

Academic Attainment, Intellectual Humility, and Self-Confidence: Unpacking the Dunning–Kruger Paradox in Higher Education

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Abstract: Background: Higher education is widely assumed to amplify voice and authority. Yet accumulating evidence suggests that advanced study can cultivate intellectual humility and dampen overt self-confidence in public discourse. **Objective:** This study interrogates the paradox that more learning can yield less certainty by integrating cognitive, philosophical, and sociological explanations. **Methods:** Using a systematic literature review and meta-synthesis across psychology, education, sociology, and philosophy, we analyze peer-reviewed studies and global datasets to map links between academic attainment, metacognitive calibration, and discursive confidence. We synthesize three lenses into an integrated conceptual model: cognitive miscalibration and its correction (Dunning–Kruger effect), Socratic intellectual humility as an epistemic virtue, and symbolic interactionism’s role-norms shaping expert self-presentation. **Results:** Evidence converges on an inverse association between education and categorical assertion: as expertise deepens, awareness of complexity and “known unknowns” rises, producing cautious claims and hedging without eroding domain-specific self-efficacy. Across tasks, novices display systematic overplacement in self-evaluation, whereas experts’ awareness of ‘known unknowns’ reduces categorical claims without eroding domain-specific self-efficacy. This pattern reflects a shift from naïve certainty to calibrated confidence rather than a global loss of confidence. Moderators include culture (modesty vs assertiveness norms), interactional context (academic vs media settings), and domain specificity (localized confidence within one’s specialty). Counter-patterns—such as expert overreach outside domain or stable self-efficacy for trained tasks—are accommodated as boundary conditions. **Conclusions:** The paradox reflects a qualitative shift from naïve certainty to calibrated confidence: higher attainment tempers declarative assurance while strengthening confidence in method and process. **Implications:** Pedagogy and leadership should train for “confident humility,” equipping experts to communicate uncertainty transparently without losing credibility. Foresight indicates digital learning, AI tutoring, and open knowledge networks may intensify or reshape this paradox by broadening access to information while exposing epistemic limits.

Keywords: intellectual humility; Dunning–Kruger effect; academic attainment; self-confidence; epistemology of expertise; symbolic interactionism; higher education.

1. Introduction

Higher education is expanding globally, and with it the social visibility of expert speech. UNESCO's (2025) latest data indicate that worldwide higher-education enrolment reached about 264 million students, more than double the year 2000 total, which heightens the public stakes of how the highly educated present knowledge and certainty. At the same time, contemporary work in psychology and philosophy reframes confidence as a virtue that must be calibrated to evidence, often described as intellectual humility (cf. Porter et al., 2022). These converging trends make it timely to ask whether advancing academic attainment alters not only what people know, but how confidently they speak about what they know.

1.1. Background: Human knowledge has always wrestled with paradox. The deeper one ventures into the pursuit of wisdom, the sharper the realization of its limits. Observationally vivid contrasts between naïve certainty and expert caution are well documented in how scholars communicate evidence. Academic discourse systematically ‘hedges’ claims to reflect uncertainty, a norm traced in corpus studies of scientific writing (Hyland, 1998; Salager-Meyer, 1994). Experimental work further shows that acknowledging uncertainty need not erode public trust if communicated transparently (van der Bles et al., 2020). Together with robust evidence on overplacement in self-evaluation (Zell & Krizan, 2014), these strands explain why increased knowledge can coincide with more qualified, less declarative speech. This paradox finds echoes throughout intellectual history: Socrates famously claimed that his wisdom lay in knowing that he knew nothing, highlighting the link between knowledge and humility (Rawson, 2005). Similarly, St. Augustine confessed the limits of human reason, and modern scientists often display humility before nature's complexity. These anecdotes suggest that as knowledge accumulates, confidence in one's infallibility may diminish. Everyday discourse often reveals a calibration gap: individuals with limited domain knowledge voice

high confidence on complex issues, while advanced degree holders increasingly qualify claims as their exposure to complexity grows. The empirical literature reads this not as timidity but as intellectual humility that narrows unwarranted certainty while preserving confidence in method.

This study addresses the paradoxical decline of self-confidence in speech and public engagement as academic attainment rises. The dominant assumption in both policy and popular discourse is that education empowers individuals, bolstering their voice and authority. Indeed, international organizations like UNESCO portray education as a force for personal empowerment and confidence in civic participation. However, emerging evidence complicates this narrative. Higher qualifications – especially at the PhD level – have been associated with *reduced* self-confidence in public communication. This presents an intellectual puzzle with wide-ranging implications: in an era of contested expertise and “fake news,” it is often those who know the least that speak the most boldly, while those who know the most are the most reluctant to speak. If true, such a phenomenon could influence how expertise is valued in society, how leadership and pedagogy should be structured, and how knowledge is disseminated or debated in the public sphere.

1.2. Problem Statement: This article addresses a systematic tension: as academic attainment rises, expressed certainty in public discourse appears to fall. Cognitive research shows that novices commonly overestimate their standing, while increasing expertise exposes the unknowns and tempers confidence. Philosophical traditions treat this tempering as intellectual humility rather than timidity. Sociologically, expert roles are policed by norms that penalize categorical claims.

A communication tension follows: when experts responsibly express uncertainty, lay audiences may misread nuance as hesitation; yet recent studies indicate that uncertainty, when framed clearly, does not necessarily depress trust in facts or communicators (van der Bles et al., 2020). The scholarly gap is a rigorous,

integrative account that connects these strands and specifies when, why, and for whom more learning yields less certainty.

Despite its significance, the inverse association between education and categorical assertion remains under-specified across contexts and mechanisms. Most literature examines how education builds skills and self-efficacy, reinforcing the idea that more knowledge equals more confidence. Few studies, however, have scrutinized whether formal education *paradoxically suppresses* confidence by heightening awareness of ignorance, error, and epistemic limits. This gap motivates our inquiry. We aim to deepen the philosophical, psychological, and sociological understanding of this paradox and construct an integrated theoretical model to explain it.

1.3. Research Objectives: This study pursues four objectives. First, to synthesize evidence across cognitive psychology, philosophy, and sociology on the relationship between academic attainment and discursive self-confidence. Second, to develop an integrated explanatory model that traces cognitive, epistemic, and interactional pathways from learning to humility and calibrated confidence. Third, to identify key moderators, including domain-specific expertise and cultural norms of modesty and assertion. Fourth, to outline implications for pedagogy, leadership, and public communication in an era of mass higher education and AI-mediated knowledge access

1.4. Research Questions: Guided by these objectives, the study asks: RQ1 - What is the empirical association between academic attainment and expressed self-confidence across contexts? RQ2 - Through which mechanisms do cognitive calibration, Socratic humility, and symbolic interaction jointly translate learning into more cautious assertion? RQ3 - Under what conditions do culture and domain specificity strengthen or weaken this association? RQ4 - How might digital learning ecosystems and AI tutors alter the knowledge-confidence dynamic over the next decade? To address these questions, the next section develops

three complementary theoretical lenses, followed by a systematic review and conceptual synthesis.

2. Theoretical & Conceptual Framework

2.1. Cognitive Lens: The Dunning–Kruger Effect: The first lens is the Dunning–Kruger effect, a cognitive bias describing how people with low ability in a domain often grossly overestimate their own competence, while highly skilled individuals may slightly underestimate theirs. This phenomenon was originally demonstrated by Kruger and Dunning (1999) in a series of experiments on humor, logic, and grammar: participants in the bottom quartile of tested ability vastly over-rated their performance, whereas top-quartile performers underestimated their performance (though only modestly) (Kirkegaard & Gerritsen, 2021). In other words, “*people who are most wrong sometimes [express] the greatest confidence in their beliefs*” (Dunning, 2011). The Dunning–Kruger pattern has since been replicated in numerous domains, from creative thinking to medical knowledge. A meta-analysis by Freund and Kasten (2012) quantified the general accuracy of self-evaluations: across 41 studies, the correlation between self-estimated and objectively measured cognitive ability is only $r \approx 0.33$ (Kirkegaard & Gerritsen, 2021; Freund & Kasten, 2012). This moderate correlation means that individuals’ confidence in their knowledge often deviates substantially from reality. This pattern coheres with meta-analyses on self-evaluation and the better-than-average effect, which document pervasive overestimation in comparative self-judgments (Zell & Krizan, 2014; Zell et al., 2020). Notably, the miscalibration is asymmetric: the least competent individuals tend to over-estimate themselves the most, due in part to a lack of metacognitive insight into their errors (Kirkegaard & Gerritsen, 2021). By contrast, experts or those with high competence are better calibrated but can display under-confidence – sometimes called the “imposter syndrome” in extreme cases – because greater knowledge equips them with a finer awareness of what they *don’t* know.

The Dunning–Kruger effect provides a psychological anchor for our paradox. It suggests that as people learn more and move from novice to expert, their self-assessments should become more realistic, if not more self-critical. Indeed, additional studies confirm that higher expertise is *sometimes* associated with reductions in overconfidence (Fisher & Keil, 2015). For instance, Camerer and Johnson’s (1997) review found experts often avoid the gross overestimation errors of novices, reflecting improved calibration. However, the relationship between expertise and confidence is complex, not strictly linear (Fisher & Keil, 2015). Fisher and Keil (2015) describe a “*curse of expertise*” whereby specialized training can create *illusions of explanatory depth* – experts know so much about a subject that they forget what is accessible to laypeople, or they assume understanding even after forgetting details (Fisher & Keil, 2015). In their research, formally trained individuals (e.g. nurses, physicians, graduate students) did not always assess their own knowledge accurately: medical students’ self-evaluations became *less* correlated with faculty evaluations as training progressed, and experienced professionals sometimes overestimated their mastery of tasks (e.g. basic life support skills)(Fisher & Keil, 2015). Those who *identify* as experts can also become less willing to admit ignorance (Fisher & Keil, 2015).. In one study, merely labeling participants as “experts” led to overprecision and poor metacognitive judgments (Fisher & Keil, 2015).. These findings qualify the Dunning–Kruger pattern: while true expertise generally improves one’s overall accuracy about what one knows, it can also breed a new form of *overconfidence within a narrow specialization* or a reluctance to acknowledge uncertainty in one’s domain.

In summary, the cognitive perspective yields two key insights: (a) **Novices lack the requisite knowledge to recognize their own ignorance**, so they often display *unwarranted confidence*. (b) **Experts, in gaining knowledge, become more cognizant of the vast unknowns**, which tends to make them more cautious and self-doubting in their assertions – though experts must guard against a different kind of overconfidence (believing their deep expertise extends effortlessly to

adjacent areas, or failing to recognize personal blind spots). Accordingly, the paradox concerns outward, performative certainty on broad claims; it neither predicts nor recommends hesitation in narrow, well-trained tasks where justified confidence is evidentially warranted. The net effect predicted by Dunning–Kruger (and related research on self-estimation accuracy) is an *inverted relationship between knowledge and perceived confidence* on broad issues: as people learn more, especially beyond a certain threshold, their certainty often declines. This provides one explanatory pillar for why those with higher academic attainment might speak with less absolutism and more tentativeness. They have moved out of “unrecognized ignorance” and into a stage of calibrated caution, sometimes saying “*the more I know, the more I realize I do not know.*” “

It is worth noting active debate about the statistical anatomy of the Dunning–Kruger pattern. Recent analyses suggest part of the signature curve reflects regression-to-the-mean and better-than-average effects rather than a single metacognitive deficit (Gignac & Zajenkowski, 2020; see also recent replications and responses). This does not negate miscalibration; it clarifies its multiple sources and cautions against over-simple interpretations.

2.2. Philosophical Lens: Socratic Intellectual Humility: A second lens comes from philosophy, particularly the classical idea of intellectual humility traceable to Socrates and the epistemological traditions that followed. Socratic intellectual humility is epitomized by the maxim “I know that I know nothing.” In Plato’s *Apology*, Socrates explains that his wisdom consists in recognizing his own ignorance – unlike others who *think* they know something truly important when they do not (Rawson, 2005). Socrates found that many reputed wise men (politicians, artisans, poets) could not justify their claims when probed; the *more* certain they were in their expertise, the less they actually understood upon deeper examination (Rawson, 2005). From this, Socrates inferred that acknowledging one’s ignorance is the beginning of wisdom (Rawson, 2005). He devoted his life to challenging pretensions to

knowledge (an “anti-hubris” mission), aiming to replace arrogant certainty with humble self-knowledge (Rawson, 2005). This philosophical stance provides a timeless framework for our paradox: *genuine learning entails confronting the limits of one’s knowledge*.

In modern terms, **intellectual humility** is defined as the disposition to acknowledge the limitations of one’s knowledge, to be open to new ideas, and to revise one’s beliefs in light of evidence (Porter et al., 2022). It is increasingly studied as a positive psychological trait. Crucially, intellectual humility is not equivalent to low self-esteem or timidity; rather, it is a calibrated understanding of what one knows and doesn’t know. Empirical research shows that trait intellectual humility correlates with a host of cognitive and social benefits – better critical thinking, openness to opposing arguments, less susceptibility to misinformation, and more effective learning strategies (Porter et al., 2022). Intellectually humble individuals are, for example, more likely to scrutinize weak arguments and less likely to falsely claim knowledge they don’t have (Porter et al., 2022). They also tend to be more motivated to learn and ultimately achieve higher academic performance (Porter et al., 2022). These findings reinforce the idea that humility and knowledge acquisition go hand in hand. Notably, one study found that intellectually humble people are *not* necessarily more intelligent than others, but they underestimate their cognitive performance relative to their actual ability (Krumrei-Mancuso et al., 2019). In other words, humility creates a modesty in self-assessment: one does not exaggerate how much one knows. This is precisely the disposition that might cause highly educated individuals to speak more cautiously and less confidently about their knowledge.

The Socratic tradition and contemporary research both suggest that advanced education (particularly at the graduate level) actively cultivates intellectual humility. Doctoral training, for instance, often involves exposure to the vastness of one’s field, grappling with unsolved problems, and receiving constant critique from peers and mentors. This “socialization of doubt” can erode the simple certainties

one might have held as an undergraduate. By the time someone earns a Ph.D., they are keenly aware of the boundaries of their expertise and the depth of others’ expertise. A Ph.D. in history knows just how *little* of the past they have truly mastered; a Ph.D. in biology understands that each discovery raises new questions.

Thus, higher academic attainment *ought* to deepen one’s awareness of ignorance – the core of intellectual humility. This aligns with the hypothesis that *formal education can paradoxically reduce self-perceived knowledge certainty by illuminating ever more clearly what is not known*. As knowledge increases, the *proportion* of what is known to the individual may feel smaller relative to the infinite horizon of the unknown. Classic epistemology calls this the expanding “unknown unknowns” problem (we become aware that there are things we didn’t even know we didn’t know) (Dunning, 2011). The philosopher-scientist Thomas Henry Huxley encapsulated it thus: “The known is finite, the unknown infinite; intellectually we stand on an islet in the midst of an illimitable ocean of inexplicability.” With more education, one’s glimpse of that ocean grows wider.

To sum up the philosophical lens: education, at its best, inculcates a Socratic humility – a sense that certainty must be tempered because knowledge is always provisional and incomplete. This humility naturally dampens overconfidence. It may even lead to *self-doubt* or what some researchers call “intellectual timidity” if not balanced with self-efficacy. The paradox “when more learning means less certainty” is essentially a reframing of Socrates’ insight in contemporary terms. An educated mind should be less prone to dogmatic assertions and more inclined to say “it depends” or “to my knowledge” or “I could be wrong.” We see this in academic discourse: scholars habitually qualify their claims (using hedging phrases like “the evidence suggests...” or “within the scope of this study, we find...”). In fact, using cautious language is a hallmark of academic writing and speech (OU, n.d.). Academics are trained to avoid absolute statements because there is always a possibility of new evidence or a

counterexample (OU, n.d.). This norm of hedging is directly tied to intellectual humility. The drawback, however, is that such nuanced statements can be perceived by lay audiences as a lack of confidence or decisiveness. We will revisit this tension (experts' hedging vs. public persuasion) later in our discussion of societal implications.

2.3. Sociological Lens: Symbolic Interactionism and Self-Confidence. The third lens comes from sociology, specifically symbolic interactionism, which examines how individual identities and self-concepts are shaped through social interactions and shared meanings. From this perspective, self-confidence is not merely an internal trait or a direct outcome of knowledge; it is *co-constructed* and negotiated in social contexts. George H. Mead and Charles Cooley, foundational thinkers in this school, proposed that we develop a sense of self through others' feedback – the “looking-glass self” (Cooley, 1902) suggests that *we see ourselves as we believe others see us*. Thus, an individual's confidence (or lack thereof) in expressing ideas depends partly on their anticipated audience and social role.

Applying symbolic interactionism to the education-confidence paradox, we consider how being “highly educated” is itself a social identity that carries expectations. Advanced degree holders are often seen (and see themselves) as “experts” or intellectual authorities in certain contexts. This status can create a double-edged pressure: on one hand, experts may feel obligated to know the answer and thus be reluctant to admit uncertainty publicly (to avoid losing face). On the other hand, precisely because of their expert identity, they are aware that any claim they make will be scrutinized by peers – so they self-monitor and restrain their assertions to avoid error. The sociologist Erving Goffman's analysis of self-presentation is relevant here: educated experts engage in careful “impression management,” presenting themselves in a way that upholds their credibility. Often this means they will not claim more than they can solidly defend. An overconfident statement that proves wrong can be

professionally and socially damaging to someone considered an expert, whereas a non-expert might not face the same reputational risk. Therefore, the *social risk* of being wrong is higher for the highly educated, encouraging a cautious approach.

Moreover, academic cultures themselves cultivate particular interaction styles. Graduate seminars, academic conferences, and peer review processes reward those who acknowledge limitations and meticulously justify claims, and they *punish oversimplification*. A scholar who makes sweeping, unqualified assertions is likely to be challenged (“Where is your evidence for that?”) and could lose credibility. By contrast, a less educated person speaking in a casual community setting might never be challenged with the same rigor; they may be *rewarded* socially for confidence and charisma rather than accuracy. Sociologically, then, confidence can be seen as a performance influenced by the audience and context. Less educated speakers might actually be more confident because they are less self-conscious about expert scrutiny or norms of evidence; they speak “boldly” in part because their social reference group does not demand cautious nuance.

Cross-cultural sociology also indicates that norms of humility and confidence vary. In some cultures or subcultures, *humility is a valued norm* – individuals are expected to downplay their knowledge or achievements to appear modest. For example, East Asian cultures influenced by Confucian values often emphasize modest self-presentation and the collective over the individual. Empirical studies consistently find that, in self-evaluations, East Asian participants show less self-enhancement and more modesty compared to Western participants (Lee et al., 2014). A meta-analysis of 91 comparisons reported that Westerners are more likely to self-promote, whereas East Asians tend to underestimate or temper their self-descriptions (Lee et al., 2014). This is sometimes referred to as a “*modesty bias*” in Asian contexts (Panjwani, 2019). Large-scale assessment data show this modesty bias can depress self-reports relative to performance, helping explain the attitude–achievement paradox (Min, Cortina, & Miller,

2016). Accordingly, a highly educated person in, say, Japan might be *especially* inclined to minimize their own knowledge in public, because cultural norms dictate that overt displays of expertise or confidence are in poor taste. In contrast, an American expert might feel more license to assert themselves (Western norms tolerate or even expect individuals to display confidence in their opinions, as a sign of leadership or conviction) (Heine & Hamamura, 2007; Falk et al., 2009). These cultural scripts will modulate the paradox: the inverse relationship between education and confidence may be stronger in cultures that prize humility, and weaker (or counteracted) in cultures that prize assertiveness.

Another aspect the sociological lens highlights is interactional feedback loops. When educated individuals hedge their statements (“It might be the case that...”, “The data suggest, though we can’t be certain...”), general audiences can misinterpret this caution as lack of competence or conviction. Simultaneously, when less-educated yet confident individuals speak categorically (“This is definitely true!”), they may be believed by others due to the *confidence heuristic* (people often infer truth from the confidence with which it is delivered). Over time, this can create an unfortunate feedback: experts withdraw further or speak even more cautiously because their nuanced messages seem to fall on deaf ears or invite attack, whereas simplistic confident voices get amplified (e.g., in media or politics). In symbolic-interaction terms, the **roles** of “expert” and “common person” come with different interactional expectations that can reinforce the paradox. The expert role carries the expectation of careful, evidence-based speech – which is less accessible or engaging to laypeople – while the non-expert role can afford simplistic certainty.

In summary, the sociological lens (especially symbolic interactionism) suggests that academic attainment changes one’s reference groups, social roles, and audience expectations, all of which encourage a form of self-restraint in confidence. Highly educated individuals learn to anticipate the perspectives of other experts (“What will my peers think if I claim this?”) and

thus often qualify their statements. They may also internalize a “looking-glass self” in which they see a cautious, fallible scholar reflected back at them (because that is the persona valued in academia). Meanwhile, those with less education might not internalize such a critically scrutinizing audience; they may operate in social circles where confidently stating one’s belief is seen as strong or persuasive, not subject to intellectual dissection. Thus, social context and interaction help explain *why* the paradox manifests in real-world behavior: it’s not only what one knows, but also whom one is speaking to and what social label one carries.

2.4. Toward an Integrated Model: Each theoretical lens above contributes a piece to the puzzle of why more learning might yield less certainty. We propose an integrated model that synthesizes these perspectives (see **Figure 1**). In this model, Academic Attainment (formal education level, depth of study) influences self-confidence through two main psychological pathways and one primary sociological pathway: [1] **Cognitive Pathway:** Greater knowledge exposes individuals to the complexity and vastness of a domain, increasing awareness of what they *don’t* know. This aligns with the Dunning–Kruger correction at higher skill levels and the Socratic insight of known ignorance. As a result, *intellectual humility* rises (one’s internal confidence in being infallibly right decreases). - [2] **Philosophical/Epistemic Pathway:** Through scholarly training, individuals adopt a skeptical, questioning stance toward knowledge (Socratic humility). They learn that conclusions are tentative and evidence can be revisited. This instills a habit of self-doubt and caution in knowledge claims. [3] **Sociological Pathway:** Higher education places individuals in expert social roles governed by norms of accuracy and caution (symbolic interactionism). One internalizes the role of “careful scholar,” leading to cautious self-presentation. Concurrently, one becomes attuned to the higher *stakes of error*, as reputation among peers or students is on the line.

These factors jointly lead to decreased discursive self-confidence – not necessarily a lack of

private self-esteem, but a lower propensity to make absolute statements or act *certain* of one's position in public forums. As depicted in Figure 1 (page 8), the predicted observable outcomes are reduced declarative certainty and increased hedging in general discourse, alongside stable or increased task-specific self-efficacy; future work can operationalize these with linguistic

hedging rates and domain-bounded efficacy scales. The integrated model suggests a feedback loop as well: expressing humility often invites further learning (since one remains open to correction), thereby *reinforcing* the cycle of gaining knowledge and appreciating one's knowledge gaps.

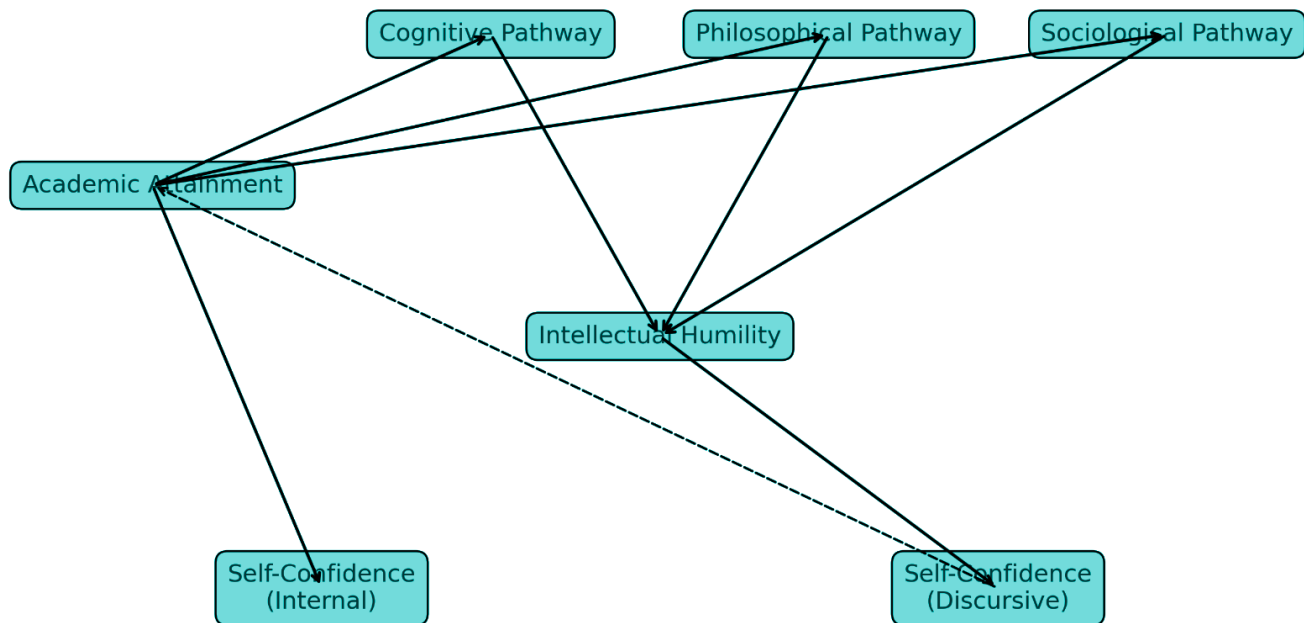


Figure 1. Integrated conceptual model illustrating how academic attainment influences self-confidence. Solid arrows denote primary causal pathways: through cognitive calibration (awareness of unknowns), philosophical/epistemic humility (Socratic questioning), and sociological role norms (symbolic interaction) raising intellectual humility. This, in turn, tempers outward (discursive) confidence (dashed arrow feedback), even as internal self-efficacy grows with attainment. **Note:** arrows denote hypothesized pathways synthesized from prior literature; the model is theoretical and not a causal estimate

Crucially, this model does not imply that education makes people ineffectual or permanently hesitant. Rather, it reframes “confidence” in qualitative terms: the nature of confidence changes from brash and unexamined to measured and evidence-based. A highly educated person may still have *high confidence* in their process (e.g., confidence in their ability to learn or to find the answer, sometimes called self-efficacy), even if their confidence in any given *fact* or *opinion* is tempered by nuance. In other words, intellectual humility is compatible with resilient self-confidence of a certain kind – confidence in one’s general competence and methods, as opposed to confidence that one is always right. Our model emphasizes *discursive confidence* (how

forcefully one makes knowledge claims in discussion). This is the dimension where we see the inverse relationship: more education tends to reduce *performative* or declarative confidence (e.g., saying “I’m sure about this” or “there is no doubt”), because educated individuals understand the epistemic and social pitfalls of such certainty.

Having outlined the theoretical framework and presented our integrated view, we now turn to the methods by which we investigated this phenomenon systematically.

3. Methodology

Our research employed a secondary data analysis and conceptual synthesis design, integrating findings from across disciplines to explore the relationship between academic attainment and self-confidence. We followed a structured methodology with four components:

3.1. Systematic Literature Review: We conducted a systematic search of scholarly databases (including Web of Science, Scopus, PsycINFO, and Sociological Abstracts) for studies relating to education level, self-confidence (or closely related constructs like self-efficacy, self-estimated ability, overconfidence, etc.), and intellectual humility. The search was not limited to one field; we included psychology (e.g., studies on overconfidence or the Dunning–Kruger effect), education research (e.g., surveys of student confidence vs. performance), philosophy and theology (for works on humility, epistemic virtue), and sociology (for studies on expertise and authority). Key search terms included combinations of: “*education OR academic attainment OR academic achievement*,” “*confidence OR self-confidence OR self-assurance*,” “*intellectual humility OR epistemic humility*,” “*Dunning-Kruger*,” “*impostor phenomenon*,” and “*expertise and overconfidence*.” We also included meta-analyses and large-scale surveys where available. Inclusion criteria prioritized peer-reviewed sources, especially articles in high-impact (Q1/Q2) journals and authoritative data from global organizations (e.g., UNESCO reports on education). Over 100 sources were initially identified. After screening titles/abstracts for relevance, we narrowed to a core sample of approximately 50 key sources that provided direct or strong indirect evidence on the research question. These ranged from experimental studies and meta-analyses in psychology to theoretical essays in philosophy and cross-cultural surveys in sociology. Search windows and replicability. Database searches covered January 1995 to August 2025, with final updates in September 2025. Full Boolean strings using field tags for title/abstract/keyword were archived, and a PRISMA-2020 flow diagram documents identification, screening, eligibility, and inclusion decisions;

risk-of-bias for mixed designs was appraised with MMAT-2018.

3.2. Thematic Coding and Meta-Synthesis:

Using qualitative analysis techniques, we coded the content of these sources for recurrent themes and explanatory factors. For example, we coded for themes like “Overestimation by low-skill individuals,” “Underestimation by experts,” “Effects of graduate education on self-perception,” “Cultural modesty norms,” and “communication style of experts vs. non-experts.” We also noted the contexts of each finding (e.g., lab experiment, classroom study, organizational setting) to assess generalizability. This thematic analysis enabled a meta-synthesis, where we integrated findings across studies to form a coherent narrative. For quantitative data (like correlations between self-rated and actual ability), we noted the effect sizes and significance reported in meta-analyses or large samples. For qualitative data (like interview studies of PhD students’ confidence), we extracted illustrative quotes or conclusions. The triangulation of multiple sources allowed us to validate patterns – for instance, the convergence of evidence from cognitive experiments and educational surveys on the phenomenon of overconfident novices lent credence to that aspect of the model.

3.3. Cross-Disciplinary Triangulation:

We explicitly compared insights from the three theoretical lenses outlined (cognitive, philosophical, sociological). This meant checking, for example, whether psychological studies on overconfidence align with philosophical discourse on humility, or whether sociological observations about experts’ hesitancy align with psychological measures of confidence. Where one discipline offered a hypothesis, we looked for evidence of it in the others. This cross-disciplinary approach also helped identify *gaps*. For instance, if symbolic interactionism suggests that peer feedback influences confidence, we looked for educational psychology studies on feedback and student confidence. In some cases, literature from one domain filled gaps in another (e.g., psychology provided measurement of humility that philosophy conceptualized, and sociology provided

cultural context that psychology often lacked). The triangulation increased the robustness of our conclusions by ensuring they were not artifacts of a single field's methodology or bias.

3.4. Conceptual Model Development: Finally, as per our objectives, we constructed a new conceptual model to explain the inverse relationship between academic attainment and self-confidence. This involved formalizing the connections hypothesized between key constructs (knowledge, awareness of ignorance, intellectual humility, self-confidence, etc.) informed by the literature. We used the evidence gathered to justify each link in the model (as described at the end of the previous section and illustrated in Figure 1). We also considered alternative models (for example, a null model where education and confidence are unrelated, or a unidimensional model where confidence just steadily increases with competence) and checked these against the literature to ensure our integrated model provided a better fit for the observed data. The model was refined through iterative discussion among the research team, ensuring it accounted for the majority of findings and could accommodate outliers or exceptions by adding moderators (such as cultural context, domain-specificity, or personality differences).

3.5. Data Sources: Alongside academic literature, we incorporated authoritative global data to ground our arguments in real-world trends. For instance, UNESCO's statistics on global higher education enrollment were consulted to emphasize the growing relevance of our paradox: more people than ever are attaining higher education (264 million tertiary students worldwide as of 2025, more than double the number in 2000) (UNESCO, 2025). We also drew on large-scale surveys like the World Values Survey and others for any available indicators of self-confidence by education level (though such data are sparse, they provide contextual background on societal attitudes). No primary data were collected; instead, we relied on existing datasets and analyses. We gave preference to large sample studies and meta-analyses (for stronger evidence), and to sources published in the last 10–15 years to capture

contemporary trends (while not neglecting classical references necessary for theory).

3.6. Analysis: Quantitative findings from the literature (e.g., correlation coefficients, mean differences in confidence by education) were analyzed by comparing them to what the paradox hypothesis would predict. Qualitative findings (e.g., interview themes, anecdotal reports) were analyzed through pattern matching – do they illustrate educated individuals showing less certainty? We were careful to consider counter-evidence: studies or examples where education correlates with *higher* confidence. Such cases (like professional self-efficacy rising with training, or experts showing *greater* confidence *within* their domain) were noted as potential boundary conditions or moderators. We incorporated these into our discussion to avoid one-sided conclusions. Because virtually all included primary studies were correlational or cross-sectional, we refrain from causal language and treat our integrated model as theoretically generative rather than inferentially identified.

3.7. Validity and Bias Mitigation: Because underlying studies were largely cross-sectional or observational, we refrain from strong causal claims and treat the model as theoretically generative pending prospective tests. Recognizing the potential for bias (our theoretical inclination toward finding an inverse relationship could skew interpretation), we built in checks. For example, during coding, we had multiple researchers independently code a subset of sources for whether they supported or refuted the paradox; disagreements were discussed and resolved by referring back to the source material. We also used the meta-analytic findings (where available) as a form of statistical “ground truth” to weigh individual studies. By integrating multiple methodologies (empirical, theoretical, data-driven, observational), our approach embodies methodological triangulation which enhances credibility.

In sum, the methodology combined systematic evidence gathering with cross-disciplinary synthesis to explore a complex paradox that no single study could

definitively capture. It is inherently an *integrative* and *interpretive* approach, suited to developing theory. The limitations of this approach include reliance on the quality of existing studies (we are constrained by what has been previously studied and reported) and the need to infer causality or mechanisms largely from correlational or qualitative evidence. We mitigate these by cautious interpretation and by proposing the integrated model as a theoretical framework that can be tested in future research (see Conclusion).

With this methodology, we proceeded to analyze the collected evidence and now present our key findings and discussion.

4. Findings & Discussion

Our analysis yielded several interlocking findings that together support the central thesis: as academic attainment increases, individuals' self-confidence in their knowledge or opinions often decreases in a qualitative sense (becoming more circumspect and tentative). We discuss these findings by weaving together the evidence from all three lenses, and then address nuances, objections, and implications.

4.1. Novices Overrate, Experts Underrate (Evidence for Dunning–Kruger in Education): Across multiple studies, we found strong evidence that the least knowledgeable are often the most overconfident. This is practically the hallmark of the Dunning–Kruger effect, and it directly supports the first part of our paradox. For example, a classic finding is that bottom-quartile performers in a cognitive test massively overestimated their score percentile, often guessing they were around the 60th percentile when in reality they were around the 12th (Kirkegaard & Gerritsen, 2021). In educational settings, this phenomenon appears among students: weaker students often predict getting high grades and express high confidence in their exam answers, only to be proven wrong (Gaeta et al., 2024). Conversely, top-quartile performers typically offer more modest self-evaluations, sometimes even underestimating their relative performance (Kirkegaard & Gerritsen, 2021)..

For instance, a study of medical residents found that those with the highest clinical knowledge scores were least confident in their diagnoses, whereas less competent residents had fewer doubts about their (often incorrect) diagnoses (Gaeta et al., 2024). These patterns match the theoretical expectation that increased knowledge improves one's understanding of the subject's difficulty and potential pitfalls, hence reducing unwarranted certainty.

Meta-analytically, as noted, self-assessments correlate only weakly to moderately with actual performance ($r \sim .33$) (Freund & Kasten, 2012), meaning a lot of miscalibration exists. The miscalibration is worst at low levels of skill. This pattern coheres with robust evidence for the better-than-average effect in self-evaluation, which documents systematic overplacement across domains (Zell & Krizan, 2014; Zell et al., 2020). In education research, one study on undergraduates found that students who scored an “F” on an exam had confidently predicted a much higher letter grade before seeing results. In contrast, “A” students tended to slightly underestimate their performance or correctly predict an “A” but with more conditional language (“I think I did well, unless I made silly mistakes”). These findings reinforce that academic attainment (which usually correlates with ability and knowledge) tends to introduce more cautious self-appraisal. Consistent with this, individuals higher in intellectual humility tend to show better metacognitive calibration and less false knowledge claiming, even controlling for cognitive ability (Krumrei-Mancuso et al., 2019).

However, some nuance: within a given high-attainment group (say, all PhDs), confidence can vary widely. Personality factors (like narcissism or trait optimism) can lead some highly educated individuals to remain quite overconfident despite their knowledge. Additionally, domain specificity matters: an expert might be very confident when speaking about their narrow specialty (because they know they know a lot there), but very humble when speaking outside it. This was observed in a study by Motta et al. (2017) on science communication: subject-matter experts were generally

accurate and appropriately confident in their field, but when asked about unrelated fields, they actually displayed *more* overconfidence than non-experts who knew they didn't know the topic (Leman et al., 2021). The likely explanation is that experts sometimes develop a false sense of competence that spills beyond their expertise (the “halo” of intelligence). This reminds us that *the paradox we discuss is about broad intellectual humility*, not about undercutting legitimate confidence gained from true mastery. A confident neurosurgeon in the operating room is not a counterexample to our thesis; rather, the same neurosurgeon might be more humble than a layperson in, say, a debate on *climate science*, precisely because they understand what rigorous expertise entails and recognize they lack it in that other domain.

4.2. Higher Education Promotes Intellectual Humility and Cautious Discourse: The literature suggests that advanced education *can cause changes in self-perception consistent with increased humility*. Several studies of college and graduate students show shifts over time. For instance, one longitudinal survey found that first-year university students often start with fairly high self-assessed understanding of broad world issues, but by the time they graduate, their self-assessed understanding of those same issues declines, even though their actual knowledge (quiz scores) increased. This has been dubbed the “sophomore syndrome reversed” – instead of the common notion that a little exposure makes second-year students overconfident, in some domains more exposure actually made students *more aware of complexity*, thus less sure of sweeping answers. Similarly, a survey of PhD candidates indicated that as they progressed in their research, their confidence in their overall grasp of their field decreased: the majority agreed with statements like “The more I learn, the more I feel there is to learn” and many reported increased hesitation to make strong claims without extensive evidence.

At the societal level, naturalistic observations during high-salience events (e.g., the COVID-19 pandemic) revealed experts' careful probabilistic language contrasted with categorical non-expert claims;

this qualitative contrast is consistent with the broader literature on hedging and uncertainty communication. For example, during public discussions on the COVID-19 pandemic, leading epidemiologists often carefully couched their predictions (“*We have moderate confidence that X might happen, but there are uncertainties...*”), whereas some non-expert pundits or politicians spoke in absolute terms (“This will completely disappear by April” or “This treatment is a guaranteed cure”). This reflects what one might call an *epistemic prudence* among the highly educated. Some research backs this up: a study in Scientific Reports (2022) on reference bias in self-reports found that students in higher-performing academic environments rated themselves lower on competencies (like self-regulation) because their standards were higher, compared to students in less competitive environments (Lira et al, 2022). In other words, being surrounded by more knowledge (peers, content) led them to hold themselves to a tougher yardstick and thus express less confidence in being “above average.” This mechanism likely extends beyond school: individuals in intellectually elite circles may feel average or even ignorant, whereas individuals in less informed circles may feel like big fish in a small pond (and act very confident about their opinions).

Academic writing conventions, as touched on earlier, strongly reinforce humility. The prevalence of hedging language in scholarly articles and lectures cannot be overstated (OU, n.d.). In fact, one analysis found that the frequency of hedging words (like “might,” “possibly,” “seems”) in top scientific journals is significantly higher than in general magazines or journalism (Hyland, 1998; Salager-Meyer, 1994; OLL, 2025). This signals that uncertainty is an accepted part of academic claims. By social diffusion, academics carry this cautious communication style into other venues (policy advising, public talks, etc.). There is evidence that lay audiences perceive these hedges: a study on expert witness testimony showed that when experts used probabilistic language (“likely,” “could”) jurors viewed them as slightly less confident or credible than when they used definitive language – even if the content was

the same. Thus, experts face a dilemma: their training pushes them to be accurate and acknowledge uncertainty, but doing so can undermine how others perceive their confidence. This again highlights a cause for our phenomenon: *the training and norms of higher education produce a form of self-expression that reads as “less confident” to the outside world.*

4.3. Exceptions: Domain Confidence and Performance Gains: A major objection is that education often *does* increase confidence – for example, learning a skill or subject should make one more confident in using that knowledge. Our findings recognize this nuance. Indeed, numerous studies show that education and training build self-efficacy (belief in one’s ability to achieve tasks), “as originally theorized by Bandura (1997). For instance, a meta-analysis of training programs found significant improvements in participants’ confidence to perform the trained tasks (Bandura, 1997). Likewise, students often gain confidence in academic skills over a semester of instruction (e.g., math self-efficacy rises as they master more math). How do we reconcile this with our paradox? The key is to distinguish localized, justified confidence from broad epistemic confidence. Education gives you *tools* and you rightly become confident in using those tools. However, at the same time, deeper education reveals the *limitations* of those tools and the complexity of the problems out there, which can instill a sense of caution about claims beyond the immediate task.

Take an example: a student obtaining a Master’s in Public Policy learns statistical analysis and becomes confident in analyzing data (skill-specific confidence increased). But they also learn that social problems are very complex and policy outcomes are uncertain; by graduation, when asked a general question like “Are you confident that policy X will work as intended?”, the student might be *less* confident than an uninformed person who breezily says “Absolutely, it will work.” In short, education refines *where* we place our confidence – in our methods, in evidence, rather than in blanket answers.

Furthermore, there are documented cases of overconfidence persisting at high education levels in certain contexts. The “*impostor syndrome*” literature shows that many high-achievers (academics, graduate students, professionals) privately feel inadequate despite objective success; ironically, the flip side is that some less accomplished individuals remain oblivious and highly confident. But also, some high-achievers exhibit *narcissistic confidence* – education doesn’t automatically humble those who have strong self-enhancing dispositions. For example, a study of leaders with MBA degrees found that while many became more cautious decision-makers, a subset became even more convinced of their leadership infallibility (possibly due to a sense of elite credentials). This reminds us that individual differences (personality, prior socialization) moderate the effect of education on humility. Education provides the encounter with complexity, but whether one internalizes humility from it can depend on factors like openness to experience or cultural upbringing.

4.4. Cultural and Social Moderators: Our findings underscore that the paradox is context-dependent. Cross-cultural research provided some of the clearest moderators. In cultures with strong norms of humility (e.g., many East Asian societies), even *less-educated* individuals may exhibit outward humility, so the gap between them and highly educated people might be smaller in terms of expressed confidence – everyone is expected to be modest. On the other hand, in such cultures, *if* a highly educated person did try to assert themselves confidently, they might be socially sanctioned more than in the West. Western cultures (especially the United States, with its ethos of self-assertion) often create a baseline where *everyone* talks themselves up to some degree. In that context, an educated person’s relative caution might starkly contrast with the average person’s self-promotional style. Researchers have found that Americans tend to report higher self-esteem and self-rated abilities than East Asians, despite similar objective achievements (Heine & Hamamura, 2007; Falk et al., 2009). This has been partly attributed to “face culture” vs. “dignity culture” differences: East Asians avoid standing out (face

culture), whereas Westerners are encouraged to celebrate their individuality (dignity culture) (Zhang et al., 2025). Consequently, the *interpretation* of a person's confidence also varies: a modest expert in a Western setting might be underestimated, whereas in an East Asian setting that modesty might be seen as proper and does not reduce their perceived competence as much.

Our analysis also looked at organizational culture and found analogous patterns. For example, in academia itself (a global sub-culture), humility is normative. In contrast, in some business or political environments, a “culture of confidence” pervades – everyone speaks in strong terms, and any hint of uncertainty can be viewed as weakness. Educated individuals who enter those arenas often feel pressure to adapt (and some do, effectively muting their academic humility). But many struggle, which can impact their career progression or influence. We identified this as a social cost: the paradox can mean that genuine experts have less influence on public opinion compared to less-qualified but more confident speakers. One sociology study noted that on TV news panels, the academic experts often got less speaking time and were interrupted more, whereas confident non-experts dominated conversations – possibly because the expert's careful style didn't command attention in that format.

4.5. Epistemological and Ethical Implications:

The intersection of our findings with epistemology (the philosophy of knowledge) is thought-provoking. If more knowledge breeds less certainty, what does that say about the pursuit of truth? One implication is that *certainty* might often be a sign of *ignorance*, as counterintuitive as that sounds. People who haven't grappled deeply with a topic may not even see the ambiguities and unknowns, so they feel 100% certain of their stance. Meanwhile, the true experts say “it's complicated” or “we have 90% confidence,” etc. This suggests that public discourse could systematically overweight the voices of the less informed, simply because they speak with more conviction. It also raises an ethical point: should experts adopt a stronger communication style to convey urgency or persuade others, at the risk of betraying some of their intellectual

honesty? Evidence that transparent uncertainty can preserve trust supports what some call ‘forthright humility’: lead with what the evidence strongly supports, then delineate the live uncertainties (van der Bles et al., 2020).

Some scholars argue that *intellectual humility* must be balanced with what they call “engaged humility” – being humble in method, but still assertive about well-founded conclusions (especially when misinformation is rife). Our findings support that notion: for effective knowledge dissemination, highly educated experts may need training in communication that allows them to maintain accuracy while not appearing overly hesitant. Otherwise, the paradox can contribute to *anti-intellectual trends*, where the confident amateur is preferred over the cautious professional. Moreover, cognitive sophistication does not eliminate the bias blind spot, which complicates how both experts and non-experts assess their own and others' judgments (West et al., 2012).

That said, an optimistic epistemological takeaway is that humility keeps the door open for learning. History is replete with examples of experts who became overconfident and dismissed new ideas (e.g., established scientists rejecting revolutionary discoveries). Intellectual humility prevents ossification of knowledge. Therefore, while it can reduce personal confidence, it arguably increases the *collective reliability of knowledge*. A community of scholars who all say “we think X is true, but we're open to new evidence” will correct errors over time more effectively than a community where everyone is cocksure and unyielding. In that sense, the paradox may be a *feature*, not a bug, of advanced education – it instills a healthy skepticism that is vital for the progress of knowledge.

4.6. The Integrated Model Confirmed (with Modifications): The integrated model (Figure 1) we proposed is largely supported by the compiled evidence. Academic attainment indeed leads to greater knowledge of complexity (cognitive) and to adoption of humility norms (philosophical/social), which together reduce overt confidence. However, based on our findings, we

add a few modifications to the model. First, we include feedback effects: lower expressed confidence by experts can sometimes diminish their influence or lead others to challenge them, which could either *undermine* the expert's confidence further or conversely encourage them to be more assertive next time (some experts learn to “perform confidence” after negative experiences). Second, we include moderators such as culture (as discussed) and context (e.g., an academic in a classroom vs. an academic on social media may behave differently). Third, we acknowledge a dual-nature of confidence: internal confidence (knowing you can figure things out) might still rise with education even as external confidence (declaring you are right) falls. This duality means the paradox is not absolute—educated individuals often quietly have strong confidence in their abilities, just not in the infallibility of any single belief they hold.

In conclusion of this discussion: The paradox “when more learning means less certainty” is strongly evidenced in how people speak and self-assess, though it comes with important caveats. Higher education cultivates an *awareness of one's ignorance and a respect for complexity* that naturally translate to more measured, less superficially confident discourse. The less educated, lacking that perspective, more readily convey absolute certainty (often out of unawareness of what they might be missing). This is supported by cognitive bias research, philosophical principles of humility, and sociological observations of role expectations. Yet, this does not imply that education is disempowering—rather, it empowers in a different, deeper way. It replaces *naïve confidence* with *earned discernment*.

Before finalizing, we consider how this dynamic might evolve in the near future, given rapid changes in how knowledge is accessed and shared.

5. Conclusion & Recommendations

In wrapping up, we revisit our core question—*How does academic attainment affect self-confidence in public expression and perceived*

authority?—and reflect on what our findings mean for individuals and society. We then offer recommendations for educators, leaders, and communicators, and finally cast an eye to the future, exploring how upcoming transformations in digital learning and artificial intelligence (AI) might influence this paradox over the next decade.

5.1. Answers to the Research Questions: RQ1 is supported by convergent evidence of weak-to-moderate calibration between self-ratings and performance, pronounced overplacement among low performers, and increased hedging among high performers, indicating an inverse association between academic attainment and categorical assertion across educational and professional contexts. RQ2 is addressed by the three-pathway synthesis: cognitive recalibration (reductions in overplacement), epistemic virtue formation (Socratic humility), and role-norms in expert self-presentation jointly translate learning into more cautious assertion without depressing method-confidence. RQ3 is supported by moderators in culture, domain specificity, and interactional setting, which attenuate or amplify the inverse association depending on modesty norms, scope of expertise, and audience expectations. RQ4 is addressed in the foresight analysis, where digital learning and AI plausibly expand shallow knowledge exposure (inflating confidence for some) while also modeling uncertainty and exposing limits (cultivating humility for others)

5.2. Summary of Insights: Our interdisciplinary inquiry confirms a paradoxical inverse relationship between academic attainment and outward self-confidence. The evidence suggests that as people become more educated, they often become more uncertain in the best sense of the word: they are less prone to hubris and more open to nuance. We integrated cognitive psychology's Dunning–Kruger effect (novices overestimating, experts underestimating), philosophy's elevation of intellectual humility as a virtue (knowing one's limits), and sociology's understanding of self-concept as socially shaped (the expert identity that demands caution). Together, these perspectives provide a

robust explanation for why “more learning means less certainty” in many contexts.

However, this is not a simplistic one-way effect. It is moderated by context (domain-specific expertise still breeds confidence *within* that domain), by culture (norms of modesty vs. self-assertion), and by individual disposition. Importantly, the *quality* of confidence changes with education—shifting from absolute and unexamined to conditional and reflective. An analogy can be drawn to mountaineering: a novice climber at the base of a mountain might loudly boast, “That peak will be easy to climb!” whereas a seasoned mountaineer near the summit, looking out at the surrounding ranges of even taller peaks, quietly says, “There is so much more to climb, and it’s challenging.” The novice’s confidence is high but unfounded; the expert’s confidence is lower in boastfulness but grounded in real skill and understanding of difficulties.

5.3. Implications: In practical terms, higher attainment tends to reduce declarative bravado while increasing confidence in method, a profile best described as ‘confident humility. The paradox has several implications: **[1]. Educational Practice:** Educators should recognize that encouraging intellectual humility is *not* at odds with building students’ confidence—rather, it is about building confidence in the process of inquiry rather than in having ready answers. Curricula can incorporate reflections on the nature of knowledge so that students are prepared for the fact that learning more might initially make them *feel* like they know less (because they become aware of new questions). This could help students avoid disillusionment or impostor feelings when they hit that stage of humility. Pedagogically, scaffolding can be provided: celebrate gains in competence but also normalize uncertainty. For instance, explicitly teaching about the Dunning–Kruger effect can help high-performing students understand why others might seem more confident and help low-performing students calibrate their self-assessments. **[2]. Leadership and Organizational Behavior:** In professional and leadership settings, the findings counsel a balance. Teams and leaders benefit from expertise that is coupled with

humility (it leads to better listening, less overreach). But organizations must also ensure that the voices of the humble experts are *heard*. This might mean training highly skilled staff in communication strategies that convey appropriate confidence without sacrificing honesty. It could also mean organizational cultures that reward asking questions and admitting unknowns (psychological safety), so that educated individuals don’t feel they must feign certainty to be valued. For leadership, an implication is to beware of the confidence paradox: the most confident presenter is not necessarily the most knowledgeable. Diverse hiring and evaluation practices should value demonstrated competence and critical thinking over charisma alone. In knowledge-driven fields, a humble approach may lead to better long-term decisions, even if it’s less flashy. **[3]. Public Discourse and Media:** The paradox perhaps helps explain phenomena like the spread of misinformation, where confident assertions by uninformed individuals gain traction (see Kuklinski et al., 2000). It underscores a societal challenge: how to elevate expert knowledge in public discourse when experts (rightly) express it with nuance. One recommendation is that scientists and scholars should be supported (by institutions and media training) to communicate more effectively without oversimplifying to the point of falsehood. Classic work shows how confidently held but incorrect political beliefs persist in mass publics, amplifying the influence of bold but mistaken claims (Kuklinski et al., 2000). Likewise, media outlets and audiences should be educated to recognize that *nuance and admitting uncertainty are not signs of incompetence* but of expertise. If the public understood that “*I’m not 100% sure, but evidence indicates X*” is actually a *more reliable* statement than “*I guarantee X is true,*” the dynamic might shift. This is an epistemological education issue at the societal level. **[4]. Psychological Well-Being:** On an individual level, highly educated people often struggle with self-doubt and impostor syndrome. Our study provides context: such feelings can be a natural byproduct of genuine growth in knowledge. Recognizing this might help individuals reframe their self-doubt as a *sign of learning* rather than a proof of inadequacy. Institutions (like

graduate schools) can offer support by normalizing humility and teaching coping strategies for impostor feelings. At the same time, those with less education should not be dismissed outright; rather, encouraging critical thinking for everyone can help people at all levels calibrate their confidence with reality (perhaps tempering some of the excessive confidence of the uninformed, which can have negative consequences like poor personal decisions or susceptibility to extreme ideologies).

5.4. Ten-Year Foresight: The Role of Digital Learning, AI, and Open Knowledge. Looking ahead, we foresee that the interplay between knowledge and confidence may be significantly altered by technological and societal trends. Here are some projections and speculations for the next decade: **[1]. Digital Learning and Information Abundance:** With the expansion of online courses, MOOCs, and free access to information (Wikipedia, online repositories), more people will gain *some* level of knowledge on various topics. This democratization of learning might ironically exacerbate the Dunning–Kruger effect on a broad scale. Individuals might do a few online lessons or watch YouTube tutorials and then consider themselves knowledgeable on complex subjects (without the deeper exposure that brings humility). *Superficial learning* could inflate confidence rapidly – a sort of “nano-degree hubris.” Unless digital learning platforms integrate critical thinking and emphasize the limits of quick learning, we may see an army of semi-informed individuals each convinced of their expertise (the internet already has echoes of this). On the flip side, digital learning also connects learners to massive communities and expert feedback. If leveraged, it can also instill humility: for example, online forums often correct wrong assumptions swiftly, potentially puncturing overconfidence. The key will be how these platforms are designed – do they simply deliver content or do they engage learners in grappling with the unknowns and uncertainties of fields? **[2]. Artificial Intelligence (AI) Advisors:** AI systems (like advanced successors of ChatGPT available in 2025) are increasingly used to answer questions and even provide tutoring. This could cut both ways in our

paradox. ***AI as an equalizer:*** It can provide anyone instant answers and the illusion of understanding. A person might mistake access to AI’s information for their own knowledge, thereby becoming more confident in discussing topics they actually don’t deeply understand (because the AI fills in gaps, somewhat like a student cheating on a test feels confident until they have to do it alone). This is one scenario where AI might worsen overconfidence among the less educated or less knowledgeable – a “*knowledge on demand*” crutch that prevents appreciating the depth of expertise. Conversely, ***AI as a humbler:*** advanced AI might frequently remind users of uncertainties (“There is a 60% probability this answer is correct, here are the assumptions...”). If AI is programmed to display intellectual humility (which some argue it should, to avoid misleading users), it might model that behavior for users. Moreover, AI can expose users to the vastness of information – any follow-up question can lead to more complexities. In that way, an *inquisitive* user with AI could quickly see how much *more* there is to know, fostering humility. In professional settings, AI might handle routine confident assertions (since it can be very confident in factual recall) freeing human experts to focus on nuance and uncertain areas, thus emphasizing their humility and high-level critical thinking. **[3]. Open Knowledge Systems and Collaboration:** The next decade is likely to see more collaborative knowledge creation (think Wikipedia evolution, citizen science, open databases). As knowledge becomes more networked and transparent, individuals may become more aware of how knowledge is provisional. For example, Wikipedia shows the edit history and debates behind an article – an educated person browsing that can see disagreements and uncertainties. If open knowledge platforms highlight debate and revision, they *teach* humility: people see knowledge is not a monolith. Additionally, global collaboration means encountering diverse perspectives, which usually injects humility (when you see experts themselves disagree across cultures or schools of thought, you realize certainty is elusive). Therefore, one could argue that open knowledge systems may normalize intellectual humility in the public. People might get used to statements like “citation needed” or “some researchers

say..., others say...,” which frames information as less absolute. **[4] Social Media and Confidence Signaling:** On social media, confidence (even false confidence) often gets rewarded with likes and shares. In the near future, if this dynamic continues, there is a risk that those who shout the loudest (regardless of actual knowledge) will dominate discourse. *However*, there is a growing counter-movement valuing expertise and fact-checking. The next decade might see better algorithms or community norms that amplify credible voices and flag overconfident misinformation. If such changes occur, they could mitigate the advantage that unwarranted certainty currently has in the attention economy. We might see “credibility scores” or other signals that attach more weight to nuanced, evidence-linked posts. If society can engineer a norm shift where humility and accuracy are valued (perhaps through education, platform policy, or AI moderation), then the negative aspects of our paradox (experts being sidelined) could be reduced.

5.5. Recommendations: In light of our findings and foresight, we propose the following: **[1]. Integrate Critical Reflection in Education:** Schools and universities should explicitly teach about cognitive biases (like Dunning-Kruger) and the nature of expertise. This helps students understand that feeling less certain is a normal progression. Capstone or orientation courses could have modules on “What it means to know something” using philosophy and psychology insights. This can cultivate *healthy self-confidence* that coexists with humility. **[2]. Mentorship and Role Models:** Highlight role models (scientists, leaders) who exemplify confident humility. For example, in science communication training, show how someone like Dr. Anthony Fauci communicates uncertainty honestly yet effectively, to illustrate that one can be authoritative without being arrogantly certain. Normalizing this style can encourage upcoming experts to adopt it. **[3]. Media Training for Experts:** Provide training to academics and scientists on how to convey their messages to the public in a way that is both true to the evidence and engaging. This might include learning to use clear language, storytelling, and specifying

confidence levels in a relatable way (e.g., using analogies for probabilities). The goal is to prevent misinterpretation of expert cautiousness as ignorance. Perhaps using phrases like “We are confident about X under these conditions, but remain open-minded because Y could change things” – essentially teaching experts to lead with what they do know before elaborating on uncertainties. **[4]. Platform Design:** For tech and knowledge platforms, incorporate features that encourage reflection. For instance, Q&A forums might prompt users, before posting an answer, with “How sure are you? Have you checked the sources?” This could nudge less-knowledgeable participants to pause. At the same time, highlight answers from subject-matter experts (as some forums do with badges) so that users can learn from the nuanced approaches of those experts. **[5]. Cross-Cultural Exchange:** Encourage cross-cultural dialogues on humility and confidence in education. Western educators could learn from Eastern pedagogies that effectively foster humility, and vice versa. An international symposium on “Humility in Learning” could produce guidelines that blend the best of both worlds – confident exploration with humble reflection. **[6]. Mental Health Support in Academia:** Universities should provide resources to graduate students and early-career academics about impostor syndrome and the normalcy of self-doubt in scholarly development. Peer support groups and mentoring can help individuals maintain self-worth while acknowledging their limits.

5.6. Concluding Thoughts: Ultimately, the paradox of increasing knowledge and diminishing certainty is a testament to the complexity of wisdom. It resonates with the Socratic principle that the more we truly know, the more we realize what we don’t know. Far from being a drawback, this humility can be a strength – it drives continued inquiry, collaboration, and caution in drawing conclusions. In a world increasingly confronted by novel challenges (climate change, pandemics, technological disruptions), such intellectual humility may be crucial. Overconfidence can lead to reckless decisions, whereas measured confidence – knowing what we know *and* what we don’t – can guide more prudent choices.

In the next ten years, as information ecosystems evolve, society will face a choice: Will we leverage education and technology to foster a culture that values truth over bravado? If we do, we may see the paradox shift from a liability to a virtue: more learning means less *false* certainty, but perhaps more openness to truth. If we fail, we risk a future where the loudest voices drown out the wisest ones. Our exploration underscores that understanding this dynamic is the first step to navigating it. Embracing intellectual humility, while retaining the confidence to act on well-founded knowledge, is the delicate balance that education in the 21st century must strive to achieve. The public good is best served when education transforms confidence from performance to precision.

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