



# Estimates of Ten Multiple Intelligences

## Sex and National Differences in the Perception of Oneself and Famous People

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*A total of 253 British and 318 American students were asked to make various estimates of overall intelligence as well as Gardner's (1999a) new list of 10 multiple intelligences. They made these estimations (11 in all) for themselves, their partner, and for various well-known figures such as Prince Charles, Tony Blair, Bill Gates, and Bill Clinton. Following previous research there were various sex and nationality differences in self-estimated IQ: Males rated themselves higher on verbal, logical, spatial, and spiritual IQ compared to females. Females rated their male partner as having lower verbal and spiritual, but higher spatial IQ than was the*

*case when males rated their female partners. Participants considered Bill Clinton (2 points) and Prince Charles (5 points) less intelligent than themselves, but Tony Blair (5 points) and Bill Gates (15 points) more intelligent than themselves. Multiple regressions indicated that the best predictors of one's overall IQ estimates were logical, verbal, existential, and spatial IQ. Factor analysis of the 10 and then 8 self-estimated scores did not confirm Gardner's classification of multiple intelligences. Results are discussed in terms of the growing literature in the self-estimates of intelligence, as well as limitations of that approach.*

**Keywords:** Multiple intelligence, sex differences, cross-cultural, famous people.

## Introduction

Over the past decade there have been over a dozen studies concerned with self-estimates of intelligence. Although various other studies predated it (e.g. Hogan, 1978), it was Beloff's (1992) study on sex differences in estimated IQ that has provoked most papers since (Bennett, 1996, 1997, 2000; Byrd & Stacey, 1993; Furnham, 1999, 2000; Furnham & Baguma, 1999; Furnham & Fong, 2000; Furnham & Rawles, 1995; Furnham, Clark, & Bailey, 1999a; Furnham, Fong, & Martin, 1999b; Furnham, Hosoe, & Tang, 2002; Petrides & Furnham, 2000).

These studies can be categorized into various areas. In many studies overall self-estimates of overall intelligence were investigated as the sole dependent variable (Beloff, 1992; Byrd & Stacey, 1993; Furnham & Gasson, 1998), while more recent studies have examined multiple intelligences (Bennett, 1996, 1997, 2000; Furnham,

2000; Furnham & Baguma, 1999). Some studies have been particularly concerned with the correlation between psychometric intelligence and self-estimated intelligence, which appears to be around  $r = .30$  (Borkenau & Liebler, 1993; Furnham & Fong, 2000; Furnham & Rawles, 1999; Paulus, Lysy, & Yik, 1998; Reilly & Mulhern, 1995). Others have looked specifically at cross-cultural differences in self-estimates (Furnham et al., 1999b; Furnham et al., 2002).

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The results of these studies show five things (Furnham, 2001):

- First, when asked to rate their overall intelligence, males give themselves significantly higher scores than females.
- Second, people tend to believe there are generational differences in IQ, with each generation being more intelligent than the last, that is, people think they (in turn) are less intelligent than their children, but more intelligent than their parents.
- Third, when asked to rate multiple intelligence, it is primarily mathematical/logical and spatial intelligence that shows significant gender differences in favor of males.
- Fourth, people believe mathematical, spatial, and verbal intelligence to be the best predictors of overall intelligence.
- Fifth, the correlation between self-estimated intelligence and a psychometrically validated test tends to be around  $r = .30$  with evidence of numerous outliers, particularly males overestimating their psychometrically measured intelligence.

This paper extends these previous studies in two ways.

- First, nearly all previous papers looking at estimates of multiple intelligences have used all or some of the 7 specified by Gardner (1993); this list, however, has been extended in his latest work to 8 or 10, depending on various criteria (Gardner, 1999a). Sex differences on all 10 multiple intelligences are considered, thus updating the work on self-estimates of multiple intelligences.
- Further, previous studies have examined sex differences in estimating *own* intelligence as well as that of family members (grandparents, parents, siblings, and children). This study will examine estimates of opposite sex partners and various famous people (two American, two British) to see if the replicated sex-differences extend to nonfamily members.

## Multiple Intelligences

In his original book Gardner (1983) defined intelligence as “the ability to solve problems or to create products that are valued within one or more cultural settings” and specified seven intelligences. He argued that linguistic/verbal and logical mathematical are those typically valued in schools. Linguistic intelligence involves sensitivity to spoken and written language and the ability to learn languages. Logical-mathematical intelligence involves the capacity to analyze problems logically, solve

math problems, and investigate issues scientifically. These two types of intelligence dominate intelligence tests. Three of Gardner’s (1983) multiple intelligences are arts based:

- *musical intelligence*, which refers to skill in the performance, composition and appreciation of musical patterns;
- *body-kinesthetic intelligence*, using the whole or parts of the body to solve problems or fashion products;
- *spatial intelligence*, which is the ability to recognize and manipulate patterns in space.

Finally Gardner (1983) outlined two personal intelligences:

- *interpersonal intelligence*, which is the capacity to understand the intentions, motivations, and desires of other people and work effectively with them;
- *intrapersonal intelligence*, which is the capacity to understand oneself and to use this information effectively in regulating one’s life.

There have, however, been numerous critiques of the theory of multiple intelligences (Allix, 2000). Klein (1997) has argued that a “weak version” of the theory of multiple intelligences would not be interesting, while the “strong version” is not supported by the evidence. Morgan (1996) argued that Gardner (1983) did not “discover new intelligences” but rather reframed and renamed cognitive styles. There are, therefore, real doubts as to whether his various intelligences are truly independent or even meaningful, although the popularity of his ideas—particularly among teachers—certainly suggests he has tapped into lay understandings about the concept of intelligence.

In his latest book Gardner (1999a) defines intelligence as a “biographical potential to process information that can be activated in a cultural setting to solve problems or create products that are of value in a culture” (p. 38–34). He introduces three possible new intelligences, though he also notes: “The strength of the evidence for these varies, and whether or not to declare a certain human capacity another type of intelligence is certainly a judgment call” (p. 47). His new intelligences are:

- *Naturalist intelligence*, which is “expertise in the recognition and classification of the numerous species—the flora and fauna—of his or her environment” (p. 43). It is the capacity of taxonomization: to recognize members of a group, to distinguish among members of a species and to chart out the relations, formally or informally, among several species.

- *Spiritual intelligence*, which is supposedly the ability to master a set of diffuse and abstract concepts about being, but also mastering the craft of altering one's consciousness in attaining a certain state of being. It is an "intelligence that explores the nature of existence in its multifarious guises" (p. 60).
- *Existential intelligence* is yet more difficult to define: "the capacity to locate oneself with respect to the furthest reaches of the cosmos—the infinite and infinitesimal—and the related capacity to locate oneself with respect to such existential features of the human condition as the significance of life, the meaning of death, the ultimate fate of the physical and the psychological worlds and such profound experiences as love of another person or total immersion in a work of art" (p. 61).

However, on further reflection Gardner (1999a) concludes: "My review process indicates that the naturalists' intelligence clearly merits addition to the list of the original seven intelligences" (p. 52). Later he also concludes: "Despite the attractiveness of a ninth intelligence, however, I am not adding existential intelligence to the list. I find the phenomenon perplexing enough and the distance from the other intelligences vast enough to dictate prudence—at least for now. At most, I am willing, Fellini-style, to joke about '8½ intelligences'" (p. 66). Despite Gardner's caution about declaring the full 10 types of intelligence authentic, this study will examine estimates of all of them.

Several issues were examined in this study, some of which are replicative and some new. Along with previous studies it examines sex and country differences in the perceptions (self-estimations) of intelligence. It also examines perceptions of the intelligence of various targeted others which has not been attempted before, including both those in a dating relationship and various famous people. It also looks at the interrelationship between the lengthened list (from 7 to 10) of the multiple intelligences specified by Gardner (1999a) and the extent to which these predict overall ratings of general intelligence. Various hypotheses were tested:

1. Males would rate their overall intelligence higher than females. Further, there would be significant differences on logical (mathematical), spatial, and spiritual intelligence with males scoring higher on the former two and females scoring higher on the latter (Furnham et al., 1999ab, 2000). Gardner (1999b) notes: "It is true that I have added an eighth, or naturalistic intelligence; I have no intuition about gender differences on that one.

However, I would speculate that if you were to include emotional, moral, or spiritual intelligence none of which qualifies by my criteria you might encounter gender effects in the opposite direction" (personal communication).

2. The best predictors of overall (g) IQ would be logical/mathematical, spatial, and verbal intelligence because these traditional features pick up what people in this culture mean by "overall intelligence" (Furnham, 2000). That is, regressing the 10 factors onto the overall factor for self-estimates would show only three significant predictors.
3. Factor analysis of the estimates on eight multiple intelligences would reveal a three-factor solution as set out by Gardner (1999), namely, "traditional intelligence" (linguistic/verbal and logical/mathematical), "artistic intelligence," (musical, body-kinesthetic, spatial) and "personal intelligence" (interpersonal and intrapersonal).

#### Estimating Others' IQ

While nearly all studies on the estimates of overall (g) and multiple intelligences have been interested in self-estimates, many have extended the research to look at parents, grandparents, siblings, and children.

Furnham (2001) reviewed all the studies in the area and noted that results indicate that participants tend to believe they are brighter than their parents, who in turn are brighter than their grandparents, but that their children are brighter than they are. Indeed, the results of Flynn (1989) suggest there may indeed be generational differences in IQ. While there is a generational pattern, there remain considerable sex differences in self- and other-estimates. That is, participants believe their grandfathers to be brighter than their grandmothers, their fathers to be brighter than their mothers, and their sons to be brighter than their daughters.

This study extended previous research by asking participants to estimate the scores of their "opposite-sex partner" (if they had one) as well as three well-known people. Furnham and Rawles (1995) asked participants to rate the overall intelligence of 15 professional groups (professor, nurse, bricklayer), which they did with no difficulty. Furnham and Ward (2001) asked New Zealand students to rate their own and their partner's multiple intelligences. While there were the significant differences on self-estimated intelligences (males gave higher estimates for logical, spatial, and existential intelligence), there was only one for partner estimates. Males

**Table 1**

Studies that have looked at self- and other-estimates of IQ.

	Overall IQ	Multiple intelligences
Self	Hogan (1978) Beloff (1992) Byrd & Stacey (1993) Reilly & Mulhern (1995) Furnham & Rawles (1995) Furnham & Rawles (1999)	Bennet (1996, 1997, 2000)  Furnham et al. (1999a) Furnham et al. (1999b) Furnham et al. (2000)
Parents	Hogan (1978) Beloff (1992) Byrd & Stacey (1993)	Furnham et al. (1999b) Furnham et al. (1999c) Furnham et al. (2000)
Grandparents	Furnham & Rawles (1995)	
Siblings	Byrd & Stacey (1993) Furnham et al. (2000)	Furnham et al. (1999b)
Children	Furnham & Gasson (1998)	Furnham (2000a)
Professionals	Furnham & Rawles (1995)	

rated their partner as having higher intrapersonal intelligence than did females. However, all the other studies concentrated on the estimates of relatives. The rating of others allowed us to test further specific hypotheses:

4. Females would rate their male partners as more intelligent than themselves overall. Females would rate their male partners as significantly more intelligent on logical and spatial intelligence, while males would rate their female partners as higher on verbal intelligence.
5. Participants would rate Prince Charles as less, but Bill Gates as more intelligent than themselves overall because of the popular press coverage of these two individuals. Many other reasons could also account for these differences such as the fact that Prince Charles inherited his position while Bill Gates is a self-made man.
6. The higher participants rate their own intelligence, the higher they tend to rate that of others (Furnham, 2000). That is, these data would show the established similarity effect shown in much social judgment research indicating that participants tend to rate others much like themselves.

## Method

### Participants

In all 571 participants completed the questionnaire, 318 of whom were Americans (178 females and 140 males) and 253 were Britons (151 females and 102 males). Their

mean age was 22.12 years (*SD* 3.84). Most were undergraduate, unmarried students from two British and three American universities.

### Questionnaire

Participants completed a one-page questionnaire set out on all previous studies in this area (Furnham, 2000). A normal distribution was shown with a mean of 100 and three positive and three negative standard deviations shown. Under each standard deviation a typical IQ score was given plus a descriptor i.e. "+1, 115 high average". Participants were then shown a grid with 11 rows and five columns. The first row was labeled "Overall Intelligence" and the remaining 10 taken from Gardner (1999) (see Table 2). There was a short description of what each intelligence stood for (see Table 2). This included the eight "definite multiple intelligences plus the two currently rejected, but considered, candidates. The rows were labelled you, your partner, Prince Charles, Tony Blair, Bill Gates and Bill Clinton." Thus each participant was requested to make 55 IQ estimates. The grid is shown in Table 2. Nearly all participants did estimates by column, that is, they first rated their overall intelligence with a specific number, then their verbal intelligence, their logical intelligence, etc. They then proceeded to make eleven estimates for their partner. Apart from standard demographic data they were also asked if they had ever taken an intelligence test and whether they thought intelligence tests measured intelligence fairly well. There was no country difference in test experience with just under a third (33.1%) reporting that they had never taken a test.



However, significantly more males had taken IQ tests compared to females. There were no country, sex, or interaction effects with respect to belief that tests measure intelligence fairly well: 48.6% said yes and 51.4% no.

#### Procedure

Participants were run in class groups. There was a 100% response rate, although a few questionnaires (3%) were spoiled. They were thoroughly debriefed after the study in their respective universities. Only half the participants estimated Bill Clinton's IQ as this was added only after some data had been collected. It was possible for participants to make estimates even when they did not

have a full appreciation and understanding of the issues/dimensions involved. That is, students may have been unclear as to the precise meaning of existential or spiritual intelligence but nevertheless made the required ratings. Debriefing suggested that this was indeed true, albeit for less than 10% of the total group.

## Results

Table 2 shows the various mean ratings. (Interested readers may obtain a 2 sex  $\times$  2 country  $\times$  55 ratings table from the first author.) Note that overall participants believed their partner, Tony Blair, and Bill Gates to be more

**Table 2**

Mean scores for the separate estimates for overall and multiple intelligences on the six target people.

	ESTIMATE					
	You	Your partner	Prince Charles	Tony Blair	Bill Gates	Bill Clinton
OVERALL INTELLIGENCE	113.12 SC (15.51)	113.19 (15.87)	108.58 (16.38)	117.74 (15.01)	129.06 (15.06)	111.51 (18.21)
1. <b>Verbal</b> or linguistic intelligence (the ability to use words)	109.14 SC (14.89)	109.25 SC (15.06)	108.58 (16.37)	121.90 (12.39)	116.98 (17.01)	118.83 (18.30)
2. <b>Logical</b> or mathematical intelligence (the ability to reason logically, solve number problems)	106.85 S (16.42)	108.44 (17.52)	101.31 (13.74)	110.33 (12.01)	132.58 SC (15.60)	106.19 (18.04)
3. <b>Spatial</b> intelligence (the ability to find your way around the environment, and form mental images)	110.12 SC (15.42)	109.40 (14.36)	103.18 (15.22)	107.71 (13.70)	117.75 (17.40)	109.01 (16.21)
4. <b>Musical</b> intelligence (the ability to perceive and create pitch and rhythm)	101.44 C (18.93)	104.97 S (17.64)	98.53 (15.91)	101.01 (14.85)	100.78 (17.37)	107.01 (17.30)
5. <b>Body-kinesthetic</b> intelligence (the ability to carry out motor movement, e. g., being a surgeon or dancer)	110.64 C (14.45)	107.17 S (14.73)	100.20 SC (15.16)	102.25 (12.85)	105.45 C (17.48)	112.22 S (18.50)
6. <b>Interpersonal</b> intelligence (the ability to understand other people)	114.11 (12.95)	108.97 S (14.97)	100.77 SC (16.80)	113.40 (17.85)	107.94 (18.59)	112.23 S (18.72)
7. <b>Intrapersonal</b> intelligence (the ability to understand yourself and develop a sense of your own identity)	112.92 (14.09)	110.35 (14.34)	103.65 (15.15)	110.41 (14.53)	112.86 S (16.77)	106.36 (18.28)
8. <b>Existential</b> intelligence (the ability to understand the significance of life, the meaning of death and the experience of love)	112.09 S (14.95)	110.25 (15.16)	101.53 (16.52)	107.01 (11.78)	105.19 (16.36)	100.09 (19.67)
9. <b>Spiritual</b> intelligence (the ability to engage in thinking about cosmic issues, the achievement of a state of being, e. g., achieving trance states, and the ability to have spiritual effects on others)	105.58 S (15.57)	104.89 SC (16.42)	99.29 S (17.84)	101.32 (16.30)	102.53 C (17.83)	99.23 (19.92)
10. <b>Naturalistic</b> intelligence (the ability to identify and employ many distinctions in the natural world, e. g., categorizing species membership).	104.80 S (14.13)	106.28 (15.28)	103.21 C (15.28)	106.71 (13.27)	107.97 (17.50)	103.61 (16.55)

S = Sex differences on this item; C = Culture difference on this item

intelligent overall than themselves, but Prince Charles less so. The highest score was 132.58 for Bill Gates' logical intelligence, followed by Tony Blair's verbal intelligence (121.90). Prince Charles had two of his eleven estimates under the population mean of 100. Paired *t*-tests on their overall (g) estimates indicated that participants thought they were more intelligent than Prince Charles ( $t(456) = 8.45, p < .001$ ), but less intelligent than Tony Blair ( $t(360) = -4.46, p < .001$ ) and Bill Gates ( $t(160) = -14.87, p < .001$ ). There was no difference between self and partner, and self and Bill Clinton. There were no sex differences in the estimates of any of the other people. However, as demonstrated in many other studies, male participants rated their overall intelligence as higher than did females ( $F(1,456) = 28.85, p < .001$ ) (115.87 vs 110.84).

## Analysis of Variance

### Own Estimates

A two-way (sex and country) ANOVA on the overall intelligence score showed a sex ( $F(1,457) = 18.96, p < .001$ ) ( $\eta^2 = .04$ ) effect where males gave higher scores ( $M = 115.82, SD = 12.80$ ) than females ( $M = 110.84, SD = 9.14$ ). Following this a two-way MANOVA was computed over the seven multiple intelligences. There was both a significant sex ( $F(10,558) = 8.67, p < .001$ ) ( $\eta^2 = .07$ ) and country ( $F(10,558) = 8.42, p < .001$ ) ( $\eta^2 = .05$ ) effect, but no interaction. Males tended to give higher scores than females and Americans higher scores than Britons.

Thereafter a series of two-way ANOVAs were computed on each of the 10 multiple intelligences. There were four significant sex effects: Males gave higher ratings for logical ( $F(1,567) = 48.23, p < .001$ ) ( $\eta^2 = .08$ ) (Male 112.46 vs Female 102.98), spatial ( $F(1,567) = 28.23, p < .001$ ) ( $\eta^2 = .05$ ) (Male 114.25 vs Female 107.28), spiritual ( $F(1,567) = 6.23, p < .01$ ) ( $\eta^2 = .02$ ) (Male 107.59 vs Female 104.19), and naturalistic intelligence ( $F(1,567) = 21.24, p < .001$ ) ( $\eta^2 = .04$ ) (Males 108.01 vs Female 102.50). There were also four significant country effects. Americans thought they had lower verbal intelligence ( $F(1,567) = 10.51, p < .001$ ) (107.32 vs 111.42) ( $\eta^2 = .02$ ), but higher spatial intelligence ( $F(1,567) = 4.72, p < .05$ ) (111.18 vs 108.80) ( $\eta^2 = .02$ ), lower musical intelligence ( $F(1,567) = 10.86, p < .001$ ) ( $\eta^2 = .03$ ) (98.91 vs 104.52), and higher body-kinesthetic intelligence ( $F(1,567) = 15.90, p < .001$ ) ( $\eta^2 = .03$ ) (112.90 vs 107.71) than the British. There were no significant sex and country interactions. *These results confirm the first hypothesis on sex differences in self-rated multiple intelligences.*

### Partner

First a two-way ANOVA was computed on the rating of the overall intelligence of the partner. There was only a significant country difference ( $F(1,292) = 4.62, p < .01$ ) ( $\eta^2 = .02$ ), showing that the British gave higher scores to their partners than did the Americans (115.83 vs 111.87).

Next a MANOVA was computed over the 10 ratings of partner. There was a significant sex ( $F(10,362) = 5.98, p < .001$ ) ( $\eta^2 = .03$ ) and country effect ( $F(10,362) = 3.69, p < .001$ ) ( $\eta^2 = .03$ ), but no significant sex  $\times$  country interaction. Following this ten two-way ANOVAs were computed on each of the ten intelligences. There were six significant sex differences: verbal intelligence ( $F(1,375) = 8.80, p < .01$ ) ( $\eta^2 = .03$ ), where males rated their partners higher than females (111.83 vs 107.68); spatial intelligence ( $F(1,374) = 12.64, p < .001$ ) ( $\eta^2 = .04$ ), where females rated their partners higher than males (111.33 vs 106.24); musical intelligence ( $F(1,391) = 4.55, p < .05$ ) ( $\eta^2 = .02$ ), where males rated their partners higher than females (107.58 vs 103.38); body-kinesthetic intelligence ( $F(1,391) = 5.64, p < .01$ ) ( $\eta^2 = .02$ ), where males rated their partners higher than females (110.58 vs 105.33); interpersonal intelligence ( $F(1,399) = 9.67, p < .01$ ) ( $\eta^2 = .03$ ), where males rated their partners higher than females (112.68 vs 106.70); and spiritual intelligence ( $F(1,374) = 7.36, p < .01$ ) ( $\eta^2 = .02$ ), where males rated their partners higher than females.

There were two country effects: The British rated their partners' verbal ( $F(1,374) = 4.28, p < .05$ ) ( $\eta^2 = .01$ ) and spiritual intelligence ( $F(1,374) = 5.81, p < .01$ ) ( $\eta^2 = .02$ ) higher than Americans did theirs. There were no significant sex  $\times$  country interactions.

*These results therefore lend partial support to hypothesis*

4. The results on the multiple intelligences were confirmed but not for overall intelligence.

### Prince Charles

First a two-way (sex and country) ANOVA was computed on the overall total IQ score. There were no significant main effects or interactions. Thereafter a MANOVA was computed on the 10 multiple intelligence estimates. There was a significant sex ( $F(10,544) = 5.82, p < .001$ ) ( $\eta^2 = .06$ ) and country ( $F(10,544) = 5.52, p < .001$ ) ( $\eta^2 = .05$ ) effect. *Males more than females and Americans more than British tended to give higher estimates.*

Thereafter, a two-way ANOVA (sex and country) was computed across all 10 multiple intelligences. There were three significant sex effects: Males gave higher estimates of Prince Charles' body-kinesthetic intelligence ( $F(1,553) = 12.24, p < .001$ ) (102.85 vs 98.37) ( $\eta^2 = .05$ ), interpersonal intelligence ( $F(1,554) = 4.88, p < .05$ ) (102.61

vs 99.49) ( $\eta^2 = .03$ ), and spiritual intelligence ( $F(1,553) = 5.88, p < .01$ ) (101.41 vs 97.82) ( $\eta^2 = .03$ ). There were three significant country effects: Americans rated Prince Charles' body-kinesthetic intelligence ( $F(1,550) = 8.37, p < .01$ ) ( $\eta^2 = .04$ ) higher than the British did (101.99 vs 98.06); Americans rated Prince Charles' interpersonal intelligence ( $F(1,550) = 5.87, p < .01$ ) higher than the British did (102.47 vs 98.72); the British, however, rated Prince Charles' naturalistic intelligence ( $F(1,555) = 14.01, p < .001$ ) ( $\eta^2 = .06$ ) higher than Americans did.

There was only one significant interaction: For spatial intelligence ( $F(1,553) = 5.32, p < .05$ ) American males gave significantly lower scores than the other three groups.

#### Tony Blair

A two-way ANOVA on the overall score showed no significant effects. A two-way MANOVA over the 10 multiple intelligences showed no significant effects.

#### Bill Gates

A two-way ANOVA on the overall intelligence estimate of Bill Gates' score showed a significant country effect ( $F(1,450) = 11.50, p < .001$ ) ( $\eta^2 = .06$ ), with Americans giving higher estimates than the British (131.11 vs 126.25). Thereafter a two-way MANOVA over the 10 multiple intelligences was computed. There was a significant sex effect ( $F(10,544) = 3.19, p < .001$ ) ( $\eta^2 = .02$ ) and country effect ( $F(10,544) = 4.41, p < .001$ ) ( $\eta^2 = .03$ ).

Following this, 10 two-way ANOVAs were computed on each of the multiple intelligences. There were two sex effects: Males rated Bill Gates' logical IQ higher than females did ( $F(1,557) = 4.02, p < .05$ ) (134.22 vs 131.45) ( $\eta^2 = .01$ ); and males rated Bill Gates' intrapersonal IQ higher than females did ( $F(1,557) = 5.10, p < .05$ ) ( $\eta^2 = .01$ ) (114.82 vs 111.52). There were also four country variables, all of which showed Americans gave higher scores than did Britons: verbal ( $F(1,557) = 4.76, p < .05$ ) ( $\eta^2 = .01$ ) (118.57 vs 115.05), logical ( $F(1,557) = 10.80, p < .001$ ) ( $\eta^2 = .01$ ) (134.58 vs 130.16), body-kinesthetic ( $F(1,557) = 12.23, p < .001$ ) ( $\eta^2 = .03$ ) (107.96 vs 102.80), and spiritual intelligence ( $F(1,557) = 4.91, p < .05$ ) ( $\eta^2 = .02$ ) (104.34 vs 100.45). There were no significant sex and country interactions.

#### Bill Clinton

A two-way ANOVA was computed on the overall IQ estimate. There was a significant country effect

( $F(1,450) = 11.50, p < .001$ ): Americans gave higher ratings than the British (131.11 vs 126.25).

Thereafter, a two-way MANOVA was computed over the multiple intelligences. There was a significant sex effect ( $F(10, 355) = 5.73$ ) ( $\eta^2 = .14$ ), but no country or sex  $\times$  country interaction. Thereafter, 10 two-way ANOVAs were computed on each of the multiple intelligences. There were four sex effects: Males gave higher verbal intelligence estimates ( $F(1,357) = 5.71, p < .01$ ) ( $\eta^2 = .02$ ) (122.06 vs 115.63), higher body-kinesthetic estimates ( $F(1,357) = 13.48, p < .001$ ) ( $\eta^2 = .04$ ) (116.63 vs 107.86), higher interpersonal estimates ( $F(1,357) = 16.76, p < .001$ ) ( $\eta^2 = .05$ ) (117.16 vs 107.36), and higher intrapersonal estimates ( $F(1,358) = 8.85, p < .01$ ) ( $\eta^2 = .03$ ) (112.03 vs 102.87). Overall these results confirmed hypothesis 5.

#### Factor Analysis

Table 3 shows the zero-order correlations for the overall estimates. All were positive and most significant so confirming the sixth hypothesis. The correlation between self and partner was  $r = .50$ , which is good evidence of the similarity judgment hypothesis.

Table 4 shows the results from the VARIMAX rotation factor analysis. This was done on the full 10, the original 7, and finally the currently recognized 8 multiple intelligences as specified by Gardner (1983, 1999a). The pattern is very clear. On all analyses, the verbal, logical, and spatial load on the same factor. In the 8 multiple intelligence model naturalistic loads on this factor, while in the 10 multiple intelligence model both naturalistic and spiritual load on this model. The other factor concerns body-kinesthetic, inter- and intrapersonal intelligence, which always load together. In the 10 multiple intelligence model existential loads on this factor. Thus, the third hypothesis is not confirmed.

**Table 3**

Zero-order correlations for estimates of overall intelligence.

	S	P	PC	TB	DG
Self (S)					
Partner (P)	.50**				
Prince Charles (PC)	.13*	.14*			
Tony Blair (TB)	.40**	.41**	.19*		
Bill Gates (BG)	.30**	.18**	.16**	.24**	
Bill Clinton (BC)	.26**	.10	.33**	.10	.23**

\*\*  $p < .01$ , \*  $p < .05$

Correlations are based on different  $N$  sizes.

**Table 4**

Factor analytic results for the 3 analyses on self-rated intelligence: 10, 8, and 7 factors.

	<b>10 Intelligence</b>		<b>8 Intelligence</b>		<b>7 Intelligence</b>	
Verbal	31	<b>54</b>	34	<b>60</b>	34	<b>57</b>
Logical	00	<b>80</b>	00	<b>83</b>	00	<b>81</b>
Spatial	24	<b>65</b>	28	<b>67</b>	27	<b>68</b>
Musical	29	35	32	35	34	33
Body-K	<b>77</b>	14	<b>79</b>	13	<b>79</b>	13
Inter-p	<b>86</b>	11	<b>88</b>	12	<b>87</b>	12
Intra-p	<b>63</b>	30	<b>65</b>	13	<b>62</b>	31
Existential	<b>63</b>	40				
Spiritual	46	<b>52</b>				
Naturalistic	38	<b>60</b>	40	<b>58</b>		
Eigenvalue	4.07	1.06	2.81	1.05	3.22	1.06
Variance	40.75	10.63	40.20	15.10	40.25	13.24

These results are similar to various other factor-analytic studies done by Furnham (2001), but not the factor structure proposed by Gardner (1983, 1999a).

### Multiple Regressions

Six hierarchical multiple regressions were performed regressing the 10 ratings onto the total overall estimate for each of the six people rated. The results were surprisingly consistent. In each one verbal and logical intelligence were significant predictors, while musical, body-kines-  
 thetic, interpersonal and intrapersonal, as well as spiritual intelligence were never significant predictors. In each case about half the variance was accounted for (45–58%). Five of the ten multiple intelligence ratings were predictive of own score, and three for all the others except Bill Gates, where it was only two ratings. These results tend to confirm previous regression studies, which show that it is the male normative of verbal, logical (mathematical), and spatial intelligence that people believe is at the heart of “real” intelligence. *This confirms the second hypothesis.*

## Discussion

This study extended the previous literature on this topic in two ways: first, by extending the list of multiple intelligences to 10, which includes the additional “confirmed” intelligence of “naturalistic” intelligence and the debated (but not yet confirmed) intelligences labeled “spiritual” and “existential”; second, by asking participants to estimate others who were not relations—one

well known to them and three well-known public figures.

One part of the study was in part replicative and examined sex differences in perceived intelligence. In accordance with nearly all previous studies in this area, males rated themselves as having a higher IQ than females. The only exception to this pattern was the study of Byrd and Stacey (1993), who found that in New Zealand male and female students gave nearly identical estimates (121.5 vs 121.9). However, a more recent study by Furnham and Ward (2001) done in New Zealand could not replicate this result. All other studies have shown that males give significantly higher estimates than females usually between a quarter and a half a full standard deviation point. Further, again a familiar pattern emerged when the multiple intelligences were examined. The logical/mathematical dimension revealed the biggest difference of over 10 IQ points. The difference in spatial intelligence has been found in previous studies (Furnham & Baguma, 1999; Furnham, Fong, & Martin, 1999b), but none has previously reported a difference in verbal intelligence particularly with men giving themselves higher self-estimates than women. However, the effect sizes demonstrate that while the differences are often significant, the effects remain small.

As before student participants rated themselves highly (one *SD* above the mean) on personal intelligences, though there is little difference between the sexes. They also had a tendency to rate themselves rather low on two of the three artistic intelligences, especially musical intelligence.

Interestingly, the “new” multiple intelligences revealed two significant differences, and in both males rated themselves more highly, particularly on naturalistic



**Table 5**  
Results of the six regression analyses where the ten multiple intelligences were regressed onto the overall rating of intelligence for the six target people.

	Self	Partner	P. Charles	T. Blair	B. Gates	B. Clinton
	Beta	Beta	Beta	Beta	Beta	Beta
	t	t	t	t	t	t
Verbal	.32	.38	.21	.28	.15	.23
Logical	.29	.24	.28	.28	.50	.25
Spatial	.20	.03	.11	.10	.08	.05
Musical	.02	.05	.02	.03	-.01	.04
Body-K	-.03	.05	.10	.00	.02	.09
Inter-P	.02	.00	.00	.10	-.06	.03
Intra-P	.07	.08	.00	-.01	.05	.11
Existential	.18	.00	.06	.16	.09	.04
Spiritual	-.04	.06	.01	-.04	.02	-.07
Naturalistic	.08	.12	.03	.05	.06	.15
F	63.01	29.76	38.97	24.91	47.78	24.25
R <sup>2</sup>	.58	.48	.45	.57	.52	.45

\*\*\*  $p < .001$ , \*\*  $p < .01$ , \*  $p < .05$

intelligence with a *SD* difference of almost 0.5. This may be because males understand the taxonomic function of naturalistic intelligence to be related to traditional intelligence and something they therefore feel themselves superior at.

It was interesting to note which of the multiple intelligences best predicted overall intelligence as revealed by the multiple regression. Furnham (2000) hypothesized in the study of parents' estimates of their children's multiple intelligences the lay concept of (general, overall) intelligence is male normative in that it is those mathematical and spatial intelligences that are conflated with overall intelligence. He notes: "It is possible that it is mathematical and spatial intelligence, as defined by Gardner (1983) that lie at the heart of most people's conception of intelligence . . . Indeed, precisely what is novel about Gardner's model is that most people do not think of musical ability and intra/interpersonal skills as part of (general) intelligence" (p. 592). In this study when the 10 self-estimated intelligences were regressed onto the total, two always proved significant: mathematical/logical, and verbal. It may well be that the consistent findings on self-estimated sex differences in overall intelligence is because lay theories of the constituents of intelligence are based heavily on two types of intelligence—mathematical/logical and spatial—where males appear to do better than females. Equally, the popularity of Gardner's work may lie precisely in the fact that it makes intelligence less male normative.

Estimating the intelligences of one's opposite-sex partner revealed interesting findings. First, there was no overall difference between the sexes. Second, males believed their female partners had higher verbal, musical, body-kinesthetic, interpersonal, and spiritual intelligence than females believed their partners had. Females did tend to believe their (male) partners had higher spatial intelligence than males thought the case for their (female) partners. Certainly the size and magnitude of the sex differences was reduced when considering the opposite sex partner. It may well be that the social comparison process reduced female humility and male hubris (Furnham, Hosow, & Tang, 2002), particularly when these people are well known.

Comparing themselves with famous figures did show many significant differences in a fairly clear pattern. Participants thought they were more intelligent than Prince Charles (a Cambridge graduate) on nearly all dimensions. This may reflect his stereotypic image as well as the fact that around a third of the British participants are from Scotland where the Royal family is less popular. The British Prime Minister was rated by these

participants as more intelligent than themselves on only three of the ten multiple intelligences. On the other hand, the entrepreneur Bill Gates was rated higher on the three thought to be the most "g-loaded" in the sense that in the regression they best predicted the overall score. It is interesting to point out that the latter two received higher ratings on the three intelligences most often tested in intelligence tests, namely, verbal, logical, and spatial. It would have been particularly interesting to have a famous female figure to see if the same pattern occurred. Further research could address this omission. Participants thought Bill Clinton nearly 10 points higher than themselves on verbal intelligence, but six points lower on spiritual intelligence.

The single dimension that differentiated most in the ratings of the "celebrities" multiple intelligences was logical, with Bill Gates having a score 30 points higher (two standard deviations) than Prince Charles. Inter- and intrapersonal intelligence also received widely different ratings, yet it was much smaller for the "new" multiple intelligences, existential, spiritual, and naturalistic.

Finally, the factor-analytic results failed to confirm either Gardner's classification or those found in traditional textbooks on intelligence (Eysenck, 1981). However, both exploratory and confirmatory factor analyses do show that participants differentiate between the various intelligences specified. This should not be seen either as confirmation or disconfirmation of Gardner's (1999a) theory, as this paper was about the *self-estimate* of skills and abilities that may or may not be related to general intelligence. Perhaps the exploratory factor analysis of the 8 intelligences (Table 5) is the clearest and one that shows a two-factor solution with the first factor reflecting more fluid intelligence and the latter more crystallized intelligence.

Retrospectively, it may have been desirable to include some famous women as targets as they may have helped unconfound rater or target effect. Furthermore, including well-known and successful men may have primed stereotypes about intelligent men which could have served to magnify gender differences in self- and other-estimates of intelligence. A further obvious limitation of this study is that there is no direct way of relating the estimates of intelligence to the actual levels of intelligence possessed by the individuals assessed. While it is unlikely to obtain the valid IQ scores from famous people, it is conceivable to have obtained the actual test scores from participants and even their partners. However, even this poses a great problem because while there are many valid tests of overall intelligence, it remains

uncertain as to whether there are any sensitive and accurate measures of what Gardner (1999a) called the artistic or personal intelligences (Petrides & Furnham, 1999).

The importance of studies of self-estimated intelligence lies not only in exploring lay theories of intelligence, but also in understanding the possible self-fulfilling nature of self-evaluations of ability. In a series of programmatic studies, Beyer (1996) demonstrated sex differences in expectations, self-evaluations, and performance on ability-related tasks. Her results support the male hubris/female humility results of these studies on self-estimated intelligence. Further, she argues that sex differences in self-evaluations effect expectancies of success and failure and—ultimately—actual performance on those tasks. She notes: "Because of the serious implications of under-estimations for self-confidence and psychological health more attention should be devoted to the investigation of gender differences in the accuracy of self-evaluations. Such research will not only elucidate the underlying processes of self-evaluation biases and therefore use of theoretical interest but will also be of practical value by suggesting ways of eliminating women's under-estimation of performance" (Beyer, 1990, p. 968).

There is, of course, an equal danger in *overestimating* intelligence possibly leading to complacency. Beyer (1998) reviewed various studies and concluded that individuals make poor self-evaluators: Correlations between medical students' self-rated knowledge and exam grades was almost exactly zero ( $-0.01$ ); self-perceptions of physical attractiveness and judges' ratings were  $.22$ ; while another correlation between performance on a test of managerial skill and experts' ratings was  $.32$ . "Interestingly, outside evaluators seem to be better assessors of a target's performance than the target her/himself" (Beyer, 1998, p. 104). Thus, it seems that while self-estimates of intelligence may not be useful as proxy IQ tests as various studies have shown (Paulus et al., 1998), they may be useful in explaining some of the variability in actual test results through the process of expectations set out by Beyer (1999).

The theoretical significance for those findings lies primarily in the structure of lay beliefs about the dimensions of intelligence; where these beliefs arise; how they are sustained; and their consequences for the holders of these beliefs. What those results have not explored is the distinction made by Dweck (1986) considering whether people see intelligence as a capacity or a fixed entity only modestly affected by effort (*entity lay theorists*); or a set of skills and knowledge base that (substantially) can be

increased with practice and effort (*incremental lay theorists*). Clearly, the consequences for extreme self-estimates if one is an entity theorist are much different than if one is an incremental theorist. What remains to be investigated is whether one can simultaneously be an entity theorist for some multiple intelligences and an incremental theorist for others.

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