Desire for Status is Positively Associate with Overconfidence: A Replication and Extension of Study 5 in Anderson, Brion, et al. (2012)

Lewend Mayiwar[1], Erik Løhre[1], Subramanya Prasad Chandrashekar[2], Thorvald Hærem[1]

[1] Department of Leadership and Organizational Behaviour, BI Norwegian Business School, Oslo, Norway

[2] Department of Psychology, NTNU–Norwegian University of Science and Technology, Trondheim, Norway

Author Note

Analysis code, data, materials, additional online material, and preregistration of the Stage 1 protocol can be accessed at https://osf.io/6m2hx/

Corresponding Author

Lewend Mayiwar, OsloMet—Oslo Metropolitan University, Pilestredet 35, 0166, Oslo, Norway. Tel.: +4792218868. E-mail: lewend.m@hotmail.com / lemay3377@oslomet.no

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Abstract

Overconfidence is prevalent despite being linked to various negative outcomes for individuals, organizations, and even societies. To explain this puzzling phenomenon, Anderson, Brion, et al. (2012) proposed a status-enhancement theory of overconfidence: Expressing overconfidence helps individuals attain social status. In this Registered Report, we conducted a direct replication of Study 5 by Anderson, Brion, et al. (2012), which found that individual differences in desire for status was positively correlated with being overconfident about one's task performance relative to others. We also tested the generalizability of the key relationship to a different measure of desire for status. Furthermore, we complemented traditional significance testing with equivalence testing and Bayesian analysis to test a set of null hypotheses in the original study. We found support for the status-enhancement hypothesis: Desire for status had a positive association with overconfidence using both the original measure of desire for status ($\beta = 0.19$, 95% [0.09, 0.28]) and the alternative measure ($\beta = 0.31$, 95% [0.22, 0.39]). A follow-up extension study aimed to test this relationship causally by manipulating the social context where status motives may be stronger (a competitive vs. cooperative context) and testing whether such an effect is driven by state-level desire for status. We did not find a direct causal effect of social context on overconfidence, but an indirect association via state-level desire for status: a competitive (vs. cooperative) group context increased desire for status ($\beta = 0.34$, 95% [0.18, 0.51]), which in turn predicted greater overconfidence ($\beta = 0.38$, 95% [0.31, 0.46]).

Keywords: status, overconfidence, status-enhancement theory, replication, registered report

Statement of Limitations

This study is a direct replication and extension of Anderson, Brion, et al. (2012), examining the link between status desire and overconfidence. Study 1's correlational design limits causal interpretation. Study 2 used an experimental approach to test the effect of competitive versus cooperative contexts; however, we found no direct effect on overconfidence, only an indirect effect via state desire for status. As the relationship between state desire for status and overconfidence is correlational, causality cannot be inferred. Both studies were conducted online, using an abstract overconfidence task and a perceived, rather than actual, group setting, which limits ecological validity. Additionally, our U.S.-based sample restricts generalizability, as overconfidence may differ in non-Western contexts. The focus on status-enhancement theory also does not encompass all possible contextual moderators. These limitations underscore the need for future experimental and field-based studies to better assess the robustness and applicability of these findings.

Replication and Extension of Anderson et al. (2012)

Overconfidence has been described as one of the most powerful, pervasive, and puzzling biases that humans display (Johnson & Fowler, 2011; Kahneman, 2011). Studies have documented various costs of overconfidence. It can lead entrepreneurs to risk too much in new ventures (Camerer & Lovallo, 1999), CEOs to engage in too many acquisitions of other firms (Malmendier & Tate, 2005), nations to initiate too many military confrontations (Johnson, 2004), and exacerbate false news susceptibility (Lyons et al., 2021). No wonder then, that Daniel Kahneman has said that overconfidence is the bias he would most like to eliminate if he had a magic wand (Shariatmadari, 2015).

Initial studies linked overconfidence to cognitive processes like miscalibration and confirmation bias (e.g., Koriat et al., 1980). Others have proposed that overconfidence stems from self-enhancement motives: People have an internal drive to be confident because it provides them with psychological benefits (Dunning et al., 1995; Kunda, 1987) such as self-esteem (Alicke, 1985), mental health (Taylor & Brown, 1988), and task motivation and persistence (Pajares, 1996). Given these positive outcomes, natural selection may have favored the development and maintenance of overconfidence since it has potentially increased net payoffs in competitive environments (Johnson & Fowler, 2011).

A more recent theoretical approach suggests that overconfidence may be a product of social motives. Specifically, Anderson, Brion, et al. (2012) proposed that overconfidence can help people attain social benefits. If you believe yourself to be better (more competent, more resourceful) than you actually are and present yourself that way, others may accept your self-presentation as true and grant you higher social status. Thus, the status-enhancement account hypothesizes a positive relation between overconfidence and status.

Across six studies (four correlational and two experimental), Anderson, Brion, et al. (2012) found (a) that overconfident individuals were rated as higher on status by their peers and observers, and (b) that a desire for status increased overconfidence. This latter finding merits special attention. While there is ample evidence indicating that overconfidence can lead to the attainment of social status (e.g., Belmi et al., 2020; Kennedy et al., 2013; Ronay et al., 2019; Sah et al., 2013; Tenney et al., 2019), very little research has examined how the desire for status influences overconfidence. In the original study, only two out of six studies tested this relationship, and as far as we know, there is only one conceptual replication (Belmi et al., 2020) and no direct replication of this finding. Thus, the relation between desire for status and overconfidence, a core assumption in Anderson, Brion, et al.'s status-enhancement account, has received far less empirical attention than the relation between overconfidence and attained social status.

In the current work, we examine the robustness of the relationship between trait desire for status and overconfidence and propose an extension of this relationship, namely, whether the social context (a competitive vs. cooperative context) increases overconfidence via state-level desire for status.

Theoretical Background: The Relation Between Status and Overconfidence

Overconfidence can be generally defined as holding an overly positive self-view, as compared to some objective benchmark (Meikle et al., 2016). Moore and Healy (2008) identified three varieties of overconfidence:

In *overestimation*, individuals overrate their performance relative to reality. For instance, they may believe they answered eight questions correctly on a test when, in fact, they got only four correct.

Overprecision manifests as excessive certainty in one's correctness. For example, when asked to make confidence intervals that you are 90% confident contain the correct answer to a numerical question, the intervals contain the correct answer only 50% of the time.

Finally, *overplacement* involves thinking one performs better than others, sometimes called a better-than-average effect. Someone might believe they scored higher than 80% of the other people who took the test when, in reality, they rank at the 50th percentile.

In their studies, Anderson, Brion, et al. (2012) focused on overplacement, since this type of overconfidence is inherently a social process—people estimate how much better they are than others.

It is important to recognize that overconfidence is different from high confidence, which can be warranted (holding a highly positive self-view that reflects reality), and to distinguish between strategic self-presentation (deliberately exaggerating your abilities) and genuine overconfidence, where you truly believe yourself to be better than warranted by reality. Anderson, Brion, et al. (2012) describe overconfidence as "a genuine yet flawed perception of one's abilities […] which is different from self-presentation and impression management, which involve deliberate attempts to present oneself in a positive light" (p. 719).

Overconfidence is a complex phenomenon that can arise from multiple mechanisms, including genuine cognitive biases and deliberate self-presentation (Von Hippel & Trivers, 2011). While researchers still debate about whether and when overconfidence is driven by genuine beliefs or self-presentational attempts, recent research suggests that overconfidence can reflect strategic self-deception, where individuals genuinely believe their exaggerated claims, potentially driven by subconscious awareness of the social advantages of appearing confident

(Schwardmann & van der Weele, 2019).[1] In either case, the theoretical principles underlying the relationship between desire for status and overconfidence should apply regardless of whether overconfidence represents a genuine belief or a deliberate and strategic process: Individuals driven by a desire for status might subconsciously act on this desire by becoming (genuinely) overconfident, or they might deliberately exaggerate their confidence even if this doesn't reflect their true beliefs about their performance.

Anderson, Brion, et al.'s (2012) status-enhancement theory has played an important role in shaping an emerging line of research focusing on the reputational consequences and the social psychological predictors of overplacement (e.g., Kennedy et al., 2013; Ronay et al., 2019; Tenney et al., 2019). As noted by Belmi et al. (2020), "overplacement may not be so universal as researchers think it is and it would contribute to our understanding of the factors that shape overplacement, an area of research that has been relatively understudied to date" (p. 4).

While the idea that overconfidence may yield social benefits has long been discussed, Anderson, Brion, et al. (2012) were the first to specify the role of the desire for status as a driver of overconfidence. The authors refer to status as the amount of respect, prominence, and influence individuals enjoy in the eyes of others.

In four out of six studies, Anderson, Brion, et al. (2012) revealed that overconfidence leads to higher status, consistent with previous work showing the interpersonal benefits of displaying confidence (e.g., Bonaccio & Dalal, 2006; Brewer & Burke, 2002; Løhre et al., 2024; Løhre & Teigen, 2023; Price & Stone, 2004). This can be interpreted as showing that people use

[1] We do not take a strong stand on this issue, but nevertheless include exploratory questions about whether self-reported perceived rank reflected genuine beliefs or were attempts at self-presentation.

a confidence heuristic, whereby observers generally believe those who are highly confident have a reason to be confident, namely, that they are competent or knowledgeable.

Importantly, the status-enhancement theory predicts that a stronger desire for social status is associated with increased overconfidence. Anderson, Brion, et al. (2012) found support for this relationship in a correlational study (Study 5) and in an experimental study (Study 6) that manipulated status via a priming procedure. Table 1 provides an overview of the main findings of the six studies reported in the original article.

Table 1

Key Findings From the Six Studies Reported in Anderson, Brion, et al. (2012)

Study	N	IVs	Main DV	Main effect	Main finding
1	76 (Students)	Overconfidence	Status attainment	$r(73) = .26$ $p < .05$	Overconfident people attained higher status, which was mediated by peer-rated competence.
2	243 (Students)	Overconfidence	Status attainment	$B = .32$ $p < .05$	Overconfident people attained higher status over time and were assigned higher grades by their peers.
			Peer-assigned grade	$B = .08$ $p < .01$	
3	80 (Students)	Overconfidence condition (vs. accurate condition)	Status attainment	$F(1, 39) = 7.80$ $p < .01$	Participants who were induced with overconfidence attained higher status.
4	120 observers (Students and staff)	Displays of overconfidence	Observer-rated competence	$r(118) = .29$ $p = .002$	Observers perceived overconfident people as more competent due to their behavioral displays.
5	77 (MTurk)	Desire for status	Overconfidence	$\beta = 0.42$ $p = .010$	Individual differences in the desire for status predicted individual differences in overconfidence.

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6	68 (MTurk)	2 (status-prime vs. control) × 2 (business vs. personal characteristics) mixed design	Self-perceived competence	$F(1, 66) = 5.03$ $p = .028$	Individuals primed to desire status perceived themselves as more competent in business-relevant skills but not business-irrelevant skills.

While the evidence that overconfidence can lead to higher status seems robust, the relationship between the desire for status and overconfidence remains less explored. Anderson, Brion, et al. report two studies (total $N = 145$) indicating a positive association between the desire for status and overconfidence. To our knowledge, this topic has received little attention, leaving room for further investigation. One exception is an article by Belmi et al. (2020), which examined the association between social rank and overconfidence (overplacement). In two well-powered correlational studies ($N_{\text{Study 2}} = 472$, $N_{\text{Study 3 (preregistered)}} = 1{,}147$), Belmi et al. (2020) found that desire for status predicted greater overconfidence (rs = .23 to .30). These two studies by Belmi et al. (2020) measured the desire for status in multiple ways and used different experimental tasks. Although effect sizes were smaller than the one observed by Anderson, Brion, et al. (2012), they are consistent with Anderson, Brion, et al.'s (2012) finding that desire for status increases overconfidence. These findings are important, because very little is known about the antecedents of overconfidence. Belmi et al. (2020) note that "the factors that shape overconfidence (and overplacement, specifically) have been relatively understudied to date […] which is unfortunate considering that overconfidence is believed to be a significant underlying cause for many organizational and societal catastrophes." (p. 5).

Building on Belmi et al.'s (2020) findings, which conceptually replicated the positive association between desire for status and overconfidence, our study conducts a very close replication of the relationship between desire for status and overconfidence following the

procedure in Anderson, Brion, et al. (2012), using multiple measures, while also ruling out alternative explanations. Anderson, Brion, et al. (2012) hypothesized that, unlike the desire for status, the need for affiliation and need for achievement are unrelated to overconfidence, finding support for their null hypotheses. Testing these null hypotheses, especially using larger samples and with methods that can quantify the null, is important for ruling out alternative explanations of overconfidence. Furthermore, we examine the relationship between desire for status and overconfidence causally—by comparing a context where status motives are salient (a competitive group context) to one where such motives are not as salient (a cooperative group context)—and test the indirect effect of group context on overconfidence via state-level desire for status. We discuss these extensions in the "Extensions" section.

Overall, our study examines the robustness of the link between trait-level desire for status and overconfidence and extends the status-enhancement theory by exploring the direct causal effect of social context on overconfidence, as well as its indirect effect via state-level desire for status.

Choice of Replication Target: Anderson, Brion, et al. (2012), Study 5

A close and independent replication of Anderson, Brion, et al.'s (2012) Study 5 has high value for several reasons (Isager et al., 2021).

First, the study addresses an important topic, both theoretically and practically. Overconfidence is a pervasive phenomenon with large potential consequences. Yet, relatively little research has explored antecedents of overconfidence. Replicating central studies on this topic is important to provide practical advice and to ensure theoretical progress.

Second, the original paper has been highly influential, currently with more than 610 citations on Google Scholar, and has contributed to active theoretical and empirical work on

overconfidence and person-perception research. Furthermore, the status-enhancement account is currently a prominent theoretical explanation of overconfidence and is part of a current renewed interest in how social motives may be (partial) explanations of well-known biases (e.g., Dorison, 2023; Dorison et al., 2022; Dorison & Heller, 2022).

Third, there are no direct replications of any of the six studies reported in Anderson, Brion, et al.'s study. Most importantly, while there are several conceptual replications of how overconfidence can lead to higher status, we are only aware of Study 5 and Study 6 in Anderson, Brion, et al. (2012), and Study 2 and Study 3 in Belmi et al. (2020) investigating the opposite relationship, that is, how desire for status is linked to overconfidence.

Fourth, we note limitations related to the original studies. The sample sizes are relatively small overall, and in Study 5 specifically ($N = 77$), providing low power to detect typical effect sizes in social psychology and individual differences research ($\bar{r} = .21$ and $\bar{r} = .19$), respectively (Gignac & Szodorai, 2016; Richard et al., 2003). A well-powered and pre-registered replication would shed light on the robustness of the original results.

We chose Study 5 as our replication target as this provides the most straightforward way to demonstrate the core phenomenon of interest; that the desire for status drives overconfidence. Study 6 was an experimental test of the same relationship. Specifically, Anderson, Brion, et al. (2012) primed the desire for status by having participants read and imagine themselves in a hypothetical work-related scenario where they had the opportunity to climb up the hierarchy, which, in contrast to a neutral control condition, led to greater overconfidence. Although we chose not to replicate Study 6, given that such priming methods may not be apt for the kind of online sample used in the current study, we propose another situational variable that can increase

overconfidence through desire for status, namely, a context that involves competition (vs. cooperation) among group members.

Extensions

We extended the original study in three ways. In Study 1, we tested the generalizability of the key association to a different measure of need for status and complement traditional hypothesis testing with methods that allow us to test null hypotheses in the original study. Next, we ran a follow-up extension study, contingent on a successful replication outcome in Study 1, that aimed to test the effect of a competitive versus cooperative context on overconfidence via state-level desire for status (Study 2).

Null Hypotheses: Need for Achievement and Need for Affiliation (Study 1)

In Study 5, Anderson, Brion, et al. (2012) tested whether the desire for status (need for dominance, specifically) uniquely predicts overconfidence among other potentially relevant psychological needs. First, they wanted to rule out the possibility that individuals who are motivated to succeed in general are more overconfident. To do this, they measured individuals' need for achievement—individuals' level of aspiration to achieve in their field and work hard toward accomplishing difficult goals. Anderson, Brion, et al. (2012) argued that individuals who seek to achieve may not be motivated to engage in overconfidence because it does not further their goals, based on previous research indicating that overly positive self-perceptions do not facilitate achievement (e.g., Robins & Beer, 2001). Thus, they hypothesized no relationship between need for achievement and overconfidence.

The other possibility that Anderson, Brion, et al. (2012) wanted to rule out was that individuals who have a strong need for affiliation are more overconfident. The need for affiliation refers to the degree to which individuals desire to engage in social activities, have

friends, and meet new people. Anderson, Brion, et al. (2012) predicted no association between need for affiliation and overconfidence, arguing that status and affiliation concerns are orthogonal according to circumplex models of human behavior (e.g., Wiggins, 1979).

Consistent with their reasoning, Anderson, Brion, et al.'s (2012) Study 5 found that only need for dominance (i.e., need for status) predicted overconfidence; neither need for achievement nor need for affiliation was significantly related to overconfidence.

However, traditional hypothesis testing does not allow for the testing of the null hypothesis of the absence of an association (Cohen, 1994). A non-significant *p*-value could either mean that there is no association or it could mean that an association exists but that the study was not sufficiently powered to detect it. Testing the absence of an association requires alternative methods that allow for such conclusions. Here, we complement the original study by using equivalence testing and Bayesian analysis to quantify evidence for the null to facilitate the interpretation of non-significant associations (Harms & Lakens, 2018; Lakens et al., 2020).

Generalization to Different Need for Status Measure (Study 1)

In Study 1, we aimed to test whether the main association between desire for status and overconfidence generalizes to a different measure of desire for status. The original study by Anderson, Brion, et al. (2012) used the need for dominance subscale from the Personality Research Form (PRF; Jackson, 1984). This subscale emphasizes behaviors and preferences related to leadership, control, and authority. For example, the scale includes items about confidence in directing others, aspirations for leadership roles, and effectiveness in persuasion. However, it has been criticized for conflating dominance with related constructs such as power and influence (Murphy et al., 2022), and it does not explicitly capture the psychological need for

status. Additionally, the PRF is copyright-restricted, with prohibitive costs that can hinder accessibility and reproducibility.

Similarly, Belmi et al. (2020) combined multiple trait-level scales to measure the desire for social rank (i.e., desire for status), where some of the measures were less about the desire for status than, for instance, power and the desire for advancement in an organization. In addition to the potential limitation of including measures that are less related to status than other constructs, combining multiple scales can be time-intensive and costly to administer.

In this study, we used Neel et al.'s (2016) Fundamental Social Motives Inventory (FSMI). The FSMI is a well-established scale that has been used to assess differences in people's fundamental social motives across cultures, at different time points, and in relation to other commonly studied measures (Pick et al., 2022). The need for status scale in the FSMI includes items that appear to more directly and consistently assess aspects of need for status compared to the need for dominance scale used in the original study. Moreover, compared to Belmi et al.'s multidimensional approach, the FSMI offers a shorter, single-scale alternative, which is easier to administer, free to use, and more practical for replication and future studies.

Cooperative versus Competitive Context (Study 2)

We conducted a follow-up extension experiment examining how the social context increases overconfidence via state-level desire for status. This experiment was contingent on the replication outcome, where we preregistered to run this extension study if we were to find evidence for an association between trait desire for status and overconfidence, using either the original measure or the alternative measure.

Anderson et al. (2015) raised the possibility that "individuals regulate their desire for status in response to social-contextual constraints" (p. 593). Indeed, a key insight from Anderson,

Brion, et al. (2012) is that overconfidence is sensitive to the salience of social status motives. Thus, although the desire for status is universal (Anderson, Willer, et al., 2012), it is also shaped by the context: In contexts where the social status motive is stronger, people are more overconfident. For instance, in Study 6, Anderson, Brion, et al. (2012) primed the desire for status by having participants read and imagine themselves in a hypothetical work-related scenario where they had the opportunity to climb up the hierarchy, which, in contrast to a neutral control condition, led to greater overconfidence. In a series of studies, Anderson, Willer, et al. (2012) found that people's desire for status was highly contextual, with people sometimes even preferring low status.

We propose that two contexts where this variation in desire for status might be particularly relevant are competitive and cooperative contexts. In zero-sum competitive contexts among individuals, individuals' main goal is typically to outcompete the others (Deutsch, 1949). Toma and Butera (2009) state that "competitive motives underlie the desire to attain a high status" (p. 795). Kilduff et al. (2016) found that participants who were asked to recall a time in which they competed with a personal rival reported being more concerned about their relative status (e.g., "I strive to have higher status than this person"; as quoted in Anderson et al., 2015, p. 585). Kilduff et al. (2016) also found that participants who recalled competing against a rival were prone to exaggerating their performance (reporting solving more anagrams than they actually did) on a subsequent, unrelated individual task devoid of competition. Although their study did not directly measure overconfidence, this inflation of performance mirrors the overestimation characteristic often associated with overconfidence. Furthermore, Radzevick and Moore (2011) found that being in competitive markets increased overconfidence over time among advisors who aimed to sell their advice to potential recipients.

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In addition, Anderson, Brion, et al.'s (2012) Study 6, which found causal evidence for an effect of desire for status on overconfidence, induced a desire for status by having participants imagine starting a prestigious job at a powerful company that promised rapid promotion and high pay. While the scenario did not mention competition, participants may have perceived this as a somewhat competitive context. Overall, these results suggest that mere exposure to a competitive context can trigger concerns for status and thereby make people overconfident.

Although competence is fundamental to social judgment and a universally valued trait (Cheng et al., 2013; Fiske & Durante, 2016; Judd et al., 2005), motivating people across various contexts to project competence for status enhancement, this tendency should be lower in cooperative compared to competitive settings. This is because the exhibition of confidence, as a specific type of competence-signaling behavior, might be more relevant in a competitive context—such as when competing for higher pay and promotion. Srna et al. (2022) conducted a series of studies finding that people value status-seeking individuals in competitive group contexts but not in cooperative group contexts, and, of particular relevance to the current study, that people were less concerned with signaling status in a cooperative setting.

In the current extension, we contrast a competitive context with a cooperative one. Unlike competitive contexts, cooperative contexts promote collaboration towards shared objectives (Deutsch, 1949), and effective cooperation relies on receptivity to others' input and a willingness to adjust one's own perspectives—traits antithetical to overconfidence (Cheng et al., 2014). Few studies have directly compared competitive contexts with cooperative ones. One exception is a study by Pesout and Nietfeld (2021) which found that, relative to participants in a cooperative condition, those in a competitive condition (where participants were promised prizes for outperforming their peers in a series of reading comprehension tasks) were more overconfident.

In cooperative contexts, there might be a greater chance of overconfidence being revealed as *over*confidence rather than confidence. When you interact closely with others, working towards the same goal (rather than competing), exaggerated beliefs in your abilities and contributions can be exposed more easily (Sah et al., 2013; Tenney et al., 2019). Overconfident individuals might even be perceived as arrogant in settings characterized by interdependence, such as in cooperative ones (Murphy et al., 2015).

Taken together, we propose that a competitive relative to a cooperative context increases the desire for status, and, by extension, that this increase in desire for status increases overconfidence, as in Anderson, Brion, et al.'s (2012) status-enhancement theory of overconfidence. A strength of our Study 2 is that unlike Anderson, Brion, et al.'s Study 5, Belmi et al.'s (2020) studies, and Study 1 in this paper, it allows us to causally test the relationship between desire for status and overconfidence.

Table 2 summarizes the hypotheses in the current replication and extension studies.

Table 2

Hypotheses Investigated in the Current Study

Hypothesis	**Description**	**Replication/ extension**	**Study**
1	Need for status is positively associated with overconfidence.	Replication	Study 1
2	Need for affiliation is not significantly associated with overconfidence.	Replication	Study 1
3	Need for achievement is not significantly associated with overconfidence.	Replication	Study 1
4	A competitive (vs. cooperative) group context increases desire for status.	Extension	Study 2

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5	A competitive (vs. cooperative) group context increases overconfidence.	Extension	Study 2
6	Need for status mediates the effect of a competitive (vs. cooperative) context on overconfidence.	Extension	Study 2

Transparency and Openness

We report how we determined the sample size, all data exclusions, all manipulations, and all measures collected in this study, and data collection was completed before we conducted any analyses (Simmons et al., 2012). We preregistered the Stage 1 article on the Open Science Framework (OSF) after in-principle acceptance, which can be accessed at https://osf.io/4pnyz (Mayiwar et al., 2024). Data, R code (RMarkdown files), and materials (Qualtrics files as Word files and importable qsf files) are available at https://osf.io/6m2hx/ (Mayiwar et al., 2024).

The study received approval from Sikt - Norwegian Agency for Shared Services in Education and Research (#854484) and from the ethical review board at BI Norwegian Business School (#033). All measures, manipulations, and exclusions are reported (either in the main text or in the additional online material). We did not run any analyses until we completed the data collection.

This Registered Report was guided by the Registered Report template by Feldman (2024). We analyzed the data in R (version 4.3.2, R Core Team, 2023), with *haven* version 2.5.4 (Wickham et al., 2020), *tidyverse* version 2.0.0 (Wickham et al., 2019), *ggplot2* version 3.4.4 (Wickham, 2016), *psych* version 2.4.3 (Revelle, 2024), *ggpubr* version 0.6.0 (Kassambara, 2020), *kableExtra* version 1.3.4 (Zhu, 2023), *bayestestR* version 0.11.6 (Makowski et al., 2019), *rstanarm* version 2.21.1 (Goodrich et al., 2020), *negligible* version 0.1.2 (Cribbie et al., 2023).

Study 1

Method

Power Analysis

We conducted a power analysis for the relationship between the desire for status and overconfidence (i.e., the direct replication). We followed Anderson and Kelley (2022) and conducted a power analysis for the status-overconfidence regression coefficient in the original study (Table 3 in Anderson, Brion, et al., 2012) using the *ss.power.reg1* function in the BUCSS R package, which adjusts the original effect for uncertainty and bias. We used the following parameters: *t*-value in the original study = 2.64, α = .05, the sample size in the original study = 77, number of predictors in the original study = 8, desired level of assurance = 0.6, desired level of statistical power = 95%. This resulted in a required sample size of 549 participants. We therefore set *N* = 550 as our target sample. However, in this study, we also randomly assigned half of the participants to complete either the same needs measures as in the original study or alternative needs measure (as part of a generalizability test). Thus, we doubled the target sample size to 1,100, of which 550 participants were assigned to a "direct replication condition" who received the original needs measures and 550 were assigned to a "generalizability condition" who received alternative needs measures.

Participants

We recruited 1,100 participants from the US via Prolific. We used standard Qualtrics spam prevention measures (e.g., prevent multiple submissions, prevent ballot stuffing, bot detection). We paid participants according to Prolific's guidelines for fair pay (currently £9.00/$12.00 per hour). For a survey taking about 12 minutes (based on pre-test responses), this gives a payment of £1.50. Table 3 provides a detailed comparison between the current and the original sample.

Table 3

Comparison of the Sample in the Original Study and the Replication

	Anderson, Brion, et al. (2012), Study 5	Replication (Study 1)
Sample size	77	550 [a] (direct replication condition using the same measures)
Geographic origin	US American	US American
Population	MTurk	Prolific participants
Gender	Not reported	Female = 701 Male = 394 Other/prefer not to say = 4
Median age	Not reported	39
Average age	36	40.70
Standard deviation age	11.39	12.74
Age range	Not reported	18-79
Medium (location)	Computer (online)	Computer (online)
Compensation	Yes, but amount not reported	Yes, £1.50
Year	Probably 2009 or 2010 [b]	2024

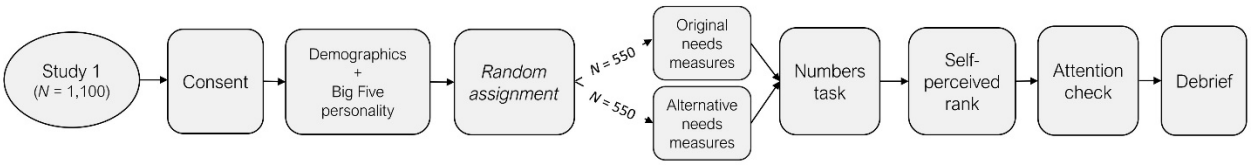
Note. [a] Study 1 includes 1,100 participants, of which 550 participants are randomly assigned to the "direct replication condition" and the other half assigned to generalizability condition using an alternative measure of desire for status. [b] The year of data collection is our estimate, based on the likely timing of data collection given the publication date and typical research timelines.

Design and Procedure

Figure 1 provides a schematic overview of the design and procedure in Study 1.

Figure 1

Flowchart Showing the Design and Procedure of Study 1



Participants responded to the survey online using Qualtrics and provided their informed consent. We used the same procedure outlined in the original study:

Participants first completed measures of demographic and individual difference variables.

They were then told they would be working with three other people, via an on-line chat

> room, who were also currently participating in the study. Before participants were to join this ostensible group, however, they completed a version of the task individually. The individual task involved 10 trials. For each trial, they estimated the average of the seven two-digit numbers simultaneously displayed for 2 seconds. After completing all 10 trials, they estimated their abilities on the task [relative to all participants in the study]. Finally, participants were told there would actually be no group task, thanked, and debriefed. (Anderson, Brion, et al., 2012, p. 728).

The only difference in our study was that half of the total 1,100 participants were assigned to complete either the original needs measures or alternative measures.

Overconfidence

After completing the numbers task, participants were told that an answer would count as correct if it fell within five points of the actual answer. On average, participants got 4.37 correct answers ($SD = 2.32$).

Next, they were asked to estimate their percentile rank relative to all other participants, on a scale from 1 (*I'm at the very bottom; worse than 99% of the people in this study*) to 100 (*I'm at the very top; better than 99% of the people in this study*) ($M = 44.11$, $SD = 23.82$). Participants also rated where they thought they would rank in terms of how many questions they answered correctly among the four-person group in which they were about to work, using a scale of 1 (*the best in my group*) to 4 (*the worst in my group*), which we reverse-scored (reversed scored $M = 2.25$, $SD = 0.79$). Both items correlated strongly with each other ($r(1098) = .77$, $p < .001$).

We then scored participants' actual performance on the task using the method described to them (incorrect responses coded as '0' and correct responses coded as '1'), and computed two

measures of actual rank in relative performance (percentile ranking): A measure of actual rank relative to all participants and a measure of actual rank relative to their ostensible group members. To compute the latter, we divided participants into hypothetical groups of four, according to the time of participation, and computed each participant's rank within their group. The two measures of actual rank in relative performance correlated strongly with each other ($r(1098) = .78$, $p < .001$).

For a descriptive overview of the self-assessed percentile rank and the actual rank items, see Tables S11-S13 in the additional online material on the OSF page (https://osf.io/m6hx4).

Finally, as in the original study, we computed two measures of overconfidence (overplacement, specifically): One that was based on participants' self-perceived and actual ranking in the total sample and one that was specific to the hypothetical group. We did this by regressing participants' self-perceived rank on their actual rank and then retained the residual. Specifically, we first ran a regression model that regressed participants' self-perceived rank relative to all participants on their actual rank among all participants and retained the residuals. The second model regressed participants' self-perceived rank relative to their ostensible group members on their actual rank within the hypothetical group. The residual score captures the variability in self-perceived rank after the variance predicted by actual rank has been accounted for.

These two measures of overplacement (i.e., overconfidence) were strongly correlated ($r(1098) = .76$, $p < .001$). Following the original study, we combined them and used their average as the overconfidence measure.

Individual Differences Measures

Replication and Extension of Anderson et al. (2012)

The individual differences measures were administered before the task and overconfidence items.

Following the original study, we gave participants in the direct replication condition (i.e., half of the participants) the Jackson's Personality Research Form (Jackson, 1984) to measure need for dominance (this was used as a measure of desire for status), need for achievement, and need for affiliation. Items were rated using a binary scale (do not agree or agree). All scales demonstrated strong reliabilities: dominance ($\alpha = .88$, $M = 0.44$, $SD = 0.29$), achievement ($\alpha = .75$, $M = 0.58$, $SD = 0.22$), affiliation ($\alpha = .85$, $M = 0.41$, $SD = 0.26$).

As in the original study, we used the 44-item Big Five Inventory (BFI; Benet- Martínez & John, 1998; John & Srivastava, 1999) to control for neuroticism, extraversion, agreeableness, conscientiousness, and openness. Participants rated their level of agreement on a scale of 1 (*strongly disagree*) to 5 (*strongly agree*). All scales demonstrated strong reliabilities: neuroticism ($\alpha = .90$, $M = 2.80$, $SD = 0.97$), extraversion ($\alpha = .88$, $M = 2.82$, $SD = 0.89$), agreeableness ($\alpha = .80$, $M = 3.90$, $SD = 0.7$), conscientiousness ($\alpha = .87$, $M = 3.91$, $SD = 0.73$), and openness ($\alpha = .83$, $M = 3.71$, $SD = 0.67$).

A key objective of the current study is to enhance reproducibility by using measures that are not copyright-restricted. Thus, participants in the "generalizability" condition responded to alternative measures of the different needs. We used the need for status scale in the Fundamental Social Motives Inventory (FSMI; Neel et al., 2016), which includes six items rated on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). The FSMI also includes a scale measuring need for affiliation, which we used here. This scale also includes six items rated on the same scale. Finally, we used the IPIP version of the NEO-PI-R (Goldberg et al., 2006), which consists of ten items rated on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

These three alternative needs scales demonstrated strong reliabilities: Need for status (α = .83, *M* = 2.90, *SD* = 0.83), need for affiliation (α = .88, *M* = 3.50, *SD* = 0.84), need for achievement (α = .86, *M* = 4.80, *SD* = 0.93).

Attention Checks

We used a set of attention and comprehension check items as part of a supplemental analysis to test whether the result from our main analysis focusing on the full sample would differ from the results when excluding participants that failed attention and comprehension checks. Participants completed an attention check that instructed them to answer "Sports" in response to a specific question about the survey topic. They also rated their seriousness when completing the survey, their understanding of the English used, and answered a question about the purpose of the study.

For complete details about the handling of exclusions and outliers, see section "Exclusion Rules and Handling of Outliers".

Demographics

At the beginning of the survey, participants indicated their age (in years), gender, and ethnicity.

Evaluation of Replication

Evaluation of Replication Closeness

We evaluated replication closeness based on the criteria described by LeBel et al. (2018). As shown in Table 4, we classify this as a very close replication.

Table 4

Evaluation of Replication Closeness

Design facet	Replication	Details
Effect/hypothesis	Same	

Replication and Extension of Anderson et al. (2012)

IV construct	Same	
DV construct	Same	
IV operationalization	Same	
DV operationalization	Same	
Population (e.g., age)	Same	Both the original and replication study uses a sample from the US via a crowdsourcing platform. Whereas the original study used MTurk, the replication uses Prolific. The demographic background of these samples should nevertheless be very similar.
IV stimuli	Same	
DV stimuli	Same	
Procedural details	Similar	Several minor adjustments were made. Some due to missing information in the original, others to ensure data quality (e.g., attention checks).
Physical settings	Same	
Contextual variables	Different	Overconfidence may or may not differ between 2009/2010 and 2024; people may find expressions of overconfidence more socially undesirable now, for instance.
Replication classification	Very close replication	

Evaluation of Replication Findings

We evaluated the replication findings based on the criteria reported by LeBel et al. (2018, 2019). This entails comparing the confidence interval for the replication effect size with the original effect size estimate and reporting (1) whether there is a signal, (i.e., whether the replication effect size excludes zero), (2) whether the effect is consistent (i.e., whether the confidence interval includes the point estimate of the original effect size or is smaller/larger/in the opposite direction), and (3) whether the replication effect size estimate is more or less precise than the original estimate. Only the results from the direct replication—the relationship between

desire for status (using the same measure as in the original study) and overconfidence—was used to determine the success of this replication.

Data Analysis Plan

Replication

To test the replication hypothesis (a positive association between desire for status and overconfidence) we conducted the same statistical tests as in Study 5 of Anderson, Brion, et al. (2012). In this study, the authors used a linear regression model that included the three need scales while controlling for the five personality scales (neuroticism, extraversion, agreeableness, conscientiousness, and openness).

We report standardized coefficients to facilitate comparison with the original results and to ensure consistency with the parameters in the power analyses.

Testing Null Hypotheses: Need for Achievement and Need for Affiliation

Equivalence testing is an adaption of traditional significance testing that allows one to examine whether an association is practically meaningful. This is done by specifying a lower and upper equivalence bound based on a smallest effect size of interest and testing whether an estimate (e.g., a regression coefficient) falls within the specified smallest effect size of interest (SESOI) bounds. Non-significant *p*-values indicate that an effect is outside the equivalence bounds and thus practically meaningful. We used the two one-sided tests of significance procedure (TOST; Lakens et al., 2018) for multiple linear regression coefficients using the *negligible* R package (Cribbie et al., 2023). We refer to these tests as “negligible association tests” (see Alter & Counsell, 2022). Following Campbell (2020), we set the smallest effect size of interest at $\beta = .10$.

Bayesian analysis quantifies the likelihood of the alternative hypothesis over the null hypothesis (or vice-versa). We used the *rstanarm* (Goodrich et al., 2020) and *bayestestR* (Makowski et al., 2019) packages in R. We used default priors in *rstanarm*, which uses weakly informative priors on the intercept, coefficients, and auxiliary parameters. These priors include normal priors on the coefficients centered at zero with a standard deviation of 2.5, scaled relative to the predictors' and outcome's standard deviations. Bayes Factor > 1 implies evidence for the alternative over the null hypothesis: 1-3 (anecdotal), 3-10 (moderate), 10-30 (strong), 30-100 (very strong), >100 (extreme) for the alternative hypothesis. Conversely, a Bayes Factor < 1 implies evidence for the null hypothesis: 1-0.33 (anecdotal), 0.33-0.1 (moderate), 0.1-0.03 (strong), 0.03-0.01 (very strong), < 0.01 (extreme) (Lee & Wagenmakers, 2014; Quintana & Williams, 2018).

Generalizability Test

We followed the same analytical procedure as for the replication part (as described in the previous section).

Exclusion Rules and Handling of Outliers

While our analysis focuses on the complete sample, as a robustness check, we also preregistered to run the analyses after excluding those who spent less than 2 minutes on the survey, indicated they did not understand the instructions, failed the attention check, indicated that they were not serious when responding (i.e., rated their seriousness as below 3 on a 5-point scale), indicated low English proficiency (below 3 on a 5-point scale), correctly guessed the main purpose of the study (this entails excluding participants who explicitly mention a relationship between desire for status and overconfidence), and outlying responses on the overconfidence measure (+/-3 SD from the mean).

After applying the exclusion criteria, 17 participants were excluded in Study 1 and 19 in Study 2. The results remained entirely consistent with the full-sample analysis. The results based on the analysis after exclusions can be accessed by downloading the analysis scripts as knitted RMarkdown files on the OSF repository (https://osf.io/brdwe for Study 1 and https://osf.io/sh8qb for Study 2).

Results

Direct Replication Test (Using the Same Needs Measures)

Following the original study, we ran a multiple linear regression model with the three need measures and the Big Five personality traits as predictors, and the average residual-based overconfidence index as the dependent variable.[2] The results from the regression model, with Bayes factors, are summarized in Table 5. For the key associations between the three needs and overconfidence, we also report results from equivalence testing (i.e., negligible association testing).

Consistent with the original study, there was a positive relationship between the desire for status and overconfidence (see Figure 2).

Table 5

Study 1: Regression Results from the Original Study, Direct Replication, and the Generalizability Test

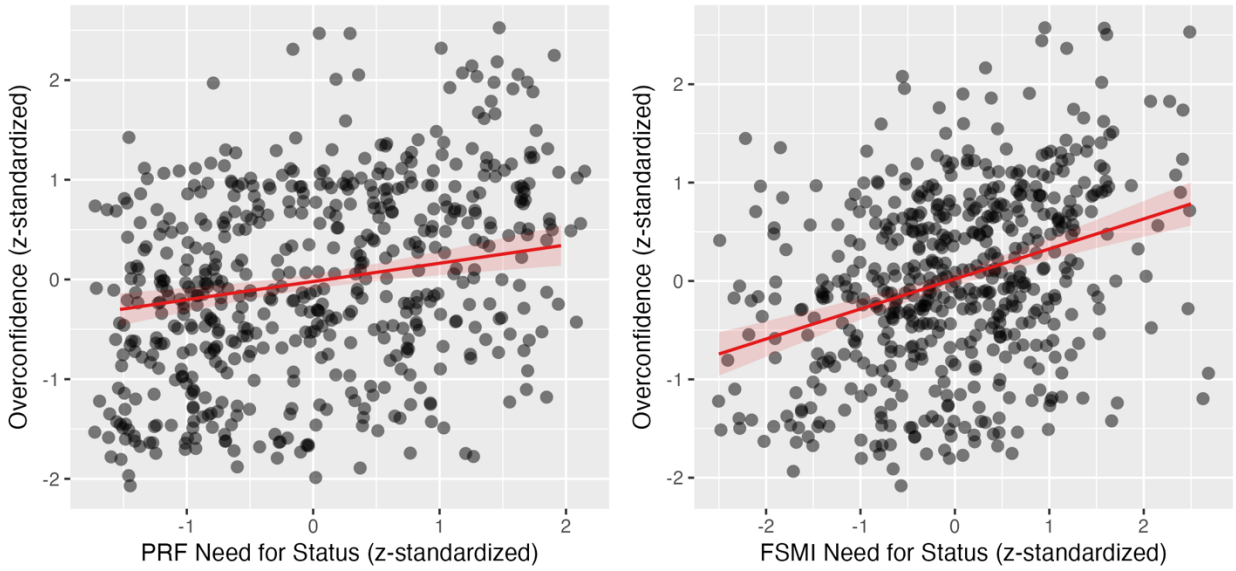
[2] As an exploratory analysis, we tested the same regression model using the difference score between self-perceived percentile ranking in the sample and their actual percentile rank in the sample rather than the residual score. The results were very similar both for the direct replication model and the generalizability model. Although, in this exploratory model, need for affiliation was also signicantly and positively related to overconfidence, but the *p*-value ($p = .048$) was right below the 5% significance level. For details, please download the analysis script as a knitted RMarkdown file on the OSF repository (https://osf.io/ws6tk; see the Regression Model Using Difference Score section on the additional online material).

	Original study	Replication model (same needs measures)				Generalizability model (alternative needs measures)		
Predictors	β	β	*p*	BF_{10}	*Replication summary*	β	*p*	BF_{10}
(Intercept)	NA	-0.01 [-0.09– 0.06]	.696	0.017		0.70 [0.17 – 1.23]	.009	0.823
Control variables								
Openness	-0.08	0.04 [-0.04 – 0.12]	.320	0.026	*NA*	0.03 [-0.05 – 0.10]	.502	0.020
Neuroticism	-0.05	-0.16 [-0.26 – -0.06]	.002	3.57	*NA*	-0.16 [-0.26 – -0.07]	.001	2.47
Extraversion	-0.25	0.06 [-0.05 – 0.17]	.295	0.041	*NA*	0.05 [-0.04 – 0.14]	.274	0.038
Agreeableness	0.04	-0.07 [-0.16 – 0.02]	.128	0.060	*NA*	0.02 [-0.07 – 0.11]	.647	0.024
Conscientousness	0.14	-0.00 [-0.10 – 0.10]	.961	0.022	*NA*	0.01 [-0.10 – 0.11]	.907	0.025
Key predictors								
Need for Achievement	-0.03	0.07 [-0.02 – 0.16]	.117	0.060	No signal– inconsistent, opposite direction	-0.14 [-0.25 – -0.03]	.010	0.805
Need for Affiliation	0.07	0.10 [-0.01 – 0.21]	.071	0.121	No signal– consistent	-0.02 [-0.12 – 0.07]	.646	0.023
Need for Dominance (Status)	0.42	0.19 [0.09 – 0.28]	<.001	10.28	Signal– inconsistent, smaller	0.31 [0.22 – 0.39]	<.001	61,000
Observations	77	550				550		
R^2 / R^2 adjusted	NA	0.19 / 0.17				0.16 / 0.15		

Note. Dependent and independent variables are z-standardized. Open, Neurotic, Extraverted, Agreeable, and Conscientious are the Big Five dimensions. Achievement, Affiliation, and Dominance are the three "need" variables. *NA*s indicate that we did not conduct a replication summary for the control variables, but only for the three key predictors of interest (i.e., need for status, need for achievement, and need for affiliation). *p*-values and confidence intervals in the original study were not reported and could not be calculated from the standardized coefficients. However, we were able to calculate these using the unstandardized coefficients, which we report in Table S14 in the additional online material on the OSF repository (https://osf.io/m6hx4).

Figure 2

Relationship Between Need for Status and Overconfidence (Original Measure on the Left and Alternative Measure on the Right)



Negligible association testing results indicated that the null hypothesis that the regression coefficient is non-negligible cannot be rejected and that there is insufficient evidence to conclude a negligible effect ($t = 3.78$, $p = .957$). Bayes factor indicated strong evidence in favor of the alternative hypothesis over the null hypothesis. Overall, these results support Hypothesis 1.

Moreover, consistent with the original study, neither need for achievement nor need for affiliation was associated with overconfidence. For both of these needs measures, negligible association testing results indicated that the null hypothesis that the regression coefficient is non-negligible cannot be rejected and that there is insufficient evidence to conclude a negligible effect (need for achievement: $t = 1.57$, $p = .266$; need for affiliation: $t = 1.81$, $p = .501$). Bayes factor indicated strong evidence in favor of the null hypothesis for need for achievement, and moderate evidence in favor of the null hypothesis for need for affiliation. These results support Hypothesis 2 and Hypothesis 3.

Finally, although not part of our hypothesis-testing, it is worth noting that neuroticism was negatively associated with overconfidence (in the original study, other than need for status, none of the variables were related to overconfidence).

Taken together, our replication results support the role of need for status as a positive predictor of overconfidence. However, the regression coefficient in the replication is much smaller, less than half the size of the original, and the replication confidence interval does not include the original estimate. Consistent with the original study, in the direct replication analysis using the same measures as Anderson, Brion, et al. (2012), we found that neither need for achievement nor need for affiliation predicted overconfidence. However, the coefficient for need for achievement was in the opposite direction, although, the confidence interval includes the original estimate. Overall, we conclude this to be a successful replication of the target article, yet with a much weaker effect for the status-overconfidence relationship than the original effect.

Alternative Needs Measures

The regression model is summarized in the right column of Table 5. The coefficient for need for status in the alternative measures model was significant and in the same direction as the original measures model. The coefficient is larger than coefficient in the original measures model. We tested whether this coefficient was statistically different from the PRF coefficient, and found no statistically significant difference between them (z = -1.89, p = .058; for details on the code behind this analysis, see the analysis script on the OSF repository at https://osf.io/hu3s9). Note, however, that the Bayes Factor for the alternative need for status measure is much larger—the Bayes Factor for the PRF coefficient indicates moderate evidence in favor of the alternative hypothesis over the null hypothesis, whereas the Bayes Factor for the FSMI coefficient indicates extreme evidence in favor of the alternative hypothesis over the null.

Moreover, need for achievement and neuroticism were both negatively associated with overconfidence using alternative measures. In the original study, these relations were in the same direction, but the coefficients were not statistically significant.

Discussion

Study 1 successfully replicated the findings from Anderson et al.'s Study 5. Desire for status was positively associated with overconfidence, even though the association was weaker than found in the original study. Of note, we also found a positive and slightly stronger relationship using an alternative measure of need for status.

In terms of the two remaining needs, neither need for affiliation nor need for achievement predicted overconfidence in the direct replication model, consistent with Anderson et al. (2012). However, in the alternative needs measures model, we found a negative relationship between need for achievement and overconfidence. This finding should be taken with caution given that the relationship was not observed when using the original needs measures. Finally, in both the replication and generalizability models, we found a negative relationship between neuroticism and overconfidence.

Study 2

Given the successful replication in Study 1, we ran a follow-up study that extended the design and procedure of Study 1 by randomly assigning participants to either a cooperative or a competitive context and measured their state-level desire for status after the task (see Figure 3 for a flowchart illustrating the design and procedure).[3]

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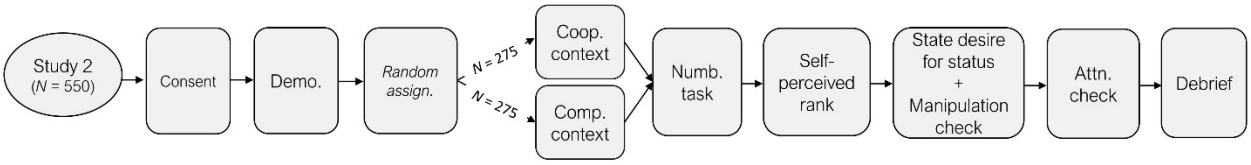
[3] We ran a pilot study testing the effect of the manipulation of context (cooperative vs. competitive) on perceptions of warmth and competence. The pilot data, analysis script, and materials pilot

Figure 3

Flowchart Showing the Design and Procedure of Study 2



Power Analysis

Based on the availability of resources (Lakens, 2022), we used the same sample size (N = 550) as in Study 1 for the extension test. We conducted a sensitivity analysis for the main effect of competitive (vs. cooperative) group context on overconfidence, using the *pwr* R package (Champely, 2020). The results indicated that N = 550 would provide 95% power to detect an effect size as small as d = 0.31 and 80% to detect an effect size as small as d = 0.20. The R code is available on the OSF repository (https://osf.io/8rngd).

Next, we conducted a Monte Carlo sensitivity analysis for the indirect effect, using an online tool developed by Schoemann et al. (2017). We used the following parameters: α = .05, standard deviation = 1.00 for all variables, number of replications = 1,000, and number of draws = 20,000. We estimated power for a range of effect sizes: 0.01, 0.02, 0.04, 0.06. Note that the indirect effect is the product of the *a* path (association between the independent variable and the mediator) and the *b* path (association between the mediator and the dependent variable). Thus, to estimate the power for the indirect effects, we varied the strength of the paths that make up the indirect effect (i.e., the *a* and *b* paths), using *r*s = .10, *r*s = .15, *r*s = .20, *r*s = .25.

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are available on the OSF repository (https://osf.io/6m2hx/; see "Pilot" subfolder in the "Registered Report Stage 1" main folder).

The results indicated that a sample of 550 participants provides 100% power to detect an indirect effect of 0.06, 97% to detect an indirect effect of 0.04, about 84% power to detect an indirect effect of 0.02, and about 40% to detect an indirect effect of 0.01. Overall, the planned sample is sufficiently powered to detect an indirect effect model based on small effect size parameters where *r*s for the individual paths are as small as .15. Note that $r = .15$ corresponds to $\beta = 0.10$, which is about one-fourth of the size of the association between desire for status and overconfidence in the original study and corresponds to the smallest effect size of interest that we specified in Study 1. This effect size is also smaller than the average effect size in social psychology and individual differences research; Gignac & Szodorai, 2016; Richard et al., 2003).[4]

Figure 4 plots the resulting power curves (the code that was used to generate the plot can be accessed at https://osf.io/8rngd).

Figure 4

Sensitivity Analysis for the Indirect Effect (Study 2)

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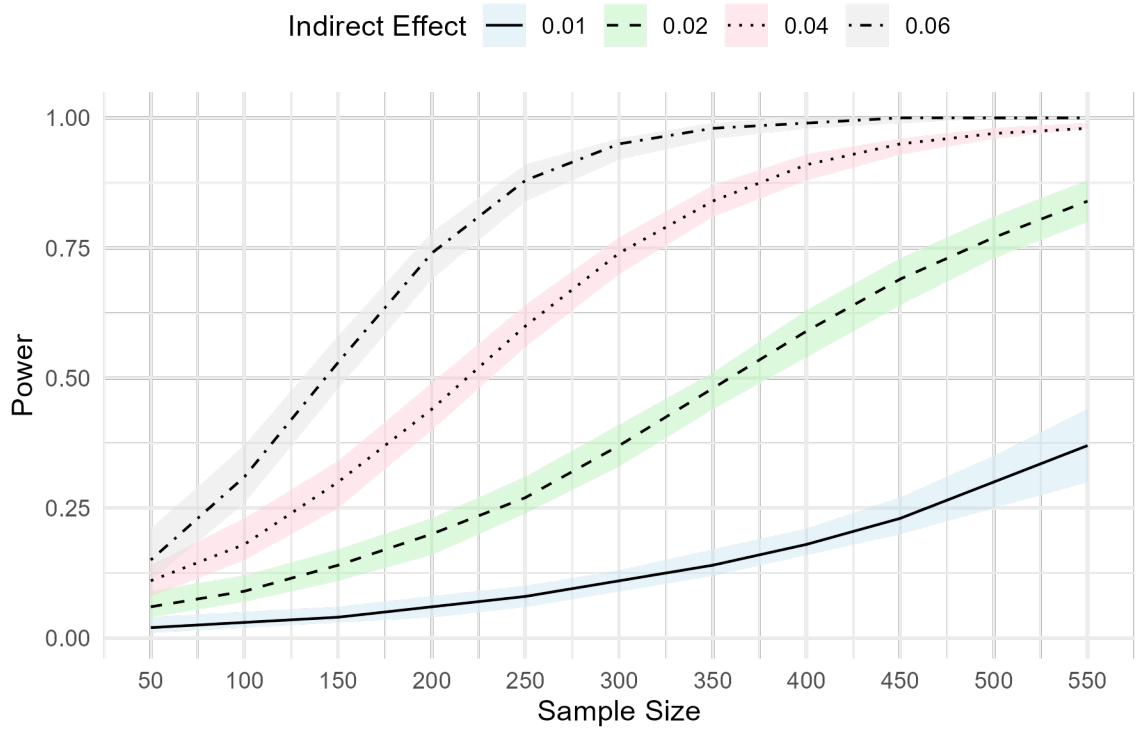
[4] We converted *r* to β using Psychometrica, an online tool developed by Lenhard and Lenhard (2022).



Participants

We recruited participants from Prolific, using the same prescreens and payment as in Study 1. 544 participants completed the experiment. The sample included 361 women, 174 men, 4 non-binary, and 5 unreported (M_{age} = 40.90 years, SD_{age} = 12.42).

Design and Procedure

We manipulated the context of the group that they thought they would work with by instructing participants that they were going to either cooperate or compete with their group members (manipulated between participants). Participants received the instructions before playing the numbers task (see Table 6).

Table 6

Instructions (in bold) for the Competitive vs. Cooperative Context Manipulation

Original study instructions	Cooperative context	Competitive context
You will now complete a task in a group with three other people who are also currently participating in the study, via an online chat room.	You will now complete a task in a group with three other people who are also currently participating in the study, via an online chat room.	You will now complete a task in a group with three other people who are also currently participating in the study, via an online chat room.
	In this group, your goal is to cooperate effectively, and the group that collectively performs the best will receive a bonus based on their combined efforts.	In this group, you will compete with the other members. The individual who performs the best will receive a bonus.
Before you join this group, you will complete a version of the task individually. In this task ("The Numbers Task"), you will guess the average of various numbers that will be displayed for a short time.	Before you join this group, you will complete a version of the task individually. In this task ("The Numbers Task"), you will guess the average of various numbers that will be displayed for a short time.	Before you join this group, you will complete a version of the task individually. In this task ("The Numbers Task"), you will guess the average of various numbers that will be displayed for a short time.

Overconfidence

Same as Study 1.

State-Level Desire for Status

Once participants had completed the task and indicated their self-perceived relative rank, we measured their state-level desire for status. We used the same four items that Anderson, Brion, et al. (2012) used as a manipulation check in Study 6 that experimentally induced status via priming. Specifically, we asked participants the extent to which they desired higher social status, regard, prestige, and respect from their group members in that particular context. Items

were rated on a scale from 1 (*not at all*) to 5 (*very much*). We averaged the items into a single scale, which showed strong reliability ($\alpha = .94$, $M = 2.78$, $SD = 1.15$).

Manipulation Check

Next, participants responded to two manipulation check items. "I expect a high degree of competition with the other group members in the group task" and "I expect a high degree of cooperation with the other group members in the task" on a scale from 1 (*not at all*) to 5 (*very much*). Participants answered the items before it was revealed to them that there would be no group task.

Attention Checks

Same as Study 1.

Demographics

Same as Study 1.

Exploratory Measures

We probed the extent to which participants' estimated relative rank reflected their genuine belief and/or a strategic attempt at enhancing one's self-presentation. We also tested whether the latter would be more prevalent among overconfident individuals—if overconfidence is driven by a desire for social status, then overconfident individuals might be more likely to deliberately enhance their self-presentation because they know that appearing competent helps boost one's status.

We used the following two items: "When you reported your estimate of your relative rank in terms of how well you did on the task, to what extent would you say this estimate" … (i) "reflected your genuine belief about your abilities" and (ii) "was an attempt at presenting

yourself in a positive light?" These two items were rated on a scale from 1 (*to no extent*) to 5 (*to a very large extent*).

We also measured participants' folk intuitions about the perceived strategic advantage of appearing confident in a competitive vs. cooperative context. We wanted to see if participants generally perceive a strategic advantage of confidence in competitive settings. Participants responded to the following two items: "In general, to what extent do you think that appearing confident provides a strategic advantage to a person in a competitive group setting?" and "In general, to what extent do you think that appearing confident provides a strategic advantage to a person in a cooperative group setting?". Both items were rated on a scale from 1 (*to no extent*) to 5 (*to a very large extent*).

Data Analysis

Competitive (vs. Cooperative) Context

Independent samples *t*-tests were used to test the effect of the competitive vs. cooperative context manipulation on the two manipulation check items, desire for status, and overconfidence. For the indirect effect of competitive vs. cooperative context on overconfidence via desire for status, we used Hayes' PROCESS macro in R (2017) and ran 'Model 4' where we included competition versus cooperation as the independent variable (dummy coded as '0' and '1' for the cooperative and competitive conditions, respectively), state-level desire for status as the mediator, and overconfidence as the outcome variable.[5] We *z*-standardized desire for status and

[5] In the main analysis, we used the average of two residual measures as the primary outcome variable (following Study 1). In the additional online material analyses available on the OSF (https://osf.io/ws6tk), we conducted two exploratory analyses. First, we tested separate indirect models with sample-based and group-based residuals as the dependent variables in each model. Second, we used difference scores instead of residuals, examining the difference between self-perceived and actual percentile ranks separately for both the sample and group contexts. The results remained largely consistent.

overconfidence to facilitate comparison with the results from the regression models in Study 1. Five thousand bootstrap samples were used to estimate the indirect effect. An indirect association is significant if the 95 % confidence interval does not include zero.

Exploratory Measures

For the exploratory measures, we conducted a one-sample *t*-test to examine whether the mean rating of each exploratory item differed from the midpoint value of the scale. Additionally, we performed paired *t*-tests to compare the means between a) the two items measuring whether participants' self-perceived ranking represented a genuine or self-presentational belief and b) the two items measuring participants' folk intuition about the strategic benefit of overconfidence in a cooperative setting versus a competitive setting.

Results

We first tested differences in the two manipulation check items between the competitive and cooperative context conditions. Participants in the competitive group reported greater expectation to compete with group members *(M* = 3.67, *SD* = 3.39) than those in the cooperative condition (*M* = 2.80, *SD* = 1.21), *t*(519.43) = -8.98, *p* < .001, *d* = 0.77, 95% CI [0.60, 0.95]. Similarly, participants in the competitive condition (*M* = 3.39, *SD* = 1.18) reported lower expectation to cooperate with group members than those in the cooperative condition (*M* = 3.94, *SD* = 0.99), *t*(534.67) = -5.89, *p* < .001, *d* = -0.50, 95% CI [-0.67, -0.33].

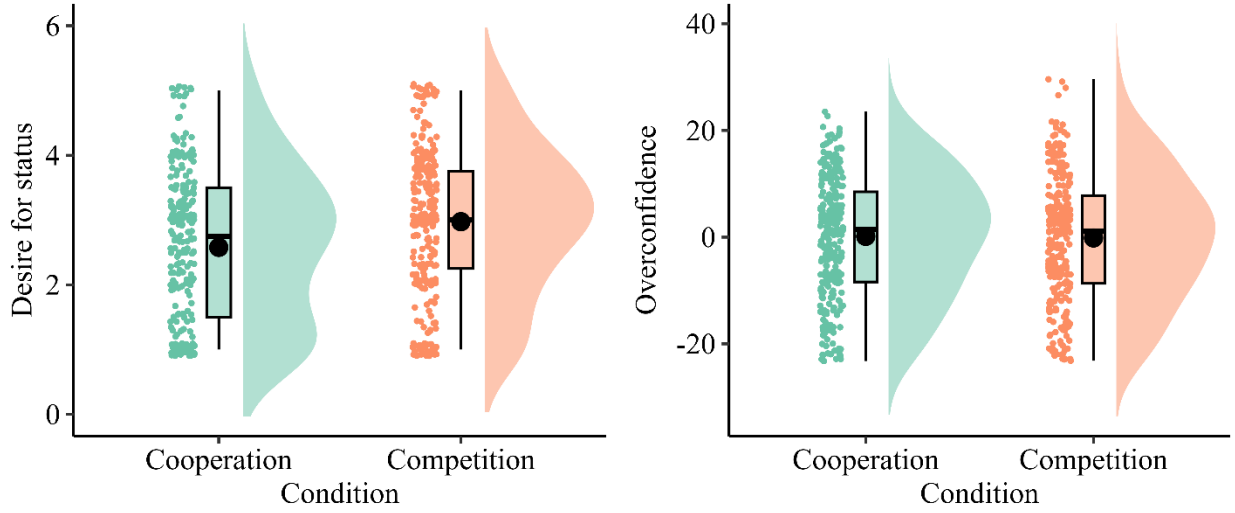
Next, we tested the main effect of a competitive vs. cooperative context on state desire for status and overconfidence (Figure 5). The competitive group reported greater desire for status (*M* = 2.97, *SD* = 1.11) than the cooperative group (*M* = 2.58, *SD* = 1.17), *t*(535.90) = 4.06, *p* < .001, *d* = 0.35, 95% CI [0.18, 0.52]. This supports Hypothesis 4. However, we found no difference in overconfidence between the competitive (*M* = -0.14, *SD* = 11.94) and cooperative

(*M* = -0.15, *SD* = 11.39) groups, *t*(541.99) = 0.29, *p* = .770, *d* = -0.03, 95% CI [-0.19, 0.14].

Thus, we did not find support for Hypothesis 5.

Figure 5

The effect of competitive (vs. cooperative) context on state-level desire for status and overconfidence (Study 2). Raincloud plots are used to visualize raw data, key summary statistics, and the distribution of the data

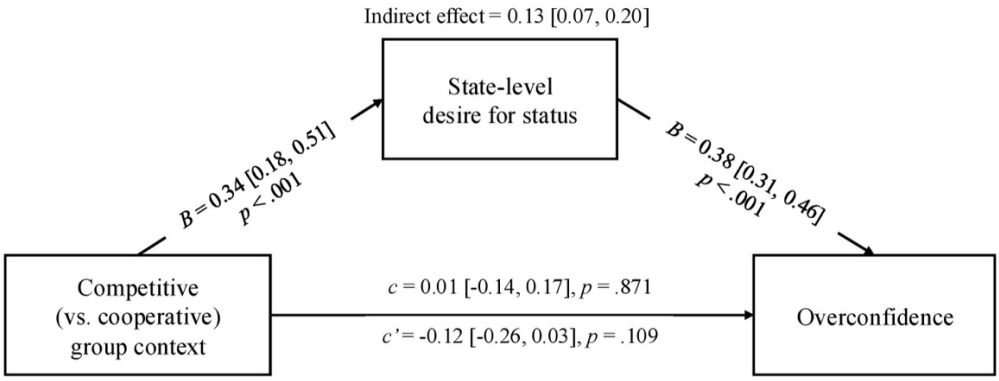


Note. Raincloud plots are used to visualize raw data, key summary statistics, and the distribution of the data. Raincloud plots were created following Allen et al. (2019). Colored fields display the distribution of responses. Boxplots display the median, first, and third quartiles. Black circles denote mean values. Outcome variables are not standardized. See the online article for the color version of this figure.

Finally, we tested the indirect effect of a competitive (vs. cooperative) context on overconfidence via state-level desire for status. The indirect effect was significant. As illustrated in Figure 6, those in the competitive condition reported greater desire for status within their group, which in turn predicted greater overconfidence. This supports Hypothesis 6.

Figure 6

Indirect Effect Model (Study 2)



Note. The cooperative condition is coded as '0' and the competitive condition as '1'. Desire for status and overconfidence are *z*-standardized to facilitate comparison with the regression estimates for trait-level desire for status in Study 1 and the replication target study.

Exploratory

Overconfidence: Genuine vs. Self-Presentational. A one-sample *t*-test indicated that for the item measuring whether participants' estimated relative rank reflected their genuine belief, the mean (M = 3.90, SD = 0.95) was significantly greater than the scale midpoint value of 3, $t(543) = 22.18$, $p < .001$, $d = 0.95$, 95% CI [0.85, 1.05]. The mean for the item measuring whether the estimated rank reflected an attempt at self-presentation (M = 2.21, SD = 1.24) was significantly lower than the scale midpoint value of 3, $t(543) = -14.85$, $p < .001$, $d = -0.64$, 95% CI [-0.73, -0.55]. A paired sample *t*-test indicated that the mean for the "genuine belief" item was significantly greater than the mean for the "self-presentation" item, $t(543) = 24.58$, $p < .001$, $d = 1.55$, 95% CI [1.42, 1.67]. The results indicate that participants were more likely to say that their estimated ranks reflect genuine beliefs in their abilities rather than a strategic attempt to present themselves more positively.

Interestingly, overconfidence did not correlate with the degree to which participants indicated that their self-perceived rank on the task reflected a genuine belief, $r(542) = -.01$, p

= .874, 95% CI [-0.91, 0.08], but correlated positively and strongly with self-presentation efforts, $r(548) = .50$, $p < .001$, 95% CI [0.43, 0.56]. These exploratory results suggest that some people who are overconfident may be so deliberately, in an attempt to influence others.

Folk Intuitions About the Advantages of Confidence. Participants' perceived strategic advantage of confidence in a competitive context ($M = 3.68$, $SD = 0.88$) was greater than the scale midpoint value of 3, $t(543) = 18.03$, $p < .001$, $d = 0.77$, 95% CI [0.68, 0.87]. Moreover, participants' perceived strategic advantage of confidence in a cooperative context ($M = 3.44$, $SD = 0.94$) was greater than the scale midpoint value of 3, $t(543) = 10.86$, $p < .001$, $d = 0.47$, 95% CI [0.38, 0.55].

A paired samples *t*-test indicated that the mean perceived advantage of confidence was greater in a competitive context than in a cooperative context, $t(543) = 6.62$, $p < .001$, $d = 0.27$, 95% CI [0.36, 0.18]. In other words, people intuitively see value in displaying confidence in a competitive context.

Discussion

The findings of Study 2 extend the status-enhancement account by investigating the influence competitive versus cooperative contexts may have on state-level desire for status and overconfidence, as well as the indirect relationship between these variables. Consistent with Hypothesis 4, participants in the competitive context reported a higher desire for status than those in the cooperative context. In contrast, we did not find a significant difference in overconfidence between the competitive and cooperative groups, indicating no support for Hypothesis 5. Thus, we did not find support for our theoretical idea that a competitive (vs. cooperative) group context has a direct, causal effect on overconfidence. However, we found that the competitive context had an indirect effect on overconfidence via heightened desire for status,

in line with Hypothesis 6. It is important to note that this indirect effect is correlational and that we cannot infer a causal relationship between the group context manipulation and overconfidence from this.

Notably, exploratory analyses showed that participants perceived a greater strategic advantage to appearing confident in competitive versus cooperative settings, highlighting some awareness of the value of confidence in socially competitive contexts. However, it is unclear whether this perceived advantage stems from confidence being interpreted as competence (i.e., an indicator of skill or ability) or as confidence itself (i.e., self-assurance and assertiveness).

Exploratory analyses also showed that participants reported that their self-perceived relative rankings reflected their genuine beliefs rather than strategic attempts to present themselves more positively. However, we found a strong positive correlation between overconfidence and reported self-presentational motives. This suggests that at least for some overconfident individuals, their assessments of their abilities relative to others may be more reflective of a conscious effort to influence others' perceptions than genuine miscalibration. Or put differently, while most people report they are trying to make genuine assessments of their performance relative to others, overconfident individuals are more likely to acknowledge that their assessments were self-presentational.

General Discussion

The status-enhancement account explains overconfidence as at least in part a social phenomenon. People who are highly confident can attain social benefits such as high status, and conversely, those who have a high need for status are more prone towards overconfidence. The current registered report aimed to replicate and extend Anderson, Brion, et al.'s (2012) Study 5,

and the two studies reported here lends support to the status-enhancement account with different approaches.

Trait Desire for Status is Associated with Overconfidence

In their Study 5, Anderson et al. found a positive relationship between need for status as a personality trait, and overconfidence (overplacement) in an estimation task. We successfully replicated this relationship, using two different measures of desire for status. Specifically, our direct replication used the same measure as the original study, namely the Personality Research Form (PRF), while our extension used the Fundamental Social Motives Inventory (FSMI; Neel et al., 2016) as an alternative measure of the need for status.

Comparing the effect sizes observed in the original vs. in the replication and extension suggests that the original effect size estimate might have been overestimated, as is often the case when sample sizes are small. In the original study, the standardized effect was $\beta = 0.42$, vs. $\beta = 0.18$ in the direct replication, and $\beta = 0.31$ in the extension using alternative measures. Despite the difference in effect size, we count this as a successful replication which lends support to the status-enhancement account. Our findings align with those of Belmi et al. (2020), who also observed smaller effect sizes in their conceptual replications of the relationship between desire for status and overconfidence.

It is also worth noting that the the effect size using the alternative measure was larger than when using the PRF. There are several potential reasons for the stronger effect observed with the FSMI. First, the FSMI is more focused on the desire for status, whereas the PRF combines related constructs, such as dominance and power, which some critics argue conflate distinct aspects of social motivation (Murphy et al., 2022). In fact, the PRF scale for need for status is labelled as a need for dominance scale. Second, the FSMI's 5-point Likert scale may

capture more variability than the PRF's binary format, or this difference could simply reflect the inclusion of alternative measures of other 'needs' in the FSMI. Regardless of the explanation for the differences in effect size, we see the fact that a positive association between need for status and overconfidence was observed with two different measures as providing further support for Anderson, Brion, et al.'s (2012) hypothesis. This result is also good news from a methodological standpoint, as it means researchers can build on these findings without copyright restrictions and prohibitive costs, given that the alternative measures we used here are freely available.

The original study by Anderson, Brion, et al. (2012) hypothesized that neither need for achievement nor need for affiliation is related to overconfidence. We complemented traditional null-hypothesis significance testing with equivalence testing and Bayesian analysis to quantify evidence supporting the null hypothesis over the alternative hypothesis. Consistent with Anderson, Brion, et al.'s predictions (2012), the *p*-values for need for achievement and need for affiliation were insignificant, and Bayes factors provided moderate to strong evidence in favor of the null. However, equivalence testing indicated inconclusive evidence. Thus, we cannot exclude the possibility of small but meaningful associations between these two needs and overconfidence. Indeed, when using alternative "needs" measures, need for achievement was significantly and negatively related to overconfidence. For need for achievement, we used the IPIP version of the NEO-PI-R (Goldberg et al., 2006). Whereas the PRF scale used in the target article includes items that capture broader attitudes about work and achievement (e.g., "People should be more involved with their work"), the items in the IPIP scale seem to focus on more action-oriented behaviors related to goal setting and hard work (e.g., "Do more than what's expected of me"). Thus, the IPIP scale might predict overconfidence negatively because individuals who endorse these items have a more accurate understanding of their achievements

and limitations, making them less prone to overconfidence. However, this is admittedly speculative, and given the mixed results with different measures, and the wide confidence interval with the lower limit close to zero using the IPIP items, further research is needed.

With both the original and the alternative measures we found a negative relationship between neuroticism and overconfidence, indicating that emotionally stable individuals are more likely to display overconfidence (overplacement). While this finding differs from the original study, it is plausible that those who experience emotions like anxiety, sadness, and shyness more frequently would be more cautious in their self-assessments. Despite previous mixed results with respect to personality correlates of overconfidence (Moore & Schatz, 2017), this finding might inspire future research into the emotional antecedents of both over- and underconfidence.

State Desire for Status is Associated with Overconfidence

As a key extension of the original study, in our Study 2, we examined whether overconfidence is sensitive to a social context that emphasizes competition vs. cooperation. We hypothesized that a competitive group context activates status motives, which, in turn, should increase overconfidence. We did not find a direct effect of competitive vs. cooperative group context on overconfidence. However, we found an indirect effect through state-level desire for status: Participants in the competitive condition reported a higher desire for status compared to participants in the cooperative condition, which, in turn, predicted greater overconfidence. Hence, while we find consistent evidence of a correlational association between desire for status and overconfidence, we do not find evidence for the causality of that association. We take this as general support for our hypotheses and for status-enhancement theory. Anderson et al. in their Study 6 used a priming manipulation to induce state need for status, and showed that this led to more overconfidence. Here, we used, in our opinion, a more direct and simpler manipulation and

found that a competitive context can activate temporary status motives, which again are associated with overconfidence. This stresses the importance of considering both trait-level (as in Study 1) and state-level (as in Study 2) desire for status with regards to overconfidence.

In Study 2, we also asked participants whether their self-rated relative ranking primarily reflected a genuine belief or a self-presentational effort. Anderson, Brion, et al. (2012) argue that overconfidence reflects a sincere, though flawed, self-perception, suggesting that people genuinely believe in their inflated abilities. However, the original studies were not designed to exclude the possibility that people may display overconfidence strategically, if they understand that this is a tool that can elevate their social status. While we found that participants generally stated that their estimated rankings reflected their genuine beliefs rather than being a self-presentation attempt, there was a strong positive relationship between self-presentation motives and overconfidence. It is important to note that this is based on participants' self-reported reasoning, which may not necessarily accurately reflect the real motives or cognitive processes behind their estimated rank. With this caveat in mind, the findings suggest overconfidence is not necessarily a cognitive error, but that, at least in some cases, it reflects a deliberate attempt to employ exaggerated claims to shape others' perceptions. Whether this is to shape others' perception of their confidence per se (i.e., self-assurance and assertiveness) or competence (i.e., an indicator of skill or ability) is unclear. We believe there is more work to be done on mapping out whether or when overconfidence reflects a cognitive error vs. an impression management strategy. Examining other social cues or interventions that relate to desire for status might reveal further insight into how context-dependent motivations shape overconfidence and related biases in self-assessment.

Overall, these findings contribute to our understanding of overconfidence, or overplacement to be exact, as a social phenomenon. While much research has explored the outcomes of overconfidence, these findings contribute to the relatively limited body of work examining its antecedents—in this case, the social psychological antecedents of overplacement (Belmi et al., 2020).

Limitations and Future Research

In the current studies, we measured overconfidence by having participants complete a number estimation task. This, of course, is an abstract exercise that differs from the complex, socially embedded tasks people encounter in real-world settings like the workplace. Moreover, the effects observed here might also vary with task complexity (Hærem & Rau, 2007; Moore & Schatz, 2017). In more demanding tasks, and in tasks requiring coordination and interdependency with others, individuals motivated by status might be less inclined to overestimate their performance relative to others, and might have less to gain from being overconfident.

Additionally, the task and context in our study provided limited social information.. While Study 2 introduced group dynamics by instructing participants to either compete or cooperate with their "group members," this setup still lacked the richness of real social situations. Consequently, our findings may not fully generalize to other contexts. Moreover, it seems plausible that status-seeking individuals would downplay their confidence in certain contexts (e.g., in a context where it is clear that expressing confidence is socially costly). Indeed, Anderson, Willer, et al. (2012) note that individuals regulate their desire for status based on the context.

Furthermore, our conclusions might not generalize to non-Western cultures, where social norms regarding the expression and value of overconfidence might differ from Western cultures. For instance, non-Western cultures might not value confidence as much, and thus, the social mechanisms underlying status attainment in such cultures might be different.

Finally, in Study 2, we found an indirect effect of a competitive (vs. cooperative) group context on overconfidence through state desire for status. However, we cannot draw causal conclusions since the relationship between state desire for status (the mediator) and overconfidence (the outcome) is correlational. Establishing causality would require manipulating both the mediator and the outcome, a task for future research that could provide valuable insights.

Conclusion

In two studies, we found support for the status-enhancement account of overconfidence. In Study 1, replicating Anderson et al.'s Study 5, trait desire for status was positively associated with overconfidence, using both the original and an alternative measure, even if the relationship was weaker than found in the original article. In Study 2, participants who believed they would be competing with others experienced higher state desire for status than those who thought they would cooperate, and state desire for status was positively associated with overconfidence. However, there was no direct effect of group context on overconfidence. Thus, while we find consistent evidence of a positive correlation between desire for status and overconfidence, we do not find evidence for a causal effect of group context on overconfidence.

Taken together, these results underscore the importance of the social and reputational aspects of overconfidence, with exploratory results suggesting that some people may deliberately exaggerate their confidence to gain status. Future work should explore the boundaries of these

effects. It seems unlikely that there will always be a positive link between need for status and overconfidence, and between (over)confidence and perceived status, and delineating when high confidence is seen as arrogance or ignorance, and when decision makers more or less deliberately downplay their confidence, would be an important task (see Table 7).

Table 7

Table of Limitations

Dimension	Assessment
Internal Validity	
Is the phenomenon diagnosed with experimental methods?	Yes, in Study 2, we experimentally manipulated the social context (competitive vs. cooperative group context) to assess the causal effect of desire for status on overconfidence. We found no direct effect of the manipulation, only found an indirect effect via state desire for status. Given that the relationship between desire for status (the mediator) and the outcome variable (overconfidence) is correlational, we cannot infer causality.
Is the phenomenon diagnosed with longitudinal methods?	No, Study 1 was correlational, and Study 2 was experimental.

Were the manipulations validated with manipulation checks, pretest data, or outcome data?	Yes, the manipulation in Study 2 was validated with manipulation checks and a pilot study.
What potential artifacts were ruled out?	In Study 1, following the original study by Anderson, Brion, et al. (2012), we ruled out the possibility that our results were due to personality traits by including the Big Five personality traits as control variables in the regression model.
Statistical Validity	
Was the statistical power at least 80%?	Yes, Study 1 had 95% power to detect the main association between desire for status and overconfidence. Study 2 had 80% to detect an effect size as small as $d = 0.20$ and more than 80% power to detect an indirect effect of 0.02.
Was the reliability of the dependent measure established in this publication or elsewhere in the literature?	Yes. We used the exact same measure of overconfidence as the original study by Anderson, Brion, et al. (2012).
Were the distributional properties of the variables examined and did the variables have sufficient variability to verify effects?	Yes.

Generalizability to Different Methods	
Were different experimental manipulations used?	No, only Study 2 used an experimental manipulation.
Generalizability to Field Settings	
Was the phenomenon assessed in a field setting?	No, the study was conducted online with Prolific participants.
Are the methods artificial?	Mixed. The task that we used to measure overconfidence (the same as the replication target study) is an abstract task that lacks ecological validity. Moreover, participants were only led to believe that they would work with other people in a group, but they never did.
Generalizability to Times and Populations	
Are the results generalizable to different years and historic periods?	This was not tested, but norms might shift and evolve over time, which would impact the generalizability of the current findings. Nevertheless, overconfidence is a well-known bias that has been studied for decades. Thus, we believe that the current findings, at least with the design and task used here, should generalize to different years.

Are the results generalizable across populations (e.g., different ages, cultures, or nationalities)?	Limited. Our sample was U.S.-based, which may restrict the generalizability of findings to non-Western cultures. Moreover, we did not prioritize representativeness given that our main goal was to replicate the original study. We see this as an important avenue for future research, to test the generalizability of the current findings to different demographics and cultures. For instance, in non-Western cultures, overconfidence might represent a socially undesirable behavior, which would have implications for the status-overconfidence relationship.
Theoretical Limitations	
What are the main theoretical limitations?	Our study focused on the status-enhancement theory of overconfidence, but this framework may not fully account for situational moderators (e.g., competitive vs. cooperative contexts). Future research should explore context-specific variations in overconfidence.

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