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Self-Esteem as a Hierometer: Sociometric Status

Is a More Potent and Proximate Predictor of Self-Esteem than Socioeconomic Status

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Abstract

The link between status and self-esteem remains theoretically and empirically controversial. To help clarify it, we proposed an integrated account of status and self-esteem, and tested several hypotheses derived from it. We distinguished between two types of status: *socioeconomic status* (SES; education, income, occupation) and *sociometric status* (SMS; respect, admiration, importance). We then examined how they related to one another and to self-esteem across five studies ($N = 2,018$). As hypothesized, in Studies 1–2 (cross-sectional), SES and SMS correlated positively with one another, and both correlated positively with self-esteem; yet SMS predicted self-esteem more strongly than SES did. Moreover, SMS mediated the link between SES and self-esteem, and this statistical model fit the data better than an alternative model where SMS and SES reversed roles. Studies 3–5 demonstrated causal links experimentally. In Study 3, manipulating SES to be higher (vs. lower) led to higher (vs. lower) SMS and state self-esteem, with SMS again statistically mediating the impact of SES on state self-esteem. In Study 4, manipulating SMS to be higher (vs. lower) led to higher (vs. lower) state self-esteem. Finally, in Study 5, manipulating SMS showed that it causally mediated the link between SES and state self-esteem. Our findings also persisted across multiple measurement formats and after controlling for the Big Five personality traits. They point to SMS being a more powerful and proximate predictor of self-esteem than SES, thereby illuminating the link between status and self-esteem, and adding to a growing literature on the psychology of status.

Keywords: status, socioeconomic status, sociometric status, self-esteem, hierometer theory

Self-Esteem as a Hierometer: Sociometric Status

Is a More Potent and Proximate Predictor of Self-Esteem than Socioeconomic Status

Social hierarchies are present in virtually every known culture and group (Fiske, 2010; Mazur, 1985; Sidanius & Pratto, 1999). Moreover, one's overall position in such a hierarchy—commonly referred to as *status*—matters. For example, higher status people are physically healthier (Singh-Manoux et al., 2005), live longer (Marmot, 2004), and enjoy greater reproductive success (Betzig, 1986). Unsurprisingly then, the striving for status is universal too, being deemed a fundamental human motive (Anderson et al., 2015; Frank, 1985).

Given the ubiquity and importance of social hierarchies, one's status within them might be expected to exert a powerful effect on one's *self-esteem*—the overall extent to which one evaluates oneself positively or negatively (Baumeister, 1998; Rosenberg, 1965; Sedikides & Gregg, 2003). However, as we discuss below, the relevant literature has yielded inconsistent and inconclusive results. Furthermore, this literature contains multiple definitions and operationalizations of status. Consequently, it remains unclear how these multiple types of status relate to one another and to self-esteem, both conceptually and empirically.

Drawing together insights from relevant theorizing and research, and guided specifically by *hierometer theory* (Mahadevan et al., 2016), we propose a novel and integrated account of how two distinct forms of status relate to each other and to self-esteem. We then test several hypotheses derived from this account. We begin with a description of hierometer theory and then review the literature on status and self-esteem.

Hierometer Theory

Recent theorizing emphasizes the functionality of the link between status and self-esteem. In particular, hierometer theory states that self-esteem forms part of an evolved psychological system that helps individuals to navigate status hierarchies adaptively (Mahadevan et al., 2019a, b). Self-esteem is hypothesized to assist individuals in tracking their position in status hierarchies and in motivating interpersonal behavior best suited to it. For, although high status affords many benefits, status-seeking still entails risk. High status is

not simply available for the taking (Anderson et al., 2001). Status contests—often zero-sum—may result in heavy losses as well as substantial gains (Berger et al., 1972; Ridgeway, 2014).

One dramatic example, keenly illustrating the social psychological dynamics, comes from an archival study of German fighter pilots during World War II (Ager et al., 2017). After hearing in an armed forces bulletin about the elite accomplishments of a former peer (one Hans-Joachim Marseille—who downed 10 British planes in a single day), the fighter pilots' overall performance improved. However, whereas ace pilots scored many more kills and survived just as often, non-ace pilots scored little better and died at a higher rate. The competition for limited wartime glory thus seemed to disadvantage those less liable to achieve it. More everyday and pervasive examples of unproductive status pursuit may be found in the consumer economy (Frank, 1985). For example, contests over relative status have been known to prompt unnecessary and unproductive “expenditure cascades” (Frank et al., 2014). Here, increased spending by members higher in the socioeconomic hierarchy induces those immediately below to spend more too, until those at the bottom of the hierarchy, who can least afford it, are ultimately compelled to follow suit. The alleged impact is the exacerbation of income inequality and fostering of personal alienation.

Accordingly, it is adaptive for individuals to “know their place” in existing social hierarchies, lest their status-seeking efforts prove fruitless or counterproductive (Anderson et al., 2008; Ridgeway & Berger, 1986). If one's status is acutely or chronically low—often because one lacks the wherewithal in terms of resources or allies to prevail in risky contests—then interpersonal submission may be a better strategy than interpersonal assertion. Accordingly, a psychological mechanism that tracks one's place in the hierarchy and regulates one's status-seeking would be of adaptive benefit. Hierometer theory states that self-esteem is the crucial gear in this mechanism. Self-esteem is hypothesized to intrapsychically track levels of social status—rising when status is higher and falling when it is lower (Hill & Buss, 2008; Mahadevan et al., 2016, 2019a, b; Sedikides & Skowronski, 2000).

Hierometer Theory and Sociometer Theory

Hierometer theory is not the only theoretical account of self-esteem's function: several others have been advanced over the years. For example, *terror management theory* posits that self-esteem buffers people from the abject terror they would otherwise experience from awareness of their own mortality, following the evolution of adaptive large brains that afforded such awareness (Solomon et al., 1991). But perhaps the leading contemporary theory in this area is *sociometer theory* (Leary & Downs, 1995; Leary et al., 1995). This theory links self-esteem to the fundamental *need to belong* (Baumeister & Leary, 1995). It posits that self-esteem serves an inclusion-regulating function. In particular, because inclusion in social groups was critical to the survival and reproduction of the human species, a psychological mechanism likely evolved to regulate it. Accordingly, self-esteem is hypothesized to operate as an internal gauge, which intrapsychically tracks a person's level of social inclusion—rising when inclusion is higher and falling when it is lower. When a person is socially excluded, their self-esteem falls, which in turn, motivates that person to behave affiliatively in order to restore their inclusion to its optimal level (Leary, 1999).

Note that, despite some superficial similarities, hierometer theory and sociometer theory differ (see Mahadevan et al., 2016, 2019a, b, for a broader discussion). Most crucially, whereas hierometer theory focuses on status and behavior related to pursuing it, sociometer theory focuses on inclusion and behavior related to pursuing it. Status and inclusion are well established as distinct constructs—logically separate from and non-derivative of one another (Anderson et al., 2015; Fournier, 2009; Huo et al., 2010). Whereas status involves *getting ahead* and reflects where one stands vertically in regard to others (i.e., in the social hierarchy), inclusion involves *getting along* and reflects where one stands horizontally in regard to others (i.e., in the social community; Black, 1976). Moreover, in keeping with their being distinct (Anderson et al., 2015; Baumeister & Leary, 1995), status and inclusion exert independent effects on self-esteem. For example, chronically higher levels of status and inclusion each covary with higher trait self-esteem after controlling for the other (Fournier, 2009; Mahadevan et al., 2016). Additionally, experimental manipulations of status and inclusion each lead to corresponding variations in state self-esteem after controlling for the other (Leary et al., 2001; Mahadevan et al., 2019a).

That said, it bears noting that more than one version of sociometer theory exists. The original version focuses squarely on social inclusion: “[T]he self-esteem system itself is a subjective monitor or gauge of the degree to which the individual is *being included and accepted versus excluded and rejected* by other people (Leary et al., 1998, p. 1290; italics added). A later version focuses on “relational value” more generally, defined as “the degree to which a person regards his or her *relationship* with another individual as *valuable or important*” (Leary, 2005, p. 82, italics added). Crucially, neither version explicitly invokes status, nor delineates a status-regulating role for self-esteem. The original version does not mention status. The later version may encompass its operation, insofar as status is a form of relational value; however, status remains explicitly unidentified. Relational value, moreover, arguably encompasses any characteristic valued in a relationship—for example, partner attractiveness (Schmitt & Jonason, 2019). Hence, whereas the later version of sociometer theory gains in scope by potentially accommodating diverse findings, it also loses in precision by making less specific predictions than the original version.

Ultimately, both hierometer theory and sociometer theory (in its original form) can be integratively understood in terms of the broader *agency–communion distinction* (“The Big Two”; Abele & Wojciszke, 2014). Agency encompasses constructs such as competence, dominance, and achievement, whereas communion encompasses constructs such as warmth, agreeableness, and affiliation (Campbell et al., 2002; Gebauer et al., 2013; Gregg & Mahadevan, 2014). By and large, hierometer theory deals with the agentic function of self-esteem, and sociometer theory with its communal function. A final way to understand hierometer theory and sociometer theory integratively is also as follows: status and inclusion can be seen as constituting two very general classes of “contingencies of self-worth” (Crocker & Wolfe, 2011), such that self-esteem is liable to depend on their attainment in one way or another—as opposed to more specific ones like “academic competence” or “family support”—where the dependencies in question are more liable to vary (Crocker et al., 2003).

In summary, hierometer theory provides a novel account of self-esteem’s function as a tracker of status. Despite being similar to sociometer theory, it is distinct from it. Our intent

here was to test hypotheses derived specifically from hierometer theory. Guided by this theory, we examined, for the first time, a key question: Just what *kind* of hierometer is self-esteem? In particular, which of two distinct *types* of social status is self-esteem primarily designed to track?

What Kind of Hierometer Is Self-Esteem?

If, as proposed by hierometer theory, self-esteem operates as a hierometer by tracking status, then higher status should lead to higher self-esteem, and lower status should lead to lower self-esteem. But status itself is a multifaceted construct that can be conceptualized and assessed in different ways (Cattell, 1942; Schooler, 1994). It is consequently important to understand how these different types of status relate to one another and to self-esteem.

The existing literature has focused predominantly on *socioeconomic status* (SES). SES—also known as “social class” or “socioeconomic class”—is usually defined as a person’s educational, income, and occupational standing (Adler et al., 2000; Manstead, 2018). The relation between SES and self-esteem is complex (Rosenberg & Pearlin, 1978; Twenge & Campbell, 2002). Some studies report positive links (Kraus & Park, 2014; Richman et al., 1985), others negative links (Francis & Jones, 1996; Soares & Soares, 1969), and still others no link at all (Ockerman, 1979; Phinney et al., 1997). Importantly, virtually no studies have experimentally manipulated actual or perceived SES to assess its causal impact on self-esteem.

Moreover, the existing literature is relatively sparse when it comes to another type of status—one that reflects the modern definition in terms of respect and admiration (Anderson et al., 2015; Fiske, 2010), and which is explicitly incorporated into hierometer theory. This type of status, for historical and methodological reasons, has acquired the potentially confusing name of *sociometric status* (SMS; Anderson et al., 2012; Coie et al., 1982; Terry & Coie, 1991). Despite its name, it is unconnected to sociometer theory. Rather, the term SMS is used—here and elsewhere in the literature—to distinguish this more informal type of social status, rooted in the respect and admiration of others, from the more formal SES, rooted in the acquisition of education, occupation, and income (Anderson et al., 2012, 2015; Weber, 1944). The few studies that have examined the link between SMS and self-esteem do suggest

that higher SMS covaries cross-sectionally with higher self-esteem (Gregg et al., 2017a; Huo et al., 2010). However, hardly any studies have experimentally manipulated actual or perceived SMS to assess its causal impact on self-esteem (but see Mahadevan et al., 2019a). Thus, the causal impact of both SES and SMS on self-esteem remains to be firmly established.

In addition, no research has yet explicitly compared the strength or primacy of the links between these two types of status—SES and SMS—and self-esteem. One investigation by Anderson and colleagues (2012) did compare the effects of SES versus SMS, but on a different outcome: subjective well-being. Moreover, this investigation did not examine how SES and SMS relate to one another. That is, there was no attempt to examine whether one form of social status acted as a means to the other, or mediated the effects of the other, in predicting psychological functioning. Thus, the relation between these two types of social status, and the nature of their respective links to self-esteem, remain unknown and in need of theoretical and empirical elucidation.

Theoretical Integration and Hypotheses

Here, we aim to remedy the deficit. We propose an integrated account of how SES and SMS relate to self-esteem, and test several hypotheses derived from it. In our account, we conceptualize SMS as the “real” status—the more *powerful* and more *proximate* predictor of self-esteem. In contrast, we conceptualize SES primarily as a source of, or input into, SMS. We posit that, if self-esteem operates as a hierometer, then it *primarily tracks SMS*. Hence, SMS will predict self-esteem more strongly than SES, but, also crucially, will *mediate* the effects of SES on self-esteem. SES will still predict self-esteem, but less strongly and less directly than SMS. Notably, we go beyond prior work that has neglected self-esteem and has dealt with these two forms of status independently (Anderson et al., 2012, 2015). Here, we approach them as conceptually distinct, but related, forms of social standing. We posit that SES and SMS will covary positively and will together predict self-esteem.

Specifically, we put forward five hypotheses: Both SES and SMS positively predict self-esteem (H1); SMS predicts self-esteem more strongly than SES (H2); SES and SMS correlate positively with one another (H3); SMS mediates the link between SES and self-esteem (H4); and SMS mediates the link between SES and self-esteem more strongly than

SES mediates the link between SMS and self-esteem (H5). We test these hypotheses in a systematic program of research. Below, we elaborate on the theoretical rationale for these hypotheses.

On the Potency of SMS

We expect both SES and SMS to predict self-esteem positively (H1), but for SMS to predict it more strongly than SES (H2). There are several reasons why SMS might prove more potent.

First, we theorize that the cognitive architecture of humans is likely adapted to SMS. In their ancestral environment, early humans largely operated in small-scale groups of hunter-gatherers, whose structure was loose and unspecified (Baumeister, 2005; Buss, 1995; Dunbar, 2007). Along with their simian ancestors, they evolved to be sensitive to signals communicating respect or disdain, which were collectively diagnostic of their overall place in the social hierarchy (Barkow, 1975; Chance, 1967, 1970). These expressive cues were likely to have formed the basis of early self-evaluations (Barkow, 1980; Sedikides & Skowronski, 1997, 2003). Thus, the self-evaluations of early humans were probably based on cues of SMS. Later in the course of evolution, as humans evolved the ability to communicate linguistically and symbolically, and developed greater powers of mental abstraction, symbolic cues signaling SES (i.e., job titles, Rolex watches, designer clothes) would also have begun to inform their self-evaluations (Belk, 1988; Lee et al., 2013; Wicklund & Gollwitzer, 1982). Nonetheless, given that human self-esteem would initially have been attuned to SMS and only belatedly to SES, it may well remain primarily attuned to the former and only secondarily to the latter (Barkow, 1975, 1980; Hallowell, 1960; Sedikides et al., 2006). Similarly, human phobias remain primarily attuned to the snakes and insects that populated their ancestral environment rather than to the (objectively more dangerous) guns or cars that populate their contemporary one (Buss, 1995; McNally, 1987).

Second, to the extent that they can be quantified, hierarchies based on SMS are liable to outnumber hierarchies based on SES. Many groups—such as friends, hobbyists, school children, and university students—do not necessarily possess a formal hierarchy based on income, education, and occupation, or the symbolic trappings thereof. However, virtually

every group possesses some sort of informal hierarchy, in which some individuals are accorded more respect and admiration than others (Bales et al., 1951; Sidanius & Pratto, 1999). Therefore, owing to the greater prevalence of these informal hierarchies, SMS is likely to exert a greater impact on people's self-esteem than SES.

Third, society is highly stratified by SES (McPherson et al., 2001; Verbrugge, 1977). Accordingly, people tend to associate with others of similar SES—for example, undergraduates with other undergraduates, and professors with other professors. Consequently, many groups already consist of individuals of similar SES, but of potentially dissimilar SMS. For instance, two graduate students at a particular academic department would formally have equal SES, possessing identical educational qualifications, incomes, and occupations. However, if Student A were regarded as brilliant and taken seriously, and Student B as mediocre and casually dismissed, Student A would informally have higher SMS than Student B. Thus, in many situations, SES is already controlled for, leaving SMS to exert a greater influence on self-esteem. Therefore, for all the above reasons, we expect both SES and SMS to predict self-esteem positively (H1), but for SMS to predict it more strongly than SES (H2).

On the Interplay Among SES, SMS, and Self-Esteem

Although conceptually distinct, SES and SMS are liable to be interrelated. This raises the question of precisely how SES and SMS are linked to one another and to self-esteem. Answers to such a question have the potential to shed light on the mechanisms and dynamics whereby social contexts exert their psychological consequences. We propose that SES is often a key input into SMS and will predict self-esteem through it. That is, higher SES will predict higher SMS (H3). Additionally, if SES frequently acts as a source of, or input into, SMS, which in turn predicts self-esteem, then SMS is likely to mediate the link between SES and self-esteem (H4). Thus, we hypothesize a causal pathway leading from SES to SMS to self-esteem, with SMS mediating the link between SES and self-esteem.

To our knowledge, the causal link between SES and SMS has not yet been established directly. However, several lines of research suggest that high SES leads to high SMS. People notice and attend to cues signaling SES, and then evaluate others on the basis of these cues

(Lefkowitz et al., 1955). Moreover, although people tend to associate with those of similar SES, in an open society, they can still freely mix, especially in public settings, with others of very different SES. Disparities in SES are readily noticeable, if not difficult to disguise. For example, people of higher and lower SES both drive on public highways and are liable to convey their SES, either intentionally or unintentionally, from the type of automobiles they drive (Piff et al., 2012). When indicators of SES are noticed and evaluated by others, they then evaluate the individual based on these indicators (Kraus & Park, 2014; Ridgeway, 2000; Ridgeway & Correll, 2006). In particular, they may then confer SMS upon, or deny SMS to, the individual.

In addition, high SES individuals are seen as more agentic and competent than their low SES counterparts (Bettencourt et al., 2001; Darley & Gross, 1983). Consequently, they are more liable to receive respect and admiration from others (i.e., high SMS). For example, consistent with the *stereotype content model* (Fiske et al., 2002), high SES groups were rated as more capable, intelligent, efficient, and skilled than low SES groups (Cuddy et al., 2007). The link was observed across cultures, in 20 countries (Cuddy et al., 2008). Moreover, the link was causal, with perceptions of high SES leading to perceptions of higher competence rather than the other way around (Caprariello et al., 2009). For example, people described as affluent were subsequently seen as more competent and self-disciplined than those described as less affluent (Christopher & Schlenker, 2000; Oldmeadow & Fiske, 2007).

Finally, high SES elicits respectful and deferential behavior in others (Anderson et al., 2006). For example, people were more likely to follow into traffic a person dressed in a suit than one dressed in dirty, casual clothing (Guéguen & Pichot, 2001; Lefkowitz et al., 1955). People were also more willing to help high SES individuals than low SES ones, even when they were not high in SES themselves (Goodman & Gareis, 1993).

Hence, SES is likely to be an important source of SMS (although by no means the only one). All else equal, people who are wealthy, highly educated, and professionally employed (i.e., of higher SES) are likely to receive more respect and admiration than those who do not (i.e., possess higher SMS; Christopher & Schlenker, 2000; Fiske, 2010). Thus, we expect high SES to predict high SMS (H3).

The above literature finds that judgments of SMS follow from judgments of SES rather than the other way around (Caprariello et al., 2009; Fiske, 2010; Ridgeway et al., 1985). However, one might also conceive of circumstances where SMS might give rise to SES. For example, someone highly respected in an oppressed community for bravely speaking out (i.e., who possesses high SMS) might later be elected if they ran for political office (i.e., would attain high SES). Freedom-fighting luminary Nelson Mandela would be a well-known example (Mandela, 1994). Accordingly, SMS might also predict self-esteem via SES. Nonetheless, given that prior research suggests that SES influences SMS rather than vice versa (Christopher & Schlenker, 2000; Singh-Manoux et al., 2003), we hypothesize that the link between SES and self-esteem, statistically mediated by SMS, will be more pronounced (H5).

Therefore, for all the above reasons, we expect higher SES to predict higher SMS (H3), for SMS to mediate the link between SES and self-esteem (H4), and for this link to be stronger than the alternative mediation pathway leading from SMS to self-esteem via SES (H5).

Theoretical and Empirical Advances

The present research is designed to make both theoretical and empirical advances. First and foremost, we propose a novel and integrative account of status and self-esteem. We ground the investigation of SES, SMS, and self-esteem in a theoretical framework (i.e., hierometer theory) that permits us to articulate coherently several hypotheses. Second, we compare directly, for the first time, the relative strengths of the links between SES and SMS, on the one hand, and self-esteem, on the other. Third, going beyond previous work that has dealt with SES and SMS in isolation, we examine how SES and SMS relate to each other, and test whether SMS mediates the link between SES and self-esteem, a hitherto unexplored possibility. This potential mediation is theoretically and practically important: It provides supportive evidence for a key pathway by which one's objective standing (e.g., one's income) affects perceptions of one's informal standing (e.g., being admired). Fourth, we compare alternative mediation pathways and test which fits the data better. Specifically, we test whether SMS statistically mediates the link between SES and self-esteem, or whether SES

statistically mediates the link between SMS and self-esteem, and then compare the relative strengths of these mediation pathways. Fifth, we assess SES and SMS in multiple formats, use multiple measures of self-esteem, and control for key personality variables, to enhance the generalizability of our findings. Sixth and finally, we investigate causal relations and directions for the first time, by experimentally manipulating perceptions of both SES and SMS. In particular, we test whether SES causally impacts SMS; whether SMS causally impacts self-esteem; and whether the effect of SES on self-esteem is mediated by SMS. This final stage corroborates any effects observed in the cross-sectional studies using a research design capable of untangling causality, thereby enhancing internal validity, and tests whether the theoretically derived predictions hold across both trait self-esteem and state self-esteem, thereby enhancing external validity.

Overview

We conducted five studies. Studies 1–2 involved cross-sectional designs, Studies 3–5 experimental designs. We recruited participants from two leading crowdsourcing sites, *Amazon Mechanical Turk*TM and *CrowdFlower*TM. This approach allowed us to access large and diverse samples without being restricted to a limited range of SES differences typical of more specific samples (e.g., undergraduate students). After careful checking, we excluded participants whose data were of dubious quality (Gregg et al., 2017b), in particular those who: (i) reported being aged below 18; (ii) reported low English proficiency; (iii) had the same IP address, suggesting duplicate contributions; (iv) completed the study too rapidly (in less than half of the median duration); (v) responded to all items identically on any questionnaire containing both forward-scored and reverse-scored items, suggesting inattention or indifference; (vi) provided blank or nonsensical responses on key measures; or (vii) were multivariate outliers (Table 1). Across all studies, 2,343 individuals took part, of which 325 (14%) were excluded, leaving a final *N* of 2,018.

To avoid response bias, we varied the order of measures across studies. In Study 1, we assessed SES and SMS subjectively, and in relative terms, using precisely matched “ladder” measures. In Study 2, we assessed SES both objectively and subjectively, assessed SMS subjectively, and further controlled for the Big Five personality traits. Prior research indicates

that self-report is a reliable and valid way of measuring several constructs including SES, SMS, and self-esteem (Diener, 1994; Hahn et al., 2014; Lyubomirsky & Lepper, 1999). People's self-reports of their SES and SMS tend to be accurate, as they correlate strongly with peer-ratings and objective indicators (Adler et al., 2000; Anderson et al., 2006; Faunce, 1984; Fournier, 2009). In Study 3, we experimentally manipulated participants' SES perceptions. In Study 4, we experimentally manipulated participants' SMS perceptions. In Study 5, we measured participants' SES perceptions and then experimentally manipulated their SMS perceptions.

The data in Studies 1–2 were collected as part of larger projects, incorporating additional variables and testing different hypotheses, parts of which have been published elsewhere (Mahadevan et al., 2016, 2019a). The data in Studies 3–5 have not been reported previously. We disclose all measures in Supplementary Materials. All studies received approval from the university's research ethics committee.

We determined sample sizes before data analysis. For Study 1, a sample of 570 participants allowed us to detect small-to-medium effects ($f^2 \approx .03$, $R^2 \approx .03$) with a power of $(1 - \beta) = .95$ at $\alpha = .05$ (two-tailed) for our most complex model (regression analysis with two predictors). For Study 2, a sample of 552 participants allowed us to detect small-to-medium effects ($f^2 \approx .04$, $R^2 \approx .04$) with a power of $(1 - \beta) = .95$ at $\alpha = .05$ (two-tailed) for our most complex model (regression analysis with seven predictors). For Study 3, we aimed to recruit 200 participants to detect small-to-medium effects ($f^2 \approx .08$, $R^2 \approx .07$) with a power of $(1 - \beta) = .95$ at $\alpha = .05$ (two-tailed) for the most complex model (one-way ANOVA with two conditions). For Study 4, we aimed to recruit 140 participants to detect small-to-medium effects ($f^2 \approx .09$, $R^2 \approx .08$) with a power of $(1 - \beta) = .95$ at $\alpha = .05$ (two-tailed) for the most complex model (one-way ANOVA with two conditions). For Study 5, we aimed to recruit 500 participants to detect small-to-medium effects ($f^2 \approx .17$, $R^2 \approx .03$) with a power of $(1 - \beta) = .95$ at $\alpha = .05$ (two-tailed) for the critical test (2×3 ANOVA).

Study 1

We initiated our investigation with a cross-sectional study designed to test the five hypotheses derived from our account. Using validated measures of SES, SMS, and self-

esteem, we examined whether and to what extent SES and SMS each separately correlated with self-esteem (H1), and we statistically compared the respective strengths of their correlations (H2). We also examined whether SES and SMS correlated positively with each other (H3). We then fitted structural equation models to test probable mediation sequences. Specifically, we examined whether the link between SES and self-esteem was statistically mediated by SMS (H4). Finally, we compared the fit of this model with that of an alternative model with the roles of SES and SMS reversed, to test whether the model with SMS as mediator best corresponded with the observed data (H5).

SES is typically assessed objectively as a composite of education, occupation, and income (Twenge & Campbell, 2002). However, some past work suggests that SES is a stronger predictor of physical and psychological health when it is measured *subjectively* rather than objectively, and when it is measured in *relative terms* rather than in absolute terms (Adler et al., 2000; Singh-Manoux et al., 2003, 2005). That is, people's own subjective assessments of their SES relative to others might predict their self-esteem more strongly than their actual objective SES measured in absolute terms. Hence, in Study 1, we assessed both SES and SMS subjectively and in relative terms. Additionally, we assessed both SES and SMS in identical formats, using *precisely matched* "ladder" measures of both constructs (Anderson et al., 2012). This helped to ensure that the results reflected the constructs themselves and not the manner of measurement, thereby enhancing the generalizability of the findings.

Finally, to ascertain that our results were not limited to a specific operationalization of self-esteem, we included two measures of trait self-esteem. In all, Study 1 tested our five hypotheses by (i) assessing SES and SMS in identical formats and (ii) employing multiple measures of self-esteem.

Method

Participants

Participants were 570 adult U.S. residents (363 women, 207 men; $M_{\text{age}} = 34.73$ years, $SD_{\text{age}} = 12.96$).

Socioeconomic Status

We assessed SES subjectively and in relative terms with a 3-item “ladder” measure adapted from Adler et al. (2000). Those authors asked participants to indicate their SES using a single-item “ladder.” Participants were shown an illustration of a ladder with 10 rungs described as follows (p. 587): “Think of this ladder as representing where people stand in our society. At the top of the ladder are the people who are the *best off*, those who have the *most money, most education, and best jobs*. At the bottom are the people who are the *worst off*, those who have the *least money, least education, and worst jobs or no job*.” Participants then placed an X on the rung that best represented where they thought they stood on the ladder.

We elaborated this single-item measure into three separate items. We asked participants to indicate, on a 6-point scale ($M = 3.39$, $SD = .51$, $\alpha = .59$), their SES in terms of education, money, and jobs as follows: “Think of this bar as a ladder that represents *how much education [how much money, how good of a job]* people have in society. At the top of the ladder are the people who have the *most education [most money, best jobs]*. At the bottom of the ladder are the people who have the *least education [least money, worst jobs or no job]*. Please move the slider to that rung on the “ladder” that best represents how much *education [how much money, how good of a job]* you think you have.”

Sociometric Status

We likewise assessed SMS subjectively and in relative terms with a 3-item “ladder” measure that carefully paralleled the above measure of SES (Anderson et al., 2012). Participants indicated their SMS on a 6-point scale ($M = 3.48$, $SD = 1.05$, $\alpha = .84$) in terms of respect, admiration, and importance as follows: “Think of this bar as a ladder that represents *how respected [admired, important]* people are in society. At the top of the ladder are the people who are the *most respected [most admired, most important]*. At the bottom of the ladder are the people who are the *least respected [least admired, least important]*. Please move the slider to that rung on the ‘ladder’ that best represents how *respected [admired, important]* you think you are.”

Note that the measures of SES and SMS were identical, save for the type of status they assessed. They were precisely matched so that both: (i) assessed social status subjectively; (ii) asked participants to rate their social status relative to others on a “ladder”;

(iii) contained three items; and (iv) featured 6-point response scales.

Self-Esteem

We assessed trait self-esteem with two measures: the 10-item *Rosenberg Self-Esteem Scale* (RSES; Rosenberg, 1965; $M = 3.62$, $SD = .82$, $\alpha = .91$), and the 20-item *Self-Liking Self-Competence Scale* (SLSC; Tafarodi & Swann, 1995; $M = 3.61$, $SD = .75$, $\alpha = .95$). The RSES is the most widely-used measure of global self-esteem (Byrne, 1996). Sample items include: “On the whole, I am satisfied with myself” and “I wish I could have more respect for myself” (reversed) (1 = *strongly disagree*, 5 = *strongly agree*). The SLSC is another well-validated measure of global self-esteem. Sample items include: “I like myself” and “I am a capable person” (1 = *strongly disagree*, 5 = *strongly agree*).¹

Results and Discussion

As hypothesized, SES and SMS each predicted self-esteem positively, both when self-esteem was measured by the RSES, $r_{\text{RSES}(568)} = .39$, $p < .001$, and when measured by the SLSC, $r_{\text{SLSC}(568)} = .41$, $p < .001$.² SMS predicted it more strongly than SES did, $r_{\text{RSES}(568)} = .53$, $p < .001$, $r_{\text{SLSC}(568)} = .57$, $p < .001$. To confirm that these differences were statistically significant, we compared the strength of these correlations using William’s T2 tests for dependent correlations (Steiger, 1980). Both tests proved statistically significant: $t_{\text{RSES}(565)} = 3.98$, $p < .001$, $t_{\text{SLSC}(565)} = 4.68$, $p < .001$. Thus, SES and SMS both predicted self-esteem positively (H1), but SMS predicted it more strongly than SES (H2), even when SES and SMS were assessed in identical formats, and for multiple measures of self-esteem.³

Supporting the idea that high SES predicts high SMS, SES and SMS were positively correlated, $r(568) = .51$, $p < .001$ (H3). We then examined the potential mediating role of SMS in a pair of structural equation models. In both models, we entered SES as the predictor and SMS as the mediator. In the first model, we entered self-esteem measured by the RSES as the outcome variable (Figure 1a). In the second model, we entered self-esteem measured by the SLSC as the outcome variable (Figure 1b). In these and all other models, we estimated effects using 5,000 bias-corrected bootstraps with standardized scores of the variables. In both models, higher SES predicted higher SMS, $B_{\text{RSES}} = .51$, $SE = .04$, $p < .001$, and $B_{\text{SLSC}} = .51$, $SE = .04$, $p < .001$. Higher SMS predicted higher self-esteem, $B_{\text{RSES}} = .45$, $SE = .04$, p

$< .001$, and $B_{\text{SLSC}} = .49$, $SE = .04$, $p < .001$. Upon inclusion of the mediator, SMS, in the models, the link between SES and self-esteem remained significant, $B_{\text{RSES}} = .16$, $SE = .04$, $p < .001$, and $B_{\text{SLSC}} = .15$, $SE = .04$, $p < .001$. Most importantly, the (bootstrapped) indirect effects were significant: SMS statistically mediated the link between SES and self-esteem, $B_{\text{RSES}} = .23$, $p < .001$, 95% $CI = [0.181, 0.285]$, and $B_{\text{SLSC}} = .25$, $p < .001$, 95% $CI = [0.202, 0.307]$, consistent with our theorizing (H4).

Could it be that the mediational roles of SES and SMS were reversed? To address this question, we proceeded to compare our predicted mediation sequence against the alternative mediation sequence from SMS via SES to self-esteem in a pair of structural equation models with SMS as the predictor, SES as the mediator, and self-esteem as the outcome variable. In both models, higher SMS predicted higher SES, $B_{\text{RSES}} = .51$, $SE = .04$, $p < .001$, and $B_{\text{SLSC}} = .51$, $SE = .04$, $p < .001$. Higher SES predicted higher self-esteem, $B_{\text{RSES}} = .16$, $SE = .04$, $p < .001$, and $B_{\text{SLSC}} = .16$, $SE = .04$, $p < .001$. Although some support emerged for mediation by SES, the (bootstrapped) coefficients observed were much smaller, $B_{\text{RSES}} = .08$, $p < .001$, 95% $CI = [0.041, 0.131]$, and $B_{\text{SLSC}} = .07$, $p < .001$, 95% $CI = [0.038, 0.124]$, and the link between SMS and self-esteem remained strong and significant with the inclusion of the mediator, SES, in the models, $B_{\text{RSES}} = .45$, $SE = .04$, $p < .001$, and $B_{\text{SLSC}} = .49$, $SE = .04$, $p < .001$. This suggested that our predicted models fit the data better than the alternative models.

To evaluate this suggestion statistically, we compared the relative fit of the estimated mediation models above, after excluding the direct effect of the predictor on the outcome variable, using Akaike Information Criterion (AIC) values (Akaike, 1974; Kline, 2005). For both measures of self-esteem, the predicted mediations by SMS fit the data far better (i.e., AIC values were much lower) than the alternative mediations by SES did (H5): $AIC_{\text{RSES}} = 25.77$ vs. 118.53; $AIC_{\text{SLSC}} = 24.98$ vs. 114.76. Thus, our hypothesized mediation pathway accorded far better with the observed data than the alternative mediation sequence did, consistent with SMS accounting for the link between SES and self-esteem (H4 and H5).

In all, the results of Study 1 supported all five hypotheses. Both SES and SMS positively predicted self-esteem (H1), but SMS predicted it more strongly than SES did (H2). Moreover, the results were consistent with SMS accounting for the link between SES and

self-esteem: Not only did SES and SMS correlate positively (H3), but SMS statistically mediated the link between SES and self-esteem (H4), and it did so more definitively than SES when their mediating roles were reversed (H5). Furthermore, these patterns emerged even when SES and SMS were assessed in identical formats—subjectively, and in relative terms, on identical “ladders”—and for multiple measures of self-esteem, thereby enhancing the generalizability of the findings.

Study 2

The results of Study 1 supported our hypotheses. The results held up even when we assessed SES and SMS using identical formats, and when we assessed self-esteem in multiple ways. Study 2 built on these findings.

First, we sought to replicate our results after controlling for key personality variables, namely, the Big Five traits. The Big Five is a hierarchical model of personality, which represents personality via five broad traits: extraversion, neuroticism, agreeableness, conscientiousness, and openness (Digman, 1990). Good construct validity has emerged across genders, cultures, and age groups (McCrae & Costa, 1997). We chose to assess and control for the Big Five traits given their importance for understanding a range of interpersonal and behavioral outcomes, including those studied in the current research. For example, Big Five traits predict aggressive behavior (Barlett & Anderson, 2012), academic performance (Nofle & Robins, 2007), and health (Goodwin & Friedman, 2006). Moreover, they predict SES, SMS, and self-esteem. For example, extraversion, conscientiousness, and openness correlate positively with SES, whereas neuroticism correlates negatively with it (Jonassaint et al., 2011). Likewise, extraversion correlates positively, and neuroticism negatively, with both SMS and self-esteem (Anderson et al., 2001; Robins et al., 2001). Thus, given that the Big Five traits collectively encompass much of the relevant variation in personality traits (Carlo et al., 2014), were our findings to persist when they were controlled for, then that would go some way towards ruling out dispositional confounds as viable alternative explanations for our findings. Accordingly, in Study 2, we concurrently assessed the Big Five personality traits, and examined the correlational and mediational links between SES, SMS, and self-esteem, both before and after controlling for them.

Second, we measured SES not only subjectively, using the “ladder” measure, but also objectively, based on standard indices of socioeconomic standing. This permitted us to assess whether or not our findings depended on the peculiarities of either operationalization of SES.

Thus, Study 2 served (a) to test the replicability of Study 1’s findings, (b) to gather evidence for their specificity (i.e., after taking other key traits into account), and (c) to gather evidence for their generalizability (i.e., assessing status via both personal estimates and standard indicators).

Method

Participants

Participants were 552 adult U.S. residents (329 women, 223 men; $M_{\text{age}} = 31.59$ years, $SD_{\text{age}} = 11.76$).

Measures

We assessed SES in two ways. First, we did so objectively. SES is typically assessed objectively as a composite of education, occupation, and income (Twenge & Campbell, 2002). Participants indicate their highest level of educational attainment from a standard list of options, as well as their occupation and income (Adler et al., 2000). These are later classified and coded into separate categories on a metric scale (e.g., for education: 1 = *Primary School*, 6 = *University Postgraduate*; Kraus & Park, 2014). The three component scores on education, income, and occupation are then averaged to create an overall measure of SES (Singh-Manoux et al., 2003, 2005). Consistent with this established practice, we assessed SES objectively as a composite of education, occupation, and income in Study 2. Participants indicated their highest educational attainment by selecting a response from a drop-down menu: (i) Primary (e.g., Elementary School); (ii) Partial Secondary (e.g., attended, but did not graduate, high school); (iii) Secondary (e.g., both attended and graduated high school); (iv) Post-Secondary (e.g., trade or secretarial qualification); (v) University Undergraduate (e.g., BA); and (vi) University Postgraduate (e.g., MA, PhD). We later coded these responses along a 6-point scale (1 = *Primary School*, 6 = *University Postgraduate*). Participants also described their current occupation in a couple of sentences. Eight independent coders later rated these responses for occupational prestige (1 = *not all*

prestigious, 6 = *very prestigious*). Inter-rater reliability was high ($\alpha = .92$). Finally, participants reported their personal annual pre-tax income in US dollars. As is typical, the income distribution was highly skewed (skewness = 9.86, $SE = 0.11$); accordingly, we applied a Procrustes transformation to the data. Specifically, we recoded the data into six equal quantiles (i.e., sextiles). We assigned each participant an income score from 1 to 6. This effectively eliminated the skewness (-0.38) and produced a 6-point metric analogous to that for education and occupation. We then created a single index of SES by averaging scores across education, occupation, and income ($M = 3.62$, $SD = .90$, $\alpha = .59$).⁴

We also assessed SES subjectively. As in Study 1, participants indicated their self-rated SES relative to others on education, occupation, and income using the 3-item “ladder” measure (Adler et al., 2000). Responses were again captured on 6-point scales, and we aggregated their responses into a single index ($M = 3.47$, $SD = .83$, $\alpha = .61$).

We assessed SMS with a reliable and structurally validated 8-item questionnaire (Huo et al., 2010; Mahadevan et al., 2016, 2019a, b; $M = 3.26$, $SD = .73$, $\alpha = .90$). The questionnaire began with the stem, “Most of the time I feel that people...” (1 = *strongly disagree*, 5 = *strongly agree*). Sample items completing this stem included: “...respect me as a person” and “...admire me”.

As in Study 1, we assessed trait self-esteem with the RSES ($M = 3.58$, $SD = .77$, $\alpha = .91$). Finally, we assessed the Big Five personality traits with the *Ten-Item Personality Inventory* (TIPI; Gosling et al., 2003; 1 = *strongly disagree*, 5 = *strongly agree*). The TIPI is a well-validated brief measure of personality. Its convergent validity, discriminant validity, and factor structure approach those of more extensive five-factor personality measures (Ehrhart et al., 2009; Muck et al., 2007; r_s for each of the two-item subscales adjusted upwards via the Spearman-Brown prophecy formula: .79 [extraversion], .74 [neuroticism], .47 [agreeableness], .68 [conscientiousness], .48 [openness to experience]).

Results and Discussion

SES positively predicted self-esteem, both when measured objectively, $r_{OBJ}(550) = .28$, $p < .001$, and when measured subjectively, $r_{SUB}(550) = .29$, $p < .001$ (H1). However, SMS predicted self-esteem more strongly than either measure of SES, $r(550) = .57$, $p < .001$.⁵

As before, these differences were statistically significant, $t_{\text{OBJ}}(549) = 6.74, p < .001, t_{\text{SUB}}(549) = 7.19, p < .001$ (H2). To ascertain whether the strengths of the links between SES, SMS, and self-esteem could be due to overlapping personality dispositions, we then computed the partial correlations between SES, SMS, and self-esteem while simultaneously controlling for the Big Five traits. Regardless, SES remained significantly and positively correlated with self-esteem, $r_{\text{OBJ}}(542) = .20, p < .001, r_{\text{SUB}}(542) = .24, p < .001$, and SMS still predicted self-esteem more strongly than either measure of SES, $r(542) = .40, p < .001$.⁶

In addition, consistent with high SES being a harbinger of high SMS, both SES and SMS again correlated positively, regardless of operationalization, $r_{\text{OBJ}}(550) = .27, p < .001, r_{\text{SUB}}(550) = .40, p < .001$. Moreover, both links remained significant after controlling for the Big Five, $r_{\text{OBJ}}(542) = .20, p < .001$, and $r_{\text{SUB}}(542) = .36, p < .001$. Thus, the data supported high SES predicting high SMS (H3), and independently of key personality characteristics.

Next, we examined whether SMS could explain the link between SES and self-esteem (H4). We fitted two structural equation models. In the first, we entered objective SES as the predictor (Figure 2a), and in the second, subjective SES (Figure 2b). In both models, we entered SMS as the mediator and self-esteem as the outcome variable. In each case, higher SES predicted higher SMS, $B_{\text{OBJ}} = .27, SE = .04, p < .001$, and $B_{\text{SUB}} = .40, SE = .04, p < .001$. Higher SMS also predicted higher self-esteem, $B_{\text{OBJ}} = .54, SE = .04, p < .001$, and $B_{\text{SUB}} = .55, SE = .04, p < .001$. SES continued to predict self-esteem upon inclusion of the mediator, SMS, in the models, $B_{\text{OBJ}} = .14, SE = .04, p < .001$, and $B_{\text{SUB}} = .07, SE = .04, p = .059$. Importantly, in each case, SMS statistically mediated the link between SES and self-esteem, $B_{\text{OBJ}} = .14, p < .001, 95\% CI = [0.098, 0.195]$, and $B_{\text{SUB}} = .22, p < .001, 95\% CI = [0.168, 0.277]$, respectively (H4).

To find out whether SMS would continue to mediate the link between SES and self-esteem after controlling for the Big Five personality traits, we then fitted two additional structural equation models. The first featured objective SES as predictor (Figure 2c), the second, subjective SES (Figure 2d). In both models, we entered SMS as the mediator and self-esteem as the outcome variable. We also simultaneously entered the Big Five traits. Higher SES continued to predict higher SMS, $B_{\text{OBJ}} = .18, SE = .04, p < .001$, and $B_{\text{SUB}} = .32,$

$SE = .04, p < .001$, and higher SMS higher self-esteem, $B_{OBJ} = .31, SE = .03, p < .001$, and $B_{SUB} = .29, SE = .04, p < .001$. SES continued to predict self-esteem upon inclusion of the mediator, SMS, in the models, $B_{OBJ} = .10, SE = .03, p < .001$, and $B_{SUB} = .09, SE = .03, p = .006$. Importantly, SMS continued to mediate the link between SES and self-esteem, $B_{OBJ} = .06, p < .001, 95\% CI = [0.031, 0.086]$, and $B_{SUB} = .09, p < .001, 95\% CI = [0.062, 0.133]$, respectively.

Finally, we compared the mediating roles of SMS and SES in a pair of structural equation models with SMS as the predictor, SES as the mediator, and self-esteem as the outcome variable. In both models, higher SMS predicted higher SES, $B_{OBJ} = .27, SE = .04, p < .001$, and $B_{SUB} = .40, SE = .04, p < .001$, and higher SES predicted higher self-esteem, $B_{OBJ} = .14, SE = .04, p < .001$, and $B_{SUB} = .07, SE = .04, p = .059$. Although some support emerged for an alternative mediational pathway from SMS via SES to self-esteem, these effects were, as in Study 1, much smaller than the predicted mediation, $B_{OBJ} = .04, p < .001, 95\% CI = [0.018, 0.058]$, and $B_{SUB} = .03, p = .068, 95\% CI = [-0.002, 0.062]$. Furthermore, SMS continued to predict self-esteem strongly with the inclusion of the mediator, SES, in the models, $B_{OBJ} = .54, SE = .04, p < .001$, and $B_{SUB} = .55, SE = .04, p < .001$. Finally, as before, a comparison of model fit revealed that the predicted mediation sequences fit the data far better than the alternative sequences: $AIC_{OBJ} = 24.08$ vs. 199.63 ; $AIC_{SUB} = 13.56$ and 185.59 . Thus, SMS statistically mediated the link between SES and self-esteem rather than the reverse (H5), regardless of whether SES was assessed objectively or subjectively, and even when the influence of key personality traits was taken into account. The results of Study 2 therefore supported each of the five hypotheses, replicating the findings of Study 1, and further testifying to their specificity and generalizability.

Study 3

Studies 1–2 examined the links between our three key constructs—SES, SMS, and self-esteem—correlationally, at the level of longstanding dispositions or traits. They showed that SMS predicted self-esteem more strongly than SES did, and that SMS accounted for the SES–self-esteem link more fully than SES accounted for the SMS–self-esteem link. These patterns held for multiple measures of SES, SMS, and self-esteem, when SES and SMS were

measured in identical formats and in different ones, and after controlling for the Big Five personality traits. The patterns observed were consistent with SMS being a more potent and more proximate predictor of self-esteem, and provided evidence to that effect, given that inconsistent patterns might well have emerged in either study.

Nonetheless, the cross-sectional designs of Studies 1–2, albeit informative for placing our theory at risk of disconfirmation (Fiedler et al., 2011), were insufficient in themselves to establish the presence and direction of causal links between the constructs (Maxwell & Cole, 2007). Indeed, few studies in the literature have experimentally manipulated SES or SMS to assess their causal impact on self-esteem. The goal of Studies 3–5, therefore, was to remedy the deficit, and clarify causality via this method for the first time.

We adopted an experimental approach that followed Spencer et al.'s (2005) recommendations. Specifically, Studies 3 and 4 together adopted an experimental-causal-chain approach, designed to establish both parts of a causal chain. Study 3 tested whether SES impacts both SMS and state self-esteem (with SMS mediating the impact of SES on state self-esteem); and Study 4 tested whether SMS itself impacts state self-esteem. That is, following the experimental-causal-chain approach, Study 3 established a causal link between the independent variable (SES) and the mediator (SMS), whereas Study 4 established a causal link between the mediator (SMS) and the dependent variable (state self-esteem). Spencer et al., (2005) explained that this approach provides one of the simplest and most compelling ways to establish causal mediation.

Studies 3–5 served an additional goal. Hierometer theory makes predictions that can be tested at the level of transient states as well as longstanding traits. If self-esteem operates as a hierometer that tracks status, then state self-esteem should respond to temporary fluctuations in status, with higher (vs. lower) status predicting higher (vs. lower) self-esteem, respectively. Thus, whereas Studies 1–2 examined the links between SES, SMS, and self-esteem at the level of traits, Studies 3–5 examined them at the level of states. If the patterns we hypothesized emerged for state self-esteem as well as for trait self-esteem, it would constitute further evidence for the generality of our findings.

In Study 3, we tested whether manipulating SES causally affects (a) SMS and (b)

state self-esteem. Obviously, it would have been logistically impossible, not to mention morally questionable, to manipulate participants' actual SES, for example, by raising or lowering their actual income to a significant degree. However, on the plausible assumption that any effects of SES on SMS and self-esteem are themselves largely or wholly psychologically mediated by perceptions of SES, we still had the option of manipulating those perceptions, both feasibly and ethically. Accordingly, we drew on procedures to do so previously employed and validated by Kraus et al. (2010). Furthermore, harkening back to Studies 1–2, we tested whether the effect of manipulated SES on state self-esteem is statistically mediated by SMS. Finally, note the following: Testing whether SES causally affects state self-esteem represents a more stringent refinement of H1 (i.e., that SES positively predicts self-esteem); testing whether SES causally affects SMS represents a more stringent refinement of H3 (i.e., that SES correlates positively with SMS); and testing whether SMS mediates the link between manipulated SES and state self-esteem represents a more stringent refinement of H4 (i.e., that SMS statistically mediates the link between measured SES and self-esteem).

Method

Participants

Participants were 221 adult U.S. residents (147 women, 74 men; $M_{\text{age}} = 35.92$ years, $SD_{\text{age}} = 11.70$).

Manipulation of Socioeconomic Status

Participants were randomly assigned to either a high SES ($n = 113$) or low SES ($n = 108$) condition using a manipulation adapted from Kraus et al. (2010). They were presented with an illustration of a ladder and asked to think of it “as representing where people stand in the United States.” Participants were asked to compare themselves to people at the very top [or bottom] of the ladder as follows: “Now, please compare yourself to the people at the very top [bottom] of the ladder. These are people who are the best [worst] off—those who have the most [least] money, most [least] education, and the best jobs [worst jobs or no jobs]. In particular, we’d like you to think about how you are different from these people in terms of your own income, educational history, and job status. Where would you place yourself on

this ladder relative to these people at the very top [bottom]?” Thereafter, participants imagined themselves in a getting-acquainted interaction with one of the people they had just thought about. Specifically, they thought about how the differences between them might impact what they would talk about, how the interaction would be likely to go, and what they and the other person might say to each other. Participants wrote about this for at least two minutes. Consistent with Kraus et al. (2010), the manipulation was designed to produce a contrast effect, such that participants would perceive their SES to be lower when comparing themselves to people at the top of the ladder, and would perceive their SES to be higher when comparing themselves to people at the bottom of the ladder.

Manipulation Check

Participants indicated their own standing on the 10-rung “ladder” (1 = *bottom*, 10 = *top*).

Sociometric Status

We assessed SMS with the 8-item questionnaire adapted from Study 2 (Huo et al., 2010; Mahadevan et al., 2016, 2019 a, b). We adapted all items to reflect the present moment. Responses were made on a 5-point scale (1 = *strongly disagree*, 5 = *strongly agree*). Internal consistency was high ($\alpha = .94$; $M = 2.86$, $SD = 0.86$).

State Self-Esteem

We assessed state self-esteem with three items: (a) “How do you feel about yourself now?” (1 = *very bad*, 8 = *very good*); (b) “How do you feel about yourself now?” (1 = *very negative*, 8 = *very positive*); and (c) “Right now, I have high self-esteem” (1 = *strongly disagree*, 8 = *strongly agree*; the Single-Item Self-Esteem Scale; Robins et al., 2001).⁷ These items have been used in previous research. They assess state self-esteem reliably and validly, and correlate strongly with established self-esteem measures (Mahadevan et al., 2020; Robins et al., 2001; Van der Linden & Rosenthal, 2016). Internal consistency was high ($\alpha = .96$; $M = 5.83$, $SD = 1.73$).

Results

Manipulation Check

The SES manipulation was effective, $t(219) = 2.93$, $p = .004$, $d = .396$. Consistent

with Kraus et al. (2010)'s findings, participants comparing themselves to those at the bottom of the ladder (high SES condition; $M = 5.54$, $SD = 1.63$) rated their own position on the ladder higher than participants comparing themselves to those at the top of the ladder did (low SES condition; $M = 4.92$, $SD = 1.53$).

Sociometric Status

SES significantly affected perceptions of SMS, $t(216) = 2.41$, $p = .017$, $d = .328$ (H3). Participants in the high SES condition rated their SMS higher ($M = 2.99$, $SD = 0.86$) than those in the low SES condition did ($M = 2.71$, $SD = 0.84$).

State Self-Esteem

SES also significantly affected state self-esteem, $t(219) = 2.07$, $p = .040$, $d = .279$ (H1). Participants in the high SES condition had higher state self-esteem ($M = 6.07$, $SD = 1.57$) than those in the low SES condition did ($M = 5.59$, $SD = 1.85$).

Mediation by Sociometric Status

Having confirmed the causal effects we hypothesized, we proceeded to test whether the effect of SES on state self-esteem was accounted for by SMS (i.e., if SMS statistically mediated the link between SES and state self-esteem; H4). We created a model in which we entered SES condition as the predictor, SMS as the mediator, and state self-esteem as the outcome variable. Higher SES predicted higher SMS, $B = .28$, $SE = .12$, $t(216) = 2.41$, $p = .017$. Higher SMS, in turn, predicted higher state self-esteem, $B = 1.06$, $SE = .12$, $t(215) = 9.01$, $p < .001$. Most importantly, the indirect (i.e., mediated) path was positive and significant, $B = .29$, $SE = .13$, $95\% CI = [.07, .57]$, indicating mediation by SMS. Furthermore, upon inclusion of the mediator, SMS, in the model, the direct path between SES and state self-esteem was no longer significant, $B = .17$, $SE = .20$, $t(215) = 0.84$, $p = .404$, $95\% CI = [-.23, .57]$. SMS fully mediated the effect of SES on state self-esteem (H4). Thus, the results, as in Studies 1–2, were consistent with SMS being the proximate mechanism that links SES to state self-esteem.

Discussion

In Study 3, we tested whether SES exerted a causal impact on both SMS and state self-esteem. Using an established experimental procedure (Kraus et al., 2010), we

successfully manipulated participants' perceptions of their SES by having them compare themselves to people of either high SES or low SES. Doing so led to lower and higher levels of SMS and state self-esteem, respectively. Additionally, we tested whether the causal effect of SES on state self-esteem could be explained by SMS. Consistent with SES being a source of, or input into, SMS, and affecting self-esteem indirectly through it, the effect of SES on state self-esteem was statistically mediated by SMS. The findings are in keeping with more stringent refinements of H1, H3, and H4, which feature a causal element. More generally, they support the contention that SMS is a more proximate predictor of self-esteem than SES, in that any effect of perceiving oneself to be higher in SES affects state self-esteem via perceiving one's SMS to be higher too.

Study 4

In Study 3, we manipulated SES perceptions to gauge the causal impact on SMS and state self-esteem. In Study 4, we tested second part of the causal chain—the link between SMS and state self-esteem (Spencer et al., 2005). We manipulated SMS perceptions using a procedure employed and validated by Gregg et al. (2018). Specifically, we asked participants to bring to mind an aspect of their lives in which their SMS was either high or low. We then assessed their state self-esteem. We hypothesized that higher SMS would lead to higher state self-esteem (H1). Note that testing whether SMS causally affects state self-esteem represents a more stringent refinement of part of H1 (i.e., that SMS positively predicts self-esteem).

Method

Participants

Participants were 144 adult U.S. residents (90 women, 54 men; $M_{\text{age}} = 40.18$ years, $SD_{\text{age}} = 14.20$).

Manipulation of Sociometric Status

Participants were randomly assigned to either a high SMS ($n = 69$) or low SMS ($n = 75$) condition. They were asked to think about an aspect of their lives (e.g., an event, occasion, or setting) in which they felt they were either (a) particularly respected by others, much admired by others, and considered important by others, or (b) *not* particularly respected by others, *not* much admired by others, and *not* considered important by others. Participants then

listed three keywords related to this aspect of their lives. Thereafter, they wrote about this aspect of their lives in more detail for at least two minutes.

Manipulation Check

We used five of the eight items of the SMS questionnaire measure (Studies 2–3) to assess the effectiveness of the manipulation. We took out the three items that directly referred to feeling respected, admired, and important, and presented them separately at the end of the study. We did so in order to reduce the possibility of participants being influenced by demand characteristics to report that the manipulation had worked. Participants indicated their level of agreement on the remaining five SMS items (1 = *strongly disagree*, 5 = *strongly agree*).

Internal consistency was high ($\alpha = .89$; $M = 3.37$, $SD = .85$).⁸

State Self-Esteem

We assessed state self-esteem with the same three items used in Study 3. Internal consistency was high ($\alpha = .97$; $M = 5.92$, $SD = 1.83$).

Results

Sociometric Status Manipulation Check

The SMS manipulation was effective, $t(142) = 7.02$, $p < .001$, $d = 1.180$. Consistent with Gregg et al.'s (2018) findings, participants in the high SMS condition ($M = 3.82$, $SD = 0.66$) rated their SMS higher than those in the low SMS condition did ($M = 2.96$, $SD = 0.80$).

State Self-Esteem

SMS significantly affected state self-esteem, $t(142) = 3.70$, $p < .001$, $d = .622$. As hypothesized, participants in the high SMS condition had higher state self-esteem ($M = 6.48$, $SD = 1.57$) than those in the low SMS condition did ($M = 5.40$, $SD = 1.91$).

Discussion

Study 4 examined the causal impact of SMS on state self-esteem. Participants' perceptions of their SMS were experimentally manipulated by having them bring to mind ways in which they were respected and admired by others, or not respected and admired by others (Gregg et al., 2018). As hypothesized, SMS exerted a causal effect on state self-esteem, with higher SMS promoting higher state self-esteem. The findings are in keeping with a more stringent refinements of H1, featuring a causal element. That is, they support the contention

that, not only is SMS a more potent predictor of self-esteem than SES, it also influences it directly.

Study 5

The findings from the previous four studies furnished support for our contention that SMS is a more potent and proximal source of self-esteem than SES. In particular, SMS covaried with self-esteem more strongly than SES did. SMS, moreover, mediated the effect of SES on self-esteem, and did so more than vice versa. These findings emerged consistently: both in Studies 1 and 2, which examined these links at the level of traits in cross-sectional designs; and in Studies 3 and 4, which examined these links at the level of states in experimental designs. Specifically, by means of an experimental-causal-chain design (Spencer et al., 2005), Studies 3 and 4 together established that SES and SMS both exerted a causal effect on state self-esteem, and that SMS causally mediated the effect of SES on state self-esteem. Study 3 first showed that the independent variable (SES) causally affected the mediator (SMS). Study 4 then showed that the mediator (SMS) causally affected the dependent variable (state self-esteem). Spencer et al. (2005) state that this particular design “can often provide the most compelling case for a theoretical account of a psychological process” such that “[i]f the process can be both easily measured and manipulated [it] is usually the optimal strategy (p. 850).”

Nonetheless, alternative experimental designs to test for mediation exist. In Study 5 we adopted one. It has been alternatively classed as a moderation-of-process design (Spencer et al., 2005, p. 847) or a manipulation-of-mediator design (Pirlott & MacKinnon, 2016, p. 30). Its rationale is as follows. Suppose one posits that an independent variable, X, causally affects a dependent variable Y, via some causal mediator, M. When M is left free to vary, statistical mediation will be observed. That is, the observed covariation between X and Y will be partly or wholly a function of joint covariation with M, such that an indirect path between X and Y via M will emerge, above and beyond any direct path between X and Y. Yet, although the presence of causal mediation would normally result in the observation of statistical mediation, the mere observation of statistical mediation need not guarantee the presence of causal mediation. The reason is that some other variable might serve as the real

causal mediator(s), while covarying with X and Y like M does. One way to move beyond such ambiguities, however, is to directly manipulate the putative causal mediator. The key point is this: if M is no longer free to vary, but is instead experimentally fixed or constrained, then X will no longer be capable of, or will be less capable of, causally affecting Y via M. Furthermore—and crucially—if X causally affects Y via M, then X and Y would show a reduction in their covariation.

Consider the following simple illustration. Suppose that rainy days make people feel sadder because such days are darker. If so, then observed illumination (M), when left free to vary, should statistically mediate the link between observed precipitation (X) and observed sadness (Y). But now further suppose a researcher were to experimentally fix levels of illumination (M) under controlled conditions. He or she could do this by making illumination (a) high in one condition, say by exposing participants to bright indoor light, or (b) low in another condition, say by having participants wear shaded spectacles. In either case, the statistical mediation would disappear, because illumination (M) no longer covaries with precipitation (X). Furthermore, if illumination (M) did causally mediate the link between (X) precipitation and (Y) sadness, then, in the experimental conditions, precipitation (X) would covary less strongly, or not at all, with sadness (Y). In practice, of course, the manipulation of levels of illumination (M) would be imperfect, given occasional defective apparatus or participant non-compliance. Nonetheless, to the extent that levels of illumination (M) were still constrained, the covariation between (X) precipitation and (Y) sadness should still be undermined.

Accordingly, we implemented in Study 5 a manipulation-of-mediator design, which examined the impact of directly manipulating SMS on the observed links between measures of SES and state self-esteem. We introduced three conditions: one in which we only measured and did not manipulate SMS; another, in which we induced high SMS; and yet another, in which we induced low SMS. We also counterbalanced the order in which participants completed the SES measure and the SMS manipulation/measure. Finally, participants completed the dependent measure of state self-esteem. Contingent on the manipulation being effective, we expected to find, in the control condition where SMS was

measured, but not manipulated, that SES would covary with state self-esteem, and that measured SMS would statistically mediate this link (as in Studies 1 and 2). In contrast, we expected to find, in the two experimental conditions—in which SMS was manipulated to be either high or low—that the link between SES and state self-esteem, and the mediation of that link by measured SMS, would dwindle or disappear, relative to the control condition. Taken together, Study 5 had the following advantages: it (a) examined both SES and SMS in the same experimental study; (b) controlled for order by counterbalancing the order of presentation of the SES and SMS variables, and (c) both measured and manipulated the mediator, SMS, enabling a test of causal mediation.

Method

Participants and Design

Participants were 531 adult U.S. residents (239 women, 290 men, 2 other; $M_{\text{age}} = 37.26$ years, $SD_{\text{age}} = 11.26$). They were randomly assigned to the condition of a 3 (SMS: not manipulated, high, low) \times 2 (order: SES-SMS, SMS-SES) between-subjects design.

Measures

We assessed SES as we had in Study 3 (Adler et al., 2000; Kraus et al., 2010). Participants indicated their self-rated SES relative to others—in terms of education, occupation, and income—on a single-item 10-point “ladder” scale ($M = 5.54$, $SD = 2.08$). We assessed SMS as we had in Studies 2–3 (Huo et al., 2000; Mahadevan et al., 2016, 2019a, b). Participants completed the 8-item questionnaire pertaining to how respected and admired they currently felt by others on a 5-point scale ($\alpha = .93$; $M = 3.58$, $SD = .86$). Note that the order in which participants completed the SES and SMS measures was counterbalanced. We assessed state self-esteem as we had in Studies 3 and 4 (Mahadevan et al., 2020; Robins et al., 2001; Van der Linden & Rosenthal, 2016). Participants completed the three items assessing how they currently felt about themselves on an 8-point scale ($\alpha = .95$; $M = 6.04$, $SD = 1.78$).

Manipulation of Sociometric Status

Participants were randomly assigned to one of three SMS conditions: a *control* condition in which SMS was not manipulated but merely measured; an experimental condition in which SMS was manipulated to be high before measuring it; and an

experimental condition in which SMS was manipulated to be low before measuring it. To achieve this manipulation, we adopted the same procedure as we had in Study 4. In particular, we instructed participants to identify three keywords, and then spend two minutes describing either some aspect of their lives where others either respected and admired them (with a view to inducing high SMS) or some aspect of their lives where others did not respect and admire them (with a view to inducing low SMS). The manipulation always preceded both the measurement of SMS and the measurement of state self-esteem.

Results

Sociometric Status Manipulation Checks

The logic of the manipulation-of-mediator design requires that the mediator be effectively manipulated, so that it is capable of perturbing any causal link that might exist between the independent variable and dependent variable. An effective manipulation would exhibit two diagnostic signs. First, the high and low SMS conditions should elicit higher and lower average levels of SMS respectively, relative to one another, and to the control condition. That is, the manipulation would have a detectable directional impact on average SMS scores. Second, the high and low SMS conditions should both elicit less variance in SMS than in the control condition. That is, the manipulation should have a detectable dispersion-restrictive impact on SMS scores.

To assess the impact of the manipulation, we entered measured SMS as the dependent variable into a 3 (SMS: not manipulated, high, low) \times 2 (order: SES-SMS, SMS-SES) between-subjects ANOVA. Levene's test indicated significant differences across conditions, $F(5, 525) = 4.96, p < .001$. Accordingly, we estimated main and interaction effects with White-corrected covariance matrices (White, 1980). No effect of order emerged, $F(1, 525) = 0.01, p = .970$, nor was the interaction with it significant, $F(2, 525) = 0.54, p = .586$. Importantly, as expected, an overall main effect of manipulated SMS emerged, $F(2, 525) = 37.47, p < .001$. Additionally, follow-up contrast analyses, using appropriately adjusted t -tests, indicated that, as in Study 4, participants reported higher measured SMS, $t(239.03) = 8.72, p < .001$, in the high SMS condition ($M = 3.93, SD = 0.68$) than in the low SMS condition ($M = 3.09, SD = 0.93$). Furthermore, the presence of a measurement-only control

condition permitted the relative impact of each condition to be separately assessed. Compared to participants in the control condition ($M = 3.61$, $SD = 0.79$), those in the high SMS condition reported higher measured SMS, $t(381.68) = 4.27$, $p < .001$, and those in the low SMS condition reported lower measured SMS, $t(246.65) = 5.42$, $p < .001$. To assess the dispersion-restrictive impact of the manipulation, we conducted pairwise F -tests comparing variance in SMS across conditions. (The fact that the omnibus Levene's test above was significant already indicated that the three conditions differed overall.) As expected, the variance in the high SMS condition was smaller than in the control condition, $F(1, 394) = 4.49$, $p = .035$, indicating that scores had been dispersion-restricted. However, contrary to expectation, the variance in the low SMS condition was larger than in the control condition, $F(1, 364) = 6.22$, $p = .013$. The variance in the low SMS condition was also larger than in the high SMS condition, $F(1, 298) = 18.30$, $p < .001$.

Thus, the manipulation was partly successful: It effectively raised average levels of measured SMS in the high SMS condition, and reduced it in the low SMS condition, relative to the control condition. However, the dispersion restriction that we anticipated only emerged in the high SMS condition. This means that only in the high SMS condition were SMS scores liable to have been appropriately constrained in a manner sufficient to perturb the influence that SES might otherwise have on SMS, in turn potentially disrupting the mediation.

Sociometric Status Impact on State Self-Esteem

Next, we examined the impact of the SMS manipulation on state self-esteem. We entered measured state self-esteem as the dependent variable into a 3 (SMS: not manipulated, high, low) \times 2 (order: SES-SMS, SMS-SES) factorial ANOVA. Levene's test again attained significance, $F(5, 524) = 5.35$, $p < .001$. We therefore estimated main and interaction effects with White-corrected covariance matrices (White, 1980). No effect of order emerged, $F(1, 524) = 0.36$, $p = .551$, nor was the interaction with it significant, $F(2, 524) = 1.40$, $p = .248$. Importantly, as expected, an overall main effect of manipulated SMS emerged, $F(2, 524) = 13.61$, $p < .001$. Moreover, follow-up contrast analyses, using appropriately adjusted t -tests, indicated that, as in Study 4, participants reported higher state esteem, $t(230.14) = 5.23$, $p < .001$, in the high SMS condition ($M = 6.46$, $SD = 1.42$) than in the low SMS condition ($M =$

5.37, $SD = 2.06$).

Again, the presence of a measurement-only control condition permitted the relative impact of each condition to be separately assessed. Compared to participants in the control condition ($M = 6.13$, $SD = 1.73$), those in the high SMS condition reported significantly higher state self-esteem, $t(385.33) = 2.06$, $p = .040$, and those in the low SMS condition reported significantly lower self-esteem, $t(243.92) = -3.63$, $p < .001$. These results indicate that the manipulation of SMS affected state self-esteem as expected: relative to control, high SMS raised it and low SMS reduced it. These results thus replicate Study 4.

Test of Causal Mediation

Did the link between the independent variable (SES) and the dependent variable (state self-esteem), considered in its own right, depend on the manipulation of the mediator (SMS)? Again, if SMS mediates the link between SES and state self-esteem, then the manipulation of SMS should undermine this link, at least in the high SMS condition where the average level of SMS was raised and its dispersion was effectively restricted (as opposed to the low SMS condition where the average level of SMS was reduced, but its dispersion not restricted). A way to test for this outcome is to test whether the experimental condition affected the magnitude of the link between SES and state self-esteem.

Accordingly, using Hayes' (2013) Process Model 3, we regressed state self-esteem on SES and on manipulated SMS, as well as on the order in which they were administered, and on all arising two-way and three-way interactions. We specified both order and manipulated SMS as categorical variables, with the reference condition being the control condition in which SMS was measured but not manipulated. We estimated effects using White-corrected covariance matrix (White, 1980) in light of prior results. As order neither interacted significantly with the other variables, all $ps \geq .307$, nor produced a main effect, $B = -0.01$, $SE = 0.10$, $t(518) = 0.09$, $p = .929$, 95% $CI = [-0.21, 0.20]$, we re-ran this analysis excluding order (Hayes, 2013, Model 1). As expected, a significant SES \times SMS interaction emerged, $F(2, 524) = 4.99$, $p = .007$. Overall, this interaction indicates that the link between SES and state self-esteem differed across the three conditions.

Specifically, in the control condition, the expected positive link emerged between

SES and state self-esteem, $B = 0.40$, $SE = 0.05$, $t(524) = 7.60$, $p < .001$, 95% $CI = [0.30, 0.50]$. In the high SMS condition, a positive link also emerged between SES and state self-esteem, $B = 0.20$, $SE = 0.05$, $t(524) = 3.84$, $p < .001$, 95% $CI = [0.10, 0.30]$. As predicted, it was significantly attenuated relative to the control condition, $B_{\text{Difference}} = -0.20$, $SE = 0.07$, $t(524) = 2.69$, $p = .008$, 95% $CI = [-0.34, -0.05]$. If SMS causally mediated that link, then—SMS being perturbed by the manipulation—precisely such an attenuation should have been expected. In the low SMS condition, a positive link also emerged between SES and state self-esteem, $B = 0.44$, $SE = 0.07$, $t(524) = 5.93$, $p < .001$, 95% $CI = [0.29, 0.58]$, but did not differ in magnitude from the control condition, $B_{\text{Difference}} = 0.04$, $SE = 0.09$, $t(524) = 0.41$, $p = .68$, 95% $CI = [-0.14, 0.21]$.

Therefore, increasing and restricting SMS (vs. not doing so) attenuated the association between SES and state self-esteem, suggesting that SMS mediates the link between SES and state self-esteem. Although the same pattern of attenuation was not observed in the low SMS condition, this result is less surprising in the light of previous indications that SMS scores were not appropriated restricted in the low SMS condition. Overall, the results indicate that link between SES and state self-esteem varied by experimental condition, attesting to causal mediation. Accordingly, Study 5 provides further evidence, via a manipulation-of-mediator design, that SMS causally mediates the link between SES and state self-esteem.

Test of Indirect Effects

A further test for the role of SMS as mediator is to examine directly whether the magnitude of the statistical mediation between SES and state self-esteem differed across SMS conditions. Accordingly, we ran the relevant analysis (Hayes, 2013, Model 7, with White-corrected covariance matrix; White, 1980). In particular, we entered SES (the independent variable), manipulated SMS, and the $SES \times SMS$ interaction as predictors of measured SMS (the mediating variable). In turn, we entered SES and measured SMS as predictors of state self-esteem (the dependent variable). The same analysis with order as additional moderator (Hayes, 2013, Model 11) revealed no significant three-way interactions, two-way interactions, or main effects for order (all $ps \geq .089$). Overall, the results indicated that, as predicted, experimental condition altered the magnitude of the indirect path linking SES to state self-

esteem via measured SMS, $F(2, 524) = 10.50, p < .001$. In the control condition, an indirect effect emerged of SES on state self-esteem via measured SMS, $B = 0.30, SE = 0.04, 95\% CI = [0.23, 0.38; 5,000 \text{ bias-corrected and accelerated bootstraps}]$. In the high SMS condition, this indirect effect also emerged, $B = 0.11, SE = 0.04, 95\% CI = [0.03, 0.19]$, but was significantly smaller in magnitude than in the control condition, $B_{\text{Difference}} = -0.19, SE = 0.05, 95\% CI = [-0.30, -0.09]$. In the low SMS condition, the indirect effect also emerged, $B = 0.36, SE = 0.05, 95\% CI = [0.27, 0.46]$, but did not differ in magnitude from the control condition, $B_{\text{Difference}} = 0.06, SE = 0.05, 95\% CI = [-0.05, 0.17]$. Accordingly, the pattern of results dovetailed with those obtained for the link between SES and state self-esteem. Overall, the results show that the indirect effect of SMS varied by experimental condition, indicating causal mediation. Accordingly, Study 5 provides further evidence, via a manipulation-of-mediator design, that SMS causally mediates the link between SES and state self-esteem.

Discussion

Complementing Studies 3 and 4, which had adopted an experimental-causal-chain design, Study 5 provided a further experimental test of the mediating role of SMS using a manipulation-of-mediator design (Pirlott & MacKinnon, 2016; Spencer et al., 2005). It tested whether SMS causally mediated the link between SES and state self-esteem. The idea is this: if SMS mediates the link between SES and state self-esteem not only statistically, but also causally, then constraining SMS scores by manipulating them to be higher or lower (and affecting state self-esteem as a result) should undermine the link between SES scores and state self-esteem scores.

We first checked whether our attempted experimental manipulation of SMS adequately perturbed SMS scores (i.e., constrained them sufficiently). The manipulation was fully successful in impacting the scores directionally: Relative to the control condition, average levels of SMS were higher in the high SMS condition and lower in the low SMS condition. However, it was only partly successful in restricting the dispersion of SMS scores: relative to the control condition, the variance was lower in the high SMS, but not in the low SMS condition. Accordingly, we regarded comparisons between the high SMS condition and the control condition as more telling than comparisons between the low SMS condition and

the control condition.

As to why our manipulation restricted dispersion in the high SMS condition, but extended dispersion in the low SMS, we offer the following post-hoc speculation. Participants in the high SMS condition, when prompted to consider ways in which others respected and admired them, may have been relatively consistent in welcoming such congenial reflections—especially those with initially lower SMS who had more “room” to move upwards. Consequently, participants in this condition may have collectively come to be more similar in their SMS, as intended. In contrast, participants in the low SMS condition, when prompted to consider ways in which others did *not* respect and admire them, may have been less consistent in their reactions to such uncongenial reflections. Whereas some may have been swayed by them, others may have resisted them (vanDellen et al., 2011). Hence, even if the manipulation worked in a directional sense—perhaps because negative reflections were more potent overall (Baumeister et al., 2001)—reactions may have been more inconsistent. If so, then participants in this condition may have collectively come to be less similar in their SMS, contrary to what was intended.

Overall, results supported our predictions. Manipulating SMS did indeed alter the impact of SES on state self-esteem. The positive association between SES and state self-esteem was significantly attenuated when SMS was experimentally manipulated to be high (i.e., its relationship with SES was disrupted), though not when it was experimentally manipulated to be low, compared to when SMS was not experimentally manipulated (i.e. its relationship with SES remained untouched). Overall, across conditions, there was a significant effect of the experimental manipulation of SMS. Likewise, the indirect effect of SMS on state self-esteem was significantly attenuated when SMS was experimentally manipulated to be high, though not when it was experimentally manipulated to be low, compared to when SMS was not experimentally altered. Again, overall, across conditions, there was a significant effect of the experimental manipulation of SMS. Hence, the results of Study 5 adopting a manipulation-of-mediator design were consistent with the results of Studies 3 and 4, which had adopted an experimental-causal-chain design. The link between SES and state self-esteem is mediated by SMS.

General Discussion

We put forward a novel and integrative account of the link between status and self-esteem. First, consistent with previous theorizing, we distinguished between two types of social standing—SES and SMS (Anderson et al., 2012, 2015; Weber, 1944). We then investigated, for the first time, how they related to one another and to self-esteem. Drawing upon functional models of self-esteem (i.e., hierometer theory; Mahadevan et al., 2016, 2019a, b), and upon past research into social hierarchies and health outcomes (Adler et al., 2000; Anderson et al., 2012, 2015; Boyce et al., 2010), we proposed that self-esteem primarily tracks SMS—the degree to which one is respected and admired by others. That is, we proposed that SMS is a more powerful and more proximate predictor of self-esteem than SES—an index of one’s education, income, and occupational prestige. Alongside this, we theorized that SES serves as a source of, or input into, SMS. It also affects self-esteem, but only weakly and indirectly, and via SMS.

We generated and tested five hypotheses derived from this account: Both SES and SMS predict self-esteem positively (H1); SMS predicts self-esteem more strongly than SES (H2); SES correlates positively with SMS (H3); SMS mediates the link between SES and self-esteem (H4); and SMS mediates the link between SES and self-esteem more strongly than SES mediates the link between SMS and self-esteem (H5).

The results of five studies supported all five hypotheses. Moreover, the support was robust. The results held across multiple measures of SES, SMS, and self-esteem. They held when SES and SMS were measured in identical formats and in different ones, when measured objectively and in absolute terms, as well as when measured subjectively and in relative terms. They also held after controlling for the Big Five personality traits.⁹ Most importantly, these links were also causal. Higher SES led to higher SMS, which in turn led to higher state self-esteem, and SMS accounted for the link between SES and state self-esteem.¹⁰

SMS as a Potent and Proximate Predictor of Self-Esteem

The relative potency and proximity of SMS as an antecedent of self-esteem might initially appear surprising. SMS is, after all, less tangible than SES. However, we outlined

several explanations for why this might be the case. To reiterate: First, sociometric hierarchies are likely to be evolutionarily older than socioeconomic hierarchies, such that human psychology is primarily attuned to the former (Barkow, 1975, 1980; Chance, 1967; Chance & Jolly, 1970; Hallowell, 1960; Sedikides & Skowronski, 1997). Second, informal hierarchies implicating SMS characterize more social contexts than formal hierarchies implicating SES, and so might therefore exert a greater psychological impact due to their greater prevalence (Bales et al., 1951; Fiske, 2010). Third, people typically interact with others of similar SES (McPherson et al., 2001; Verbrugge, 1977), so that dissimilarities in SMS at shared levels of SES might be what they primarily notice, leading the latter to carry greater psychological weight. Thus, despite SMS being less tangible than SES, there are several good reasons why SMS nonetheless predicts self-esteem more strongly than SES does. Indeed, it might be the very intangibility of SMS that leads to its psychological power being underestimated (Ridgeway, 2014). That is, because SES hierarchies are institutionalized and declared (Searle, 2010), their impact can be readily recognized and acknowledged, whereas, because SMS hierarchies are implicit and unspoken (Jost et al., 2004), their impact may be inadvertently overlooked or played down.

However, SES and SMS are related. As the saying goes, “respect has to be earned.” SMS judgments are not made in a vacuum: All else equal, wealthy and educated professionals are more likely to be respected and admired than those who lack these attributes (Berger et al., 1972; Christopher & Schlenker, 2000; Cuddy et al., 2008). That is, SES is often an important source of, or input into, SMS, and is likely to influence self-esteem through it.

Taken together, we expected higher SES to predict higher SMS, and higher SMS in turn to predict higher self-esteem, with SMS mediating the link between SES and self-esteem. This was consistently the case. SES and SMS were positively correlated, and higher manipulated SES led to higher SMS. Higher SMS, in turn, led to higher state self-esteem. SMS also mediated the effect of SES on state self-esteem, whether SES was measured or manipulated.

Diverse Assessments of SES, SMS, and Self-Esteem

We assessed SES, SMS, and self-esteem in several ways across studies. Study 1 assessed SES and SMS subjectively, and in relative terms, using identical “ladder” measures. Study 2 assessed SES both subjectively and objectively, assessed SMS subjectively, and further controlled for the Big Five personality traits. Study 3 experimentally manipulated SES perceptions. Study 4 experimentally manipulated SMS perceptions. Study 5 measured SES perceptions, and both measured and experimentally manipulated SMS perceptions.

One limitation, however, was that we did not assess SMS objectively via other-reports in Studies 1–2. In past research, SMS has been assessed via both self-reports (Huo et al., 2010) and other-reports (Anderson et al., 2006). We did not use the latter for two reasons. First, measuring SMS via other-reports involves limiting its assessment to specific face-to-face groups (Anderson et al., 2001, 2012). However, as discussed, face-to-face groups typically consist of individuals of similar SES. The objective of our research was to test predictions derived from hierometer theory that SMS is a more powerful and more proximate predictor of self-esteem than SES. Thus, restricting our investigation to face-to-face groups would likely have limited differences in participants’ SES, thereby giving SMS an unfair advantage. Accordingly, assessing SES and SMS in large diverse samples with a range of SES differences constituted a stronger test of our hypotheses. Second, prior research has demonstrated that self-reports of one’s SMS tend to be accurate: they closely match peer evaluations (Anderson et al., 2001, 2008; Faunce, 1984; Fournier, 2009).

Across studies, SMS predicted self-esteem more strongly than SES, and more strongly mediated its effects. Importantly, this was true even in Study 1 where SES and SMS were measured identically: Both were assessed subjectively, and in relative terms, using identical “ladder” measures. We obtained the same results pattern even after controlling for type of measurement (objective vs. subjective, relative vs. absolute) by holding it constant.

Theoretical and Practical Implications

These findings offer both good and bad news for low SES individuals. On the positive side, they indicate that SES matters less to self-esteem than SMS does. Thus, low SES individuals can maintain high self-esteem as long as they receive social respect and admiration (i.e., have high SMS; Crocker & Major, 1989; Gray-Little & Hafdahl, 2000). On

the negative side, however, SES and SMS are positively correlated, and SMS mediates the link between SES and self-esteem. Thus, low SES individuals are less likely to receive this social respect and admiration. They may therefore find it more of a challenge to maintain high self-esteem.

On a practical note, the fact that we succeeded in moving around participants' construals of their SES and SMS, with their attendant effects on self-esteem, using relatively brief experimental manipulations, suggests that there may be scope, especially with more sustained interventions (cf. Bailey et al., 2020), for bolstering people's self-esteem by modifying how they construe their standing in society. In particular, encouraging people to make downward comparisons when it comes to their socioeconomic standing (Aspinwall & Taylor, 1993), and to focus on cases where they are respected and admired rather than the opposite (Weber & Hagemayer, 2018), may help them to sustain a positive view of self. It also raises a further issue of the psychological mechanism that might underlie such shifts in self-construal. Relevant work on biased scanning, which investigates how people can activate subsets of their self-concept, in either private or public settings, to achieve identity change (Fazio et al., 1982; Schlenker et al., 1994; Tice, 1992). Here, the idea would be to induce biased scanning of the social hierarchy rather than the self-concept in order to alter construals of one's status first and construals of one's self second. Acting indirectly on known antecedents of self-esteem, rather than directly on self-esteem itself, offers an alternative approach for interventions designed to raise the latter. Finally, if, as our findings suggest, SMS is a more potent and proximal source of self-esteem than SES, then there would be grounds for focusing on manipulating construals of SMS as opposed to SES.

Our findings also help to explain prior results concerning the link between SES and self-esteem. For example, the link is weak among children, but moderate among adults (Twenge & Campbell, 2002). In the case of children, SES may be generally understood to reflect parental rather than personal achievements. As such, it might not translate readily into respect or admiration among one's peers that could then raise self-esteem. However, in the case of adults, when SES can be more credibly presumed to reflect personal achievements (Gebauer et al., 2013; Zeigler-Hill, 2010), SES will be more likely to elicit respect and

admiration among one's peers, and thereby raise self-esteem.

It is also instructive to situate our current research vis-à-vis past research designed to explore the enduring effects, not of status, but of self-esteem. In particular, several longitudinal studies have found that self-esteem—notwithstanding prior skepticism about its predictive utility and causal impact (Baumeister et al., 2003; but see Sedikides & Skowronski, 2020)—successfully predicts a range of adaptive social outcomes across a span of many years (Trzesniewski et al., 2006). Moreover, many of these outcomes either affect or track higher levels of SES and SMS (Huysse-Gaytandjieva et al., 2015; Kammeyer-Mueller et al., 2008; Wang et al., 1999). So, whereas we hypothesized and found that SES and SMS can predict or shape self-esteem, the researchers above hypothesized and found that self-esteem can predict or shape SES or SMS. Are these two sets of findings at odds? We would argue not, for two reasons. First, if one admits the possibility of bidirectional causation operating across time, which is standard in social science, then both effects can peacefully coexist rather than mutually exclude one another. Second, hierometer theory, in its complete form, ultimately does predict that self-esteem affects SMS via an adaptive feedback loop whereby SMS affects self-esteem, self-esteem in turn affects assertiveness, and assertiveness finally affects SMS again. Such a possibility would be eminently testable in a longitudinal paradigm. Accordingly, our approach, and the approach adopted in the longitudinal studies cited, are complementary rather than competitive. Indeed, the former builds on the latter.

Another relevant question here concerns the role and nature of the feedback loop specified by hierometer theory—in particular, whether it operates homeostatically or not. An important distinction can be made between homeostatic drives, which are often physiological and permit satiation, and non-homeostatic drives, which are often non-physiological, and can be desired indefinitely. For example, the drive for subjective well-being appears to be non-homeostatic, in that no one can ever have enough. Moreover, inputs into subjective well-being, such as those involved in SES (e.g., income), tend to be readily adapted to, so that one's desire for more of those inputs remains eternally keen, resulting in the so-called “hedonic treadmill” (Fujita & Diener, 2005). The matter gets subtler when it comes to the question of whether SMS and self-esteem are targets of homeostatic desire or not. Some

research maintains that self-esteem can be construed as striven for in its own right (Crocker & Park, 2004), and so potentially without limit (Sedikides & Gregg, 2001). However, both hierometer theory and sociometer theory maintain that self-esteem is not striven for in itself, but is instead a tracker of social positions that people strive for: SMS and inclusion, respectively. In both cases, the motivation to achieve them may still be classed as homeostatic, because striving ceases once the relevant conditions are met in one's social world. Where status-seeking is concerned, this involves occupying the desired vertical position in the social hierarchy; where inclusion-seeking is concerned, this involves occupying the desired horizontal position in the social community. The contention, in both cases, is that self-esteem serves as the intrapsychic indicator of whether and to what extent those coveted social positions have been met. Self-esteem then operates imperatively to regulate interpersonal behavior in the appropriate matter (i.e., regulating assertiveness in the case of status-seeking, or regulating affiliativeness in the case of inclusion-seeking). Nonetheless, hierometer theory and sociometer theory still differ in their predictions. According to sociometer theory, striving is a function of scarcity: if one lacks sufficient inclusion, then one redoubles one's efforts to achieve inclusion (i.e., by behaving affiliatively) until sufficient inclusion is reached. The postulated dynamic is thus compensatory: less inclusion, more affiliation. In contrast, according to hierometer theory, striving is a function of abundance: if one possesses sufficient SMS, then one strives for further SMS (i.e., by behaving assertively), whereas if one possesses insufficient SMS, then one stops striving (i.e., by behaving submissively). The postulated dynamic is thus consolidatory: more SMS, more assertion. Thus, the theories make directionally different predictions in respect of the regulatory behavior that they specify. Ultimately, moreover, SMS and inclusion may operate as higher-order inputs into self-esteem, affecting it directly, whereas other factors (e.g., SES) may operate as lower-order inputs into self-esteem, affecting it indirectly.

Overall, status and self-esteem are phenomena that matter very generally, both because they are cross-cultural human universals, and because they each carry important consequences (Diener, 2009; Sidanius & Pratto, 1999). Therefore, it is important to consider the role of status broadly. For example, SMS might not only mediate the effect of SES on

self-esteem, it might also account for the effect of other person-based factors on self-esteem—such as competence, skill, and performance in various domains. That is, the link between competence and self-esteem might also be mediated by SMS, with more competent individuals garnering greater respect and admiration from others, which in turn leads to their experiencing higher self-esteem. Likewise, SMS might play an important role in determining aspects of psychological functioning beyond self-esteem. These include clinically significant emotions, such as anxiety (Bateson et al., 2011), depression (Price et al., 1994), and shame (Gilbert, 2003). In that sense, our empirical efforts can be understood as part of a wider research program that has theorized and tested the adaptiveness of specific psychological characteristics. In each of these cases, the psychological characteristic in question is hypothesized to reflect some key feature of the social environment, and, in principle, operates in a functional way, but with the caveat that the system of which it forms a part may sometimes be miscalibrated in practice, resulting in maladaptation or psychopathology (Bergstrom & Meacham, 2016).

Finally, by systematically testing the basic causal links among SES, SMS, and self-esteem, we set the stage for future work to address profitably how these links are moderated by various situational and dispositional variables. One relevant moderator, for example, is liable to be whether the general social environment is more rooted in prestige or dominance (De Waal-Andrews et al., 2015; Henrich & Gil-White, 2001). In small academic task groups, members who are recognized by others for their talents and abilities may duly rise in rank over those who enjoy controlling other members (Redhead et al., 2019). Accordingly, hierometer theory would predict that such admired high-ranking members would enjoy higher self-esteem. However, in the less genteel environment of a male prison, where hierarchies are defined by physical force and gang membership (Wood, 2014), being feared rather than admired might be stronger predictor of inmate self-esteem.

Limitations and Future Directions

Some caution is warranted regarding the generalizability of findings. First, our studies involved large, diverse samples collected in the United States. Consequently, we did not address the potential role of cultural differences (Markus & Kitayama, 1991; Sedikides et al.,

2015). Second, we recruited participants via the online platforms *Amazon Mechanical Turk*TM and *CrowdFlower*TM. Among other things, high income individuals tend to be underrepresented in such platforms (Ipeirotis, 2010). Income predicts subjective well-being and self-esteem more strongly in less wealthy societies (Diener & Diener, 2009), and so the associations between SES and self-esteem may be comparatively larger in our studies. Third, it is difficult to rule out the possibility that demand characteristics may have played some role in generating the experimental effects we observed (Orne, 1962). However, it should not be assumed that manipulations where self-reports serve as dependent measures must necessarily be compromised by demand characteristics (Berkowitz & Troccoli, 1986). It bears noting that, online, there is no physically present experimenter to please. Moreover, a recent series of experiments found that, even when participants were informed of the experimenter's hypothesis in online crowdsourced research, it did not make them more likely to confirm the hypothesis (Mummolo & Peterson, 2019). In addition, we took care in Study 4 to lower the likelihood of demand characteristics by deliberately mismatching the lexical elements of our SMS manipulation and our SMS measure, thereby ensuring that synonymy did not serve as confirmatory cue. Finally, our correlational studies, which cannot by definition exhibit experimental demand characteristics, yielded patterns of findings that complemented and reinforced those of our experimental studies, indicating that experimental demand characteristics are not the sole and necessary source of those patterns.

Conclusion

Informed by hierometer theory, we addressed the divergent findings of past research, and developed a novel and integrated account of status and self-esteem. Our research highlights the multi-dimensional nature of status and points to the importance of delving deeply into its theoretical and methodological underpinnings. It adds to a growing literature on the psychology of status, by clarifying its links to a key aspect of psychological functioning. Specifically, our research affords a more refined and accurate understanding of the relations among SES, SMS, and self-esteem. It indicates that all status is not created equal: Although both SES and SMS matter to self-esteem, it is SMS that takes the more potent and proximal position in this relation.

References

- Abele, A. E., & Wojciszke, B. (2014). Communal and agentic content. A dual perspective model. *Advances in Experimental Social Psychology* 50, 195-255.
<https://doi.org/10.1016/B978-0-12-800284-1.00004-7>
- Adler, N., Epel, E. S., Castellazzo, G., & Ickovics, J. R. (2000). Relationship of subjective and objective social status with psychological and physiological functioning: Preliminary data in healthy white women. *Health Psychology*, 19(6), 586-592.
<https://doi.org/10.1037//0278-6133.19.6.586>
- Akaike, H. (1974). A new look at the statistical model identification. *IEEE Transactions on Automatic Control*, 19(6), 716-723. <https://doi.org/10.1109/TAC.1974.1100705>
- Allison, P. D. (2003). Missing data techniques for structural equation modeling. *Journal of Abnormal Psychology*, 112(4), 545-557. <https://doi.org/10.1037/0021-843X.112.4.545>
- Anderson, C., Ames, D. R., & Gosling, S. D. (2008). Punishing hubris: The perils of overestimating one's status in a group. *Personality and Social Psychology Bulletin*, 34(1), 90-101. <https://doi.org/10.1177/0146167207307489>
- Anderson, C., Hildreth, J. A. D., & Howland, L. (2015). Is the desire for status a fundamental human motive? A review of the empirical literature. *Psychological Bulletin*, 141(3), 574-601. <https://doi.org/10.1037/a0038781>
- Anderson, C., John, O. P., Keltner, D., & Kring, A. L. (2001). Who attains social status? Effects of personality traits and physical attractiveness in social groups. *Journal of Personality and Social Psychology*, 81(1), 116-132. <https://doi.org/10.1037//0022-3514.81.1.116>
- Anderson, C., Kraus, M. W., Galinsky, A. D., & Keltner, D. (2012). The local-ladder effect: social status and subjective well-being. *Psychological Science*, 23(2), 764-771.
<https://doi.org/10.1177/0956797611434537>
- Anderson, C., Srivastava, S., Beer, J. S., Spataro, S. E., & Chatman, J. A. (2006). Knowing your place: Self-perceptions of status in face-to-face groups. *Journal of Personality and Social Psychology*, 91(6), 1094-1110. <https://doi.org/10.1037/0022->

3514.91.6.1094

- Aspinwall, L. G., & Taylor, S. E. (1993). Effects of social comparison direction, threat, and self-esteem on affect, self-evaluation, and expected success. *Journal of Personality and Social Psychology*, *64*(5), 708-722. <https://doi.org/10.1037/0022-3514.64.5.708>
- Bailey, D. H., Duncan, G. J., Cunha, F., Foorman, B. R., & Yeager, D. S. (2020). Persistence and fade-out of educational intervention effects: Mechanisms and potential solutions. *Psychological Science in the Public Interest*, *21*(2), 55–97. <https://doi.org/10.1177/1529100620915848>
- Bales, R. F., Strodtbeck, F. L., Mills, T. M., & Roseborough, M. E. (1951). Channels of communication in small groups. *American Sociological Review*, *16*, 461-468. <https://doi.org/10.2307/2088276>
- Barkow, J. H. (1975). Prestige and culture: A biosocial interpretation. *Current Anthropology*, *16*, 553-572. University of Chicago Press.
- Barkow, J. H. (1980). Prestige and self-esteem: A biosocial interpretation. In D. R. Omark, F. F. Strayer, & D. G. Freedman (Eds.), *Dominance relations: An ethological view of human conflict and social interaction* (p. 319-332). Garland SMTP Press.
- Barlett, C. P., & Anderson, C. A. (2012). Direct and indirect relations between the Big 5 personality traits and aggressive and violent behavior. *Personality and Individual Differences*, *52*(8), 870-875. <https://doi.org/10.1016/j.paid.2012.01.029>
- Bateson, M., Brilot, B., & Nettle, D. (2011). Anxiety: An evolutionary approach. *Canadian Journal of Psychiatry*, *56*(12), 707-715. <https://doi.org/10.1177/070674371105601202>
- Baumeister, R. F. (1998). The self. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.) *Handbook of social psychology* (4th edition, p. 680-740). McGraw-Hill.
- Baumeister, R. F. (2005). *The cultural animal: Human nature, meaning, and social life*. Oxford University Press.
- Baumeister, R. F., Bratslavsky, E., Finkenauer, C., & Vohs, K. D. (2001). Bad is stronger than good. *Review of General Psychology*, *5*(4), 323-370. <https://doi.org/10.1037/1089-2680.5.4.323>

- Baumeister, R. F., Campbell, J. D., Krueger, J. I., and Vohs, K. D. (2003). Does high self-esteem cause better performance, interpersonal success, happiness, or healthier lifestyles? *Psychological Science in the Public Interest*, 4(1), 1–44.
<https://doi.org/10.1111/1529-1006.01431>
- Baumeister, R. F., & Leary, M. R. (1995). The need to belong: Desire for interpersonal attachments as a fundamental human motivation. *Psychological Bulletin*, 117(3), 497–529. <https://doi.org/10.1037/0033-2909.117.3.497>
- Belk, R. (1988). Possessions and the extended self. *Journal of Consumer Research*, 15, 139–168.
- Berkowitz, L., & Troccoli, B. T. (1986). An examination of the assumptions in the demand characteristics thesis: With special reference to the Velten mood induction procedure. *Motivation and Emotion*, 10(2), 337–349. <https://doi.org/10.1086/209154>
- Berger, J., Cohen, B. P., & Zelditch, M., Jr. (1972). Status characteristics and social interaction. *American Sociological Review*, 37(3), 241–254.
<https://www.jstor.org/stable/2093465>
- Bergstrom, C. T., & Meacham, F. (2016). Depression and anxiety: Maladaptive byproducts of adaptive mechanisms. *Evolution, Medicine, and Public Health*, 1, 214–218.
<https://doi.org/10.1093/emph/eow019>
- Bettencourt, B. A., Charlton, K., Dorr, N., & Hume, D. L. (2001). Status differences and in-group bias: A meta-analytic examination of the effects of status stability, status legitimacy, and group permeability. *Psychological Bulletin*, 127(4), 520–542.
<https://doi.org/10.1037/0033-2909.127.4.520>
- Betzig, L. L. (1986). *Despotism and differential reproduction: A Darwinian view of history*. Aldine Press.
- Black, D. (1976). *The behavior of law*. Academic Press.
- Boyce, C. J., Brown, G. D., & Moore, S. C. (2010). Money and happiness rank of income, not income, affects life satisfaction. *Psychological Science*, 21(4), 471–475.
<https://doi.org/10.1177/0956797610362671>
- Buss, D. M. (1995). Evolutionary psychology: A new paradigm for psychological science.

- Psychological Inquiry*, 6(1), 1-30. https://doi.org/10.1207/s15327965pli0601_1
- Byrne, B. M. (1996). *Measuring self-concept across the life span: Methodological issues and selected instrumentation*. American Psychological Association.
- Campbell, W. K., Rudich, E., & Sedikides, C. (2002). Narcissism, self-esteem, and the positivity of self-views: Two portraits of self-love. *Personality and Social Psychology Bulletin*, 28(3), 358-368. <https://doi.org/10.1177/0146167202286007>
- Caprariello, P. A., Cuddy, J. C., & Fiske, S. T. (2009). Social structure shapes cultural stereotypes and emotions: A causal test of the stereotype content model. *Group Processes and Intergroup Behavior*, 12(2), 147-155. <https://doi.org/10.1177/1368430208101053>
- Carlo, G., Knight, G. P., Roesch, S. C., Opal, D., & Davis, A. (2014). Personality across cultures: A critical analysis of Big Five research and current directions. In F. T. L. Leong, L. Comas-Díaz, G. C. Nagayama Hall, V. C. McLoyd, & J. E. Trimble (Eds.), *APA handbook of multicultural psychology (Vol. 1): Theory and research* (p. 285-298). American Psychological Association.
- Cattell, R. B. (1942). The concept of social status. *The Journal of Social Psychology*, 15, 293-308.
- Chance, M. R. A. (1967). Attention structure as the basis of primate rank orders. *Man*, 2, 503-518. https://doi.org/10.1007/978-1-4684-2901-5_6
- Chance, M. R. A., & Jolly, C. J. (1970). *Social groups of monkeys, apes and men*. Dutton.
- Christopher, A. N., & Schlenker, B. R. (2000). The impact of perceived material wealth and perceiver personality on first impressions. *Journal of Economic Psychology*, 21(1), 1-19. [https://doi.org/10.1016/S0167-4870\(99\)00033-1](https://doi.org/10.1016/S0167-4870(99)00033-1)
- Cohen, J. & Cohen, P. (1983). *Applied multiple regression/correlation analysis for the behavioral sciences* (2nd ed.). Erlbaum
- Coie, J. D., Dodge, K. A., & Coppotelli, H. (1982). Dimensions and types of social status: A cross-age perspective. *Developmental Psychology*, 18(4), 557-570. <http://dx.doi.org/10.1037/0012-1649.18.4.557>
- Costello, A. B. & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four

- recommendations for getting the most from your analysis. *Practical Assessment, Research & Evaluation*, 10(7), 1-9. <https://doi.org/10.7275/jyj1-4868>
- Crocker, J., Luhtanen, R. K., Cooper, M. L., Bouvrette, A. (2003). Contingencies of self-worth in college students: Theory and measurement. *Journal of Personality and Social Psychology*, 85(5), 894-908. <https://doi.org/10.1037/0022-3514.85.5.894>
- Crocker, J., & Major, B. M. (1989). Social stigma and self-esteem: The self-protective properties of stigma. *Psychological Review*, 96(4), 608-630.
- Crocker, J., & Park, L. E. (2004). The costly pursuit of self-esteem. *Psychological Bulletin*, 130(3), 392-414. <https://doi.org/10.1037/0033-2909.130.3.392>
- Crocker, J., & Wolfe, C. T. (2001). Contingencies of self-worth. *Psychological Review*, 108(3), 593-623. <https://doi.org/10.1037/0033-295X.108.3.593>
- Cuddy, A. J. C., Fiske, S. T., & Glick, P. (2007). The BIAS Map: Behaviors from intergroup affect and stereotypes. *Journal of Personality and Social Psychology*, 92(4), 631-648. <https://doi.org/10.1037/0022-3514.92.4.631>
- Cuddy, A. J., Fiske, S. T., & Glick, P. (2008). Warmth and competence as universal dimensions of social perception: The stereotype content model and the BIAS map. *Advances in Experimental Social Psychology*, 40, 61-149. [https://doi.org/10.1016/S0065-2601\(07\)00002-0](https://doi.org/10.1016/S0065-2601(07)00002-0)
- Darley, J. M., & Gross, P. H. (1983). A hypothesis-confirming bias in labeling effects. *Journal of Personality and Social Psychology*, 44(1), 20-33. <https://doi.org/10.1037/0022-3514.44.1.20>
- De Waal-Andrews, W., Gregg, A. P., & Lammers, J. (2015). When status is grabbed and when status is granted: Getting ahead in dominance and prestige hierarchies. *British Journal of Social Psychology*, 54(3), 445-464. <http://dx.doi.org/10.1111/bjso.12093>
- Diener, E. (1994). Assessing subjective well-being: Progress and opportunities. *Social Indicators Research*, 31(2), 103-157. <https://doi.org/10.1007/BF01207052>
- Diener, E. (Ed.). (2009). *Cross-cultural correlates of life satisfaction and self-esteem*. In E. Diener (Ed.), *Social indicators research series: Vol. 38. Culture and well-being: The collected works of Ed Diener* (p. 71–91). Springer Science + Business

Media. https://doi.org/10.1007/978-90-481-2352-0_4

Digman, J. M. (1990). Personality structure: Emergence of the five-factor model. *Annual Review of Psychology, 41*, 417-440.

<https://doi.org/10.1146/annurev.ps.41.020190.002221>

Dunbar, R. (2007). The social brain hypothesis and its relevance to social psychology. In J. P. Forgas, M. G. Haselton, & W. von Hippel (Eds.), *Evolution and the social mind* (p. 21-31). Psychology Press.

Ehrhart, M. G., Ehrhart, K. H., Roesch, S. C., Chung-Herrera, B. G., Nadler, K., & Bradshaw, K. (2009). Testing the latent factor structure and construct validity of the Ten-Item Personality Inventory. *Personality and Individual Differences, 47*(8), 900-905.

<https://doi.org/10.1016/j.paid.2009.07.012>

Faunce, W. A. (1984). School achievement, social status, and self-esteem. *Social Psychology Quarterly, 47*(1), 3-14. <https://doi.org/10.2307/3033883>

Fazio, R. H., Effrein, E. A., & Falender, V. J. (1981). Self-perceptions following social interaction. *Journal of Personality and Social Psychology, 41*(2), 232-242.

<https://doi.org/10.1037/0022-3514.41.2.232>

Fiedler, K., Schott, M., & Meiser, T. (2011). What mediation analysis can (not) do. *Journal of Experimental Social Psychology, 47*(6), 1231-1236.

<https://doi.org/10.1016/j.jesp.2011.05.007>

Fiske, S. T. (2010). Interpersonal stratification: Status, power, and subordination. In S. T. Fiske, D. T., Gilbert, & G. Lindzey (Eds.), *Handbook of social psychology* (5th ed., p. 941-982). Wiley.

Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology, 82*(6), 878-902.

<http://dx.doi.org/10.1002/9780470561119.socpsy002026>

Fournier, M. A. (2009). Adolescent hierarchy formation and the social competition theory of depression. *Journal of Social and Clinical Psychology, 28*(9), 1144-1172.

<https://doi.org/10.1521/jscp.2009.28.9.1144>

- Francis, L. J., & Jones, S. H. (1996). Social class and self-esteem. *Journal of Social Psychology, 136*(3), 405-406. <https://doi.org/10.1080/00224545.1996.9714019>
- Frank, R. H. (1985). *Choosing the right pond: Human behavior and the quest for status*. Oxford University Press.
- Frank, R. H., Levine, A. S., & Dijk, O. (2014). Expenditure Cascades. *Review of Behavioral Economics, 1* (1–2), 55-73. <http://dx.doi.org/10.1561/105.00000003>
- Fujita, F., & Diener, E. (2005). Life satisfaction set point: Stability and change. *Journal of Personality and Social Psychology, 88*(1), 158-164. <https://doi.org/10.1037/0022-3514.88.1.158>
- Gebauer, J. E., Wagner, J., Sedikides, C., & Neberich, W. (2013). The relation between agency-communion and self-esteem is moderated by culture, religiosity, age, and sex: Evidence for the self-centrality breeds self-enhancement principle. *Journal of Personality, 81*(3), 261-275. <https://doi.org/10.1111/j.1467-6494.2012.00807.x>
- Gilbert, P. (2003). Evolution, social roles and the differences in shame and guilt. *Social Research: A Quarterly Journal, 70*(4), 1205-1230.
- Goodman, M. D., & Gareis, K. C. (1993). The influence of status on decisions to help. *The Journal of Social Psychology, 133*(1), 23-31. <https://doi.org/10.1080/00224545.1993.9712115>
- Goodwin, R. D., & Friedman, H. S. (2006). Health status and the five-factor personality traits in a nationally representative sample. *Journal of Health Psychology, 11*(5), 643-654. <https://doi.org/10.1177/1359105306066610>
- Gosling, S. D., Rentfrow, P. J., & Swann, W. B. (2003). A very brief measure of the Big-Five personality domains. *Journal of Research in Personality, 37*(6), 504-528. [https://doi.org/10.1016/S0092-6566\(03\)00046-1](https://doi.org/10.1016/S0092-6566(03)00046-1)
- Gray-Little, B., & Hafdahl, A.R. (2000). Factors influencing racial comparisons of self-esteem: A quantitative review. *Psychological Bulletin, 126*(1), 26-54. <https://doi.org/10.1037/0033-2909.126.1.26>
- Gregg, A. P., & Mahadevan, N. (2014). Intellectual arrogance and intellectual humility: An evolutionary-epistemological account. *Journal of Psychology and Theology, 42*(1), 7–

18. <https://doi.org/10.1177/009164711404200102>
- Gregg, A. P., Mahadevan, N., & Sedikides, C. (2017a). Intellectual arrogance and intellectual humility: Correlational evidence for an evolutionary-embodied-epistemological account. *The Journal of Positive Psychology, 12*(1), 59-73.
<https://doi.org/10.1080/17439760.2016.1167942>
- Gregg, A. P., Mahadevan, N., & Sedikides, C. (2017b). The SPOT Effect: People spontaneously prefer their own theories. *Quarterly Journal of Experimental Psychology, 70*(6), 996-1010. <https://doi.org/10.1080/17470218.2015.1099162>
- Gregg, A. P., Mahadevan, N., & Sedikides, C. (2018). Taking the high ground: The impact of social status on the derogation of ideological opponents. *Social Cognition, 36*(1), 43-77. <https://doi.org/10.1521/soco.2018.36.1.43>
- Guéguen, N., & Pichot, N. (2001). The influence of status on pedestrians' failure to observe a road safety rule. *The Journal of Social Psychology, 141*(3), 413-415.
<https://doi.org/10.1080/00224540109600562>
- Hahn, A., Judd, C. M., Hirsh, H. K., & Blair, I. V. (2014). Awareness of implicit attitudes. *Journal of Experimental Psychology: General, 143*(3), 1369-1392.
<https://doi.org/10.1037/a0035028>
- Hallowell, A. I. (1960). *Self, society and culture in phylogenetic perspective*. University of Chicago Press.
- Hayes, A. F. (2013). *Introduction to mediation, moderation, and process control analysis: A regression-based approach*. Guilford Press.
- Henrich, J. & Gil-White, F. J. (2001). The evolution of prestige: Freely conferred deference as a mechanism for enhancing the benefits of cultural transmission. *Evolution and Human Behavior, 22*, 165-96.
- Hill, S. E., & Buss, D. M. (2008). The evolution of self-esteem. In M. Kernis (Ed.), *Self-esteem: Issues and Answers: A source book of current perspectives*. Guilford Press.
- Huo, Y. J., Binning, K. R., & Molina, L. E. (2010). Testing an integrative model of respect: Implications for social engagement and well-being. *Personality and Social Psychology Bulletin, 36*(2), 200-212. <https://doi.org/10.1177/0146167209356787>

- Huyse-Gaytandjieva, A., Groot, W., Pavlova, M., & Joling, C. (2015). Low self-esteem predicts future unemployment. *Journal of Applied Economics*, *18*(2), 325-346.
[https://doi.org/10.1016/S1514-0326\(15\)30014-3](https://doi.org/10.1016/S1514-0326(15)30014-3)
- Ipeirotis, P. (2010). *Demographics of Mechanical Turk*. Working Paper CeDER-10-01, New York University, Stern School of Business. Retrieved from
<http://hdl.handle.net/2451/29585>
- Jonassaint, C. R., Siegler, I. C., Barefoot, J. C., Edwards, C. L., & Williams, R. B. (2011). Low life course socioeconomic status (SES) is associated with negative NEO PI-R personality patterns. *International Journal of Behavioral Medicine*, *18*(1), 13-21.
<https://doi.org/10.1007/s12529-009-9069-x>
- Jost, J. T., Banaji, M. R., & Nosek, B. A. (2004). A decade of system justification theory: Accumulated evidence of conscious and unconscious bolstering of the status quo. *Political Psychology*, *25*(6), 881-919. <https://doi.org/10.1111/j.1467-9221.2004.00402.x>
- Kline, R. B. (2005). *Principles and practice of Structural Equation Modelling*. Guilford Press.
- Kraus, M. W., Côté, S., & Keltner, D. (2010). Social class, contextualism, and empathic accuracy. *Psychological Science*, *21*(11), 1716-1723.
<https://doi.org/10.1177/0956797610387613>
- Kraus, M. W., & Park, J. W. (2014). The undervalued self: social class and self-evaluation. *Frontiers in Psychology*, *5*, 1404. <https://doi.org/10.3389/fpsyg.2014.01404>
- Leary, M. R. (1999). Making sense of self-esteem. *Current Directions in Psychological Science*, *8*(1), 32-35. <https://doi.org/10.1111/1467-8721.00008>
- Leary, M. R. (2005). Sociometer theory and the pursuit of relational value: Getting to the root of self-esteem. *European Review of Social Psychology*, *16*, 75-111.
<https://doi.org/10.1080/10463280540000007>
- Leary, M. R., Cottrell, C. A., & Phillips, M. (2001). Deconfounding the effects of dominance and social acceptance on self-esteem. *Journal of Personality and Social Psychology*, *81*(5), 898-909. <https://doi.org/10.1037/0022-3514.81.5.898>
- Leary, M. R., & Downs, D. L. (1995). Interpersonal functions of the self-esteem motive: The

- self-esteem system as a sociometer. In M. H. Kernis (Ed.), *Efficacy, agency, and self-esteem* (p. 123-144). Plenum Press.
- Leary, M. R., Haupt, A. L., Strausser, K. S., & Chokel, J. T. (1998). Calibrating the sociometer: The relationship between interpersonal appraisals and the state self-esteem. *Journal of Personality and Social Psychology, 74*(5), 1290–1299. <https://doi.org/10.1037/0022-3514.74.5.1290>
- Leary, M. R., Tambor, E. S., Terdal, S. K., & Downs, D. L. (1995). Self-esteem as an interpersonal monitor: The sociometer hypothesis. *Journal of Personality and Social Psychology, 68*(3), 518-530. <https://doi.org/10.1037/0022-3514.68.3.518>
- Lee, S. Y., Gregg, A. P., & Park, S. H. (2013). The person in the purchase: narcissistic consumers prefer products that positively distinguish them. *Journal of Personality and Social Psychology, 105*(2), 335–352. <https://doi.org/10.1037/a0032703>
- Lefkowitz, M., Blake, R. R., & Mouton, J. S. (1955). Status factors in pedestrian violation of traffic signals. *The Journal of Abnormal and Social Psychology, 51*(3), 704-706. <http://dx.doi.org/10.1037/h0042000>
- Lyubomirsky, S., & Lepper, H. S. (1999). A measure of subjective happiness: Preliminary reliability and construct validation. *Social Indicators Research, 46*(2), 137-155. <https://doi.org/10.1023/A:1006824100041>
- Mahadevan, N., Gregg, A. P., & Sedikides, C. (2019a). Is self-regard a sociometer or a hierometer? Self-esteem tracks status and inclusion, narcissism tracks status. *Journal of Personality and Social Psychology, 116*(3), 444-466. <https://doi.org/10.1037/pspp0000189>
- Mahadevan, N., Gregg, A. P., & Sedikides, C. (2019b). Where I am and where I want to be: Perceptions of and aspirations for status and inclusion differentially predict psychological health. *Personality and Individual Differences, 139*, 170-174. <https://doi.org/10.1016/j.paid.2018.10.041>
- Mahadevan, N., Gregg, A. P., & Sedikides, C. (2020). The ups and downs of social life: Within-person variations in daily status and inclusion differentially predict self-regard and interpersonal behavior. *Journal of Personality*.

<https://doi.org/10.1111/jopy.12559>

- Mahadevan, N., Gregg, A. P., Sedikides, C., & De Waal-Andrews (2016). Winners, losers, insiders, and outsiders: Comparing hierometer and sociometer theories of self-regard. *Frontiers in Psychology, 7*, 334. <https://doi.org/10.3389/fpsyg.2016.00334>
- Mandela, N. (1994). *The long walk to freedom: The autobiography of Nelson Mandela*. Abacus.
- Manstead, A. S. R. (2018). The psychology of social class: How socioeconomic status impacts thought, feelings, and behaviour. *British Journal of Social Psychology, 57*(2), 267-291. <https://doi.org/10.1111/bjso.12251>
- Markus, H. R., & Kitayama, S. (1991). Culture and the self: Implications for cognition, emotion, and motivation. *Psychological Review, 98*(2), 224–253. <https://doi.org/10.1037/0033-295X.98.2.224>
- Marmot, M. (2004). *The status syndrome: How your social standing affects your health and life expectancy*. Bloomsbury.
- Maxwell, S. E., & Cole, D. A. (2007). Bias in cross-sectional analyses of longitudinal mediation. *Psychological Methods, 12*(1), 23–44. <https://doi.org/10.1037/1082-989X.12.1.23>
- Mazur, A. (1985). A biosocial model of status in face-to-face primate groups. *Social Forces, 64*(2), 377-402. <https://doi.org/10.2307/2578647>
- McCrae, R. R., & Costa Jr, P. T. (1997). Personality trait structure as a human universal. *American Psychologist, 52*(5), 509-516. <https://doi.org/10.1037/0003-066X.52.5.509>
- McPherson, M., Smith-Lovin, L., & Cook, J. M. (2001). Birds of a feather: Homophily in social networks. *Annual Review of Sociology, 27*, 415-444. <https://doi.org/10.1146/annurev.soc.27.1.415>
- McNally, R. J. (1987). Preparedness and phobias: A review. *Psychological Bulletin, 101*(2), 283-303. <https://doi.org/10.1037/0033-2909.101.2.283>
- Muck, P. M., Hell, B., & Gosling, S. D. (2007). Construct validation of a short five-factor model instrument: A self-peer study on the German adaptation of the Ten-Item

- Personality Inventory (TIPI-G). *European Journal of Psychological Assessment*, 23(3), 166-175. <https://doi.org/10.1027/1015-5759.23.3.166>
- Mummolo, J., & Peterson, E. (2019). Demand effects in survey experiments: An empirical assessment. *The American Political Science Review*, 113(2), 517-529. <https://doi.org/10.1017/S0003055418000837>
- Neel, R., Kenrick, D. T., White, A. E., & Neuberg S. L. (2016). Individual differences in fundamental social motives. *Journal of Personality and Social Psychology*, 110(6), 887-907. <https://doi.org/10.1037/pspp0000068>
- Noftle, E. E., & Robins, R. W. (2007). Personality predictors of academic outcomes: Big five correlates of GPA and SAT scores. *Journal of Personality and Social Psychology*, 93(1), 116-130. <https://doi.org/10.1037/0022-3514.93.1.116>
- Ockerman, J. (1979). *Self-esteem and social anchorage of adolescent White, Black, and Mexican American students*. R & E Research Associates.
- Oldmeadow, J., & Fiske, S. T. (2007). System-justifying ideologies moderate status–competence stereotypes: Roles for belief in a just world and social dominance orientation. *European Journal of Social Psychology*, 37(6), 1135-1148. <https://doi.org/10.1002/ejsp.428>
- Orne M. T. (1962). On the social psychology of the psychological experiment: With particular reference to demand characteristics and their implications. *American Psychologist*, 17(11), 776-783. <https://doi.org/10.1037/h0043424>
- Phinney, J. S., Cantu, C. L., & Kurtz, D. A. (1997). Ethnic and American identity as predictors of self-esteem among African American, Latino, and White adolescents. *Journal of Youth and Adolescence*, 26, 165-185.
- Piff, P. K., Stancato, D. M., Côté, S., Mendoza-Denton, R., & Keltner, D. (2012). Higher social class predicts increased unethical behavior. *Proceedings of the National Academy of Sciences*, 109(11), 4086-4091. <https://doi.org/10.1073/pnas.1118373109>
- Pirlott, A. G., & MacKinnon, D. P. (2016). Design approaches to experimental mediation. *Journal of Experimental Social Psychology*, 66, 29-38. <https://doi.org/10.1016/j.jesp.2015.09.012>

- Price, J. S., Sloman, L., Gilbert, P., Gardner, R., & Rohde, P. (1994). The social competition hypothesis of depression. *British Journal of Psychiatry, 164*(3), 309-315.
<https://doi.org/10.1192/bjp.164.3.309>
- Redhead, D., Cheng, J.T., Driver, C. C., Foulsham, T., & O'Gorman, R. (2019). On the dynamics of social hierarchy: A longitudinal investigation of the rise and fall of prestige, dominance, and social rank in naturalistic task groups. *Evolutionary Human Behavior, 40*(2), 222-234. <https://doi.org/10.1016/j.evolhumbehav.2018.12.001>
- Richman, C. L., Clark, M. L., & Brown, K. P. (1985). General and specific self-esteem in late adolescent students: Race \times gender \times SES effects. *Adolescence, 20*(790), 555-566.
- Ridgeway, C. L. (2000). The formation of status beliefs: Improving status construction theory. *Advances in Group Processes, 17*, 77-102. [https://doi.org/10.1016/S0882-6145\(00\)17004-3](https://doi.org/10.1016/S0882-6145(00)17004-3)
- Ridgeway, C. L. (2014). Why status matters for inequality. *American Sociological Review, 79*(1), 1-6. <https://doi.org/10.1177/0003122413515997>
- Ridgeway, C. L., & Berger, J. (1986). Expectations, legitimation, and dominance behavior in task groups. *American Sociological Review, 51*(5), 603-617.
<https://doi.org/10.2307/2095487>
- Ridgeway, C. L., & Correll, S. J. (2006). Consensus and the creation of status beliefs. *Social Forces, 85*(1), 431-453. <https://doi.org/10.1353/sof.2006.0139>
- Ridgeway, C. L., Berger, J., & Smith, L. (1985). Nonverbal cues and status: An expectation states approach. *American Journal of Sociology, 90*(5), 955-978.
<https://doi.org/10.1086/228172>
- Robins, R. W., Hendin, H. M., & Trzesniewski, K. H. (2001). Measuring global self-esteem: Construct validation of a single-item measure and the Rosenberg Self-Esteem Scale. *Personality and Social Psychology Bulletin, 27*(2), 151-161.
<https://doi.org/10.1177/0146167201272002>
- Robins, R. W., Tracy, J. L., Trzesniewski, K. H., Potter, J., & Gosling, S. D. (2001). Personality correlates of self-esteem. *Journal of Research in Personality, 35*, 463-482.
<https://doi.org/10.1006/jrpe.2001.232>

- Rosenberg, M. (1965). *Society and the adolescent self-image*. Princeton University Press.
- Rosenberg, M., & Pearlman, L. I. (1978). Social class and self-esteem among children and adults. *American Journal of Sociology*, *84*(1), 53-77. <https://doi.org/10.1086/226740>
- Schlenker, B. R., Dlugolecki, D. W., & Doherty, K. (1994). The impact of self-presentations on self-appraisals and behavior: The power of public commitment. *Personality and Social Psychology Bulletin*, *20*(1), 20-33. <https://doi.org/10.1177/0146167294201002>
- Schmitt, D. P., & Jonason, P. K. (2019). Self-esteem as an adaptive sociometer of mating success: Evaluating evidence of special-design across 10 world regions. *Personality and Individual Differences*, *143*, 13-20. <https://doi.org/10.1016/j.paid.2019.02.011>
- Schooler, C. (1994). A working conceptualization of social structure: Mertonian roots and psychological and sociocultural relationships. *Social Psychology Quarterly*, *57*(3), 262-273. <https://doi.org/10.2307/2786880>
- Searle, J. R. (2010). *Making the social world*. Oxford University Press.
- Sedikides, C., Gaertner, L., & Cai, H. (2015). On the panculturality of self-enhancement and self-protection motivation: The case for the universality of self-esteem. *Advances in Motivation Science*, *2*, 185-241. <https://doi.org/10.1016/bs.adms.2015.04.002>
- Sedikides, C., & Gregg, A. P. (2001). Narcissists and feedback: Motivational surfeits and motivational deficits. *Psychological Inquiry*, *12*, 237-239.
- Sedikides, C., & Gregg, A. P. (2003). Portraits of the self. In M. A. Hogg & J. Cooper (Eds.), *Sage handbook of social psychology* (p. 110-138). Sage Publications.
- Sedikides, C., & Skowronski, J. J. (1997). The symbolic self in evolutionary context. *Personality and Social Psychology Review*, *1*(1), 80-102. https://doi.org/10.1207/s15327957pspr0101_6
- Sedikides, C., & Skowronski, J. J. (2000). On the evolutionary functions of the symbolic self: The emergence of self-evaluation motives. In A. Tesser, R. Felson, & J. Suls (Eds.), *Psychological perspectives on self and identity* (p. 91-117). American Psychological Association.
- Sedikides, C., & Skowronski, J. J. (2003). Evolution of the self: Issues and prospects. In M. R. Leary & J. P. Tangney (Eds.), *Handbook of self and identity* (p. 594-609). Guilford

Press.

Sedikides, C., & Skowronski, J. J. (2020). In human memory, good can be stronger than bad.

Current Directions in Psychological Science, 29(1), 86-91.

<https://doi.org/10.1177/096372141989636>

Sedikides, C., Skowronski, J. J., & Dunbar, R. I. M. (2006). When and why did the human self evolve? In M. Schaller, J. A. Simpson, & D. T. Kenrick (Eds.), *Evolution and social psychology: Frontiers in social psychology* (p. 55-80). Psychology Press.

Sidanius, J., & Pratto, F. (1999). *Social dominance: An intergroup theory of social hierarchy and oppression*. Cambridge University Press.

Singh-Manoux, A., Adler, N. E., & Marmot, M. G. (2003). Subjective social status: its determinants and its association with measures of ill-health in the Whitehall II study. *Social Science and Medicine*, 56(6), 1321-1333. [https://doi.org/10.1016/s0277-9536\(02\)00131-4](https://doi.org/10.1016/s0277-9536(02)00131-4)

Singh-Manoux, A., Marmot, M. G., & Adler, N. E. (2005). Does subjective social status predict health and change in health status better than objective status? *Psychosomatic Medicine*, 67(6), 855-861. <https://doi.org/10.1097/01.psy.0000188434.52941.a0>

Soares, A. T., & Soares, L. M. (1969). Self-perceptions of culturally disadvantaged children. *American Educational Research Journal*, 6(1), 31-45.

<https://doi.org/10.2307/1162094>

Solomon, S., Greenberg, J., & Pyszczynski, T. (1991). Terror management theory of self-esteem. In C. R. Snyder & D. R. Forsyth (Eds.), *Handbook of social and clinical psychology: The health perspective* (p. 21-40). Pergamon Press.

Sowislo, J. F., & Orth, U. (2013). Does low self-esteem predict depression and anxiety? A meta-analysis of longitudinal studies. *Psychological Bulletin*, 139(1), 213-240.

<https://doi.org/10.1037/a0028931>

Spencer, S. J., Zanna, M. P., & Fong, G. T. (2005). Establishing a causal chain: why experiments are often more effective than mediational analyses in examining psychological processes. *Journal of Personality and Social Psychology*, 89(6), 845-851. <https://doi.org/10.1037/0022-3514.89.6.845>

- Steiger, J. H. (1980). Tests for comparing elements of a correlation matrix. *Psychological Bulletin*, 87(2), 245-251. <https://doi.org/10.1037/0033-2909.87>
- Tafarodi, R. W., & Swann Jr, W. B. (1995). Self-liking and self-competence as dimensions of global self-esteem: initial validation of a measure. *Journal of Personality Assessment*, 65(2), 322-342. https://doi.org/10.1207/s15327752jpa6502_8
- Terry, R., & Coie, J. D. (1991). A comparison of methods for defining sociometric status among children. *Developmental Psychology*, 27(5), 867-880. <http://dx.doi.org/10.2307/1130578>
- Tice, D. (1992). Self-concept shift and self-presentation: The looking glass self is also a magnifying glass. *Journal of Personality and Social Psychology*, 63(3), 435-451. <https://doi.org/10.1037/0022-3514.63.3.435>
- Trzesniewski, K. H., Donnellan, M. B., Moffitt, T. E., Robins, R. W., Poulton, R., & Caspi, A. (2006). Low self-esteem during adolescence predicts poor health, criminal behavior, and limited economic prospects during adulthood. *Developmental Psychology*, 42(2), 381-390. <https://doi.org/10.1037/0012-1649.42.2.381>
- Twenge, J. M., & Campbell, W. K. (2002). Self-esteem and socioeconomic status: A meta-analytic review. *Personality and Social Psychology Review*, 6(1), 59-71. https://doi.org/10.1207/S15327957PSPR0601_
- VanDellen, M. R., Campbell, W. K., Hoyle, R. H., & Bradfield, E. K. (2011). Compensating, resisting, and breaking: a meta-analytic examination of reactions to self-esteem threat. *Personality and Social Psychology Review*, 15(1), 51-74. <https://doi.org/10.1177/1088868310372950>
- Van der Linden, S., & Rosenthal, S. A. (2016). Measuring narcissism with a single question? A replication and extension of the Single-Item Narcissism Scale (SINS). *Personality and Individual Differences*, 90, 238-241. <https://doi.org/10.1016/j.paid.2015.10.050>
- Verbrugge, L. M. (1977). The structure of adult friendship choices. *Social Forces*, 56(2), 576-597. <https://doi.org/10.2307/2577741>
- Wang, L. Y., Kick, E., Fraser, J., & Burns, T. J. (1999). Status attainment in America: The roles of locus of control and self-esteem in educational and occupational outcomes.

- Sociological Spectrum*, 19(3), 281-298. <https://doi.org/10.1080/027321799280163>
- Weber, M. (1944). *Class, status, party* (transl. by H. H. Gerth & C. W. Mills). *Politics*, 1, 271-278.
- Weber, S., & Hagmayer, Y. (2018). Thinking about the Joneses? Decreasing rumination about social comparison increases well-being. *European Journal of Health Psychology*, 25(3), 83-95. <https://doi.org/10.1027/2512-8442/a000013>
- White, H. (1980). A heteroskedasticity-consistent covariance matrix estimator and a direct test for heteroskedasticity. *Econometrica: Journal of the Econometric Society*, 48(4), 817-838. <https://www.jstor.org/stable/1912934>
- Wicklund, R. A., & Gollwitzer, P. M. (1982). *Symbolic self-completion*. Erlbaum.
- Wood, G. (2014, October). *How gangs took over prisons*. Retrieved from <https://www.theatlantic.com/magazine/archive/2014/10/how-gangs-took-over-prisons/379330/>
- Zeigler-Hill, V. (2010). The interpersonal nature of self-esteem: Do different measures of self-esteem possess similar interpersonal content? *Journal of Research in Personality*, 44(1), 22-30. <https://doi.org/10.1016/j.jrp.2009.09.005>

Footnotes

¹ In Study 1, we also included the questionnaire measure of SMS. The results were similar to those we report in text for the “ladder” measure of SMS.

² Before proceeding to test our hypotheses, we sought confirmation that our measures of SMS and self-esteem were empirically distinct. For, if they assessed the same underlying construct, then any correlation between them would be tautological. We conducted two exploratory factor analyses, one on the SMS and RSES items, and one on the SMS and SLSC items. Each used Principal Axis Factoring with Direct Oblimin rotations (a method that avoids artificially imposing factorial independence; Costello & Osborne, 2005). Each analysis yielded three factors. In the first case, all the SMS items loaded highest on Factor 2 (average = .77, range = .69 to .91), but not on Factors 1 and 3 (average = -.01, range = -.07 to .06), whereas all the RSES items loaded highest on Factors 1 and 3 (average = .69, range = .51 to .92), but not on Factor 2 (average = .04, range = -.06 to .12). In the second case, all the SMS items loaded highest on Factor 3 (average = .73, range = .63 to .88), but not on Factors 1 and 2 (average = .03, range = -.02 to .11), whereas all the SLSC items loaded highest on Factors 1 and 2 (average = .67, range = .43 to .88), but not on Factor 3 (average = .04, range = -.07 to .22). Thus, the SMS and self-esteem items loaded on separate factors, consistent with their measures being empirically distinct.

³ The measure of SES exhibited lower internal reliability than the measure of SMS. This was not surprising: education, occupation, and income should hardly be expected to covary in lockstep. Accordingly, we added them as separate predictors in a regression analysis. All three collectively predicted self-esteem, whether assessed by the RSES, $R_{\text{MULTIPLE}}(565) = .40, p < .001$, or by the SLSC, $R_{\text{MULTIPLE}}(565) = .42, p < .001$. However, in each case, SMS still predicted self-esteem more strongly than SES did ($R_{\text{RSES}}[567] = .53, p < .001$; $R_{\text{SLSC}}[567] = .57, p < .001$). These differences were statistically significant ($t_{\text{RSES}}[565] = 3.79, p < .001$; $t_{\text{SLSC}}[565] = 4.46, p < .001$). Finally, when we controlled for differences in the internal reliabilities of the SES and SMS measures (Cohen & Cohen, 1983), the SMS coefficients still exceeded the SES coefficients by a non-trivial margin (RSES: disattenuated $r_s = .61$ and $.53$ respectively; SLSC: disattenuated $r_s = .64$ and $.55$, respectively).

⁴In Study 2, four participants did not report their educational qualifications and 46 participants did not report their income. We used pooled estimates from multiple imputations to compute objective SES for these participants (Allison, 2003).

⁵Again, to refute accusations of tautology, we sought and found confirmation that the measures of SMS and self-esteem were empirically distinct. An exploratory factor analysis, with Principal Axis Factoring and Direct Oblimin rotation, yielded three factors. All the SMS items loaded highest on Factor 2 (average = .67, range = .48 to .82), whereas all the RSES items loaded highest on Factors 1 and 3 (average = .67, range = .52 to .86). With the exception of one SMS item which loaded fairly highly on Factor 3 (.45), cross-loadings were low. The SMS items did not load highly on Factors 1 and 3 (average = .06, range = -.23 to .30). Likewise, the RSES items did not load highly on Factor 2 (average = .06, range = -.04 to .27). Thus, as before, the SMS and self-esteem items loaded on separate factors, consistent with their being empirically distinct.

⁶To afford SES maximal predictive power, we also tried entering all six indices of SES as separate predictors in a regression analysis on self-esteem. Their collective predictive power, $R_{\text{MULTIPLE}}(535) = .39, p < .001$, was still significantly less than that of SMS, $R(543) = .61, p < .001$. Thus, consistent with Study 1, SMS predicted self-esteem more strongly than SES did. Furthermore, a comparison of the disattenuated coefficients showed that SMS still predicted self-esteem substantially more strongly than SES did (SMS: disattenuated $r = .63$; objective SES: disattenuated $r = .38$; subjective SES: disattenuated $r = .39$).

⁷In Study 3, as well as Study 4, we included, for exploratory purposes, a trait measure of self-esteem, the Rosenberg Self-Esteem Scale (Rosenberg, 1965). The results, although somewhat weaker, were similar to those we report in the text.

⁸Results were the same when we re-included the three omitted items and assessed the effect of the SMS manipulation on the full 8-item SMS questionnaire ($\alpha = .94$; $M = 3.38$, $SD = .87$). The manipulation was effective, $t(142) = 7.12, p < .001, d = 1.196$. Participants in the high SMS condition ($M = 3.85, SD = .67$) rated their SMS higher than those in the low SMS condition did ($M = 2.96, SD = .81$).

⁹We additionally examined if the main findings remained consistent after taking age and gender into account. Across all five studies, the key associations between SES, SMS, and self-esteem remained consistent after controlling for age and gender, thereby providing further evidence of the robustness of these findings. We report the results in full in the Supplementary Materials (pp. 3–8).

¹⁰We additionally confirmed, as an exercise in methodological housekeeping, that the measures of SMS and self-esteem were empirically distinct (see Footnotes 2 and 5). Complementing prior investigations that support the validity and reliability of the scales that we adopted (Huo et al., 2010; Rosenberg, 1965; Tafarodi & Swann, 1995), three separate factor analyses across studies showed that the SMS items and the self-esteem items loaded on separate factors. Furthermore, although the correlations between SMS and self-esteem were high, they were not as high as might have been expected had the measures assessed the same underlying construct (Sowislo & Orth, 2013). Across studies, the correlations between SMS and self-esteem ranged from .53 to .57; in contrast, the correlation between the RSES and SLSC—the two measures of self-esteem—was .92.

Table 1. *Data Screening for All Studies*

<i>Criteria</i>	Study 1	Study 2	Study 3	Study 4	Study 5
Total unscreened sample size	644	608	241	162	688
1. Age < 18 years	1 (0.2%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
2. Poor reported English proficiency	1 (0.2%)	1 (0.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
3. Multiple completions	11 (1.7%)	15 (2.5%)	13 (5.4%)	6 (3.7%)	85 (12.4%)
4. Overly rapid completion	22 (3.4%)	15 (2.5%)	N/A N/A	N/A N/A	N/A N/A
5. Stereotyped responses	18 (2.8%)	14 (2.3%)	N/A N/A	N/A N/A	N/A N/A
6. Blank or nonsensical responses	34 (5.2%)	15 (2.5%)	8 (3.5%)	12 (7.4%)	68 (10.5%)
7. Multivariate outliers	– –	– –	– –	– –	10 (1.5%)
Total excluded	74 (11.5%)	56 (9.2%)	20 (8.3%)	18 (11.1%)	157 (22.8%)
Total screened sample size	570	552	221	144	531

Note. Figures outside parentheses indicate absolute numbers; figures within parentheses indicate percentages. Participants were defined as having *multiple completions* if another case shared the same IP address; as having *overly rapid completion* if they completed the survey in less than half of the median time taken for that survey overall; as having *stereotyped responses* if they showed no variance in their responses to any questionnaire containing both forward-scored and reverse-scored items; as having *blank or nonsensical responses* if they completed fewer than 95% of questionnaire items on a survey (Studies 1–2) or omitted or provided nonsensical responses to the experimental manipulation (Studies 3–5); and as *multivariate outliers* if they were found to be outliers when considering multiple variables conjointly (Study 5). Studies 3–5 (experimental) were quite short and did not contain questionnaires with reverse-coded items, so the criteria of *overly rapid completion* and *stereotyped responses* did not apply. Participants could be excluded on multiple grounds, so additivity is not to be expected.

Figure 1a

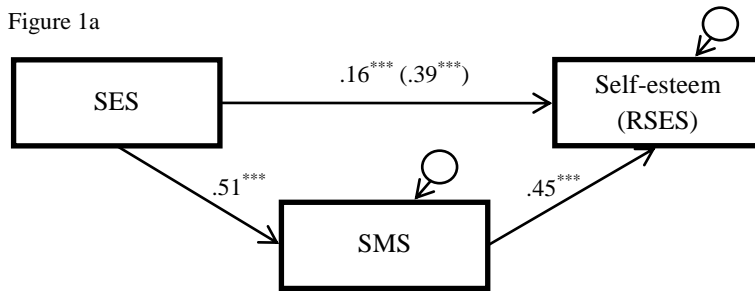
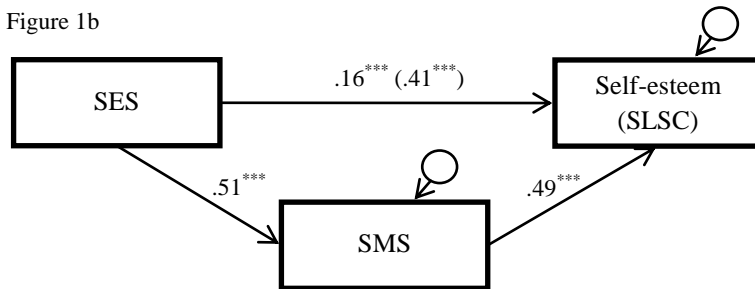


Figure 1b



Figures 1 and 2. The mediating role of SMS (Study 1). *Note.* In all models, effects were estimated using 5,000 bias-corrected bootstraps with standardized scores of the variables. Values in the models represent beta coefficients. Values in parentheses represent the strength of the association between the predictor and outcome variable before the mediator was included in the model, whereas values outside parentheses represent the strength of the link when the mediator was included in the model. SES was entered as an exogenous variable. SMS and self-esteem were entered as endogenous variables and are indicated with error terms. Goodness-of-fit indices are inapplicable because the models are saturated models with zero degrees of freedom (Kline, 2005, p. 133).

* $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 2a

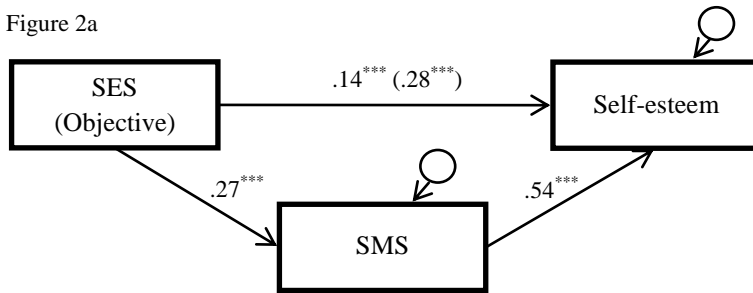
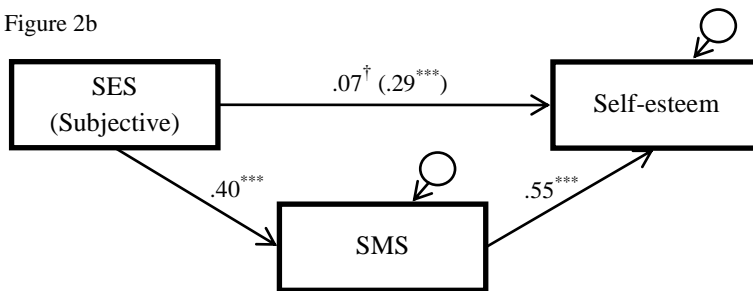


Figure 2b



Figures 2a and 2b. The Mediating Role of SMS (Study 2). *Note.* In Figure 2a, SES was measured objectively as a standard composite of education, income, and occupation. In Figure 2b, SES was measured subjectively on the ladder measures adapted from Adler et al. (2000). † $p < .10$; * $p < .05$; ** $p < .01$; *** $p < .001$.

Figure 2c

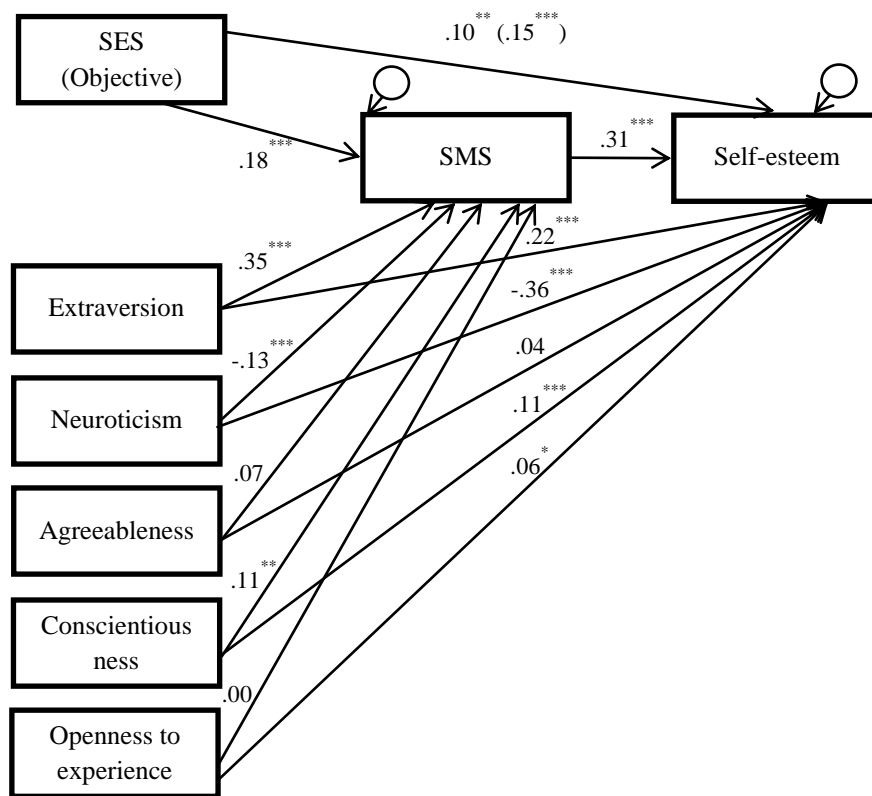
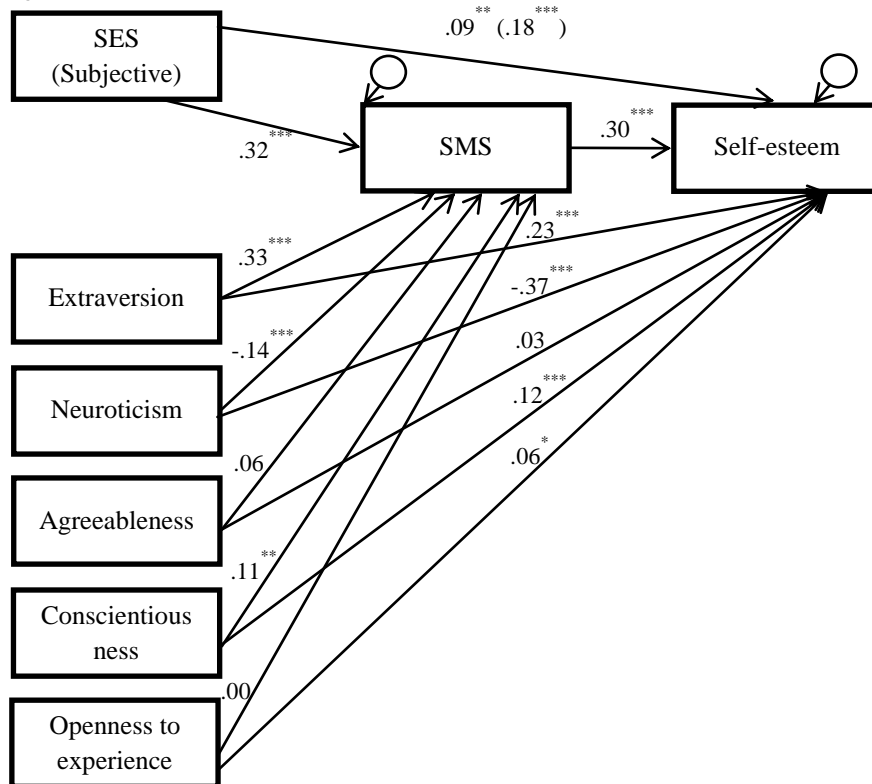


Figure 2d



Figures 2c and 2d. The mediating role of SMS after controlling for the Big Five personality traits (Study 2)

Figure 3

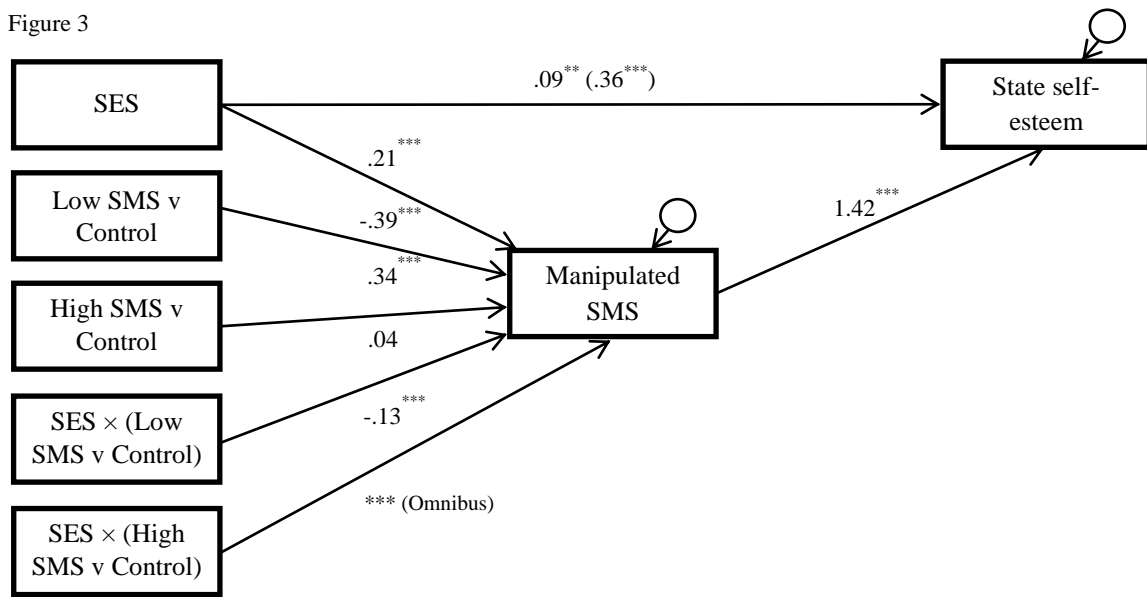


Figure 3. Experimental Mediation by SMS (Study 5).