Self-assessed intelligence in adults: The role of gender, cognitive intelligence and emotional intelligence

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Abstract:

The contribution of psychometrically assessed cognitive intelligence (g)* and emotional intelligence (EI) in predicting self-assessed intelligence (SAI) was examined for both men and women. Adults participating in a career exploration program were asked to estimate their cognitive intelligence, then given an objective measure of cognitive ability followed by an ability-based EI assessment. Overall, objective measures of intelligence accounted for 30% of the variance in SAI suggesting that SAI can be a useful tool in career counselling. Gender provided 2% of variance. Men tended to overestimate and women underestimate SAI but men were more accurate estimators of their own abilities than women (r = .61 vs .48). Ability based EI provided about 1% extra variance regardless of degree of accuracy in SAI. Results suggest that EI overall does not mediate between SAI and objective measures and is likely not a good predictor of SAI accuracy.

Introduction:

The scientific study of intelligence – its definition, relationship to other constructs and real world outcomes, development over the lifespan, and, more recently, its various manifestations, has been ongoing for over a century. A variety of theories have been proposed and investigated, but there is still much that needs to be learned. In addition to these explicit theories of intelligence which are generally based on psychometric data and empirical study, Sternberg (1990) also distinguishes implicit theories – those which are held beliefs by lay individuals about what intelligence is and how it is displayed. Both of these sets of theories are important and, Sternberg argues, are often related and interactive. Lay conceptions of intelligence may give rise to testable hypotheses which, in turn, confirm or refute commonly held beliefs – beliefs which are by no means static and change over time (Shipstone & Burt, 1973).

People do not usually have access to psychometric instruments which purport to assess intelligence. However, whether lay or professional, people often, and perhaps unconsciously, assess their own and others' intelligence and make decisions based on these assessments. The impact may be felt in the areas of education, relationships, and the world of work. It is important, therefore, to try to understand how individuals arrive at their conclusions regarding intelligence and whether they are "accurate" since these conceptions have social consequences (Chamorro-Premuzic & Furnham, 2005).

Research on self-assessed intelligence (SAI) has progressed on several fronts. First, have been studies addressing how intelligence is conceptualized by lay persons as opposed to experts (Sternberg, Conway, Ketron, & Bernstein, 1981), by people of different ages (Berg & Sternberg, 1985) and in different cultures (Wober, 1973; Nevo & Khader, 1995). A second research area has investigated the relationship between SAI and psychometrically determined intelligence (g)* in the hope that there may be a significant correlation, making SAI useful as a "proxy" intelligence (Paulhus, Lysy, & Yik, 1998). Standardized intelligence tests are often time consuming, expensive, and require knowledgeable personnel for administration, and so a high SAI – objectively measured g relationship would be beneficial. However, while the correlations are significant, they are mild – usually falling in the r = .30 range - despite procedures to attempt to increase them (Paulhus et al., 1998; see Chamorro-Premuzic & Furnham, 2005). Third, factors such as personality traits or gender differences which may influence one's perceived intelligence have been examined. Chamorro-Premuzic et al, (2005) found that the Big Five personality traits accounted for between 9 and 16% of the variance in SAI and a further study (Chamorro-Premuzic & Furnham, 2006) suggests that gender and personality traits may have mediating effects on SAI. Last, and perhaps most important and largely unexplored, is research showing how SAI relates to real world outcomes in contexts such as education and the world of work (Muller & Dweck, 1998).

Gender differences

Gender differences in SAI have been observed consistently for decades. In an analysis of eleven studies of university students, Hogan (1978) found males to overestimate and females to underestimate their own intelligence, and this pattern has been found to extend to same sex parents and children as well – i.e. males overestimate fathers' and sons' intelligences while females underestimate mothers' and daughters' intelligences compared to the opposite sex parent and child (Beloff, 1992). This trend appears to have continued at least into the 1990s (Furnham & Rawles, 1995; Furnham & Gasson, 1998). Some researchers argue that this tendency is related to environmental factors – in particular societal stereotypes regarding career, family and education which affect females' self evaluations negatively (Maltby, Day, & Macaskill, 2007). Stereotypes regarding differences in intelligence, whether accurate or exaggerated, are certainly present in society (Swim, 1994; Halpern, Benbow, Geary, Gur, Hyde, & Gernsbacher, 2007). Men are seen as being better at the maths, sciences, and areas involving spatial abilities like engineering. Women are thought to be more proficient at tasks requiring verbal and personal – i.e. emotional – intelli-

*The use of "g" in this paper refers to the general intelligence factor (Spearman, 1927; Carroll, 1993) obtained by more objective assessment procedures.

gences. Likely, it is the interaction of biological and environmental factors that sways one's perception of intelligence.

Emotional intelligence

The concept of emotional intelligence (EI) has been present in the literature for many decades (Thorndike, 1920; Wechsler, 1950) but has become much more popular as a research topic since Goleman's (1995) book *Emotional Intelligence* propelled the idea into public consciousness. It has been embraced enthusiastically by many people as evidence that cognitive intelligence is not the only intelligence needed to be successful, and may, in fact, be secondary. So far, this evidence has not been forthcoming to the extent originally claimed. Various theories and accompanying measuring instruments (in brackets) have been developed, primary among them being Bar-On's Emotional-Social Intelligence model (Emotional Quotient Inventory - EQi); Goleman's Emotional Competencies model (Emotional Competencies Inventory - ECI); and Mayer, Salovey, and Caruso's ability-based model (Mayer-Salovey-Caruso Emotional Intelligence Test – MSCEIT). EI theories have been criticized for their lack of consistency of definition as well as lack of discriminant validity from other constructs (Roberts, Zeidner, & Matthews, 2001). In particular, EI assessment instruments that rely on self-judgment have been found to correlate too greatly with scales of personality and lack psychometric support (Conte, 2005). Research in EI is expanding in an attempt to validate the construct by showing that it is related to real-world social, work, and personal outcomes.

To date very little research exists which explores the relationship between one's realistic perception of abilities and emotional intelligence. It would be reasonable to expect that those who know themselves well, and are therefore accurate in their self-appraisals, would score more highly on measures of EI. The current study seeks to add to the SAI literature by investigating the relationship of SAI to the relatively new construct of emotional intelligence, in particular, whether accuracy of self-assessment is positively related to higher emotional intelligence. Gender differences have been found with both SAI and EI, (Furnham & Rawles, 1995; Brackett, Rivers, Shiffman, Lerner,& Salovey, 2006) and it was therefore decided that analyses for both sexes were appropriate. Self-evaluation studies have been criticized on various issues and would benefit from meeting at least two minimum standards (Colvin, Block, & Funder, 1995). First, any evaluation of a person's self-appraisal accuracy must include a valid criterion for comparison. Second, it would be more useful to examine participants more representative of the general population. One concern with social science research in general is that, because of ease of access, the preponderance of samples are taken from a university student population and such has been the case for much of the SAI literature reviewed. This practice is problematic in that students, while being adults, do not represent society as a whole in variables such as age, general intelligence level, education level, as well as life stage with respect to career. It was felt that research with adult, non-student men and women may shed a different light on how SAI, gender, and EI behave.

Traditionally, the ability to perceive one's self realistically has been considered an indicator of mental health (Vogt & Colvin, 2005). While some researchers have argued that self-deception may contribute to psychological well-being (Taylor & Brown, 1988; Colvin & Block, 1994), the majority of the literature appears to suggest the opposite. Kruger and Dunning (1999) argue that individuals who are incompetent in certain domains often lack awareness of "…how well one is performing, when one is likely to be accurate in judgment, and when one is likely to be in error" (p. 1121).

That individuals do often consciously or unconsciously misrepresent their abilities is well documented and this tendency is a major drawback to the credibility of self-report assessment instruments in all areas of client evaluation and research (Paulhaus, 1991; Paulhaus, Harms, Bruce, & Lysy, 2003). Self-report inventories, therefore, are suspect since it often is the case that those who rate themselves most erroneously compared with an objective measure are the most incompetent in performing the task (Kruger and Dunning, 1999). As a result, in order to avoid compounding self-assessment error, in this study it was decided that an ability-based EI instrument – the MSCEIT - would be the most effective way to measure EI. Current reviews of EI instruments tend to confirm this choice (Conte, 2005; McEnrue & Groves, 2006).

Frijda (1988) argues that "emotions...arise in response to events that are important to the individual, and which importance he or she appraises in some way" (p. 349). Further, emotions systems, when activated, have been found to influence cognitive processes such as attention, learning and memory leading to adaptive behaviours (Muramatsu and Hanoch, 2005). Mayer, Salovey and Caruso contend that emotions convey meanings about relationships of a person with self, others, objects, or events – in other words, matters which are personal and rise out of one's concerns, motives or goals (Mayer, Salovey, & Caruso, 2004; Frijda, 1988). When these relationships change, emotions are triggered. EI, in their view, involves the ability to recognize emotions, identify and think about them, and use them to problem-solve so as to adapt to the environment. It is around this theory that the MSCEIT has been developed. Within this context, one would expect the process of self-evaluation to be an emotionally-laden experience. Presumably the act of introspection, especially in the area of cognitive abilities which are seen as being very important to success in western society, would trigger many emotions. In this study, it is hypothesized that the extent to which individuals recognize and use these emotions to manage themselves and their environments should be reflected in the accuracy of SAI. In other words, EI should contribute to the variance in SAI above and beyond that of cognitive g.

Questions

In particular, the questions of interest were these:

1) What is the contribution of gender to SAI variance above and beyond that of g?
2) Are there gender differences in SAI accuracy in an adult non-student sample?

3) In this sample, do men overestimate and women underestimate SAI as previously found?
4) What is the contribution of EI, if any, to SAI and do some aspects of EI contribute more than others?
5) Are there gender differences in the role of EI in SAI?

Method:

Participants:

Participants were 350 adults attending a 4-week government funded career exploration program. All were unemployed at the time of the research. Age ranged from 18 to 63 years with an average age of 36.4 years (s.d. = 11.5), 40% were male. The average grade level achieved was 12.6 (s.d. = 2.2).

Instruments:

Wonderlic Personnel Test (WPT): The Wonderlic Personnel Test is a short-form test of cognitive ability (g) purported to measure "the level at which an individual learns, understands instructions and solves problems" (Wonderlic, 1992). Its sizeable reliability and validity estimates are based on an adult working population. Test-retest reliabilities are reported ranging from .82 to .94, and concurrent validities of >.80 with the WAIS-R and about .80 with the GATB-G have been observed (Wonderlic, 1992). The WPT manual reports mean raw score and standard deviation values of 21.6 and 7.1 respectively compared with 24.8 and 6.7 obtained in the current investigation.

The manual makes provision for two scores – a timed (12 minute) score, and an untimed score which is considered the more representative of an individual's true ability if he or she obtains a requisite additional number of questions correct when no time restrictions are imposed.

The Career Oriented Multiple Intelligence Test (COMIT):

The COMIT is a self-report instrument (unpublished) in which persons are asked to rate their abilities in eight different domains patterned after the intelligences proposed by Howard Gardner (Gardner, 1983, 1998). Individuals respond to 64 statements (eight per domain), by rating their abilities on a five-point scale (1 = not at all like me, to 5 = definitely me!). Statements are indirect – that is, they inquire about interests, behaviours, and everyday situations rather than asking about intelligence directly. Examples of items include: "I can easily compute numbers in my head" (mathematical/logical domain), or "I can express my thoughts well on paper" (linguistic domain). The mean internal consistency (Cronbach's alpha) of the COMIT's eight intelligences is >.80.

Using strategies outlined in Paulhaus et al., (1998), responses on 22 of the 64 items are weighted and used to derive a self-assessed intelligence (SAI) score which is a client's perceived estimate of cognitive ability. Correlations of the COMIT SAI score currently stand at a moderate .55 with the WPT and at .53 with the GATB-G (General Learning Aptitude) score (n = 640), which are very reasonable for proxy IQ estimates and higher than the approximate r = .30 that is normally reported in the literature (Chamorro-Premuzic & Furnham, 2005). Cronbach's alpha for the 22 items is .86.

Mayer-Salovey-Caruso Emotional Intelligence Test (MSCEIT):

The MSCEIT has been designed to assess an individual's emotional intelligence using an objective or ability-based method in which test-takers are required to perform eight different types of tasks in the emotion domain. The total MSCEIT score is subdivided into two main area scores – Experiential EI and Strategic EI. Experiential EI is purported to measure more basic-level emotional processes such as "the identification of emotion and its productive use in thought" (Caruso & Wolfe, 2006). This area is further divided into two branches –Perceiving Emotions and Facilitating Thought. Strategic EI is assumed to involve higher-level emotions processing such as reasoning about emotions, managing emotions, and using this information in personal and social decision-making (Caruso & Wolfe, 2006). It is also comprised of two branches – Understanding Emotions and Managing Emotions. Raw scores on the MSCEIT are converted to standard scores having a mean of 100 and a standard deviation of 15.

Reliability of the MSCEIT is good at the total, area and branch levels with total scores having a split-half reliability of .91 and area score reliabilities of .90 for Experiential EI and .85 for Strategic EI. Test-retest reliability has been found to be .86. McEnrue and Groves (2006) described the MSCEIT as having high construct validity, moderate content, predictive and external validity and low face validity.

Procedure:

In a career-counsellor led brief discussion, small groups of participants were asked to share their views regarding the nature and possible kinds of intelligence, after which they were administered the SAI measure (COMIT), followed immediately by the WPT. All clients were allowed as much time as needed after the initial 12 minute administration of the WPT, and the more representative score (timed or untimed) was then used for data analysis. The MSCEIT was computer administered several days later.

Data Analysis:

WPT raw scores were first adjusted to one form (A) to correct for slight differences between the A and B forms of the test. Pearson-product correlations between overall SAI, MSCEIT total, area, and branch scores, and WPT scores were conducted and are shown in Table 1. Similar analyses were also performed separately for men and women (Table 2). T-tests were conducted to determine significant differences between sexes (Table 3). Outliers greater than 2.0 sd (10 cases) were excluded from the analysis.

Following the procedures of Chamorro-Premuzic and Furnham (2006) a regression analysis was performed using SAI as the criterion and psychometrically measured g, EI branch scores, and gender as predictors. Results are shown in Table 4.

To determine the extent to which men and women over- or underestimate SAI, raw scores for WPT and SAI were converted to standardized z-scores and the differences between WPT and SAI z-scores calculated (z-WPT minus z-SAI).

Results:

Tables 1 through 4 are shown in the Appendix.

See Table 1 for the descriptive statistics and intercorrelations for all measures used. Overall correlation of SAI with g is r = .55.

Men were found to slightly overestimate SAI (mean z = -.07) and women to underestimate SAI (mean z = .06). These differences were not significant. Overall, accuracy of SAI did show a positive and significant correlation with the total EI score of the MSCEIT, but this relationship fell to near 0 when g was partialed out.

Discussion:

The purpose of this study was to explore a) whether gender differences are observed in SAI in an adult non-student sample as has previously been the case; and b) whether emotional intelligence plays a role in an individual's ability to assess him/herself above and beyond that contributed by psychometrically measured g and gender.

The overall contribution of gender to SAI (Question 1), even though significant, was negligible at about 2%, less than what has been reported elsewhere. As seen in Table 2, males in this study were considerably more accurate in predicting their intelligence (r = .61 for males vs. r=.48 for females)(Question 2). The reason for this is not clear but it appears they generally had a realistic self-view – at least in this area. Overall, males did overestimate their intelligences and females did underestimate theirs, but the differences were not significant (Question 3). It is possible that engaging in the process of career decision-making had more of a sobering effect on the male adults in this sample than the females. In addition, as discussed earlier, lay perceptions of intelligence change over time. Perhaps earlier stereotypes of male intellectual superiority, more overt in past generations, have moderated in the past decade as people become more egalitarian in their attitudes. This hypothesis needs to be investigated more thoroughly.

The correlations of SAI with g were found to be higher than has been previously reported; the overall r of .55 exceeds the usual r of approximately .30 by a considerable amount indicating that the participants in this study had more insight – at least into their own cognitive abilities. There may be several reasons for this. First, the individuals in the study were adults seeking career direction on their own volition and may have been more focused on their abilities in preparation for career exploration. Perhaps this mind set encouraged more accurate self-evaluation. In addition, participants were prepared for the SAI by a brief discussion regarding intelligence. This, too, may have activated schemata around the topic, thereby increasing metacognition and enhancing self-evaluation accuracy. Third, it could also be that the SAI instrument used, in some way capitalized on those aspects of g that allowed the participants to judge themselves more precisely. In any event, the measured g accounted for about 30% of the variance of SAI.

Correlations of this magnitude make SAI a useful tool in the portfolio of assessments necessary for a comprehensive evaluation in such areas as career counselling. Individuals engaged in career exploration are likely to take one of two paths upon completion – go directly into the work environment, or enter training and education programs leading to a chosen vocation. In either case, knowing how individuals view their abilities compared with a standardized measure provides a good starting point for career counselling in investigating why discrepancies between SAI and g, if any, are occurring. Such a discussion could be important for all participants in this process. In particular, it may be most beneficial for those persons with low SAI and high g who view their abilities pessimistically. Subjective beliefs often become self-fulfilling prophecies, and changing the belief may have a positive effect on future endeavors. For those who are accurate and realistic about their abilities, this knowledge confirms what they already know which can be reassuring. The effect on high SAI/low g individuals could be mixed; some may benefit by readjusting their goals, thus possibly saving time and financial resources, while others may either ignore the information or be negatively affected by it. Large SAI/ g differences can also be used as a rationale to further investigate an individual's abilities, since there may be other factors such as learning disabilities, attention problems, or physical or mental illnesses interfering with cognition.

Contrary to what was expected, EI did not appear to play any role in people's perceptions of ability (Question 4), overall or for either gender (Question 5). This was observed at total, area, and branch levels of the MSCEIT . While correlations with SAI were significant for the Understanding and Managing branches (Table 1), this relationship dropped to almost 0 when the effect of cognitive g was partialed out. This suggests that the MSCEIT may be providing information regarding a person's accumulated knowledge and experience regarding emotional functioning, analogous to Cattell's (1971) theory of crystallized intelligence. Mayer et al. (2000) argue that the Understanding branch of the MSCEIT model is the most cognitive of the branches, and should therefore be related more to cognitive g as it is seen to do in this analysis.

Self-evaluation, particularly as it pertains to the world of career and further education, would seem an emotionally charged phenomenon. Ability tends to limit careers that can be pursued, and such barriers have potential for generating emotional stress. Self-assessment in any area brings to the fore discrepancies that may exist between what is and what is desired. It seems reasonable to suppose that individuals who are able to perceive this environment more accurately and adapt to it by emotional problem solving would display higher emotional intelligence. This was not seen to be the case. However, before drawing any conclusions, it is necessary to look at the contexts within which EI may have been demonstrated, and the aspects of EI required in each of these. The MSCEIT asks the individual to solve various emotional "problems", but does not – and cannot at this juncture – evaluate the "feelings" or somatic experience that occurs in any kind of emotion-laden event. Knowing "about" an emotional problem and how to theoretically solve it from a distance, as it were, and "feeling" the emotions generated in actual situations are quite different and have potentially different behavioural consequences. Despite being the most investigated and validated EI instrument

so far in the nascent world of EI measurement, the MSCEIT is limited, as any paper and pencil (or computerized) test is, in what aspects of EI it can measure.

It appears that in this study, whatever component is being measured by the MSCEIT does not appear to be playing a part in self-evaluation. This in no way denigrates the instrument, but it does emphasize the fact that those who are developing EI measurement tools have a very difficult task in separating the various components of what is still a poorly defined construct.

Suggestions for further research:

SAI needs to be investigated across the lifespan to determine whether accuracy changes with age and gender. Preliminary analysis of the data in this study suggests that young males are wildly inaccurate in their self-assessments while older males are very accurate. Females appear much more moderate at every age level. This has implications for career counsellors, especially those dealing with young career-exploring men, in that the results of any other self-reported assessments should perhaps be viewed with more caution.

Replication studies similar to those reported in Chamorro-Premuzic & Furnham (2005 – chapter 6), should be carried out to determine whether past trends regarding male SAI overestimation and female underestimation are changing and why.

If the MSCEIT is found to measure more of a crystallized aspect of emotional intelligence, this implies that there may also be a fluid component (see Ortony, Revelle & Zinbarg, 2007). Investigating this possibility and attempting to measure it are still issues that need to be resolved.

More formalized procedures need to be developed around using SAI to augment and question standardized test scores. Longitudinal studies that follow individuals into career settings would provide valuable information regarding which are the more accurate predictors of success.

Appendix

Table 1: Descriptive statistics including overall means, standard deviations and inter-correlations for all measures.

	mean	sd	2	3	4	5	6	7	8	9
1 WPT (g)	24.8	6.7	.55**	.33**	.20**	.17**	.16**	.35**	.44**	.16**
2 SAI	25.2	5.7	-	.21**	.09	.09	.07	.27**	.29**	.17**
3 Total EI	93.5	11.9		-	.89**	.75**	.75**	.77**	.67**	.62**
4 Exper. EI	98.3	13.7			-	.87**	.78**	.43**	.38**	.36**
5 Perceiving	98.2	13.1				-	.41**	.31**	.28**	.24**
6 Facilitating	97.8	14.0					-	.48**	.39**	.44**
7 Strat. EI	91.5	10.0						-	.86**	.79**
8 Underst.	92.8	11.4							-	.39**
9 Managing	93.3	9.0								-

*p<.05; **p<.01

Table 2: Descriptive statistics including overall means, standard deviations and inter-correlations for all measures.

	1	2	3	4	5	6	7	8	9
1 WPT (g)	-	.61**	.30**	.16	.14	.11	.32**	.39**	.14
2 SAI	.48**	-	.28**	.16	.17	.06	.30*	.30**	.17*
3 Total EI	.38**	.16*	-	.90**	.76**	.75**	.77**	.67**	.59**
4 Exper. EI	.26**	.06	.88**	-	.87**	.77**	.45**	.42**	.32**
5 Perceiving	.22**	.04	.74**	.87**	-	.41**	.31**	.30**	.20*
6 Facilitating	.20**	.05	.76**	.81**	.43**	-	.46**	.38**	.42**
7 Strat. EI	.35**	.20**	.81**	.46**	.33**	.49**	-	.84**	.79**
8 Underst.	.47**	.25**	.69**	.37**	.28**	.39**	.87**	-	.34**
9 Managing	.14	.11	.68**	.43**	.31**	.46**	.79**	.42**	-

*p<.05; **p<.01

Table 3: Means, standard deviations and significance of differences for men and women.

	mean males n = 141	sd	mean females n = 207	sd	Sig.
WPT (g)	25.8	7.2	24.0	6.4	*
SAI	26.6	5.8	24.3	5.4	**
Total EI	93.1	13.0	93.7	11.2	ns
Exper. EI	97.2	15.5	99.1	12.3	ns
Perceiving	97.4	15.8	98.7	11.1	ns
Facilitating	98.7	16.0	97.2	12.5	ns
Strat. EI	93.4	10.6	90.2	9.4	**
Underst.	94.6	12.1	91.5	10.7	*
Managing	94.8	10.0	92.2	8.2	**

*p<.05; **p<.01

Table 4: Regression analysis: psychometric intelligence (g), EI branch scores, and gender as predictors of SAI

	variables entered	% of variance explained					
step		R^2	ΔR^2	df	ΔF	β	t
#1	g	.300	.300	1,321	137.76	.55	11.74**
#2	g					.52	9.89**
	perceiving					-.01	-.10
	facilitating					-.08	-1.44
	understanding					.06	.96
	managing					.10	1.84
		.313	.013	4,317	1.45		
#3	g					.51	9.78**
	perceiving					.02	.35
	facilitating					-.09	-1.54
	understanding					.04	.74
	managing					.08	1.50
	gender					.14	2.84**
		.330	.017	1,316	8.07		

*p<.05; **p<.01

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