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Full length Research Paper

Personality and self-assessed intelligence: Can gender and personality distort self-assessed intelligence?

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This paper examines the extent to which self-assessed intelligence (SAI) may be a function of personality traits, gender, and "actual" intellectual ability (as measured through psychometric *g*) in a sample of 188 (119 female) UK university students. Participants completed three cognitive ability tests and the "Big Five" personality inventory after estimating their own multiple intelligences. Psychometric *g* (extracted from the three ability test scores) was a significant predictor of SAI (extracted from self-assessed multiple intelligences), accounting for 10% of the variance. When personality was added to the regression model, the percentage of variance explained increased to 22%, whilst gender accounted for an additional 7% (total = 29%). Emotional Stability (rather than Neuroticism) and Extraversion (rather than Introversion) were associated with higher SAI. Theoretical implications with regard to the taxonomic position of SAI, and practical implications with regard to educational and occupational assessment and performance are discussed.

Keywords: self-assessed intelligence, personality traits, psychometric intelligence, gender.

Introduction

What determines individual differences in self-assessed intelligence (SAI[1]), that is, whether and to what degree we consider ourselves intelligent? For many years, differential psychologists have debated whether SAI should be considered a proxy measure of IQ (Paulhus, Lysy & Yik, 1998), the manifestation of certain personality traits (Eysenck & Eysenck, 1985), or a mix of both (Stankov, 1999). However, few studies have examined the extent to which personality and intelligence may affect SAI (Chamorro-Premuzic, Furnham, & Moutafi, 2004; Furnham & Chamorro-Premuzic, 2004; Furnham, Chamorro-Premuzic, & Moutafi, 2005).

There are many implications justifying this line of research (Sternberg, 1982). First, SAI, just like any other variables of self-concept, has a direct impact on people's performance - there are few who would refute this since Bandura's (1986) self-efficacy theory. Thus lower SAI may have self-defeating effects on performance, whilst higher SAI may increase confidence and motivation and in turn performance. Second, SAI may determine individuals' interests: those who feel bright may choose "bright" occupations, but those who feel less intellectually gifted may choose less challenging activities (Ackerman & Beier, 2003). Third, SAI may determine the level of effort an individual is prepared to invest: excessively low levels of SAI may have negative effects on one's confidence and thus lead to intellectual avoidance (staying away from challenging tasks that are perceived

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[1] Throughout this paper we will use the abbreviation SAI to refer to self-assessed intelligence, though other authors mentioned have used different labels to refer to this concept; for instance 'meta-cognition' (Stankov, 1999), self-estimates of intelligence (Furnham, 2001), 'self/other-assessed intelligence' or 'intelligence c' (Eysenck & Eysenck, 1985), and 'subjectively-assessed intelligence', which encompasses both self- and other-ratings (Chamorro-Premuzic & Furnham, 2005).

as out of reach), but excessively high levels of SAI may be equally deterring, as individuals may feel "over-qualified" intellectually to perform certain tasks or simply decide to invest minimum level of effort as they feel bright enough to succeed without hard work (Muller & Dweck, 1998). Finally SAI may be more malleable and subjected to change than actual intellectual ability (research has shown that an individual's level of intelligence remains pretty much the same until late adulthood, where *fluid* abilities – those least related to knowledge and information possessed – start to decrease) (Beier & Ackerman, 2001). Thus SAI should be a topic of educational as well as occupational interest: it affects performance, interests and job-satisfaction as well as confidence in everyday life.

It has been recently proposed (Chamorro-Premuzic, 2004) that SAI should be considered a *mediating* variable between personality and intelligence. Thus personality traits may influence one's estimations of his/her own abilities, which in turn may affect test-performance. Accordingly, studies have shown that personality traits such as the "Big Five" dimensions of Emotional Stability (low Neuroticism) and Extraversion are associated with higher SAI, which in turn is associated with higher scores on psychometric ability tests (Chamorro-Premuzic, Moutafi, & Furnham, 2005; Chamorro-Premuzic & Furnham, 2005). These studies have also found SAI to be positively correlated with Openness to Experience, a trait related to an individual's level of intellectual curiosity, aesthetic preference, and creativity, and negatively with Agreeableness.

However, in order to compare the possible impact of "actual" intelligence and personality traits on SAI, the regression model should be reversed to include personality and psychometric intelligence as predictors and SAI as criterion. This conceptual distinction will enable us to assess the impact of major individual differences (personality and intelligence) on SAI. Furthermore, the predictive power (incremental validity) of gender – so far the most consistently reported correlate of SAI (Furnham, 2001) – will also be examined in order to attempt to understand why certain people "feel clever", whilst other do not. Males tend to award themselves significantly higher SAI than do females, but are these gender differences partly associated with individual differences? If the relationship between gender and SAI is mediated by personality traits (such as Extraversion or Neuroticism), or psychometric intelligence, it would suggest that gender differences in SAI are a function of individual differences. Likewise, if the correlation between personality variables and SAI drops when measured intelligence is partialed out, it would imply that personality differences in SAI are a function of "actual" intelligence, rather than non-ability traits.

Thus several hypotheses will be tested:

h1) There will be a significant positive correlation between psychometric intelligence (*g*) and SAI; this correlation is expected to be in the region of r = .30, and will replicate previous findings (Chamorro-Premuzic & Furnham, 2005; Furnham, 2001; Paulhus, Lysy & Yik, 1998).

h2) SAI will also be significantly correlated with personality traits; in particular, it is expected that SAI will be positively correlated with Extraversion and Openness, but negatively correlated with Neuroticism and Agreeableness (Chamorro-Premuzic & Furnham, 2004; Chamorro-Premuzic, Moutafi, & Furnham, 2005).

h3) SAI will be significantly correlated with gender; this correlation is expected to be in the region of r = .30, and males will report higher SAI than females will (Furnham, 2001).

h4) Finally it is predicted that personality traits and gender will have incremental validity in the prediction of SAI, over and above *g*. This will show that SAI may not only be influenced by "actual" intelligence (as it would be the case if participants could provide an accurate estimation of their psychometric intelligence scores), but also non-ability traits such as personality and gender.

Method

Sample and Procedure

A total of 188 students from the University of London participated in this study as part of their course work. There were 119 (63%) females and 69 (37%) males. Their age ranged from 18 to 24 years, with *M* = 19.23 (SD = 3.45) years. All students were fluent in English and enrolled in a Psychology major. Data was collected during the initial week of their first academic year. Thus students' had no previous university instruction in psychology. Participants completed all measures in a large lecture theatre under the supervision of five examiners. First, they were given the SAI questionnaire, followed by the NEO personality inventory, followed by the three cognitive ability tests. Details on all instruments are provided below.

Measures

a) Personality Traits

The Revised NEO Personality Inventory (NEO PI-R) (Costa & McCrae, 1992) is a 240-item un-timed questionnaire to assess the 5 major dimensions of personality (Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness) as well as 30 underlying primary traits (6 per major trait). Each item of the inventory is a statement, to which one must respond on a five-point Likert-type scale. Answers range from strongly disagree to strongly agree. A considerable amount of research has been done on the NEO PI-R demonstrating high levels of both reliability and validity (Matthews & Deary, 1998).

b) Psychometric Intelligence (g)

A *g* score was computed for every participant after Principal Component Analysis was used to extract an overall factor which

Table 1. Descriptive Statistics and Inter-correlations Amongst all Measures (SAI, Psychometric Intelligence, Personality Traits, and Gender)

	α	M	SD	2	3	4	5	6	7	gender
1 SAI	.80	106.9	8.99	.33**	- .31**	.35**	.09	- .15*	.10	-.41**
2 g	.78	28.5	8.67	-----	- .21**	.24**	.15*	- .13	- .09	- .21**
3 Neuroticism	.82	97.3	25.40		-----	-.31**	-.04	.07	- .19**	.29**
4 Extraversion	.83	112.8	25.59			-----	.36**	.15*	.16*	- .09
5 Openness	.78	120.0	23.47				-----	.22**	-.06	.04
6 Agreeableness	.79	111.2	21.05					-----	.16*	.28**
7 Conscientiousness	.74	110.3	20.83						-----	- .04

Note. N = 188. SAI = self-assessed intelligence, g = psychometric intelligence.
*p < .05, **p < .01

accounted for 65% of the variance in scores on the following three cognitive ability measures:

The Wonderlic Personnel Test (Wonderlic, 1992): a 50-item test that is administered in 12 minutes and measures intellectual quotient (IQ). Scores can range from 0-50. Items include word and number comparisons, disarranged sentences, serial analysis of geometric figures and story problems that require mathematical and logical solutions. The test has impressive norms and correlates very highly (r = .92) with the WAIS-R.

The Baddeley Reasoning Test (Baddeley, 1968): a 60-item test that is administered in 3 minutes and measures fluid intelligence (*gf*) through logical reasoning. Scores can range from 0 – 60. Each item is presented in the form of a grammatical transformation that has to be answered with "true/false", e.g. "A precedes B – AB" (true) or "A does not follow B – BA" (false). The test has been employed previously in several studies (e.g., Hammerton, 1969) to obtain a quick and reliable indicator of people's intellectual ability.

The Raven's Progressive (Advanced) Matrices (Raven, 1958): a very well known and extensively used measure of fluid intelligence. Participants get a booklet of related patterns (6 per page) and have to select the next one in the series. The test is timed and the matrices increase in difficulty. It has excellent psychometric properties.

b) Self Assessed Intelligence (SAI)

This was a single factor obtained from a 10-item inventory designed to assess people's estimations of their own multiple intelligences (see Furnham, 2000). Participants are asked to estimate their verbal, logical, spatial, musical, body-kinesthetic, interpersonal, intrapersonal, existential, spiritual and naturalistic intelligences (Gardner, 1999) on a normal distribution or "bell curve" that includes a brief explanation and description of each score range (e.g., 55 = mild retardation, 100 = average, and 145 = gifted). As in previous studies, a single factor was obtained through data reduction (Principal Components Analysis), which was labeled SAI (see Furnham, 2001a, for a review of studies employing this and similar inventories) and accounted for 79% of the variance. Factor scores for each participant were computed through simple addition. A high score on the SAI factor refers to high estimated intelligence or the belief that one is very bright, and vice-versa.

Results

Descriptive Statistics and Correlations

Descriptive statistics including means (*M*), standard deviations (*SD*), and internal reliability coefficients (Cronbach's α) and inter-correlations for all scales are reported in Table 1. SAI were significantly and positively correlated with psychometric intelligence (*g*) (r = .33, p < .01). This confirmed *h1*. In line with *h2*, SAI was also significantly correlated with Neuroticism (r = -.31, p < .01), Extraversion (r = .35, p < .01) and Agreeableness (r = -.15, p < .05) (but not with Openness or Conscientiousness). Finally, supporting *h3*, SAI was significantly correlated with gender (r = -41, p < .01), indicating that males tended to report higher SAI than their female counterparts did.

Hierarchical Regression and Mediation Analysis

Linear hierarchical regression was performed on the data to test (*h4*) the extent to which gender and personality traits may show incremental validity, over and above *g*, in the prediction of SAI. Results are reported in Table 2. The first step included *g* as a predictor of SAI and showed that psychometric intelligence scores account for 10% of the variance in SAI. When personality traits were added as predictors in step 2, the percentage of variance accounted for increased to 22% (thus personality traits accounted for an additional 12% of the variance in SAI). The significant predictors in step 2 were *g*, Extraversion, Agreeableness, and Neuroticism. When, in step 3, gender was added to the predictors, the percentage of variance explained increased by an additional 7% (total = 29%), and gender was the most significant predictor in

Table 2. Psychometric Intelligence (g), Personality Traits, and Gender as Predictors of Self-Assessed Intelligence (SAI)

	Variables entered	% Variance explained				std β	std β	std β	t
step		**ΔR^2**	**R^2**	**df**	**ΔF**	**step1**	**step2**	**step3**	
#1	g					.33			4.67**
		.10	.10	1, 182	21.86**				
#2	g						.22		3.14**
	Neuroticism						-.15		2.12*
	Extraversion						.26		3.47**
	Openness to Experience						-.00		.05
	Agreeableness						-.16		2.28*
	Conscientiousness						.08		1.12
		.12	.22	6, 177	9.42**				
#3	g							.18	2.65**
	Neuroticism							-.08	1.17
	Extraversion							.26	3.56**
	Openness to Experience							.00	.03
	Agreeableness							-.08	1.21
	Conscientiousness							.06	.97
	gender							-.30	4.42**
		.07	.29	7, 176	11.71**				

Note. Criterion variable = SAI (self-assessed intelligence). g = general (psychometric) intelligence. All R values are adjusted. Gender coded 1 = males, (37%), 2 = females (63%).

the model, followed by Extraversion and *g*. Thus *h4* was confirmed.

There was a reduction in the *β* coefficient of gender as predictor of *g* when Extraversion and Neuroticism were included in the regression. Thus personality had a partial mediating effect on the relationship between gender and psychometric intelligence. At the same time, there was a mediating effect of psychometric *g* in the relationship between Extraversion and Neuroticism on one hand, and SAI on the other. This partial mediating was confirmed by the decrease in the *β* coefficients of both personality traits as predictors of SAI.

Extreme High and Low SAI (Follow Up Analyses of Variance)

Data was further analyzed through a series of Analyses of Variance (ANOVA's) to test whether extreme high and low SAI participants differed on *g* or personality traits scores. Extreme SAI scorers were identified at the upper and lower 15% of frequencies/distribution, resulting in a sub-sample of $n = 45$. Amongst extreme low SAI scorers, there were 17 females and 3 males, whilst amongst extreme high SAI scorers, there were 20 males and 7 females. Table 3 reports the results of the ANOVA's. As can be seen, the analyses replicated the pattern of the correlation and regression analyses, with significant differences in *g*, Neuroticism, and Extraversion, between extreme high and low SAI scorers.

Discussion

The present study set to explore the extent to which SAI may be determined by personality traits (Big Five), gender, and "actual" intelligence (as measured through psychometric *g*). Thus it investigated the mediating effects of psychometric intelligence in the relationship of gender and personality with SAI. The study of this relationship is relevant for two major reasons, namely a) differential psychologists have yet to establish whether SAI should be conceptualized as part of intelligence or personality (or a mix of both), and b) since SAI are only modestly related to psychometric intelligence, and therefore not an accurate indicator of people's intellectual ability, it ought to be examined what factors (other than "actual" intelligence) determine individual differences in SAI.

Correlations between SAI and individual differences variables were consistent with previous findings. Thus SAI was positively and significantly associated with *g*, and in the region of r = .30, suggesting that participants' "insight" into their intellectual ability was only modest (Furnham, 2001; Paulhus et al., 1998). More precisely, the results from the regression analysis showed that only

Table 3. Group Differences in Personality and g Between Extreme High and Low SAI Scorers (after ANOVA)

		Sum of quares	df	Mean Square	F
g	Between Groups	908.39	1	908.39	6.65*
	Within Groups	6139.18	45	136.42	
	Total	7047.58	46		
Neuroticism	Between Groups	5960.02	1	5960.02	7.83**
	Within Groups	34232.40	45	760.72	
	Total	40192.42	46		
Extraversion	Between Groups	9981.05	1	9981.05	12.88**
	Within Groups	34866.65	45	774.81	
	Total	44847.70	46		
Openness	Between Groups	330.45	1	330.45	1.01
	Within Groups	14673.76	45	326.08	
	Total	15004.21	46		
Agreeableness	Between Groups	248.42	1	248.42	.51
	Within Groups	21592.55	45	479.83	
	Total	21840.97	46		
Conscientiousness	Between Groups	607.92	1	607.92	1.40
	Within Groups	19413.05	45	431.40	
	Total	20020.97	46		

Note. N = 46. Independent Factor = Extreme High and Low SAI (cut-off point = upper & lower 15%)

10% of the variance in SAI is accounted for by *g*. To the extent that psychometric intelligence is a reliable and valid indicator of a person's "actual" intellectual ability, it can be therefore, concluded that SAI are not a good measure of intelligence. That is, SAI must be affected by factors other than intellectual ability (Chamorro-Premuzic & Furnham, 2005).

Accordingly, SAI was also significantly correlated with non-ability variables, such as gender and the personality traits Neuroticism (low Emotional Stability or high trait Anxiety), Extraversion, and (low) Agreeableness. Except for the weaker than expected correlation between SAI and Openness (which failed to reach statistically significant levels), the associations between SAI and the 'Big Five' personality traits were consistent with recent studies (Chamorro-Premuzic, Moutafi, & Furnham, 2005; Furnham, Chamorro-Premuzic, & Moutafi, 2005). This pattern of results can be interpreted as follows: individuals high in Neuroticism tend to half lower self-esteem and frequently experience self-defeating thoughts; conversely, extraverted individuals tend to be more active, confident, and optimistic, whilst Agreeableness is associated with modesty (Costa & McCrae, 1992; Matthews & Deary, 1998). With regard to gender, there is consistent evident now that males tend to report higher SAI than females, though possible mediating and moderating variables (e.g., stereotypes, cultural values, femininity/masculinity, social identity) have yet to be examined (Furnham, 2001). The present data is useful to look at the possible mediating effects of personality traits, that is, whether males' higher SAI are a function of, for instance, their lower levels of Neuroticism or higher levels of Extraversion. Likewise we have examined whether gender differences in SAI are a function of "actual" intelligence or, rather, possible distorting effects of gender on SAI.

Because personality traits were still significant predictors of SAI when g was accounted for, it can be assumed that the effects of personality traits on SAI are largely independent of *g* or "actual" intelligence that is personality may distort SAI (or the level of accuracy in people's estimat because personality traits were still significant predictors of SAI when g was accounted forions of their own intellectual abilities). On the other hand, gender was still a significant predictor of SAI, even when personality traits (Extraversion and Neuroticism) were taken into account. Thus gender's effects on intelligence test performance may be assumed to be relatively independent from that of personality traits. Likewise, gender was still a significant predictor of SAI when psychometric intelligence scores were taken into account, which suggests that gender has independent

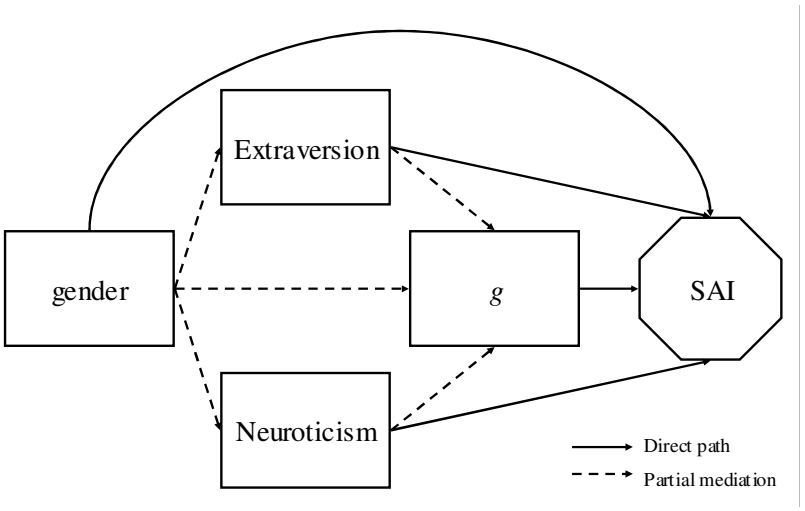

Figure 1. Graphic depiction of the mediating path between gender, personality, psychometric (g) and self-assessed intelligence (SAI).

effects on SAI – therefore distorting SAI that is reducing people's accuracy in estimating their abilities. A conceptual path summarizing these findings is shown in Figure 1.

Naturally, there are some limitations to the present study which oblige us to be careful about the generalization and robustness of the present findings. First, the present study was conducted on a sample of bright college students who were enrolled in a competitive degree in a prestigious UK university. These students may be expected (and in fact ability test scores confirm this) to be brighter than expected and as part of a psychology degree they may be more interested and even more skilful at estimating their abilities than the average person. However, correlations between psychometrically obtained intelligence scores and estimates of these scores in non-student samples have often yielded similar results (r's in the region of .30) (Chamorro-Premuzic & Furnham, 2004, 2005; Furnham, 2001). Furthermore, if anything, samples as the ones we examined should be able to be *more* (not less) accurate than the overall population implying that non-ability influences on SAI may be stronger in more representative samples.

A second, perhaps more complicated issue (which also limits the validity of our results) is the correlational nature of this study. It is a *cliché* in psychology to state that correlation does not imply causation, but in the study of individual differences we are almost obliged to remind ourselves (and our readers) of this rule. Furthermore, the directional paths between SAI and psychometric intelligence can only be determined conceptually or theoretically. However in line with Chamorro-Premuzic and Furnham's (2005) theoretical model of intellectual competence, we have attempted to provide a clear rationale to account for *one* of the possible paths between SAI and "actual" intelligence, which in fact explains how non-ability traits such as gender and personality may partly explain why people's estimations of their own abilities are not accurate.

Despite these limitations, there are important theoretical and applied implications to be drawn from the present findings. Theoretically, our results have shown that SAI can be best conceptualized as a "mix" of ability and non-ability factors. Thus they may be affected by "actual" intelligence, but also by personality and gender. From an applied point of view, the present results provide an important account of the individual differences variables that may lead people to over- or under-estimate their abilities. In educational and occupational settings, this information may be useful to predict and understand differences in level of achievement, as well as help individuals to be able to assess their abilities accurately, as inaccurate self-perceptions may have negative effects for both the individual and the organization.

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