Positive Intelligence Illusions: On the Relation Between Intellectual Self-Enhancement and Psychological Adjustment

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ABSTRACT   The relation between self-enhancement and psychological adjustment has been debated for over 2 decades. This controversy is partly due to the variety of approaches implicated in the assessment of mainly self-enhancement but also psychological adjustment. We adopted a face-valid approach by statistically removing actual intellectual ability variance from self-rated intellectual ability variance. Study 1 ($N = 2,048$), a concurrent Internet investigation, provided initial insight into the relation between intellectual self-enhancement and psychological adjustment. Study 2 ($N = 238$), a longitudinal round-robin investigation, allowed a closer examination of the dynamic processes underlying this relation. Self-enhancement was positively linked to multiple indicators of intrapersonal and interpersonal adjustment, and predicted rank-order increases in adjustment over time. The links between intellectual self-enhancement and intrapersonal adjustment were mediated by self-esteem. Finally, the interpersonal costs and benefits of self-enhancement systematically varied depending on methodology.

For over 20 years, it has repeatedly been shown that most people possess inflated self-views: they overestimate their strengths and underestimate or are unaware of their weaknesses (Alicke & Sedikides, 2009; Sedikides & Strube, 1997; Taylor & Brown, 1988). The propensity for perceiving oneself in an unduly positive light is often referred to as self-enhancement (SE). But how are individual differences in SE related to psychological adjustment? This question has also been debated for over two decades.

Some researchers speak of *positive illusions* about one's strengths that allow an individual to feel good about her- or himself, to cope more effectively with life's hassles, and to be liked by others (Taylor & Brown, 1988; Taylor, Lerner, Sherman, Sage, & McDowell, 2003; Taylor & Sherman, 2008). Other researchers, in contrast, draw a rather bleak picture of the self-enhancer as loftily self-deceived, with poor mental health, disengaged from academic work, and disliked by peers (Colvin & Block, 1994; Colvin, Block, & Funder, 1995; John & Robins, 1994). The former perspective, then, anticipates and reports a positive relation, whereas the latter perspective a negative relation, between SE and psychological adjustment. How can these seemingly discrepant findings be reconciled? Part of the answer, we argue, lies in the diverse methodological approaches used to assess SE.

Methodological Approaches Toward Self-Enhancement

Below, we will review three major ways in which SE has been assessed: via self-reports, as narcissism, and via observer reports. (In a subsequent section, we will review a fourth assessment method, comparison of expected task performance with objective criteria.)

Self-Reports

Some studies have assessed SE through self-reports. Most frequently, so-called better-than-average-effect (BTAE) measures have been used for this purpose. In particular, participants rate their self-attributes in comparison to others, typically the average peer (Guenther & Alicke, 2010; Sedikides, Gaertner, & Toguchi, 2003; Taylor et al., 2003). From this perspective, self-enhancers are persons who think that they are better than their average peer. This methodological approach has several benefits. It captures people's subjective beliefs (Baumeister, Campbell, Krueger, & Vohs, 2003), which, after all, are consequential for achievement and well-being (Alicke & Sedikides,

2011; Marsh & Craven, 2006; Swann, Chang-Schneider, & McClarty, 2007). Moreover, BTAE measures are well suited for analyses at an aggregate level. Given that not everybody can be above average, these measures inform whether a proclivity to self-enhance is apparent in a given sample. Yet, BTAE measures lack precision at the individual level of analysis. Although they can tell whether a participant's self-view is positive, neutral, or negative, they cannot tell whether this participant's self-view is *overly* positive. For such claims, an external or objective criterion is needed.

Narcissism

Some studies have used narcissism scales to assess SE, given that narcissism is characterized by pervasive SE tendencies (Hart et al., 2011; Hepper, Gramzow, & Sedikides, 2010; Morf, Horvath, & Torchetti, 2011). However, such a practice can be rather problematic. Even though SE is a robust and pervasive component of narcissism, narcissism entails other components that are not necessarily part of SE (e.g., exhibitionism, concern with power, condescension of others; Horton & Sedikides, 2009; Kubarych, Deary, & Austin, 2004; Sedikides, Campbell, Reeder, Elliot, & Gregg, 2002). Therefore, it is not clear whether empirical relations between narcissism and indicators of psychological adjustment (Rose, 2002; Sedikides, Rudich, Gregg, Kumashiro, & Rusbult, 2004) are due to SE or to other components of narcissism.

Observer Reports

Other studies have assessed SE using an external criterion, namely, observers. These can be peers (Paulhus, 1998), friends (Colvin et al., 1995), or clinicians (Colvin et al., 1995; Shedler, Mayman, & Manis, 1993). Typically, the resulting SE index is based on a residuation method (John & Robins, 1994; Paulhus, 1998). Observer ratings for a positively evaluated trait are partialed out of self-ratings for the same trait. The residuals represent positive (or negative) self-views that are not shared by observers.

Although observer ratings are often a good approximation of one's personality, this approach is also somewhat controversial. The advantage of observer reports is that they can outperform subjective reports in predicting an individual's external (e.g., charming, extraverted) or evaluative (e.g., abrasive) traits (Vazire, 2010; Wagerman

& Funder, 2007). However, individuals are better than observers in judging their own internal traits (e.g., optimistic, anxious; Vazire, 2010), which is why observer perceptions are not necessarily better than self-perceptions in predicting behavior (Vazire, 2010; Vazire & Mehl, 2008).

Yet, objective test performance is the key benchmark of ability-related traits (e.g., intelligent, abrasive) and therefore is preferable to observer ratings (we will elaborate on this alternative later). There is also a pertinent methodological issue. Partialing out observer ratings in the calculation of SE necessitates the removal of the variance that observer ratings share (due to generalized impressions) with observer-rated psychological adjustment. This can be problematic because SE may also be linked to generalized positive impressions. Residualizing observer ratings from self estimates, then, would lead researchers to underestimate or even neglect the relation between SE and peer-rated psychological adjustment.

Relation Between Self-Enhancement Assessment Method and Psychological Adjustment

How are the aforementioned SE assessment methods linked to psychological adjustment? Regardless of whether it is assessed through BTAE measures, narcissism scales, or observer-based criterion measures, SE is positively linked to indicators of intrapersonal adjustment, such as self-esteem, positive affect, satisfaction with life, and emotional stability (Sedikides et al., 2004; Sedikides & Gregg, 2008; Taylor et al., 2003; Yik, Bond, & Paulhus, 1998). Furthermore, SE longitudinally predicts intrapersonal adjustment (Bonanno, Field, Kovacevic, & Kaltman, 2002; Bonanno, Rennicke, & Dekel, 2005; Zuckerman & O'Loughlin, 2006).

The link between SE and interpersonal adjustment, however, has not been that straightforward. BTAE measures are positively associated with observer-rated adjustment indicators, such as likability (Taylor et al., 2003). In contrast, the association between narcissism and interpersonal adjustment is mixed: whereas some studies suggest that narcissists are popular (Young & Pinsky, 2006) and likeable (Back, Schmukle, & Egloff, 2010a), other studies suggest that narcissists are described as disagreeable by others (Paulhus, 1998, 2001; Vazire, Naumann, Rentfrow, & Gosling, 2008). Given that narcissism is a multicomponent construct (Gregg & Sedikides, 2010; Raskin & Hall, 1979, 1981), it is unclear whether these associations are driven

by SE. Moreover, associations between narcissism and interpersonal adjustment may depend on acquaintance duration or familiarity. Positive associations with observer-rated adjustment indicators emerge mainly among short-term acquaintances, with negative associations among longer acquaintances (Paulhus, 1998, 2001).

In the case of observer-based criterion measures of SE, the results have been inconsistent. Target persons who self-enhance relative to observer ratings have been judged as psychologically maladjusted by independent coders in some studies (Colvin et al., 1995) and have been seen as neutral (i.e., neither adjusted nor maladjusted) by observers in other studies (Yik et al., 1998). Furthermore, in a third batch of studies, the relation between SE and observer-rated psychological adjustment remained positive even when observer ratings had been partialed out (Taylor et al., 2003).

Summing up, SE is positively associated with intrapsychic adjustment regardless of how SE has been assessed. In contrast, methodological issues complicate the interpretation of findings concerning the relation between SE and interpersonal adjustment.

Intellectual Self-Enhancement and Psychological Adjustment

These problems can be circumvented if the external benchmark does not depend on observer ratings. Such a practice can be accomplished by comparing expected or self-rated performance on a certain task with objective task outcomes or criteria. This practice represents the fourth assessment of SE. Performances on computer games (Johnson et al., 2006), academic grades (Gramzow, Elliot, Asher, & McGregor, 2003), or intelligence test scores (Gabriel, Critelli, & Ee, 1994; Paulhus & John, 1998; Stankov & Crawford, 1997) have been implemented as objective criteria. Intelligence test scores are especially well suited as criteria, given that, for more than a century of research, they have been shown to be valid and reliable indicators of cognitive performance (Sternberg, 2000).

The literature suggests a positive relation between intellectual SE and intrapersonal adjustment. Having a positive opinion of one's cognitive or academic abilities is related to global feelings of competence and self-worth (Marsh, 1986, 1990). Moreover, overestimating one's intelligence is associated with high self-esteem. In the above-mentioned study by Gabriel et al. (1994), participants rated their own intelligence on a percentile scale as compared to the average student. Verbal and mathematical assessments of intelligence were

also available. SE was defined as self-rated intelligence independently of actual intelligence. The more participants overestimated their intelligence, the higher their self-esteem was.

Unlike intellectual SE, self-esteem is a global trait: it depends on the positivity of both self-evaluations and feelings toward one's self (Sedikides & Gregg, 2003; Tafarodi & Milne, 2002). Self-esteem is closely associated with other indicators of psychological adjustment. It is linked to positive emotions and subjective well-being, and is inversely linked to depression and anxiety (DeNeve & Cooper, 1998; Neiss et al., 2005; Trzesniewski et al., 2006). Given that intellectual SE is related to self-esteem, intellectual SE will likely be related to psychological adjustment, whereas self-esteem might qualify as a mediator of that relation. Consistent with this reasoning, self-esteem has, in some studies, emerged as a mediator of the link between SE and psychological adjustment. For example, Wu, Tsai, and Chen (2009) reported that self-esteem mediates the concurrent association between an aggregate positive beliefs variable consisting of SE, optimism, and control beliefs and life satisfaction.

What is the association between intellectual SE and interpersonal adjustment? The relevant literature has been rather scarce. Whereas it has been shown that peer acceptance affects self-evaluations positively (Leary & Baumeister, 2000; Srivastava & Beer, 2005), it is also possible that intellectual SE affects peer evaluations. Intellectual self-enhancers may be liked by others due to their high self-esteem (Hoorens, 2011; Sedikides, Gregg, & Hart, 2007; Sedikides & Skowronski, 2000). Self-esteem is associated with individuals' ability to form supportive and close relationships with others (Swann et al., 2007). In particular, individuals high in self-esteem are socially skilled (Riggio, Throckmorton, & DePaola, 1990), feel valued by intimate others (Murray, Holmes, & Griffin, 2000), and affirm those others (Murray, Rose, Bellavia, Holmes, & Kusche, 2002). In conclusion, intellectual SE is positively linked to self-esteem (Gabriel et al., 1994), and self-esteem is likely to engender social benefits. Therefore, we hypothesized that intellectual SE would increase likability in long-term acquaintances, with this effect being mediated by self-esteem.

Outline and Hypotheses

The current research had two aims. The first aim was to investigate the processes that underlie the association between intellectual SE

and psychological adjustment. We took a face-valid approach to the assessment of SE by statistically removing variance from self-rated intellectual ability that it shared with actual intellectual ability. We hypothesized that SE would be positively related to intrapersonal adjustment, with this link being mediated by self-esteem. Despite the fact that intellectual SE shares variance with narcissism (Gabriel et al., 1994), which has positive social consequences only at short acquaintance (Paulhus, 1998, 2001), we hypothesized that intellectual SE predicts likability in long-term acquaintances. We also hypothesized that this positive link between SE and likability would be mediated by self-esteem.

Our second aim was to test whether empirical associations between SE and psychological adjustment vary systematically depending on the methodology used to assess SE. As such, we included two popular measures alongside intellectual SE: narcissism scales and self-ratings controlled for peer ratings of intelligence (instead of actual intelligence values). We hypothesized that all three measures of SE (i.e., intellectual SE, narcissism, SE index using peer ratings as criteria) would be similarly related to intrapersonal adjustment. Our hypotheses differed, however, in terms of interpersonal adjustment. Concerning the link between narcissism and interpersonal adjustment, we hypothesized that the SE component of narcissism predicts likability, whereas its other components may account for negative social effects. Kubarych et al. (2004) presented a factor solution of the Narcissistic Personality Inventory (NPI; Raskin & Hall, 1979, 1981) that distinguishes a subfacet labeled Special Person from a Power and an Exhibitionism subfacet. We tested which of these subfacets best predicts SE, and we hypothesized that this facet would also predict likability. Moreover, we hypothesized that the short- and long-term effects of narcissism would differ from the corresponding effect of intellectual SE: unlike intellectual SE, narcissism would be positively linked to likability mainly at short (compared to long) acquaintance.

Lastly, we formulated a methodological hypothesis concerning the link between an SE indicator using peer ratings as a benchmark and interpersonal adjustment. Statistically, an SE index partialing out actual intelligence and an index partialing out peer ratings of intelligence can be expected to overlap largely, as both indicators represent intelligence self-ratings with different portions or variance being partialed out. Nevertheless, we argue that the portion of vari-

ance that is removed by partialing out intelligence peer ratings contains variance that intelligence peer ratings share with peer ratings in general. If SE is linked to generalized positive impressions, partialing out one outcome (i.e., intelligence) will lead to an attenuation of the link between SE and another outcome (i.e., likeability). Therefore, we hypothesized that when peer ratings (vs. actual intelligence values) were used as the benchmark, the positive links between residualized SE and interpersonal adjustment would be attenuated.

STUDY 1

Study 1 was an online concurrent investigation. We assessed verbal knowledge—a core aspect of crystallized intelligence—through a vocabulary test and instructed participants to estimate their verbal knowledge. This method allowed us to compare self-beliefs about crystallized intelligence to actual crystallized intelligence. Furthermore, we obtained peer-rated measures of interpersonal adjustment and personality: we asked participants to invite a friend to sign in for the survey and provide peer ratings. We will refer to participants as target persons and to their friends as peers.

Method

Sample and Procedure

The sample consisted of German-speaking Internet users, with 2,306 target persons completing the online survey. We excluded participants who did not follow instructions (258). The resulting N was 2,048. Target person mean age was 27.58 years ($SD = 8.8$). Seventy-six percent of target persons were either students or had obtained a university degree, and 70% were female. The study was advertised as a survey on "vocabulary skills, personality and friendship" on several email lists, including one that targeted students of several universities in Berlin.

    First, target persons completed self-perception and psychological adjustment scales. Next, they took the vocabulary test. As an incentive, they received a personality profile and detailed feedback about their performance on the vocabulary test at the end of the study. Subsequently, they were asked to invite a friend, who knew them well and who was not their romantic partner, to participate in the study. Target persons who proceeded to invite a peer were given the opportunity to participate in a lottery and win an electronic audio device. Target persons were

reassured that peers would have no access to performance outcomes; therefore, target persons had no reason to expect peer feedback on their performance.

Peer ratings of psychological adjustment and personality were available for 420 of the target persons. We excluded 82 peers who did not follow instructions. The resulting N was 338. The peer mean age was 27.22 years ($SD = 8.62$), and 74% of the peers were either students or held a university degree. In 77% of the cases, target persons had invited same-sex peers to participate in the study. Of the peers, 96% indicated that they had known the target persons for more than one year, and 67% indicated that they had known the target person for more than four years. Target persons for whom peer ratings were available did not differ meaningfully from target persons for whom peer ratings were unavailable on any of the predictor or outcome variables.[1]

Self-Enhancement Measures

We used the following performance indicators and self-rating scales for the assessment of self-enhancement. We assessed verbal intelligence with the Multiple-Choice Vocabulary Test [Mehrfachwahl Wortschatz-test] (MWT; Lehrl, 1995). This test consists of 35 sets of five alternative letter combinations, only one of which is a correctly spelled word. We used the number of correctly answered items as the total score ($M = 25.44$, $SD = 3.66$; $\alpha = .68$). We constructed a scale to assess target persons' self-rated verbal intelligence consisting of the following six items (1 = *does not apply to me*, 7 = *fully applies to me*): "I have a large vocabulary," "I am unfamiliar with many foreign words that other people know" (reverse scored), "I am intelligent," "I know more things than other people," "I am not very knowledgeable" (reverse scored), "I consider myself erudite" ($\alpha = .93$). We computed an index of intellectual SE by partialing out verbal intelligence (i.e., vocabulary test) scores from self-rated verbal intelligence scores. That is, we removed systematic variance due to actual ability from self-rated ability. This way, the measure contained (next to a certain degree of error variance) self-ratings of intelligence that were statistically independent of actual intelligence. We used standardized residuals in all analyses. We assessed narcissism with the validated German version (Schütz, Marcus, & Sellin, 2004) of the NPI (Raskin & Hall, 1979, 1981). This scale consists of 40 items. Participants indicate their endorsement of each item on a 2-point scale (1 = *agree*, 2 = *disagree*;

1. Two effects were statistically significant. Not only were they inconsequential to the theoretical issues involved, but also the relevant effect sizes were negligible ($d = .05$).

$\alpha = .83$). Along with the total score of the NPI, we assessed scores for the three subscales: Special Person ($\alpha = .63$; sample item: "I am more capable than other people"), Power ($\alpha = .75$; sample item: "I have a natural talent for influencing people"), and Exhibitionism ($\alpha = .63$; sample item: "I like to be the centre of attention"). Finally, we computed an SE_p index using not actual intelligence but rather peer-rated intelligence as a criterion (see below for the assessment of peer-rated intelligence). We did so by removing from self-rated intelligence variance that was shared between self-rated and peer-rated intelligence. We saved standardized residuals and used them as SE_p indicators.

Intrapersonal Adjustment

We used the following scales for the assessment of intrapersonal psychological adjustment, as reported by target persons. We assessed self-esteem with the Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965—revised German adaptation by von Collani & Herzberg, 2003). The RSES comprises 10 items ($1 = strongly\ agree$, $4 = strongly\ disagree$). Sample items are "I take a positive attitude toward myself" and "At times I think I am no good at all" (reverse scored; $\alpha = .88$). We assessed positive affect with portions of the expanded form of the Positive and Negative Affect Schedule (PANAS-X, Watson & Clark, 1994; Watson, Clark, & Tellegen, 1988). Specifically, we selected the 10 items that measure general positive emotions (e.g., active, enthusiastic).[2] Participants rated ($1 = very\ slightly\ or\ not\ at\ all$, $5 = extremely$) the extent to which they felt in accordance with each item during "the past week, including today" ($\alpha = .87$). We assessed life satisfaction with the Satisfaction With Life Scale (Diener, Emmons, Larsen, & Griffin, 1985—German version by Schumacher, Klaiberg, & Brähler, 2003). The scale comprises five items ($1 = strongly\ disagree$, $7 = strongly\ agree$). Sample items are "In most ways my current life is close to my ideal" and "I am satisfied with my life" ($\alpha = .86$). Lastly, we assessed depression with the German short version of the Center for Epidemiological Studies Depression Scale [Allgemeine Depressionsskala] (ADS-K; Hautzinger & Bailer, 1993). The ADS-K measures depressive affect, physical symptoms, motoric inhibition, and dysfunctional cognition patterns in both clinical and subclinical populations ($\alpha = .74$).

2. We also assessed negative affect, and we found it to be highly correlated with depression in both studies. In addition, all results pertaining to the relation between negative affect and SE were virtually identical to those pertaining to the relation between depression and SE (Neiss, Stevenson, Legrand, Iacono, & Sedikides, 2009). Due to the large overlap with depression and for reasons of brevity, we refrained from reporting these results.

Peers' Perceptions of Target Persons

We used the following scales to assess how self-enhancers are perceived by their peers. Target persons' verbal intelligence was rated by their peers on the same six items as the ones that target persons used to rate themselves (1 = *does not apply to my friend at all*, 7 = *fully applies to my friend*). Sample items are "My friend has a large vocabulary" and "My friend knows more things than most other people" ($\alpha = .81$). We assessed likability with a shortened and revised version of a scale (1 = *not at all*, 6 = *very much*) developed by Back, Schmuckle, and Egloff (2010b) that measures positive affective reactions toward a specific other person. The scale consists of four items. Sample items are "I like my friend" and "I get along with my friend very well" ($\alpha = .81$). Lastly, we assessed peer-rated Agreeableness with the Big Five Inventory-SOEP (BFI-S; Schupp & Gerlitz, 2008). The BFI-S is a brief measure of the Big Five personality traits (0 = *totally applies to me*, 4 = *doesn't apply to me at all*) that has been developed in the context of the Socio Economic Panel (SOEP; a large and representative German study) and has been adapted for the assessment of peer-rated Agreeableness. The BFI-S consists of 15 items, and we assessed Agreeableness using the following three items: "My friend is someone who has a forgiving nature," "My friend is someone who is considerate and kind to others," and "My friend is someone who sometimes is somewhat rude to others" (reverse scored; $\alpha = .61$).

Results and Discussion

Preliminary Analyses

Mean self-ratings on verbal intelligence were above the midpoint of the scale ($M = 5.51$; $SD = .82$), $t(2,047) = 82.75$, $p < .001$, $d = 1.83$. Interestingly, peers thought even higher of the target persons' intelligence ($M = 6.24$; $SD = .68$) than the target persons themselves did, $t(337) = 14.43$, $p < .001$, $d = .97$. Actual intelligence and self-rated verbal intelligence were positively related, $r = .23$, $p < .001$, as were actual and peer-rated verbal intelligence, $r = .24$, $p < .001$, and self- and peer-rated verbal intelligence, $r = .27$, $p < .001$.

Self-Enhancement and Intrapersonal Adjustment

We then tested the hypothesis that self-esteem mediates positive links between SE and intrapersonal adjustment (Baron & Kenny, 1986). SE was positively related to the mediator, self-esteem, $\beta = .38$, $p < .001$, as well as to two outcome variables, life satisfaction,
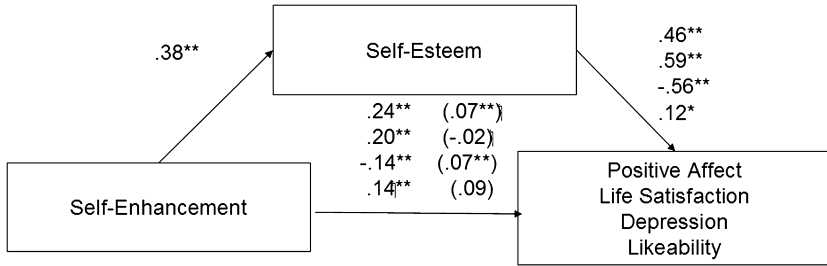
Figure 1
Mediation model of self-enhancement, self-esteem, positive affect, life satisfaction, depression, and likeability. *$p < .05$, **$p < .01$.

$\beta = .20$, $p < .001$, and positive affect, $\beta = .24$, $p < .001$, whereas it was negatively related to the third outcome variable, depression, $\beta = -.14$, $p < .001$. Thus, the first two mediational steps were met for all outcome variables. When in a next step both SE and self-esteem were entered as predictors, self-esteem predicted positive affect, $\beta = .46$, $p < .001$, life satisfaction, $\beta = .59$, $p < .001$, and depression, $\beta = -.56$, $p < .001$, over and above the effect of SE (see Figure 1). Sobel tests revealed that including self-esteem next to SE as an additional predictor led to significant declines in the strength of associations between SE and positive affect, $z = 14.33$, $p < .001$, life satisfaction, $z = 15.80$, $p < .001$, and depression, $z = 15.29$, $p < .001$. In all, as hypothesized, self-esteem mediated the association between SE and intrapersonal adjustment.

Self-Enhancement and Interpersonal Adjustment

Next, we tested how self-enhancers were seen by their peers. SE was positively related to peer-rated likability, $r = .14$, $p < .01$, and unrelated to peer-rated Agreeableness,[3] $r = -.03$, $p = .59$. We proceeded to test whether the positive association between SE and likability was mediated by self-esteem. Self-esteem predicted likability over and above the effect of SE, $\beta = .12$, $p < .05$, and a Sobel test revealed the significance of the indirect path, $z = 2.01$, $p < .05$ (see Figure 1). Thus, as hypothesized, self-esteem mediated the association between SE and likability.

3. It may be the case that SE leads to interpersonal problems only when it occurs at an extreme level (Baumeister, 1989). Therefore, in both studies, we entered SE squared as an additional predictor (next to SE) and tested for curvilinear associations between SE and interpersonal adjustment. We found none.

Intellectual Self-Enhancement in Comparison to Other Measures of Inflated Self-Views

We subsequently tested whether the association between SE and psychological adjustment systematically varied depending on methodology. As alternative measures of SE, we used narcissism and the SE_p index, which involved not actual intelligence but rather peer-rated intelligence as a criterion.

SE was positively related to narcissism, $r = .46$, $p < .001$, and largely overlapping with SE_p, $r = .95$, $p < .001$. We have argued that the relation between SE and intrapersonal adjustment is positive regardless of which SE measure is used. Indeed, the pattern of correlations with indicators of intrapersonal adjustment was the same for all three measures (see Table 1). Based on participants for whom data for all three SE indicators were available ($N = 338$), we tested whether the strength of correlations with the intrapersonal adjustment indicators differed for the three SE measures. Two-tailed t tests for dependent correlations indicated that only in one instance did a difference in correlations between the SE measures and adjustment exist: narcissism was more weakly correlated to depression than both

Table 1
Study 1: Correlations of Self-Enhancement and Narcissism With Psychological Adjustment

	Self-Esteem	Life Satisfaction	Positive Affect	Depression	Likability	Agreeableness
SE	.38**	.20**	.24**	−.14**	.14**	−.03
NA	.31**	.23**	.28**	−.05**	.11*	−.12*
SP	.40**	.30**	.32**	−.10**	.15**	.01
P	.23**	.16**	.21**	−.05*	.04	−.17**
Ex	.05*	.06**	.11**	.06**	.06	−.12*
SE_p	.41**	.23**	.14**	−.19**	.08	−.06

Note. $n = 2,048$ for all variables based on self-ratings; $n = 338$ for all variables involving peer ratings. SE = intellectual self-enhancement; NA = narcissism; SP = Special Person (Kubarych et al., 2004); P = Power (Kubarych et al., 2004); Ex = Exhibitionism (Kubarych et al., 2004); SE_p = self-enhancement index using peer ratings as criteria.
*$p < .05$. **$p < .01$ (two-tailed).

SE, $t(334) = -2.12$, $p < .05$, and SE_p, $t(334) = -2.05$, $p < .05$. In all other cases, the correlations with adjustment indicators were the same for all three measures.

We further argued that the relation between SE and interpersonal adjustment depends on the methodology adopted to assess SE. First, we compared narcissism to intellectual SE. Like intellectual SE, narcissism was positively linked to likability, $r = .11$, $p < .05$. Unlike SE, however, narcissism was negatively linked to peer-rated Agreeableness, $r = -.12$, $p < .05$. As indicated by a t test, the negative correlation between narcissism and Agreeableness was not significantly stronger than the one between SE and Agreeableness, $t(334) = 1.58$, $p = .11$. As a reminder, we hypothesized that a positive association between narcissism and likability is due to the SE component of narcissism. In testing this hypothesis, we focused on the subfacets of the NPI. To determine which subfacet is the one most indicative of SE, we simultaneously regressed intellectual SE on the three NPI subfacets. SE was best predicted by Special Person, $\beta = .40$, $p < .001$, followed by Power, $\beta = .17$, $p < .001$, and Exhibitionism, $\beta = -.03$, $p = .19$. Consistent with our reasoning, only the subfacet most indicative of SE (Special Person) was positively linked to likability, whereas the other subfacets were negatively linked to Agreeableness (see Table 1). These findings indicate that the SE component of narcissism accounts for the positive link to likability, whereas the other components account for the negative link to Agreeableness. This conclusion is buttressed by the findings that the positive link between the overall NPI score and likability became nonsignificant when we computed a partial correlation controlling for SE, $r = .06$, $p = .28$, whereas the negative link between the overall NPI score and Agreeableness was still significant, $r = -.12$, $p < .05$. In all, SE accounted for narcissists' likability but not for their disagreeableness.

Lastly, we compared the SE_p indicator, which used peer ratings as criteria, to intellectual SE. We argued that the use of peer ratings as criteria for the measurement of SE may lead to an underestimation of positive links between SE and peer-rated psychological adjustment. Consistent with this proposition, SE_p was (in contrast to the more valid SE index) not significantly linked to likability, $r = .08$, $p = .14$. As indicated by a t test for dependent correlations, SE_p was less strongly correlated to likability than SE, $t(334) = 3.55$, $p < .001$. Had we used solely peer ratings as a criterion, the positive link between SE and likability would have remained undetected.

Summary

The results of Study 1 provide converging evidence in support of the hypothesis that intellectual SE is positively associated with intrapersonal and interpersonal adjustment, while these associations are mediated by self-esteem. Stated otherwise, self-enhancers were well adjusted mainly due to their high self-esteem. Also as hypothesized, links between SE and interpersonal (but not intrapersonal) adjustment differed depending on methodology.

STUDY 2

Given that the concurrent design of Study 1 prohibited causal inferences, in Study 2 we implemented a longitudinal approach with the aim to examine the dynamic processes underlying the association between SE and psychological adjustment over time. Within a naturalistic round-robin design, formerly unacquainted participants were randomly assigned to different groups and regularly interacted with each other over an 8-month period. This design enabled us to control statistically for a certain type of response bias, the *perceiver effect* (Kenny, 1994). This effect refers to the tendency to evaluate positively not only oneself, but also others. This bias is confounded with positive self-ratings, as persons providing positive ratings for themselves can have either a positive view of people in general, including themselves (that is, a high perceiver effect), or a positive view of themselves exclusively (Kwan, John, Kenny, Bond, & Robins, 2004). Given that the perceiver effect itself is positively related to both SE and psychological adjustment (Wood, Harms, & Vazire, 2010), it remains unclear whether an SE index that is statistically independent of the perceiver effect would still be related to psychological adjustment, and that is why we controlled statistically for the perceiver effect. Using this bias-free index of intellectual SE, we examined its relation with intrapersonal as well as interpersonal adjustment. Again, we hypothesized that SE is positively linked to indicators of intrapersonal and interpersonal adjustment, while these links are mediated by self-esteem.

As in Study 1, we compared the links between intellectual SE and psychological adjustment to those between two alternative measures of SE: (1) narcissism and (2) an SE_p index using peer ratings as criteria. Whereas in Study 1 we focused on the different components

of narcissism, in Study 2 we distinguished between the short-term as opposed to the longer-term effects of SE and narcissism. We hypothesized that, unlike intellectual SE, narcissism would evoke positive reactions mainly at short acquaintance. Finally, as in Study 1, we hypothesized that SE_p would be more weakly linked to likability than our initial SE index.

Method

Sample

Participants were first-year psychology students attending Utrecht University, the Netherlands. For educational purposes, first-year students in the Netherlands are randomly placed in groups in which they work together during the entire academic year to complete a substantial part of the psychology curriculum. The students had been assigned to one of the 20 introduction groups of approximately 25 people each ($N = 489$). The study was advertised via emails, flyers, posters, and an announcement during the first lecture. A total of 378 participants (77% of all first-year students) stemming from 18 groups signed up through a Web site. Of these, we selected the 10 groups in which more than 80% of participants had registered for our study. The original sample included 238 students from these 10 groups. The mean participant age was 18.9 years ($SD = 1.7$), and 181 of them (82%) were female. The majority of participants (92%) were of Dutch origin. Due to dropouts, the sample size diminished to 213 participants at the last wave of data collection. Intelligence test scores, which were necessary for the computation of the SE index, were available for 188 students.

Design and Procedure

Data were collected as part of a larger project consisting of six waves. For the current purposes, however, data were collected only in three waves.[4] Starting from the second week of their first academic year, participants completed the questionnaires online by accessing a Web site with a personal password (Wave 1). After 4 months, participants completed a second wave of data collection (Wave 2). Four months later (one month before the second semester's final examinations), participants completed the third data collection wave (Wave 3). During each wave, we assessed different indicators of intrapersonal adjustment (i.e., self-esteem, positive emotional experience, depression). Further, each participant rated herself or himself, as well as every other group member, in terms of several attributes and personality traits (i.e., intelligence, likability, Agreeable-

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4. These were Waves 1, 2, and 4 of the original project.

ness). Waves 2 and 3 included narcissism measures, and Wave 3 an intelligence measure. We randomized the order of rating scales. Finally, participants were guaranteed confidentiality.[5]

Self-Enhancement Measures

Participants completed the measures as part of a general battery of measures. To combat participant fatigue and malaise, we collected peer ratings with single items. Intelligence is a relatively stable personality trait, and, as such, we opted to assess it only once, in Wave 3, with a shortened (15 instead of 36 items) version of the Raven Advanced Progressive Matrices (Raven, 1990). We aggregated items to form a composite scale of cognitive ability ($\alpha = .71$). The mean score on this scale was 10.72 ($SD = 2.80$), with a skew of $-.51$ ($SE = .18$) and a kurtosis of $-.20$ ($SE = .35$). Processing time correlated with test performance, $r = .28$, $p < .01$, and we thus partialed it out of the test scores for all subsequent analyses. We assessed self-rated intelligence with the following item: "Some people are dull and not so intelligent, whereas other people are very intelligent and clever. Please rate yourself and your group members on this dimension" (1 = *not intelligent*, *dull*, 7 = *very intelligent*, *clever*). Retest reliability was $r = .62$, $p < .001$ (Wave 1 to Wave 2). The perceiver effect in terms of intelligence refers to whether a respondent tends to rate others as intelligent. To obtain a measure of the perceiver effect, we assessed how positively or negatively a participant evaluated his or her group members as compared to the group mean. Higher scores indicated a stronger tendency to provide high ratings in terms of intelligence. To gain an index of intellectual SE, we partialed intelligence test scores, as well as the intelligence perceiver effect, out of intelligence self-ratings. Stated otherwise, we statistically removed from the intelligence self-ratings systematic variance shared with actual intelligence (IQ) as well as with the perceiver effect. The remaining residuals contained (next to a certain degree of error variance) self-ratings of intelligence that were statistically independent of actual intelligence and the perceiver effect. We calculated the SE index separately for each wave and used standardized residuals for all subsequent analyses. We assessed narcissism using an adapted version of the 10-item Childhood Narcissism Scale (CNS; Thomaes, Stegge, Bushman, Olthof, & Denissen, 2008). One of the benefits of this scale is its short completion time. The scale is internally consistent, is single-factored, and has good reliability and validity. To adapt the scale

5. As the sample consisted of 10 different student groups, it was unclear whether multilevel models would be appropriate. We examined this possibility by including group membership as a Level 2 predictor. This practice did not change the pattern or the strength of Level 1 relations. Hence, we did not consider Level 2 variation in further analyses.

to the measurement of adult narcissism, we replaced words such as *kids* and *class* with suitable adult terms. Sample items are "I like to think how incredibly nice I am" and "I love showing all the things I can do" (0 = *not at all true*, 4 = *completely true*). Alphas were .81 for Wave 2 and .83 for Wave 3. Finally, for each wave, we computed an SE_p index using not actual intelligence but rather peer-rated intelligence as a criterion (see below for the assessment of peer-rated intelligence). We did so by removing from self-rated intelligence shared variance between self-rated and peer-rated intelligence. We saved standardized residuals and used them as SE_p indicators.

Intrapersonal Adjustment

As in Study 1, we assessed self-esteem with the RSES (Rosenberg, 1965). The range of alphas was .86–.89 for the three waves. Also as in Study 1, we used 10 items of the expanded form of the PANAS-X (Watson & Clark, 1994; Watson et al., 1988) for the assessment of positive affect. Participants rated their positive emotional experience during "the past week, including today" (1 = *very slightly or not at all*, 5 = *extremely*). Alphas ranged from .75 to .87. We assessed depression with a modified version of the Beck Depression Inventory (BDI; Beck, Steer, & Brown, 1996). The BDI comprises 21 symptoms. In the original version, participants are asked to indicate agreement with a certain intensity level of each item (i.e., depressive symptom). In the modified version, participants rated (1 = *completely true*, 5 = *not at all true*) only the highest intensity level of each symptom. Example items are "I feel my future is hopeless and will only get worse" and "I blame myself for everything bad that happens." Alphas ranged from .89 to .94.

Peers' Perceptions of Target Persons

The following scales assessed how self-enhancers are perceived by their peers. We averaged peer ratings for each target person. Target persons' intelligence was rated by their peers on the same item as the one that target persons used to rate themselves. Hierarchical linear model (HLM) intercept reliabilities for peer-rated intelligence ranged from .75 to .81 over the three waves.[6] We used the following item to assess likability: "You don't

6. We derived all reliability estimates using multilevel analyses, where single ratings represented Level 1 and target persons represented Level 2. A consideration of group membership as a third level only led to very slight decreases in reliability of the peer-rated measures (mean HLM reliability over all variables and all waves was .76 using two levels of analysis and .72 using three levels of analysis). Therefore, we report the more parsimonious two-level estimates.

like some people at all while you like other people very much. Please rate yourself and your group members on this dimension." Participants rated the likability of each target person on a scale ranging from 1 (*do not like him or her at all*) to 7 (*like him or her very much*). HLM intercept reliabilities ranged from .59 to .63. Finally, we assessed Agreeableness with an item from the Ten Item Personality Inventory (TIPI) that was developed by Gosling, Rentfrow, and Swann (2003) and has been adopted and modified by Denissen, Geenen, Selfhout, and van Aken (2008). Specifically, we combined the two Agreeableness items into one bipolar rating scale (critical, quarrelsome vs. sympathetic, warm) on which participants rated their peers and themselves. The scale ranged from 1 (*extremely like the left adjective pair*) to 7 (*extremely like the right adjective pair*). Self-ratings derived from this measure have been shown to correlate significantly with Agreeableness items of the Big Five Inventory (Denissen et al., 2008; John & Srivastava, 1999). HLM intercept reliabilities ranged from .67 to .75.

Results and Discussion

Preliminary Analyses

Mean intelligence self-ratings across all three data collection waves were above the scale midpoint ($M = 5.18$; $SD = .75$), $t(189) = 21.81$, $p < .001$, $d = 1.57$, indicating that participants thought rather highly of their intellectual abilities. A comparison of mean intelligence self-ratings and mean peer ratings across all three waves further revealed that participants saw themselves as more intelligent than they were seen by their peers ($M = 4.84$; $SD = .48$), paired samples $t(189) = 6.89$, $p < .01$, $d = .54$. Actual intelligence and self-rated intelligence were positively related, $r = .24$, $p < .001$, as were actual and peer-rated intelligence, $r = .17$, $p < .01$, and self- and peer-rated intelligence, $r = .37$, $p < .001$.

Self-Enhancement and Intrapersonal Adjustment

Next, we examined the relation between SE and intrapersonal adjustment. At all three waves, SE was positively related to self-esteem and positive affect, whereas it was negatively related to depression—marginally at Wave 2, significantly at Wave 3 (see Table 2). With the exception of the unexpected nonsignificant association between SE and depression at Wave 1, these results suggest a positive association between SE and intrapersonal adjustment.

Table 2

Study 2: Correlations of Self-Enhancement and Narcissism With
Psychological Adjustment

		Self-Esteem	Positive Affect	Depression	Likability	Agreeableness
Wave 1	SE	.26**	.20**	−.05	.02	.05
	NA	.40**	.18**	−.18**	.17*	.09
	SE$_p$	.31**	.16*	−.08	−.07	−.07
Wave 2	SE	.30**	.19**	−.13†	.07	.04
	NA	.31**	.22**	−.19**	.04	.04
	SE$_p$	.28**	.14†	−.09	−.12†	−.10
Wave 3	SE	.25**	.23**	−.18*	.19*	.08
	NA	.32**	.15*	−.15*	−.08	−.16*
	SE$_p$	.23**	.20**	−.11	−.06	−.06

Note. N ranged from 183 to 220 participants. SE = self-enhancement; NA = narcissism; SE$_p$ = self-enhancement index using peer ratings as criteria.
*$p < .05$. **$p < .01$. $^†p < .10$ (two-tailed).

   Nevertheless, the results do not inform about the nature of this relation. It is unclear whether SE drives adjustment or vice versa. To address this issue, we used cross-lagged longitudinal models and predicted rank-order changes in intrapersonal adjustment over time by initial SE values. In these analyses, a participant's intrapersonal adjustment was predicted by his or her previous SE level as well as by previous adjustment (autoregressive path). We did this separately for the three indicators of intrapersonal adjustment and estimated two regression coefficients, one for each time interval (i.e., between Waves 1 and 2, between Waves 2 and 3).

   All autoregressive paths were significant. For self-esteem, regression coefficients were $β = .73$, $p < .001$ and $β = .80$, $p < .001$, for the two time intervals. For positive affect, they were $β = .29$, $p < .001$ and $β = .41$, $p < .001$; and, for depression, they were $β = .58$, $p < .001$ and $β = .62$, $p < .001$. Thus, the indicators of intrapersonal adjustment showed moderate to strong rank-order stability over time. More interestingly, initial SE predicted rank-order increases in self-esteem, $β = .12$, $p < .05$, during the first time interval and marginal rank-order increases in positive affect, $β = .13$, $p = .07$, during the second time interval. Furthermore, SE was related to rank-order

decreases in depression during both the first time interval, β = –.14, $p < .05$, and the second time interval, β = –.13, $p < .05$. SE, then, was related to relative increases in intrapersonal adjustment and to decreases in maladjustment over a 4-month period.

We subsequently tested whether changes in SE follow initial levels of adjustment. We computed regression analyses using prior adjustment and SE as predictors, and later SE as a criterion. Again, autoregressive paths were significant both for the first time interval, β = .53, $p < .001$, and for the second time interval, β = .63, $p < .001$, indicating that SE is moderately stable over time. However, only one result stands in partial support of the idea that prior psychological adjustment predicts increases in SE. Specifically, Wave 2 SE was marginally predicted by Wave 1 self-esteem, β = .11, $p = .09$, when prior self-esteem was controlled. These results do not provide unequivocal support for the claim that SE is a consequence of psychological adjustment. Rather, the results, taken together, indicate that SE is related to rank-order increases in psychological adjustment over time. SE may positively affect intrapsychic adjustment.

As a next step, we focused on the possible mechanism underlying this effect. We examined the proposal that self-esteem mediates the associations between SE and other psychological adjustment indicators. As all zero-order correlations between the predictor and the criteria were significant at Wave 3, we analyzed data from this wave. SE was related to all outcome variables as well as to the mediator variable (see Figure 2), and so the first two mediational steps were met. When in a next step both SE and self-esteem were entered as
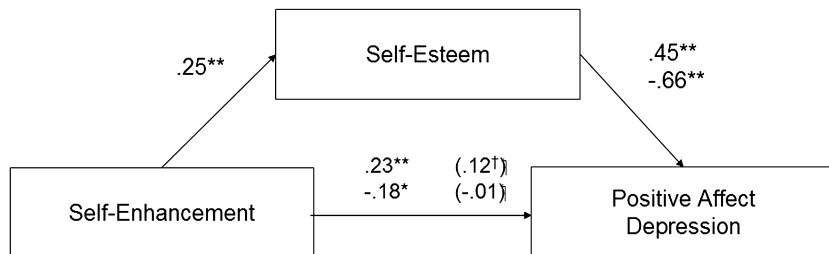
Figure 2
Mediation model of self-enhancement, self-esteem, positive affect, and depression (Wave 3 data). *$p < .05$, **$p < .01$, †$p < .10$.

predictors, self-esteem significantly predicted positive affect, β = .45, $p < .001$, and depression, β = –.66, $p < .01$, over and above the effect of SE. Sobel tests revealed significant indirect effects for positive affect, $z = 3.03$, $p < .01$, and depression, $z = 2.34$, $p < .05$. These results indicate that the links between SE and intrapersonal adjustment are mediated by self-esteem.

Self-Enhancement and Interpersonal Adjustment

Next, we analyzed how self-enhancers are seen by their peers. SE was positively related to peer-rated likability, $r = .19$, $p < .05$, at Wave 3. Self-enhancers, then, were liked after 8 months of acquaintanceship. We examined the temporal development of this association in detail.

Specifically, we implemented a cross-lagged longitudinal model and predicted later likability by prior SE while controlling for prior likability. The autoregressive paths showed that likability was rather stable over time at both the first interval, β = .65, $p < .001$, and the second interval, β = .72, $p < .001$. Moreover, Wave 3 likability was predicted by Wave 2 SE when controlling for Wave 2 likability, β = .15, $p < .01$. Thus, SE led to increases in peer-rated social acceptance over time; self-enhancers, in fact, became more likable.

We also tested the possibility that, just the other way around, likability predicted inflated self-perception of intelligence. A cross-lagged longitudinal model showed a marginal positive relation between Wave 2 likability and Wave 3 SE when controlling for Wave 2 SE, β = .11, $p = .08$. Intellectual self-enhancers became increasingly likable over time, and being liked by others might also have fostered inflated self-views.

Lastly, we examined whether the positive link between SE and likability obtained at Wave 3 was mediated by self-esteem. As shown above, SE was positively related to likability, β = .19, $p < .05$, as well as to self-esteem, β = .25, $p < .001$. Further analyses, however, revealed that self-esteem did not predict likability when SE was controlled, β = .08, $p = .31$. Therefore, unlike in Study 1, self-esteem did not mediate the link between SE and likability.

Intellectual Self-Enhancement in Comparison to Other Measures of Inflated Self-Views

We then tested whether the association between SE and psychological adjustment systematically varies, depending on methodology. As

alternative measures of SE, we used narcissism and the SE_p index, which, again, relies on peer-rated (rather than actual) intelligence as a criterion. SE and narcissism were moderately correlated, with correlation coefficients ranging between $r = .25$, $p < .001$, at Wave 2, and $r = .23$, $p < .01$, at Wave 3. The overlap between SE and SE_p was again large, with correlation coefficients ranging between $r = .95$, $p < .001$, at Wave 1, and $r = .87$, $p < .001$, at Wave 3.

We have argued that the relation between SE and intrapersonal adjustment is positive, regardless of the SE measure implemented. Given the unavailability of narcissism scores for Wave 1, we used scores gathered at Wave 2 for the Wave 1 correlational analyses (retest reliability was $r = .75$, $p < .001$, from Wave 2 to Wave 3). Consistent with our hypothesis, the pattern of correlations with indicators of intrapersonal adjustment was the same for the initial SE index, narcissism, and SE_p (see Table 2). To test whether correlations with indicators of intrapersonal adjustment are statistically different for the three SE measures, we aggregated the values of the three measures over all three waves and correlated these aggregates with aggregated adjustment. As indicated by two-tailed t tests for dependent correlations, only in one instance did a difference in correlations between the SE measures and adjustment exist: SE_p was more weakly correlated to positive affect than SE, $t(185) = 2.35$, $p < .05$. In all other cases, the strength of correlations with adjustment indicators was the same for all three measures.

The pattern of relations with interpersonal adjustment, however, was markedly different for intellectual SE, narcissism, and SE_p. Unlike SE, narcissism was positively related to likability at Wave 1, $r = .17$, $p < .05$. As indicated by a t test, the positive correlation between narcissism and likability was marginally stronger than the one between SE and likability, $t(182) = 1.78$, $p = .08$. At Wave 3, however, after participants had become fairly well acquainted with each other, the picture had reversed: narcissism was uncorrelated with likability, whereas SE was now positively related to peer-rated likability, $r = .19$, $p < .05$. A t test revealed that self-enhancers were now more likable than narcissists, $t(180) = 2.92$, $p < .05$. Moreover, at Wave 3, narcissists were, unlike self-enhancers, seen as disagreeable by their peers, $r = -.16$, $p < .05$. As indicated by a t test, narcissists were deemed less agreeable than self-enhancers, $t(180) = 3.59$, $p < .01$. In all, self-enhancers became increasingly likable as peers got

to know them better, whereas narcissists evoked positive reactions in others only at first sight.

We further hypothesized that the use of peer ratings of intelligence as a criterion for the computation of an SE index would lead to an underestimation of positive links between SE and peer-rated psychological adjustment. As shown in Table 2, links between SE_p and peer ratings of interpersonal adjustment were consistently lower than those between the SE index and these adjustment indicators. At Wave 2, SE_p was even negatively related to likability at a marginal level, $r = -.12$, $p = .09$, and unlike SE, SE_p was unrelated to likability at Wave 3. As indicated by t tests for dependent correlations, the correlation between SE and likability was significantly stronger for SE than for SE_p at Wave 1, $t(182) = 4.01$, $p > .001$; Wave 2, $t(181) = 5.40$, $p < .001$; and Wave 3, $t(180) = 7.16$, $p < .001$. Thus, when peer ratings of intelligence were used as criteria, links between SE and interpersonal adjustment were weaker than when actual intelligence values have been used as benchmarks.

GENERAL DISCUSSION

The objective of the current research was twofold. Our first aim was to use an SE measure that is unaffected by the pitfalls of most existing measures and to examine the dynamics underlying its associations with psychological adjustment. Our second aim was to test whether choice of SE measure systematically affects empirical results concerning the association with psychological adjustment. We conducted two studies testing over 2,000 participants.

Concerning our first aim, findings were straightforward. The results provided convergent support for the positive illusions view of SE (Marshall & Brown, 2007; Taylor & Brown, 1988; Taylor, Kemeny, Reed, Bower, & Gruenewald, 2000; Taylor & Sherman, 2008): SE was positively related to intrapersonal adjustment. This is notable, as Study 1 and Study 2 involved different designs (concurrent vs. longitudinal), tested participants from different countries (Germany vs. the Netherlands), and operationalized SE differently (as crystallized vs. fluid intelligence). Moreover, the findings contributed insight into the dynamic processes underlying the association between intellectual SE and psychological adjustment. SE longitudinally predicted rank-order increases in adjustment and, in both

studies, a large portion of the positive associations between SE and intrapersonal adjustment was mediated by self-esteem—a pattern consistent with the notion that self-esteem is a crucial link between inflated self-views and psychological adjustment (Neiss et al., 2005; Sedikides et al., 2004; Wu et al., 2009).

SE was also associated with interpersonal benefits. Self-enhancers were liked by their peers across both studies. Given that peer ratings were provided by close friends in Study 1 and by fellow students in Study 2, the results indicate that SE is linked to likability within different social contexts. In opposition to findings on the social effects of narcissism (Paulhus, 1998, 2001), intellectual self-enhancers are liked at long-term acquaintance: They were liked by their close friends (Study 1) and they became increasingly popular over time (Study 2).

In Study 1, self-esteem mediated the link between SE and likability. In Study 2, however, this finding was not replicated. There are at least two explanations for this discrepancy. First, as the sample size in Study 2 was smaller than in Study 1, statistical power may have been insufficient to detect the relatively small indirect effect obtained in Study 1. Alternatively, the discrepant results may be accounted for by differences in the social relationships involved (friendships in Study 1, academic bonds in Study 2). It may be the case that, in friendships, high self-esteem, which is associated with individuals' ability to form supportive and close relationships (Murray et al., 2000; Riggio et al., 1990; Swann et al., 2007), plays a role in mediating the link between SE and likability. However, in achievement settings, other features of intellectual self-enhancers (e.g., positive attitude toward academic work, high motivation; Marsh, Trautwein, Luedtke, Koeller, & Baumert, 2006; Sedikides & Hepper, 2009) may play a mediating role. In any case, the present results demonstrate that the associations between SE and likability cannot be accounted for by self-esteem alone. Future research would do well to address other potential mediators and social-contextual differences in the mechanisms underlying the link between SE and likability.

The second aim of the current research was to test whether results concerning the link between SE and adjustment vary systematically depending on methodology. We argued that SE is positively linked to intrapsychic adjustment, regardless of the SE measure being used. Moreover, we hypothesized that the links between SE and

interpersonal adjustment would be distinct for different SE indicators. In support of the hypotheses, all three SE indicators (i.e., our initial SE indicator, narcissism, and the SE_p indicator using peer ratings as benchmark criteria) were positively associated with intrapsychic adjustment in both studies. This finding is consistent with research documenting positive associations between SE and intrapersonal adjustment (Bonanno et al., 2002, 2005; Sedikides et al., 2004; Taylor et al., 2003; Taylor & Sherman, 2008; Yik et al., 1998; Zuckerman & O'Loughlin, 2006). Hence, SE is positively linked to intrapersonal adjustment, no matter how it is measured.

In contrast, associations between SE and interpersonal adjustment varied systematically depending on methodology. Narcissism, a personality trait often equated with SE, evoked different social reactions than SE. Findings from Study 1 indicate that an SE component of narcissism is (like intellectual SE) positively linked to likability, whereas other components of narcissism are negatively linked to Agreeableness. These findings indicate that SE itself has positive interpersonal consequences; it is narcissists' dominant interpersonal orientation and their strong need for admiration that account for negative interpersonal effects. Moreover, findings from Study 2 indicate that the short- and long-term effects on likability differ for narcissism and SE. Whereas SE predicted rank-order increases in likability over time, narcissists were liked only at first sight and were seen as disagreeable at longer acquaintance (Back et al., 2010a; Paulhus, 1998). These findings suggest that, unlike narcissism, SE is interpersonally adaptive in the long run.

Moreover, our findings show that peer ratings are a problematic benchmark. In both studies, SE and SE_p were largely overlapping, but nevertheless SE_p was (unlike the more valid SE indicator) uncorrelated to likability. We have an explanation for the large overlap between SE and SE_p. Given that neither actual intelligence nor intelligence peer ratings correlated strongly with intelligence self-ratings, partialing out these constructs did not remove a large portion of variance from the self-ratings. The remaining residuals (SE and SEp) would therefore be expected to correlate highly. The fact that SEp was nevertheless unrelated to likability indicates that the relatively small portion of variance that was removed by partialing out intelligence peer-ratings was variance that intelligence peer-ratings shared with likability peer ratings (and this most likely was variance due to generalized impressions). Certainly, future research should

examine in depth the role of generalized impressions in this context. Regardless, our findings provide first evidence that peer ratings as benchmarks can lead to negatively biased results if adjustment is also peer rated.

LIMITATIONS AND FUTURE RESEARCH DIRECTIONS

Our measures of intellectual SE did not necessarily tap variance exclusive to SE. As no test measures intelligence perfectly, it may be the case that they were slightly confounded by actual intelligence that was not captured by our IQ tests. Moreover, despite the high face validity, we cannot empirically rule out the possibility that our SE measures shared variance with constructs other than SE due to imperfect scale construction. Nevertheless, we focused on different aspects of intelligence in each of the studies, used different instruments to assess both intelligence and self-ratings, and still obtained highly consistent results. Therefore, methodological issues surrounding individual SE measures are unlikely to account for the findings.

In both studies, correlations between actual and self-rated intelligence were relatively weak in size. These fairly low correlations replicate earlier findings demonstrating that most individuals are rather poor at estimating their own intelligence (Dunning, Heath, & Suls, 2004; Gabriel et al., 1994; Kruger & Dunning, 1999). One could, however, raise the question of whether a certain degree of overlap between self-ratings and criteria is a necessity for a valid SE measure. Isn't it important that self-ratings and ability are at least moderately correlated, so that a meaningful portion of variance is removed from the self-ratings by partialing out ability? From our point of view, the answer is no. SE is defined as the propensity for perceiving oneself in an unduly positive light. This means that self-ratings alone can be valid SE indicators if it is proven that they are ungrounded in reality. (For an SE measure following this logic, see Paulhus, Harms, Bruce, & Lysy, 2003.) If self-ratings and ability are correlated, however, a valid SE measure must be statistically independent of ability, irrespective of the size of the correlation between self-ratings and ability.

The CNS, which we used to assess narcissism in Study 2, is an instrument that has only recently been developed and that has

mainly been validated in children and adolescents (Thomaes et al., 2008). Even though the measure has not been used as frequently with adults as the NPI, the CNS was shown to be reliable in our study, and results were in line with hypotheses. Considering the psychometric problems of the NPI (Brown, Budzek, & Tamborski, 2009) and given that the use of multiple measures increases generalizability, we encourage narcissism researchers to adopt the CNS as an alternative or supplementary assessment of narcissism.

Some of the reported effects are rather small and would have remained undetected if smaller samples had been used to test them. Nevertheless, they are unlikely to be due to type 1 error, as they were replicable and almost fully in line with hypotheses. Moreover, even the small effects are of high theoretical relevance given that they help to resolve long-standing issues concerning the costs and benefits of SE.

The current research examined processes underlying the relation between SE and psychological adjustment by using a combination of mediational and cross-lagged analyses. Future research would need to supplement the findings through experimental techniques that would allow direct inferences about the causal role of SE. For example, does an experimental manipulation of ability-related self-conceptions (e.g., through false feedback about performance on an intelligence task) influence intrapersonal and interpersonal adjustment? Moreover, as both of our studies were conducted in Western societies fairly high in individualism (Hofstede, 2001), future research would need to replicate the findings with community and non-Western samples, although increasing evidence points to SE having intrapersonal benefits in East Asian culture (Cai et al., 2011; Gaertner, Sedikides, & Chang, 2008; O'Mara, Gaertner, Sedikides, Zhou, & Liu, 2011).

Our findings are restricted to the intellectual domain, and as such, future research would also do well to examine whether self-enhancement on traits other than intelligence is similarly related to psychological adjustment. Several possibilities exist to assess abilities other than intelligence without the use of self-ratings or observer ratings. Examples are performance on computer games (Johnson et al., 2006), tasks varying in objective diagnosticity (Sedikides, 1993), tasks requiring self-regulation abilities (Baumeister, Bratslavsky, Muraven, & Tice, 1998), and lie detection skills (Vrij, 2008).

CONCLUDING NOTE

The present research suggests that overestimating one's cognitive abilities is generally a blessing rather than a curse for the individual. Moreover, empirical relations between SE and interpersonal, but not intrapersonal, psychological adjustment systematically differ depending on the methodology used for the assessment of SE. In all, the findings provide both theoretical and methodological insights into the benefits, and also costs, of SE.

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