



Humor ability reveals intelligence, predicts mating success, and is higher in males

Gil Greengross^{a,*}, Geoffrey Miller^b

^a Department of Anthropology, University of New Mexico, United States

^b Department of Psychology, University of New Mexico, United States

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ABSTRACT

A good sense of humor is sexually attractive, perhaps because it reveals intelligence, creativity, and other 'good genes' or 'good parent' traits. If so, intelligence should predict humor production ability, which in turn should predict mating success. In this study, 400 university students (200 men and 200 women) completed measures of abstract reasoning (Raven's Advanced Progressive Matrices), verbal intelligence (the vocabulary subtest of the Multi-dimensional Aptitude Battery), humor production ability (rated funniness of captions written for three cartoons), and mating success (from the Sexual Behaviors and Beliefs Questionnaire). Structural equation models showed that general and verbal intelligence both predict humor production ability, which in turn predicts mating success, such as lifetime number of sexual partners. Also, males showed higher average humor production ability. These results suggest that the human sense of humor evolved at least partly through sexual selection as an intelligence-indicator.

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1. Introduction

Humor is an evolutionary enigma: people across cultures enjoy it with smiling, laughing, and mirth, and socially value those who produce it (Apte, 1985), yet humor production seems to yield no survival benefit, and humor's ancestral origins and adaptive functions have been hotly debated since Darwin (Darwin, 1872; Gervais & Wilson, 2005).

Sexual selection offers one possible explanation for humor's origins, functions, correlates, and social attractiveness (Bressler, Martin, & Balshine, 2006). According to the theory of mental fitness indicators (Miller, 2000, 2007), some human capacities such as language, creativity, art, music, altruism, and humor evolved at least partly through mutual mate choice for 'good genes' and 'good parent' traits. In this view, a good sense of humor is sexually attractive because it is a hard-to-fake signal of intelligence, creativity, mental health, and other traits desired by both sexes, consciously or not.

Also, sex differences in reproductive strategies may explain why females value humor production ability more in mates (Lundy, Tan, & Cunningham, 1998), why females laugh and smile more during conversations, especially in response to humor produced by the opposite sex (Provine, 2000), and why women tend to like a man who will make them laugh, while men want a woman who will laugh at their humor (Bressler et al., 2006). Further, since mental fitness indicators such as humor ability may reveal general genetic quality (low mutation load), such cognitive abilities should remain at least moderately heritable despite generations of selection in favor of maximum values (Miller, 2007), and this may explain the observed heritability of humor styles and humor production ability (Vernon, Martin, Schermer, & Mackie, 2008).

Humor, intelligence, and mating success may have especially important relationships, which this paper investigates. Intelligence has been much better studied than humor as a mental fitness indicator: general intelligence is one of the most sexually desirable traits for both sexes (Buss, 1989), is highly heritable (Plomin & Spinath, 2004), and is correlated with many fitness-related traits such as physical health and

* Corresponding author. Tel.: +1 505 255 1008.

E-mail address: humorology@gmail.com (G. Greengross).

longevity (Gottfredson & Deary, 2004), body symmetry (Banks, Batchelor, & McDaniel, 2010), physical attractiveness (Langlois et al., 2000) and semen quality (Arden, Gottfredson, Miller, & Pierce, 2008).

If humor production ability is an honest indicator of intelligence, humor production ability should positively correlate with intelligence. There is some evidence that a good sense of humor is associated with verbal creativity (Kaufman, Kozbelt, Bromley, Geher, & Miller, 2008; O'Quin & Derks, 1997) and intelligence (Feingold & Mazzella, 1993; Howrigan & MacDonald, 2008). For example, Feingold and Mazzella (1991) studied verbal intelligence and "humor reasoning ability" in three samples (36 Harvard graduate students, 59 psychology undergraduates from City University of New York, and 52 volunteers from Central Park in New York; total $N=147$), and found moderate correlations ($r=0.31-0.52$) between the Vocabulary scale of the Multi-Aptitude Test and rater-judged humor production tasks, such as writing funny captions to cartoons stripped of their captions and writing a repartee to an absurd question.

Howrigan and MacDonald (2008) found correlations of 0.12–0.23 between general intelligence, as measured by the Raven's Advanced Progressive Matrices, and judge-rated humor production tasks that included humor responses to funny emails, mock descriptions of stereotyped characters and funny drawings, in a sample of 185 southern California college students.

This study aims to investigate further the relationship between humor and intelligence in the light of sexual selection theory. We can make several predictions if the human capacity for producing verbal humor evolved at least partly through mutual mate choice as a mental fitness indicator, and if male variance in reproductive success was somewhat higher:

- (1) General intelligence should predict humor ability, and verbal intelligence especially should predict verbal humor ability;
- (2) Humor ability should predict mating success, such as lifetime number of sexual partners, even if it does not predict reproductive success given modern contraception;
- (3) Given that females show stronger preferences for humor ability than males do, humor production ability should be higher in males on average, even if there are no sex differences in intelligence (just as males show higher average height due to stronger female preferences for height, even if there are no sex differences in average health, which is a closer proxy for genetic quality).

To test these hypotheses, we administered measures of intelligence, humor ability, and mating success to a moderately large sample of university students.

2. Methods

2.1. Participants

Participants were 400 students (200 males and 200 females) enrolled in psychology courses at the University of New Mexico (UNM). Average age was 20.6 years ($+/-4.7$, range 18–57). Participants' self-reported ethnicity was 58%

White, 29% Hispanic, 5% Asian-American, 4% American Indian, 3% African American, and 2% other. UNM is a large state university with low entrance requirements, and many minority, nontraditional, mature, and first-generation students. Thus, UNM students show high variance (and low restriction of range) in intelligence, sexual attitudes, mating strategies, political values, religiosity, and other demographic, psychometric, and mating-relevant variables.

2.2. Measures

2.2.1. Intelligence

We measured abstract reasoning ability with the 12-item version (Winfred & Day, 1994) of Raven's Advanced Progressive Matrices (RAPM), which ask participants to choose which of eight sub-patterns best fits into an abstract spatial pattern. It is an excellent measure of non-verbal abstract reasoning ability and is highly correlated with the g factor in many studies (Jensen, 1998). We measured verbal intelligence with the 46-item vocabulary subtest of the Multi-dimensional Aptitude Battery (MAB), which asks participants to choose which of five words has the meaning closest to that of a given word (Jackson, 1984). It is a strong measure of vocabulary size and shows fairly high correlations with the verbal subset of the Wechsler Adult Intelligence Scale-Revised (WAIS-R) (Wechsler, 1981), and with full-scale IQ (Carless, 2000). We combined the Raven's abstract reasoning scores with the MAB vocabulary scores to yield an estimate of general intelligence.

2.2.2. Humor ability

We measured capacity for producing verbal humor by using blind ratings of participant ability to produce funny captions for cartoons. Participants were given three cartoons without captions from the *New Yorker* magazine's cartoon caption contest (cartoons were at least one year old to reduce the possibility of familiarity). They were instructed to write as many funny captions as they could, for all cartoons, in 10 min. This open-ended humor production is a reasonably valid measure of spontaneous humor ability (Feingold & Mazzella, 1991, 1993). Later, six judges (four men and two women, all students) rated the funniness of each caption on a scale from 1 ("not funny at all") to 7 ("very funny"). Judges saw the captions in a randomized order, and were blind to any characteristics of the participants.

All scores were standardized to control for judges using the rating scales in different ways. Participants produced an average of 3.5 captions per cartoon. Funniness ratings were highly skewed, with most captions rated not funny at all, and even the funniest students producing only a few captions per cartoon that were even moderately funny. So, from each judge's ratings of each caption for each cartoon, we took the highest-rated caption as most representative of the participant's humor ability. Then we averaged these high scores across the six judges and the three cartoons to yield an overall humor ability score. Internal consistency scores (Cronbach's alphas) of ratings across the six judges averaged 0.72 across the three cartoons, which is somewhat higher than in other cartoon-captioning studies (Feingold & Mazzella, 1993; Masten, 1986).

2.2.3. Mating success

Participants completed an extended version of the Socio-sexual Orientation Inventory (SOI) (Simpson & Gangestad, 1991) It included nine questions (Cronbach's alpha 0.75) about short-term mating success such as lifetime number of sexual partners, number of one-night stands, and number of times the participant had sex with two or more partners within a 24-hour period (see Table 1 for the raw results). Responses to these items were factor-analyzed to yield our measure of mating success – a measure that emphasized quantity over quality of mates. The questionnaire also included 9 items (Cronbach's alpha 0.81) about attitudes towards short-term mating such as “Sex without love is OK, morally”; these were factor-analyzed to yield a measure of pro-promiscuity attitudes. Finally, there were 4 items (Cronbach's alpha 0.68) such as “Religion has an important role in my attitude towards love and sex” and “Premarital sex is wrong”, factor-analyzed to yield a measure of traditional family values. Mating success correlated 0.34 ($p < 0.001$) with pro-promiscuity attitudes and -0.10 (ns) with family values; pro-promiscuity attitudes correlated -0.36 ($p < 0.001$) with family values.

3. Results

3.1. Correlations among humor, mating and intelligence

Table 2 shows the raw bivariate correlations (for males and females separately) among the two intelligence measures (MAB vocabulary score and Raven's abstract reasoning score), humor ability (rated caption average), mating success, and age. In all analyses there were no raters' sex differences.

Consistent with prediction 1, both intelligence measures predicted humor ability, for both males and females, all at $p < 0.001$. For males, humor ability was correlated $r = 0.44$ with MAB vocabulary and $r = 0.27$ with Raven's abstract reasoning; for females, the respective correlations were $r = 0.31$ and $r = 0.24$. The overall correlations (including both sexes) were $r = 0.38$ ($p < 0.001$) between vocabulary score and humor ability, and $r = 0.25$ ($p < 0.001$) between Raven's score and humor ability. This difference in correlations was significant (two-sided Fisher t -to- z transformations for the difference

Table 1
Male and female raw scores on the 10 mating success items.

	Males (N = 200) Mean (SD)	Females (N = 200) Mean (SD)
Age at first intercourse	16.77 (1.70)	16.21 (2.48)
Acts of intercourse in the past month	6.01 (8.93)	6.69 (7.63)
No. of sex partners in the past year	1.85 (1.82)	1.78 (1.49)
Lifetime no. of sex partners	7.22 (10.37)	5.72 (6.56)
Likely no. of sex partners in the next 5 years	5.34 (10.09)	2.42 (3.29)
No. of sex partners on one occasion only	2.63 (4.97)	1.83 (2.87)
Times had intercourse with two or more different partners within the same 24 h	0.66 (1.55)	0.24 (0.66)
Times had intercourse with two or more different partners within the same 7 days	1.45 (4.91)	0.94 (2.46)
Times had intercourse with a new partner within the first week of meeting	2.85 (5.83)	1.73 (3.90)
Times had intercourse with an ex-partner more than a month after having split up	2.78 (6.03)	1.80 (4.05)

Table 2

Correlations among intelligence tests (Vocabulary and Raven's), humor ability, mating success, and age, for males (above the diagonal, N = 200) and females (below the diagonal N = 200).

	1	2	3	4	5
1. Vocabulary		0.33***	0.44***	0.05	0.37***
2. Raven's	0.33***		0.27***	-0.14	0.05
3. Humor ability	0.31***	0.24**		0.13	0.21**
4. Mating success	0.23**	0.11	0.14		0.28**
5. Age	0.19**	0.01	0.15*	0.12	

* $p < 0.05$.

** $p < 0.01$.

*** $p < 0.001$.

between the two was $z = 2.1$ ($p < 0.05$)), suggesting (unsurprisingly) that verbal intelligence more strongly predicts capacity for verbal humor than abstract reasoning ability does.

To evaluate whether humor production can predict mating success and pro-promiscuity attitude factors, two backward multivariate regressions were conducted, with average humor ability score regressed over sex, verbal intelligence, RAPM, number of captions produced and either mating success and pro-promiscuity attitude factor as the dependent variable.

For the pro-promiscuity attitude factor, the final model was significant [$F(2, 274) = 73.42$, adjusted $R^2 = 0.35$, $p < 0.001$], with only the sex (women = 0, men = 1) variable as a predictor ($B = 1.16$, $SE = 0.10$, $p < 0.001$). Men were more likely to have positive attitudes towards short-term, uncommitted sex. For the mating success factor, the final model was significant [$F(2, 295) = 5.36$, adjusted $R^2 = 0.03$, $p < 0.01$], with only the humor ability variable in the final model ($B = 0.14$, $SE = 0.06$, $p < 0.01$). Participants who had higher humor production scores were more likely to reported having more short-term, uncommitted sex.

3.2. Structural equation models of intelligence, humor ability, and mating success

Fig. 1 shows results of two structural equation models (one for males and one for females) based on confirmatory factor analyses (CFA) with EQS 6.1, to test if humor ability mediates the effect of intelligence on mating success. Vocabulary scores and Raven's scores were the intelligence measures; judged funniness of cartoons 1, 2, and 3 were the humor ability measures; the factor derived from the 10 SOI-derived sexual history items was the mating success measure. For the male model, $\chi^2 = 10.262$ ($df = 7$, $p < 0.18$), goodness of fit index (GFI) = 0.977, comparative fit index (CFI) = 0.972, and the root mean-square error of approximation (RMSEA) = 0.057. For the female model, $\chi^2 = 11.315$ ($df = 7$, $p < 0.13$), goodness of fit index (GFI) = 0.976, comparative fit index (CFI) = 0.964, and the root mean-square error of approximation (RMSEA) = 0.064. The results for both sexes fit the data extremely well, and show that humor ability strongly mediates the positive effects of intelligence on mating success.

3.3. Sex differences

Table 3 shows sex differences in vocabulary score, Raven's score, humor ability, number of captions produced, age, mating

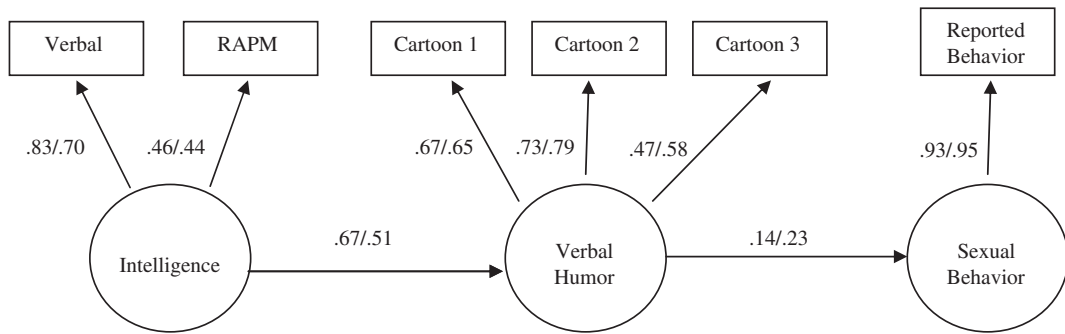


Fig. 1. Structural equation model based on confirmatory factor analysis (CFA) testing the effect of intelligence on reported sexual behavior mediated by verbal humor production. Standardized estimates for heterosexual men (left of slash for each path, $N = 184$) and heterosexual women (right of slash, $N = 187$) are shown. All paths were significant at $p < 0.5$.

success, pro-promiscuity attitudes, and family values. Males scored significantly higher on vocabulary, humor ability, captions produced, mating success, and pro-promiscuity attitudes (all at $p < 0.01$ or lower).

Regression analyses showed that even controlling for vocabulary score and Raven's score, and number of captions produced, men still produced funnier captions on average, perhaps reflecting higher unconscious mating effort. There were no significant sex differences in the correlations between humor ability and vocabulary or Raven's scores, so humor may be an equally reliable intelligence-indicator in each sex.

4. Discussion

This study confirmed three predictions derived from a sexual selection model of humor (Miller, 2000): intelligence predicts humor ability, humor ability predicts mating success, and males show higher average humor ability. Further, structural equation models showed that humor ability strongly mediates the positive effects of intelligence on mating success, suggesting that intelligence may be sexually attractive mainly insofar as it is manifest through verbal humor. Humor is not just a reliable intelligence-indicator; it may be one of the most important traits for humans seeking mates (Smith, Waldorf, & Trembath, 1990; Sprecher & Regan, 2002). Of course, mate attraction is not the only function of

humor. Humor can also be used in competing for status with same-sex rivals (Greengross & Miller, 2008), reducing social tensions (Chafe, 1987), and other adaptive functions (Li et al., 2009).

The results are consistent with other humor studies. Verbal humor is widely used in social situations and plays an important role in attracting mates, especially for men (Lundy et al., 1998; Provine, 2000). Men were funnier than women on average and produced a larger number of captions, consistent with the sexual signaling hypothesis in which men try (unconsciously) to signal their mate quality through their humor ability, and women are more responsive to and discriminating about humor (Bressler & Balshine, 2006; Miller, 2000). However, humor ability mediated the effects of intelligence on mating success not only for men, but also for women, suggesting that men are also discriminating about women's humor ability as an intelligence-indicator. Notably, pro-promiscuity attitudes were not associated with humor ability, but higher family values scores (more religious/moralistic attitudes towards sex) predicted lower humor ability. Nonetheless, given that men were funnier on average and women tend to be choosier in selecting mates, men might be more motivated to display their humor ability.

The study had some limitations in the sample and measures that should be addressed in further research. Although our UNM student sample was quite diverse in intelligence, humor ability, mating success, socioeconomic status, and ethnicity, further studies should use larger community samples, across cultures, and with a wider age range. Also, genetically informative samples based on extended twin family designs would allow calculation of additive, dominance, and epistatic genetic effects on humor ability, and genetic correlations among intelligence, personality, humor ability, and mating success; DNA samples would allow genome-wide association studies of single nucleotide polymorphisms, copy number variants, and other forms of genetic variation associated with humor ability. Further studies should use a larger number of intelligence measures so a proper g factor can be extracted, and should use better, more objective measures of mating success that address quality as well as quantity of mates. Given the dearth of well-validated humor ability measures, future studies could potential revive some of the older measures, such as the Sense of Humor subscale of the George Washington University Series Social Intelligence Test (Moss, Hunt, Omwake, & Woodward, 1955). Also, future studies

Table 3

Sex differences on key measures, comparing males ($N = 200$) and females ($N = 200$), with positive d values (effect sizes) indicating that men scored higher than women.

	Males Mean (SD)	Females Mean (SD)	t	d
Vocabulary score	20.22 (6.02)	18.90 (5.80)	2.24*	0.22
Raven's score	7.21 (2.45)	6.82 (2.25)	1.64	0.16
Humor ability	0.09 (0.48)	-0.09 (0.49)	3.77***	0.38
No. of captions	11.39 (4.14)	9.85 (3.49)	4.02***	0.40
Age	21.09 (5.43)	20.12 (3.67)	2.10*	0.21
Mating success	0.08 (0.66)	-0.08 (0.46)	2.39*	0.28
Pro-promiscuity attitudes	0.31 (0.61)	-0.32 (0.49)	10.95***	1.36
Family values	-0.05 (0.75)	0.05 (0.66)	-1.31	0.14

* $P < 0.05$.

*** $P < 0.001$.

should ideally include measures not only of humor ability and general intelligence, but also of other potentially related constructs such as creativity, social intelligence, emotional intelligence, the Big Five personality traits, and measures of mental illnesses allegedly associated with verbal creativity, such as schizotypy and hypomania. In addition, abstract reasoning and verbal intelligence capture only some facets of intelligence, and the results might be different if other measures of intelligence were used (e.g. other g-factor related measures, see Jensen, 1998). Future studies should use a variety of intelligence scales to see how different types of intelligence relate to humor and mating success.

Another key limitation is the somewhat artificial humor production task: writing captions for cartoons, in the absence of natural social interactions or potential mates, do not reflect most everyday uses of humor. However, it seems reasonable to suppose that people may show stable levels of humor ability across different levels of social interactiveness, ranging from paper-and-pencil studies such as this, through emails or social networking sites, and stand-up comedy in front of an audience, to more ecologically valid and ancestrally natural forms of social interaction such as face-to-face flirtation and conversation. On the other hand, one strength of the study is the blind rating of humor ability, independent of other social cues. Previous research shows that people are perceived as funnier if they are more physically attractive, more agreeable, or higher in status (Greengross & Miller, 2008; Lundy et al., 1998), and blind ratings eliminate such halo effects.

In summary, the human capacity for producing and appreciating humor may parallel the capacities of other animals for producing and appreciating other types of courtship displays that reliably reveal phenotypic and genetic qualities.

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