theory of differential parental investment begins with the premise that reproduction is a lopsided affair for most animals, humans included. For women, reproduction involves a considerable obligatory biological cost; gestation, birth, and lactation demand years of maternal care, with the added risk of becoming the sole caregiver should the selected male partner prove unreliable (Campbell, 2002). In contrast, men's *minimum* parental investment requires only a few minutes of exertion.

These huge differences in the potential costs and benefits of sexual congress result in a reproductive ceiling for women that is much lower than that of men, and potential costs for women that vastly outweigh the potential costs for men. Indeed, while the current record for women is held by an eighteenth century Russian peasant, surnamed Vassilyev, who apparently gave birth to 69 children, outside of such anomalies most women who reach reproductive age give birth to at least one child and fewer than a dozen, and so it has been for millennia. The picture is very different for men, as the greater choosiness of women and the lower costs of reproduction for men increase reproductive variance between males (Betzig, 2021; Brown et al., 2009). Many of our would-be male ancestors died childless because they were never chosen as a partner (Daly & Wilson, 1983), while some men's reproductive output extended into the dozens, or occasionally even hundreds – with the current record held by Moulay Ismail ibn Sharif, a former Sultan of Morocco, who is recorded to have fathered 888 children (Kruger, 2007). Across evolutionary time, these sex differences in choosiness and reproductive costs meant that men faced a more competitive reproductive landscape than did women – the greater the potential variation in reproductive success, the greater the competitive pressures of selection.

Evidence for these sex-differentiated patterns of reproduction can be found in our DNA (Seielstad et al., 1998; Stoneking, 1998), which reveals more ancestral mothers than fathers in our collective gene pool (Balaesque et al., 2006; Cummins, 2001; Hammer et al., 2008). Y-linked DNA (inherited only from ancestral males) shows less diversity than does mitochondrial DNA (inherited from only ancestral females), suggesting that certain selective pressures may have weighed more heavily on men than they have on women. We are not trying to suggest that overconfidence is a Y-linked trait, and indeed, overconfidence likely predates the separation of our hominin ancestors from the ancestors of modern chimpanzees. Rather, this evidence for greater male within-sex variability in reproduction highlights the more competitive landscape faced by males across time. Under such circumstances, the potential gains of risky strategies like overconfidence are more likely to outweigh the potential risks for males, giving overconfident men an advantage.

Sex-differentiated adaptive pressures have also been invoked as a distal cause for men's relative inclination towards a host of competitive pursuits, including entrepreneurship (White et al., 2006), heroics (Farthing, 2005), future discounting (Daly & Wilson, 2005), risk taking (Dekel & Scotchmer, 1999; Ronay & von Hippel, 2010), and violence and aggression (Archer, 2006; Daly & Wilson, 1989; Wilson & Daly, 1985). While overconfidence may well be an important

unmeasured variable in many of these contexts, its greatest utility likely follows from its status-enhancing social function. For example, Anderson et al. (2012) found that overconfidence is associated with higher levels of peer-rated social status, in both short-term and long-term groups. Status is tightly coupled to social advantages and material wealth, and because these assist with provisioning and parental care, high social status is strongly desired by females when assessing potential romantic partners (Hopcroft, 2006). Social status, in turn, is a good predictor of one's genetic footprint – anthropological work shows clear and consistent links between status and reproductive success (Betzig, 2012; Turke & Betzig, 1985; von Rueden et al., 2011), with von Rueden and Jaeggi (2016) finding that status is a significant predictor of male reproductive success in 33 non-industrialized societies across the world.

It is important to keep in mind that, despite these generalizations, parental care varies considerably across species and contexts (Kokko & Jennions, 2008). For instance, a small number of shore birds have polyandrous mating systems that are accompanied by high levels of male parental care, leading to female-biased operationalized sex ratios (OSRs), along with stronger reproductive competition among females than males (Emlen & Oring, 1977). Female competition for reproductive opportunities is also relatively strong in a few cases of social mammals where female rank and reproductive success are closely correlated, such as Kalahari meerkats (Clutton-Brock et al., 2002) and spotted hyenas (Holekamp et al., 1996). Nonetheless the logic underlying parental investment theory (Trivers, 1972) holds even in such cases; sexual selection typically has its strongest effects on the sex that invests least in the offspring, and mate choice is exerted mainly by the sex that invests more, which in the majority of species is the female (Andersson & Iwasa, 1996). In mammals, where male-only care is completely absent and female-only care exists in about 90% of species (Clutton-Brock, 1991), males typically compete for females more strongly than females compete for males. Nonetheless, in humans the effect of differential parental investment in mating competition is diminished by the fact that humans are also pair bonding, and hence all males and all females must compete for access to preferred members of the opposite sex (Stewart-Williams & Thomas, 2013).

Overconfidence and Risk-Taking

In the context of sexual competition, the status-enhancing benefits of overconfidence comport well with men's relative proclivity toward risk-taking (Byrnes et al., 1999). Because risky decisions involve balancing potential costs and benefits (e.g., Bernoulli, 1738; Friedman & Savage, 1948; Real & Caraco, 1986; Rubin & Paul, 1979), calibration of one's capacities can help people assess when a risk is worth taking, whereas overconfidence can lead to unnecessary or excessive risk (e.g., Krueger & Dickson, 1994; Malmendier & Tate, 2005, 2008). This logic suggests that overconfidence can drive greater risk-taking, but evidence for this causal inference remains unclear (Broihanne et al., 2014; Camerer & Lovallo, 1999; Ronay et al., 2016).

Alternatively, the causal direction might go the other way – an inherent proclivity toward risk might lead men to express overconfidence more strongly. According to this possibility, overconfidence is not only a precursor to unnecessary risk;

overconfidence might be a strategy adopted by people in service of a greater risk orientation or a greater focus on short-term gains (see also, Maner & Hasty, 2022). When exaggerated displays of confidence go undetected, as they frequently do (Ronay et al., 2019), overconfidence can provide a status boost via inferences of greater competence (Anderson et al., 2012; Tenney et al., 2019). But false signaling can also become apparent and invite challenge (Ligon & McGraw, 2016; Tibbets & Izzo, 2010), leading to loss of social standing (Bromley, 1993; Kennedy et al., 2013; Tenney et al., 2007, 2019) via perceptions of arrogance (Murphy et al., 2015), low competence (Ronay et al., 2019), and low value as a collaborative partner (Tenney et al., 2019). Within small scale societies overconfident displays, classified as “big man” behaviors, are rarely tolerated and group-leveling mechanisms are used to regulate against such displays (Boehm, 1999).

In appraising such risks, differences in selective pressures appear to have played a role in shaping the strategies of men and women (Baker & Maner, 2009; Byrnes et al., 1999; Daly & Wilson, 1997; Ellis et al., 2012; Wilson & Daly, 1985). Proximate biological mechanisms, such as higher levels of testosterone, focus attention on rewards and reduce sensitivity to losses (van Honk et al., 2004), thereby increasing competition and risk-taking (Apicella et al., 2008; Coates & Herbert, 2008; Dabbs & Dabbs, 2000; Kurath & Mata, 2018; Ronay & von Hippel, 2010). Dynamic and interacting fluctuations in testosterone and cortisol also play a role in the expression of risk (Mehta et al., 2015) and competitive behavior (Knight et al., 2022). In short, the costly inclination of men toward risk-taking, and the neuroendocrine mechanisms that regulate the expression of these tendencies (Wingfield, 2017), may be the legacy of countless generations of men competing with each other for females.

Although female expressions of risk taking may be tailored to different contexts in a similar manner to overconfident displays (Fessler et al., 2004), given differences in adaptive pressures faced by males and females, there is much more utility in physical risk taking for men than there is for women (Ronay & von Hippel, 2010). And while the above might suggest that overconfidence should correlate with testosterone, there is not good evidence for this relationship. There are no reports in the literature of associations between overconfidence and testosterone measured via saliva (Johnson et al., 2006; Ronay et al., 2017) or hair samples (Ronay et al., 2018), and mixed findings emerge when correlating overconfidence with 2D:4D (a potential proxy for individual differences in testosterone; Dalton & Ghosal, 2018; Ronay et al., 2018; da Silva et al., 2020).

Whether overconfidence causes greater risk-taking or is a manifestation of this tendency, the costs are clear; young men occupy the highest demographic category for early mortality in industrialized nations (Kruger & Nesse, 2004). Men are more likely than women to kill and be killed (Fridel & Fox, 2019), to die in automobile accidents (Mannocci et al., 2019), and to die from accidents while engaging in sports or other leisure activities (Kruger & Nesse, 2004). Despite these costs to survival, greater variance in male than female reproductive success means that sexual selection may have favored those males who are willing to shoulder such risks to outcompete other males and attract females (Andersson, 1994).

Consistent with this line of reasoning, overconfidence appears to be a strategy well suited to intrasexual competition. For instance, overconfidence is associated

with greater success attracting romantic interest and deterring romantic rivals and agent-based models suggest that as competition increases, the deterrent effect of overconfidence on potential rivals yields a more positive effect on the likelihood of romantic success (Murphy et al., 2015). Although gender did not moderate these effects, because competition among males for females is typically steeper than it is among females for males, overconfidence provides greater utility for males – attracting mates who value competence and the status afforded by inferred competence, and intimidating rivals who might otherwise compete. Furthermore, women are attracted to confident men to a greater extent than men are attracted to confident women (Tracy & Beall, 2011), perhaps in part due to the important role that confidence plays in creating and enabling male social and professional success.

Overconfidence is a social tool, and like any tool it must fit the job at hand. Like other forms of self-deception, overconfidence should be expressed most strongly when persuasion is paramount, such as when people compete for resources or come into conflict with other groups (Butterworth et al., 2022). For instance, Soldà et al. (2020) find that overconfidence is more strongly expressed when people anticipate having to convince others of their competence, biasing their information search in a manner that supports their persuasive goals. Even though overconfidence can invite social costs, its utility in competition is tied to the *relative* advantages it affords (Soldà et al., 2021), and in the context of sexual competition, men's relative advantages are more closely tied to their reproductive success than are women's. Thus, over time, the mate-attracting and rival-deterring benefits of overconfidence may have positioned overconfidence to be disproportionately adaptive among men versus women.

The Social Regulation of Overconfidence

Overconfident leaders have the potential to provide group-level benefits, such as enhanced intragroup motivation, or the attraction of coalitional partners and intimidation of rival groups. Such positive effects have been noted by contemporary organizational scholars. For instance, overconfident leaders may better communicate a clear organizational vision (Shipman & Mumford, 2011) and better maintain the organization's strategic direction (Bolton et al., 2012). Thus, there may have been numerous benefits to group members for granting overconfident people status and influence over their group. Nonetheless, balancing these benefits against the potential harms of overconfident leaders would have required careful social regulation. Just as dishonest signaling is kept in check among non-human species by direct challenge (esp. of non-costly signals; Rohwer & Rohwer, 1978; Tibbetts & Dale, 2004), overconfidence displays are also kept in check by others.

For most of our evolutionary history, it is thought that humans lived in small bands of hunter gatherers of up to 150 individuals (Marlowe, 2010) and people typically remained within the same collection of social groups for the entirety of their lives. Knowledge of others was acquired either by face-to-face interaction or by word of mouth (Moore, 1996). Longstanding knowledge of everyone else in the group would have lowered the threshold at which inflated signaling could be

recognized. Given the thorough understanding that group members would have had of each other's actual competence (Megarry, 1995; San Martin et al, 2015), overconfidence would have played a less influential role in group decision making and would have had less utility as a deceptive social strategy. In such stable social environments, overconfident displays may have been most effective when interacting across groups. For instance, golden-crowned sparrows develop badges of status to denote their relative social rank, which minimize costs of unnecessary conflict over mates, food, and territory. When researchers manipulated these signals by painting larger status badges on less dominant birds, they found that the enhanced badges fooled strangers – with the birds winning dominance in interactions with birds from neighboring flocks – but had no effect on dominance interactions among flock-mates (Chaine et al., 2018).

In such close-knit contexts, socially savvy group members are likely to have found ways to minimize detection and punishment. Overconfident people might have avoided outright declarations of grandiosity that undermine social standing once detected, instead leveraging subtler non-verbal channels such as vocal tone, eye contact, and expansive posturing, which elevate social standing even after being detected as inflated signals of confidence (Tenney et al., 2019). Nonetheless, if repeatedly detected, overly self-enhancing signals could result in the loss of social status, long-term reputation damage, or finding oneself the target of negative gossip (Barkow, 1992; Melwani, 2012). All of these outcomes run counter to the self-promoting goal of signaling overconfidence in the first place. Via these social mechanisms, the impact and persuasiveness of overconfidence would have been constrained.

As a result of this coevolutionary struggle, the pressures driving displays of overconfidence and the mechanisms for recognizing and regulating overconfidence were likely to have been well balanced in ancestral societies, resulting in an Evolutionarily Stable Strategy (Maynard Smith & Price, 1973). This logic suggests that overconfidence itself probably has a natural ceiling, whereby people are likely to display levels of overconfidence that their peers find plausible (Epley & Whitchurch, 2008). Self-inflation that is too substantial is likely transparent and thus socially detrimental (von Hippel & Trivers, 2011b), whereas overconfidence that is within the latitude of acceptance of one's audience is likely to be rewarded. The key point here is that our ancestors' latitude of acceptance was likely guided by extensive knowledge, which would have constrained excessive overconfidence. As these social constraints are attenuated in humans by higher levels of social mobility, the cost:benefit ratio that informs the utility of overconfidence tips toward benefits, and so we see the potential for runaway expressions of overconfidence.

Overconfidence Unbound

The single greatest threat to an Evolutionarily Stable Strategy is a change in the strategists' environment, or in game-theoretic terms, a change in the payoff matrix (Cook & Saccheri, 2013; Maynard-Smith, 1976). When contextual factors change,

they can dramatically alter the value of one type of response over another. One implication of this observation is that if modern organizational environments differ enough from ancestral group environments, the balance between the display and detection of overconfidence may no longer be at equilibrium.

We suggest that modern organizational environments have indeed disrupted the social regulation of overconfidence and decreased the effectiveness of detection mechanisms via higher levels of mobility across groups and regions (Arthur & Rousseau, 1996). Modern groups, organizations, and societies are often composed of thousands or even millions of individuals, few of whom are personally known or related to each other. Many modern societies are characterized by high levels of social, relational, residential, and organizational mobility, especially in more individualistic Western cultural contexts (Oishi, 2010). For example, the average American will move nearly a dozen times in their lifetime, spending on average no more than 4 years in any given job (Oishi, 2010).

Such modern, socially mobile environments are vastly different from the smaller, kin-intensive societies common to humans for millennia (Boehm, 1999; Henrich et al., 2010). For instance, Henrich (2020) argues that the rise of Christianity as the Western world's dominant religion during the first millennia C.E. coincided with and facilitated the increased urbanization of populations in Western Europe. As a result, Western social environments became larger and more mobile, as individuals became increasingly independent and less reliant on kin networks for support. Institutions arose to fill the void left by the dissolution of kin-networks, such as churches, universities, guilds, and especially important for our purposes, corporations.

Compared to those from more traditional, kin-based societies, individuals from Western cultures are more trusting toward strangers, less likely to conform to their ingroups, and less restricted by rules and regulations (Schultz et al., 2019). From the perspective of those attempting to sway others with their overconfidence, the less regulated, the more socially mobile, and the more depersonalized the environment the better. Such environments diminish the “shadow of the future” (Axelrod, 1984) by reducing social accountability and allowing exaggerated claims to remain unchecked. There is a reason why “snake oil salesmen” were only ever “passing through” (Gandhi, 2013). The result of this unprecedented social and professional mobility first evident in Western cultural environments is an incentive structure that is well suited to the overconfident.

Given that modern (and especially Western) organizations are typified by high levels of mobility across groups and regions, inflated signaling should be less apparent and of less consequence to the signaler if detected in such settings. Expectations for reciprocity, and detection of cheaters tends to be higher in low-mobility societies such as Japan (Yamagishi, 1988), where in-group individuals are monitored more closely, and transgressors are punished more severely than in more mobile, Western cultural groups (e.g., Wang & Leung, 2010; Yamagishi & Yamagishi, 1994). Reputation damage remains a threat to members of modern organizations who overly inflate their signals, but this problem can be more smoothly skirted by shifting companies, or even entire industries and geographic regions to find a clean slate (Oishi, 2010). Although some research has found few if any disincentives for overconfidence (Kennedy et al., 2013), it is notable that this work has been conducted

primarily in modern Western contexts that are typified by fewer social constraints and higher mobility, often using one-shot laboratory-based situations that do not have particularly negative ramifications for the overall group, especially in the long-run (Kennedy et al., 2013).

A Gendered Currency of Corporate Confidence

Increasing the threshold for the detection of overconfidence inflates its social currency. With the possibility of social sanctions mitigated via increased group mobility in modern environments, individuals may find confidence to be a relatively easy way to extend their lever of influence. Those who express greater confidence are conferred greater status, and so exert stronger influence over group norms, climate, and culture. Unfortunately, this process can easily lead to an “arms race” of confidence, wherein people compete for in-group status via ever grander expressions of confidence (Bendersky & Hays, 2012; Cheng et al., 2021). National levels of overconfidence have been shown to covary with national levels of inequality (Loughnan et al., 2011), suggesting more competitive countries, and perhaps also more competitive companies and industries, amplify expressions of overconfidence.

A key feature of this theorizing is that the utility of, and therefore expressions of overconfidence are dampened by social and cultural constraints, while being amplified by higher levels of competition. We see evidence for attenuated, or modified expressions of overconfidence in cross-cultural data (e.g., Markus & Kitayama, 1991; Yates et al., 1997), in anthropological research where “big man” behaviors are quickly corrected by other group members (e.g., Boehm, 1997, 1999), and in response to prescriptive gender norms that constrain women’s expressions of agency (Rudman, 1998). We see evidence of amplified overconfidence in response to higher levels of economic inequality, presumably due to heightened status competition (Loughnan et al., 2011). Critical to our theorizing is the linking of male displays of overconfidence to higher levels of male sexual competition. We reason that greater within-sex variance in reproductive opportunities stimulates competition in a similar way to greater variation in economic opportunities and outcomes, driving up the potential utility of overconfidence and decreasing aversion to accompanying social risks. In the context of modern organizational environments, the cultural constraints on overconfidence are relatively few, at least for men, and so we see overconfidence unbound.

Organizational incentives are usually structured such that overconfidence pays off. Consider a contested opportunity for a desired organizational resource, such as a competition between two equally qualified employees for a promotion. If neither individual can convince the other to back down, then neither has an advantage over the other. But if one individual can convince the other that (s)he is better, the overconfident competitor is likely to acquire the resource, leaving the timid individual with nothing. Finally, if both individuals are overconfident and contest the resource, then both pay a cost due to the resulting conflict, but one of the two (overconfident) individuals will still prevail. This logic suggests that overconfidence is a useful

strategy independent of what one's opponent does and the evidence supports this possibility, even when overconfidence results in absolute losses (Soldà et al., 2021).

When confidence carries such currency, the robust sex differences in overconfidence described above place women at a distinct disadvantage. Presumably, when women are competing for resources in male-dominated fields, they are likely to strategically employ overconfidence, just as men do (Adams & Funk, 2012; Sheedy & Lubojanski, 2018). However, even when women are as overconfident as men, their accompanying behavioral signals are less likely to garner the level of status as those of men who display the very same behavioral hallmarks of overconfidence. More assertive women (though not men) often encounter a “backlash effect” in the form of negative social evaluations (Babcock et al., 2003; Rudman, 1998). As a result, advising women to lift their confidence game and “lean in” (Sandberg, 2013) to navigate corporate culture and increase their status may not be as effective as intended. Such advice has also drawn criticism for positioning the need for change with women, whereas many contend the real problem lies with corporate culture, practices, and policies (e.g., Chrobot-Mason et al., 2019; Wittenberg-Cox, 2013).

The arguments we have presented in this paper suggest there is a modern cult of confidence endemic to leadership (Chamorro-Premuzic, 2013; Hayward et al., 2004), business and entrepreneurship (Hayward, 2007), politics (Sheffer & Loewen, 2019; van Prooijen, 2021), and celebrity (Clements, 2017). It is a cult that grants status (Anderson et al., 2012) and shapes the selection of leaders (Ronay et al., 2019) on the basis of bravado (MacLaren et al., 2020) rather than substantive content. It is a cult that leads to excessive risk-taking (Adam et al., 2015; Ho et al., 2016), often resulting in substantial costs for group members (e.g., Gietl & Kassner, 2020; Malmendier & Tate, 2005, 2008). Critically, it is a gendered cult, wherein the currency that confidence affords is neither equal in supply, nor of equal social value, to men and women.

Conclusion

One clear implication of our analysis is that the checks and balances on overconfidence that existed during our ancestral past are often weak or absent in modern organizations. As a result, the evolved tendency toward overconfidence appears to have much greater costs for modern organizations than it would have in our deep past. Nonetheless, *overconfidence* is not without its virtues when appropriately tempered by reality. For this reason, the success of the overconfident and those whom they influence may ultimately depend on our ability to rein in the overly deluded.

Perhaps one way forward is to take a page from organizations that operate in lower mobility cultures, where cheater-detection strategies are more closely attuned to those that likely existed in ancestral environments. For example, corporations in Japan tend to hold groups rather than individuals responsible for mistakes (Menon et al., 1999), and also expect leaders to take the blame for errors made throughout their organizations (Zemba et al., 2006). Such accountability lowers the incentives for individuals to benefit in ways that harm the collective. If cultures of collective responsibility were effective in our ancestral past, they may continue to act as

effective deterrents in our present as well. Alternatively, selecting more women for leadership positions may also help solve this particular problem.

Data Availability Data sharing not applicable to this article as no datasets were generated or analyzed during the current study.

Declarations

Conflict of Interest On behalf of all authors, the corresponding author states that there is no conflict of interest.

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