Some people are attracted sexually to intelligence: A psychometric evaluation of sapiosexuality

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ABSTRACT

The emergence of the popular culture notion of a sapiosexual, an individual who finds high levels of intelligence (IQ) the most sexually attractive characteristic in a person, suggests that a high IQ may be a genuinely sexually attractive trait, at least for some people. Consequently, mean desirability ratings of IQ on a percentile continuum were estimated, across sexual attraction specifically and long-term partner interest conditions ($N = 383$). Furthermore, we evaluated the psychometric properties of a newly developed measure, the Sapiosexuality Questionnaire (SapioQ). Finally, we estimated the correlation between objective intelligence and the SapioQ. On average, the 90th percentile of intelligence (IQ $\approx$ 120) was rated to be the most sexually attractive and the most desirable in a long-term partner. However, 8.1% and 1.3% of the sample scored above 4.0 and 4.5, respectively, on the SapioQ (theoretical range: 1 to 5), which had respectable psychometric properties. The desirability ratings across the IQ percentile continuum interacted with the two conditions (i.e., sexual attraction specifically versus partner interest), such that the rater desirability of IQ increased more substantially for partner interest than sexual attraction specifically across the 25th to 75th IQ percentiles. Finally, objective intelligence correlated negatively with rated sexual attraction specifically and partner interest for a hypothetical person at 25th and 50th percentiles of IQ ($r \approx -0.25$). By contrast, objective intelligence failed to correlate with sapiosexuality ($r = -0.02$, $p = 0.765$; $BF_{01} = 12.84$). The results were interpreted to suggest that, for most people, a very high IQ in a partner (IQ 135 +) is not the most attractive level of intelligence, which may be considered supportive of a version of the threshold hypothesis of intelligence. Finally, although sapiosexuality may be a genuine psychological construct, it appears to be influenced by non-intellective factors.

1. Introduction

Intelligence is one of the most highly ranked characteristics in a prospective mate (Buss et al., 1990; Goodwin & Tinker, 2002). However, rank measurement precludes the possibility to evaluate what degree of intelligence in a prospective mate is most preferred. Theoretically, it has been suggested that high levels of intelligence should be valued in a prospective mate, because intelligence represents a broad set of substantially heritable capacities that may offer evolutionary advantages (Barkow, 1989; Miller, 2000). However, it has also been contended that people may only look for "…some level of sufficiency in intelligence…" (Li, Bailey, Kenrick, & Linsenmeier, 2002, p. 953), rather than value incrementally and linearly greater levels of intelligence. In addition to valuing intelligence in a prospective mate (e.g., spouse), the emergence of the popular culture notion of a sapiosexual (a.k.a., sapiophile), an individual who finds high levels of intelligence the most sexually attractive characteristic in a person (Peckham, 2012; Timpf,

2015), suggests that intelligence may be a genuinely sexually attractive trait, at least for some people.

To-date, clear evidence relevant to the value of various levels of intelligence has not been reported, as previous research has used levels of measurement that do not afford unambiguous insights into the issue (e.g., rank-ordering; incomplete Likert-scales). Additionally, the evaluation of sapiosexuality as a psychological construct has not yet been investigated. Consequently, the purpose of this investigation was to measure the desirability of various levels of intelligence with a more fully informative level of measurement (full range percentiles), within the context of sexual attraction specifically and a high-investment relationship (e.g., marriage). Additionally, a psychometric scale was developed to measure individual differences in the hypothesized construct of sapiosexuality. Finally, the possibility that individual differences in objective intelligence may relate positively to individual differences in the rated sexual appeal of intelligence, as well as the rated value of intelligence in a prospective partner, was investigated.

2. Previous research

In a highly influential study with a sample of 9474 participants drawn from 33 countries, Buss et al. (1990) reported that 'intelligent' was the second most highly valued characteristic in a mate, behind only 'kind and understanding'. The results reported by Buss et al. (1990) have been essentially replicated across a number of different types of studies (e.g., Goodwin & Tinker, 2002; Kamble, Shackelford, Pham, & Buss, 2014; Perilloux, Fleischman, & Buss, 2011). Much of the research in this area is based on the Partner Preference Scale (Buss & Barnes, 1986), which includes 13 conventionally considered desirable traits in a prospective mate or partner. In addition to 'kind and understanding' and 'intelligent', the Partner Preference Scale includes the following traits: 'creative and artistic', 'exciting personality', 'good earning capacity', 'physically attractive', and 'good heredity', for example. The typical use of Buss and Barnes' (1986) Partner Preference Scale requires the respondents to rank-order the 13 traits from least (rank = 13) to most (rank = 1) valued, with respect to their desirability in a prospective mate or partner.

A ranking approach may be considered advantageous, as many of the traits included in the Partner Preference Scale are considered to be possibly attractive qualities in a partner (Buss & Barnes, 1986). Thus, based on a more conventional Likert 5-point scale, it is possible that many respondents would rate most of the 13 traits within the Partner Preference Scale very highly, which would yield mean trait scores with relatively little inter-trait variability. An absence of meaningful variability in scores may preclude the observation of statistically significant effects (Duan & Dunlap, 1997). However, a rank order measurement approach necessarily implies that at least one trait will receive a rank of 1 and one trait will receive a rank of 13, across all respondents.

There are, however, well-known limitations associated with a rank order approach to measurement. In particular, rank order measurement scales are considered less informative than other more continuously scored scales (Pedhazur & Schmelkin, 1991). For example, the rank order measurement approach employed by the Partner Preference Scale does not offer clear insights into what *level* of intelligence is valued in a partner by respondents. Stated alternatively, the relatively high ranking of the trait 'intelligent' reported across several investigations does not necessarily imply that a very high, or even moderately high, level of intelligence was valued by the respondents. Instead, a high mean rank associated with the word 'intelligent' may simply indicate that a moderate level of intelligence was valued by a large percentage of the respondents.

In addition to the rank measurement approach, some of the work by Buss and colleagues included Likert-based data. For example, Buss, Shackelford, Kirkpatrick, and Larsen (2001) used the mate selection values questionnaire from Hill (1945), which includes 'education and intelligence' as one of 18 mate characteristics rated on with 4-point Likert scale: 0 = irrelevant or unimportant; 1 = desirable, but not very important; 2 = important; and 3 = indispensable. Based on an American male undergraduate sample collected in 1996 (N = 226), Buss et al. (2001) reported a mean of 2.40 (SD = 0.65) for the 'education and intelligence' mate characteristic, which was numerically higher than 13 other mate characteristics. Similar results were reported for the female portion of the sample (N = 381). Thus, on average, people rated 'education and intelligence' as somewhere between important and indispensable.

Although additional insights can be gained by the analysis of data derived from a 4-point Likert scale, in comparison to ranking, Buss et al. (2001) acknowledged that the response scale lacked discrimination. Perhaps most importantly, Buss et al. (2001) acknowledged that several of rated mate characteristics were, unfortunately, double-barrelled in nature. For example, the questionnaire combined education and intelligence into a single mate characteristic. Consequently, it is difficult to evaluate the results reported by Buss et al. (2001) with respect to intelligence, specifically. The primary reason Buss et al. (2001) used the

less than ideal Hill (1945) measure was to ensure comparability with much older studies in the area, as the investigation had a cross-generational focus.

In addition to the measurement approaches employed by Buss and colleagues, several alternative measurement strategies have been used in the area, some of which may be considered less affected by the limitations described above. For example, Kenrick, Sadalla, Groth, and Trost (1990) asked university students (N = 93) to rate the minimum acceptable level of intelligence in a mate across four levels of relationship involvement: single date, sexual relations, steady dating, and marriage. The students provided ratings on a more continuous level of measurement; specifically, a percentile scale (0 to 100). Kenrick et al. (1990) found intelligence to be a relatively highly rated characteristic in a mate across all four levels of relationship investment. For example, a single date was associated with a mean intelligence minimum expectation of approximately the 50th percentile. By contrast, the most substantial level of involvement, marriage, was associated with a mean intelligence minimum expectation of approximately the 65th percentile. Kenrick, Groth, Trost, and Sadalla (1993) reported comparable effects, based on a similar scale of measurement (see also Regan, 1998). Although perhaps an improvement over Buss et al. (2001), Kenrick et al.'s (1990) method of measurement may be considered limited, as the participants were instructed to consider only minimum expectations of intelligence. Kenrick et al. (1990) did not focus upon desirable or preferred levels of intelligence in a mate, as they assumed there would be ceiling effects.

In another relevant study, Regan, Levin, Sprecher, Christopher, and Gate (2000) administered a modified version of the Partner Preference Scale to a sample of 561 university students. Specifically, Regan et al. (2000) administered a questionnaire of 23 traits (e.g., intelligent, honesty, sexy looking, athletic, etc.) with a 6-point percentile scale: 40th, 50th, 60th, 70th, 80th, and 90th percentiles. Half of the students were asked to specify their percentile preferences across the 23 traits with regard to a partner for a short-term sexual relationship. The other half of the participants was instructed to specify their preferences across the 23 traits with regard to a partner for a long-term romantic relationship. Importantly, however, the participants were instructed to be "realistic" (p. 7), as no one can be expected to be high on all of the traits. Regan et al. (2000) also cautioned the participants to consider that "…extreme levels of some desirable traits may have a negative side" (p. 7). Finally, Regan et al.'s (2000) approach to measurement did not include any percentiles greater than the 90th. Consequently, the results reported by Regan et al. (2000) also cannot provide clear evidence about the degree to which people desire or prefer intelligence in a prospective mate.

Finally, we review an experiment conducted by Li et al. (2002) with a sample of 71 general community participants recruited from an airport. In their first experiment, Li et al. (2002) estimated the amount of a limited 'budget' the participants allocated to various desirable mate characteristics in a prospective partner. The within-subjects factor in the experiment was the fixed total amount of the limited budget: 20, 40, and 60 mate dollars. Li et al. (2002) found that the amount of absolute dollars spent on intelligence remained approximately the same across the 20 and 60 mate dollars conditions (for both males and females). Consequently, Li et al. (2002) suggested that people may simply seek out a sufficient level of intelligence in a partner to carry out day-to-day tasks, rather than a highly intelligent person.

It is useful to contrast Kenrick et al.'s (1990) assumption of intelligence desirability ceiling effects with Li et al.'s (2002) suggestion of sufficiency in intelligence. That is, Li et al.'s (2002) position would imply the absence of ceiling effects, as an IQ of approximately 100 would be considered sufficient to satisfy most people with respect to carrying out day-to-day tasks. We note that Li et al.'s (2002) suggestion of sufficiency in intelligence is reminiscent to the well-known threshold IQ hypothesis. In the area of intelligence, the typically articulated threshold hypothesis represents the notion that the value of intelligence

does not likely extend beyond an IQ of approximately 120 for a variety of socially valuable variables, including creativity, academic achievement, and occupational success (Getzels & Jackson, 1962; Muller et al., 2005; Torrance, 1962). Supporters of the threshold IQ hypothesis contend that other factors (e.g., personality) come into play with respect to influencing socially desirable variables, for people with an IQ > 120. For the purposes of distinguishing between the reviewed findings above, we use the terms 'threshold IQ 100 hypothesis' (Li et al., 2002) and 'threshold IQ 120 hypothesis' (Getzels & Jackson, 1962).

A substantial amount of predictive validity intelligence research has largely failed to support any type of intelligence threshold hypothesis. Instead, there is more compelling evidence to suggest that the predictive value of intelligence is mostly linear across the whole spectrum of ability (Kuncel & Hezlett, 2010; Wai, Lubinski, & Benbow, 2005). Consequently, it may be argued that the association between the rated attractiveness of a prospective mate and the IQ of the prospective mate should be approximately linear, as general intelligence may be regarded as an indicator of fitness (i.e., linear hypothesis; Miller, 2000; Prokosch, Yeo, & Miller, 2005).

Lastly, we note that there is also empirical evidence to suggest that the association between intelligence and socially valuable variables may be exponentially positive. An exponential positive association implies that a high level of intelligence is more valuable than a moderate level of intelligence, and a very high level of intelligence is even more substantially valuable than a high level of intelligence (i.e., the difference is larger). Such a positive, exponential effect has been observed between SAT scores and income within a sample of the top 1% of intellectual ability (Robertson, Smeets, Lubinski, & Benbow, 2010). A similar positive, exponential effect was reported between national student cognitive ability (e.g., PISA) and national gross domestic product (Coyle, Rindermann, Hancock, & Freeman, 2017). To our knowledge, a theoretical explanation for why intelligence may be exponentially more valuable at the extreme upper-end has not yet been provided.

To help consolidate the four theoretical and empirical representations of the associations between intelligence and socially valuable variables discussed, thus far, four idealised scatter plots have been created. As can be seen in Fig. 1, the linear (Panel A), threshold IQ 120 (Panel B), threshold IQ 100 (Panel C), and positive exponential (Panel E) theoretical associations are depicted. Based on the existing empirical literature, positions about the nature of the association between the degree of intelligence in a prospective mate and their attractiveness cannot be evaluated clearly. In particular, the evidence based on the ranking method typically employed by users of the Partner Preference Scale, and the many Likert-based variations thereof, are either ambiguous or not fully informative. Arguably, however, the issue could be evaluated with a method of measurement that has not, yet, been used in the area.

2.1. A proposed measurement solution

A strategy to overcome the ambiguous results associated with investigations which used limited information measurement scales, as reviewed above, is to ask participants to provide responses freely (e.g., no promptings to be "realistic") on a more continuous scale to represent the degree to which they prefer, value, agree, etc. with a statement. For example, with respect to the trait of intelligence, participants could be asked to rate the degree to which they would be interested in a potential partner (e.g., marriage, children), if they later learned that the person was more intelligent than 1%, 10%, 25%, 50%, 75%, 90%, and 99% percent of the population. Specifically, for each percentile, the participant could rate their level of interest on a 6-point Likert scale (e.g., extremely uninterested, very uninterested, uninterested, interested, very interested, and extremely interested). Such a measurement approach would facilitate an evaluation of the degree to which high levels of intelligence is considered desirable in a potential partner. For

example, if the highest mean rating were associated with approximately the 50th percentile, then the threshold IQ 100 hypothesis would be supported. By contrast, if the highest mean rating were associated with the 99th IQ percentile, then the linear hypothesis or the positive exponential hypothesis would be supported, depending on the pattern of the means across all of the percentiles.

Although the above measurement approach may be useful to the evaluation of degree of intelligence desirability in a potential partner, it would not address the possibility that intelligence may be a genuinely sexually attractive trait. That is, the vast majority of the research in the area of attractiveness of intelligence has focussed upon relationships and/or reproduction, either directly or indirectly. To help facilitate an evaluation of the possibility of intelligence as a specifically sexually attractive trait, the example item described in the previous paragraph relevant to the 1st to 99th intelligence percentiles could be modified slightly. For example, participants could be asked to rate the degree to which they would be sexually attracted to a person, if they later learned that the person was more intelligent than 1%, 10%, 25%, 50%, 75%, 90%, and 99% percent of the population. Research specifically focussed upon the sexual attractiveness of intelligence may be considered timely, considering the emerging frequency with which some people describe themselves as a sapiosexual (McCombs, 2015; Timpf, 2015; Walton, Lykins, & Bhullar, 2016).

2.2. Sapiosexuality

In popular culture, an individual who finds high levels of intelligence the most sexually attractive attribute in a person is known as a sapiosexual (or a sapiophile) (Peckham, 2012). It should be made clear that a sapiosexual does not value intelligence in a prospective mate simply because of the corresponding benefits that may arise by virtue of partnering with a relatively intelligent person (e.g., better job prospects). Instead, the popular literature in the area suggests that intelligence is a genuine "turn-on" (Raab, 2014).

Theoretically, it has been contended that intelligence should be considered a sexually attractive quality in a mate, because it is an indicator of biological fitness (Miller, 2000). Empirically, Prokosch et al. (2005) reported a correlation of 0.27 between physical symmetry (an indicator of good health) and general intelligence. Additionally, there is empirical evidence to support the notion that individual differences in intelligence can be discerned by adults, at least to some degree, in common social interactions (Murphy, Hall, & Colvin, 2003; Prokosch, Coss, Scheib, & Blozis, 2009). Consequently, Prokosch et al. (2005) suggested that the positive association between physical symmetry and intelligence may lead to the perception of intelligence as sexually attractive, beyond the potential survival and parental benefits. Stated alternatively, as intelligence may be considered a valid indicator of "good genes", intelligence may be sexually attractive in its own right.

Despite the above theoretical and indirect empirical research, there is very little research that has addressed directly the hypothesis that intelligence may be specifically sexually attractive. In one somewhat relevant investigation, Gangestad, Thornhill, and Garver-Apgar (2010) hypothesized that if intelligence is a genuinely sexually attractive trait in males, then women should find relatively intelligent men to be more attractive during ovulation, in comparison to the luteal phase. However, Gangestad et al. (2010) failed to find support for such a hypothesis in a sample of 66 couples (i.e., the women rated their own partners for sexual attraction).

By contrast, Haselton and Miller (2006) found that there was a tendency for child-bearing age women (*N* = 40) to be more attracted to creatively intelligent men, in comparison to rich men, when the women were most fertile (mid-cycle). Additionally, in a qualitative investigation (i.e., focus groups), Janssen, McBride, Yarber, Hill, and Butler (2008) reported that some men found intelligence to be a sexually attractive characteristic in a woman (a "turn-on"). However, such information was obtained in informal conversations with groups of men
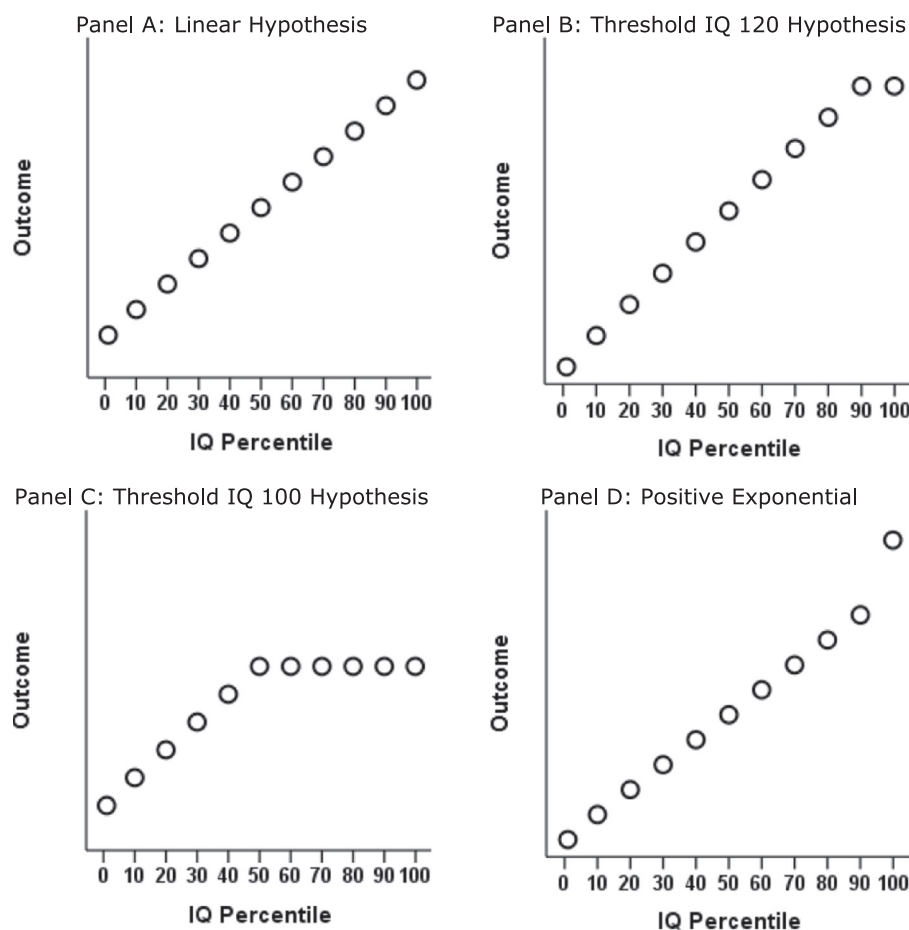
Panel A: Linear Hypothesis

Panel B: Threshold IQ 120 Hypothesis

Panel C: Threshold IQ 100 Hypothesis

Panel D: Positive Exponential

on the topic of sexual attraction, rather than structured measurement.

In light of the above, it may be proposed that some people may find intelligence a genuinely sexually arousing trait in another person. Furthermore, some people may find intelligence the most sexually arousing trait in another person (i.e., sapiosexuals). However, the evidence is far from compelling. Consequently, a primary purpose of this investigation was to develop a psychometric measure to determine whether the construct of sapiosexuality was associated with basic validity.

To evaluate the plausibility of the sapiosexuality construct, a series of items were generated to capture the likelihood of the specific experience of sexual attraction and/or arousal across several situations and/or contexts. As can be seen in Appendix A, nine items were generated in this investigation to measure sapiosexuality. Six of the items were keyed positively (items 1, 2, 4, 6, 8, and 9) and three items were keyed negatively (items 3, 5, 7). The item response scale corresponded to a 5-point Likert-scale: 1 = 'Strongly Disagree', 2 = 'Disagree', 3 = 'Neutral', 4 = 'Agree', 5 = 'Strongly Agree'. It will be noted that the items pertain specifically to the sexual attractiveness of intelligence, rather than valuing the trait of intelligence in a partner more generally. Such an emphasis was deliberate. We wished to avoid confounding the additional factors that are considered when deliberating the value of intelligence in a partner (e.g., higher socio-economic status). Based on our reading of the popular culture literature, the phenomenology of sapiosexuality appears to exist independently of the bio-social benefits of intelligence.

In order to be associated with basic validity, scores from the newly developed multi-item Sapiosexuality Questionnaire (SapioQ) would need to be demonstrated to be associated with factorial validity (Guilford, 1946). In this case, a single dimension was expected, which could be evaluated via factor analysis. Additionally, the percentage of

true score variance to total variance would be expected to be minimally 70% for basic research purposes (i.e., coefficient alpha = 0.70; Nunnally & Bernstein, 1994). Finally, support for the construct of sapiosexuality was considered observed, based on the observation of some people with a high score on the SapioQ. Although any demarcation criterion used to specify a 'high score' on the SapioQ would be, at least to some degree, arbitrary, we considered an average score above 4.0 ('Agree') across the items to be consistent with the inclination toward a sapiosexual disposition. An average score above 4.5 was considered consistent with a strong inclination toward sapiosexuality.

2.3. Gender differences

The most well-known theoretical model proposed to explain gender differences between males and females with respect to sexual behavior is the parental investment model (Trivers, 1972). With respect to humans, the model proposes that females should be more selective in choosing a sexual partner, whether for short-term (one-night stand) or long-term relationships (marriage), as females provide a greater investment in the rearing of children. Based on Feingold's (1992) meta-analysis, females were found to accord greater weight to socio-economic status, ambitiousness, and intelligence, for example, in the context of mate selection preferences. With respect to the importance of intelligence in a sexual partner, Feingold (1992) reported a standardized difference in favour of females equal to $d = 0.30$ ($k = 15$; $N = 6541$). Feingold (1992) reported the result as consistent with the parental investment model.

It should be noted that Feingold's (1992) meta-analysis examined the value of intelligence purely from the perspective of a main effect. There is evidence, however, to suggest that the interpretation of the main effect is complicated by an interaction. Specifically, it has been

found that the main effect of gender on the value of intelligence interacts with degree of relationship investment. For example, Kenrick et al. (1990) reported an essentially linear increase in mean minimum intelligence expectation across dating ($M \approx$ 49th percentile), sexual relations ($M \approx$ 55th percentile), steady dating ($M \approx$ 61st percentile) to marriage ($M \approx$ 63rd percentile) for females. By contrast, the male portion of the sample was associated with a reduction in mean minimum intelligence expectation from dating ($M \approx$ 51st percentile) to sexual relations ($M \approx$ 41st percentile), which was then followed by increases from steady dating ($M \approx$ 62nd percentile) to marriage ($M \approx$ 66th percentile). The results reported in Kenrick et al. (1990) were replicated closely by Kenrick et al. (1993) in a sample of 235 undergraduates.

Thus, when analysed specifically across various degrees of relationship investment (one-night stand to marriage), males and females are remarkably similar in their minimal intelligence expectations, with one exception: sexual relationship only. The interaction between sex and relationship investment has been interpreted as consistent with the modified parental investment model, which states that females have greater expectations for intelligence in a prospective mate only for relationships that are purely sexual in nature (Kenrick et al., 1993). Based on the results of Kenrick et al. (1990; 1993) and the modified parental investment model, it may be hypothesized that females would rate intelligence as more sexually attractive than males, on average. Correspondingly, it may be hypothesized that females, on average, would report higher levels of sapiosexuality, in comparison to males. Thus, a secondary purpose of this investigation was to test the above two hypotheses, based on the more fully informative percentile scales, as well as the newly developed measure of sapiosexuality (SapioQ).

2.4. Intelligence as a predictor of valuing intelligence in others

As reviewed above, intelligence has been reported to be relatively highly rated trait in a prospective partner across various types of relationships. However, it is important to note that there are non-negligible individual differences associated with the degree to which intelligence is valued as a trait in a prospective mate. For example, Regan (1998) had 72 people report their minimal intelligence expectations (percentile) for a prospective mate in a short-term relationship context. Based on the results reported by Regan (1998) for the sexes separately, we estimated the overall sample mean to equal approximately the 39th minimal intelligence percentile. Furthermore, we estimated the overall sample standard deviation at approximately 15. Assuming a relatively normal distribution, a mean of 39 and a standard deviation of 15 would imply that some people reported a minimal intelligence expectation as low as the 10th percentile. Additionally, some would have reported a minimal intelligence expectation as high as the 70th percentile. Evidently, there are substantial individual differences in the value of intelligence in a prospective partner in the short-term relationship context.

It is interesting to speculate why such vast individual differences in the value of intelligence in a prospective mate exist. One possibility is that individual differences in people's own intelligence may account for some the individual differences in the value of intelligence in a prospective mate. Such a hypothesis is consistent with the assortative mating for intelligence evidence, i.e., there is a positive correlation between the IQ scores of spouses (r = 0.30 to 0.40; Van Leeuwen, Van Den Berg, & Boomsma, 2008; Watson et al., 2004). Furthermore, Mascie-Taylor (1989) failed to find a statistically significant correlation between degree of IQ score similarity and the number of years the couples have been married. The absence of such an effect implies that the IQ score similarity among the couples was the result of selection, rather than convergence during marriage. Of course, the results reported by Mascie-Taylor (1989) are only indirectly supportive of the hypothesis that individual differences in intelligence predict individual differences in the value of intelligence in a prospective mate.

In one of the few partially direct investigations relevant to the issue, Kenrick et al. (1993) had a sample of 235 undergraduates self-appraise their own intelligence on a percentile scale. Kenrick et al. found that individual differences in self-appraised intelligence correlated positively with individual differences in minimum expectations of intelligence in a prospective mate. For example, with respect to a one-night stand, the correlation between self-appraised intelligence and minimal expectations of intelligence was r = 0.42 and r = 0.30 for females and males, respectively. As the correlation between self-reported intelligence and task-based measured intelligence is only $r \approx$ 0.30 (Gignac, Stough, & Loukomitis, 2004; Jacobs & Roodenburg, 2014), the results reported by Kenrick et al. (1993) are limited. Consequently, a final purpose of this investigation was to estimate the association between objective intelligence and the degree to which a person values intelligence in a prospective mate (e.g., marriage, children), the degree to which intelligence is rated specifically as sexually attractive, and individual differences in sapiosexuality.

2.5. Summary

It is known that both males and females value intelligence in a prospective mate across a variety of types of relationships. However, it is not yet known the level of intelligence that people prefer, on average, whether from the perspective of sexual attraction specifically or a high-investment relationship. Additionally, the speculative construct of sapiosexuality has not yet been investigated psychometrically. Finally, the association between individual differences in objective intelligence and individual differences in the value of intelligence in a prospective mate and individual differences in sapiosexuality has not yet been estimated. Consequently, the primary purpose of this investigation was to address all of the above issues with a more fully informative preferred level of intelligence scale, a newly developed self-report measure of sapiosexuality, and a collection of objective measures of intelligence.

3. Method

3.1. Sample

The final sample consisted of 383 participants (males: N = 159; females: N = 221; other: N = 3). The mean age was 25.51 (SD = 7.41; inter-quartile range: 18 to 32). The participants were recruited from two sources. First, we recruited a total 181 participants from a first-year undergraduate psychology research pool at a university in Perth, Australia (University of Western Australia). The mean age was 20.67 (SD = 6.70; interquartile range: 18 to 20). The university participants received a small amount of course credit for participating. Although information on ethnicity was not obtained from the participants, the university student body is known to be populated from a primarily white, European background. Furthermore, participants were recruited on the basis that English was their first language. Some indication of the representativeness of the university sample can be discerned by the sample's longest letter-number sequence mean of 5.42 (SD = 1.04), which is approximately half of a standard deviation larger than the general population (Wechsler, 2008b). Additionally, the APM (odd-items) mean was 10.29 (SD = 2.67), which is somewhat lower than the commonly observed mean of approximately 11 observed for first-year psychology university samples (e.g., Jaeggi et al., 2010; Unsworth, Brewer, & Spillers, 2009). Based on the above, we estimated the mean IQ of the sample at between 106 and 108, which is not substantially greater than the general population mean of 100.

Secondly, we recruited 226 participants from Amazon's Mechanical Turk, a platform that has been shown to yield reasonably reliable and valid data from a relatively representative general community population (Buhrmester, Kwang, & Gosling, 2011). The only two filters applied in the MTurk recruitment were US residents and an age range of 18 to 40 years. However, six participants reported their age as > 40.

Consequently, they were removed from the sample. Additionally, 18 of the remaining 220 Mechanical Turk responses were not found to have completed the questionnaires entirely seriously. Such a determination was made on the basis that their pattern of responses to one or more of the questionnaires was implausible. We note that all of the key results and conclusions reported in this investigation were essentially the same, with the inclusion of all of the Mechanical Turk participants. Finally, there was one missing value associated with a single item (Sapiosexual Questionnaire item 3) which was imputed via expectation maximization. Thus, the final Mechanical Turk sample consisted of 202 participants. Finally, the Mechanical Turk sample had an educational profile approximately comparable to the general US population: some high school = 0.5%; high school graduate or graduate equivalency = 7.7%; associate's technical degree = 5.5%; some college = 24.5%; associate's academic degree = 10.5%; bachelor's degree = 44.5%; master's degree = 4.5%; professional school degree = 1.8%; doctoral degree = 0.5%. With respect to the results reported in this investigation, there were little in the way of meaningful differences between the undergraduate and Mechanical Turk samples. Consequently, the two sources of data were combined to form a single sample.

4. Measures

4.1. Partner Preference Scale

Partner preference was measured with the Partner Preference Scale (Buss & Barnes, 1986). The scale consists of the following 13 partner characteristics: kind and understanding, religious, exciting personality, creative and artistic, good house-keeper, intelligent, good earning capacity, wants children, easy going, good heredity, college graduate, physically attractive, healthy. In his investigation, the scale was administered online via the Qualtrics platform. The 13 characteristics were presented in a random order on the screen. The participant was required to move the characteristics with the mouse/pointer such that those closer to the top of the order were more greatly preferred. In this investigation, the highest ranked characteristic was accorded a value of 1 and the lowest ranked characteristic was accorded a value of 13. The Partner Preference Scale was administered in this investigation to evaluate comparability of results with previous investigations in the area. None of the Mechanical Turk participants completed the Partner Preference Scale.

4.2. Intelligence Percentile Attraction/Interest Scales

A newly developed scale designed to assess the degree to which a person finds intelligence attractive in a potential mate along a percentile continuum (1st, 10th, 25th, 50th, 75th, 90th, and 99th; see Appendix B). The scale exists in two forms: one form is relevant to sexual attraction specifically, and the other form is relevant to a potential romantic partnership (marriage, children). The specific sexual attraction form poses the following question: "How sexually attracted to the person would you be, if you later learned that their intelligence level was such that they were…" The partner interest form poses the following question: "How interested would you be in the person as a potential partner (e.g., marriage, children), if you later learned that their intelligence level was such that they were…" For the specific sexual attraction form, the six-point response scale was: extremely unattracted = 1; very unattracted = 2; unattracted = 3; attracted = 4; very attracted = 5; and extremely attracted = 6. Finally, for the partner interest form, the six-point response scale was: extremely uninterested = 1; very uninterested = 2; uninterested = 3; interested = 4; very interested = 5; and extremely interested = 6.

4.3. Sapiosexuality Questionnaire (SapioQ)

A newly developed questionnaire designed to measure the hypothesized construct of sapiosexuality. The questionnaire consists of nine self-reported items measured on a five-point Likert scale (see Appendix A): 1 = Strongly Disagree, 2 = Disagree, 3 = Neutral, 4 = Agree, 5 = Strongly Agree. All nine items relate directly to the sexual attractiveness of intelligence. For example, item 2: "Listening to someone speak very intelligently arouses me sexually," and item 4: "A very high level of intelligence alone is enough for me to be attracted to someone sexually". Three items (3, 5, and 7) are negatively keyed (see Appendix A). The three negatively keyed items were reverse scored prior to all of the analyses. The psychometric properties of the SapioQ are reported in the results section below.

4.4. Intelligence

Individual differences in intelligence were measured with four cognitive abilities tests. Fluid intelligence was measured with the Advanced Progressive Matrices (Raven, 1966). The APM consists of 36 items, however, due to time constraints, only the odd-numbered items were administered in this investigation. Working memory capacity was measured with a slightly adapted version of the Letter-Number Sequence subtest from the WAIS-IV (Wechsler, 2008a). Processing speed was measured with all four forms of the Connections test (Salthouse et al., 2000). Component scores were generated from a principal components analysis of the four Connections tests (i.e., speed$g$). Crystallised intelligence was measured with the Advanced Vocabulary Test (Gignac, Shankaralingam, Walker, & Kilpatrick, 2016). The AVT consists of 21 multiple-choice items with five response alternatives. Due to time constraints, only the odd-numbered items (11 items in total) of the AVT were administered in this investigation. In this sample, the descriptive statistics and internal consistency reliabilities (coefficient alpha) were as follows: APM $\alpha = 0.66$ ($M = 10.29$; $SD = 2.67$); Letter-Number Sequencing $\alpha = 0.82$ ($M = 11.92$; $SD = 2.98$) Connections $\alpha = 0.73$ ($M = 101.78$; $SD = 23.59$); and AVT $\alpha = 0.49$ ($M = 5.36$; $SD = 1.96$). Based on the current investigation's sample, the four intelligence tests were associated with a positive manifold (mean $r = 0.28$). Furthermore, a maximum likelihood factor analysis uncovered a single-factor with positive loadings from each of the subtests: Advanced Vocabulary Test $\lambda = 0.37$; Advanced Progressive Matrices $\lambda = 0.56$; Letter-Number Sequencing $\lambda = 0.53$; and Connections $\lambda = 0.72$. Regression-based maximum likelihood factors scores were calculated for each participant, in order to estimate the associations between the relevant variables and general intelligence. Based on Armor's (1973) theta formula, the general intelligence factor scores' internal consistency reliability was estimated at 0.62. Intelligence data were only available for 177 participants within the undergraduate university source. None of the Mechanical Turk participants completed the objective intelligence testing.

4.5. Procedure

For the university sample, the testing battery was administered as a part of a multi-portion study relevant to intelligence, test-taking motivation, and academic motivation (total testing time approximately 50 min). After providing informed consent, and completing some basic demographic questions, the participants completed the self-report measures on-line (Qualtrics). Next, they completed the intelligence tests in the following order: Advanced Vocabulary Test, Advanced Progressive Matrices, Letter-Number Sequencing (L-NS), and Connections. The AVT and APM were administered online (Qualtrics). The L-NS and Connections tests were administered face-to-face with an experimenter. An experimenter was in the testing room at all times. All testing was completed individually and took approximately 50 min. Only the Intelligence Percentile Attraction/Interest Scales and the

SapioQ were administered (in that order; total testing time allowed = 10 min) to the Mechanical Turk workers (Qualtrics).

4.6. Data analysis

First, in order to evaluate the comparability of this investigation's sample and results to previous investigations in the area, we estimated the 13 trait mean ranks associated with the Partner Preference Scale. We expected that 'intelligent' would be associated with approximately the second highest rank. We tested the differences between the top three trait mean ranks statistically, with a series of bootstrapped, single-step, Games-Howell multiple comparison analyses, as such an analysis does not assume any level of measurement or homogeneity of variance (Games, Keselman, & Rogan, 1981; Mooney & Duval, 1993). We considered between-subjects design statistical analysis as appropriate, in this case, as many of the correlations between the ranks were necessarily negative, due to the nature of ranked data. We tested gender differences in mean ranks with a series of bootstrapped Welch's *t*-tests for the same reasons.

We conducted a 2 × 7 factorial repeated measures ANOVA, in order to determine which of the seven intelligence percentiles was associated with the highest rated mean, as well as to evaluate the possibility of an interaction with context (i.e., sexual attraction specifically vs. long-term relationship). We decomposed a statistically significant interaction with a follow-up series of 2 × 2 contiguous factorial repeated measures ANOVAs. We evaluated the possibility of curvilinear effects with quadratic and cubic trend analyses.

Next, we evaluated the Sapiosexuality Questionnaire (SapioQ) for factorial validity via an unrestricted principal axis factor analysis. To help decide the number of factors to extract, a parallel analysis was performed (O'Connor, 2000). Additionally, we estimated the internal consistency reliability of the test scores via coefficient alpha. Finally, we performed a series of Pearson correlations, in order to estimate the association between SapioQ scores and the seven intelligence percentile ratings (across both of the sexual attraction specifically and partner interest conditions). Correspondingly, we performed Pearson correlations, in order to estimate the association between objective intelligence and the intelligence percentile ratings, as well as the SapioQ scores. Where appropriate, we disattenuated the correlations for imperfect reliability in the test scores (r_d; Nunnally & Bernstein, 1994). Finally, we estimated the *p*-values for the disattenuated correlations, based on the procedure described by Bobko and Rieck (1980).

5. Results

5.1. Intelligence: Ranked data

As can be seen in Fig. 2, based on the Partner Preference Scale, 'intelligent' was the numerically second highest ranked mate characteristic (*M* = 3.54; *SD* = 1.98), behind only 'kind and understanding' (*M* = 2.16; *SD* = 1.73). Thus, based on the commonly used ranking measurement approach, intelligence was rated very highly as a characteristic in a mate. Based on a series of bootstrapped Games-Howell multiple comparison analyses, 'kind and understanding' (M_{rank} = 2.16; *SD* = 1.73) was found to be statistically significantly more highly rated than both 'intelligent' (M_{rank} = 3.54; *SD* = 1.98; ΔM_{rank} = −1.38, 95%CI: −1.77/−1.00) and 'exciting personality' (M_{rank} = 3.92; *SD* = 2.51; ΔM_{rank} = −1.76, 95%CI: −2.18/−1.35). Although the 'intelligent' characteristic was not found to be more highly rated than 'exciting personality' (ΔM_{rank} = −0.38, 95%CI: −0.94/0.19), 'intelligent' was found to be more highly rated than the remaining 10 mate characteristics, as can be appreciated by the fact that the 'intelligent' mean rank 95% confidence intervals (bootstrapped) did not intersect with any of the remaining 10 mate characteristics (see Fig. 2). Finally, it will be noted that the permutation-based Pearson correlation (Hayes, 1998) between the mean mate characteristic ranks obtained in this
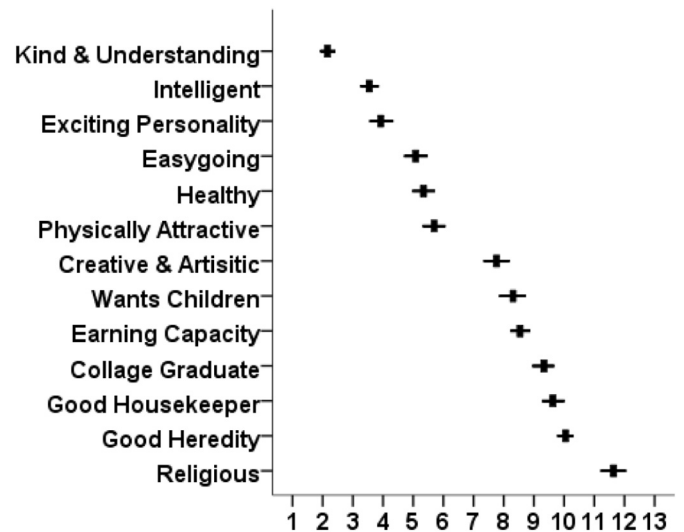

Fig. 2. Mean ranks (■) and 95% confidence intervals (whiskers) associated with the 13 mate characteristics (*N* = 177).

investigation correlated *r* = 0.98 (*p* < 0.001) with the mean mate characteristic ranks reported in Buss and Barnes (1986). Thus, there was a substantial degree of comparability between this investigation's Partner Preference Scale results and previous investigations in the area.

5.2. Intelligence: Likert-rated data

Prior to conducting the 2 × 7 factorial repeated measures ANOVA, the assumption of sphericity was tested. The assumption was violated, χ^2 = 2443.29, *df* = 20, *p* < 0.001, ε = 0.29. Consequently, the Huynh-Feldt adjusted results were consulted. The main effect null hypothesis of equal Likert-rated attraction/interest means (collapsed) across the seven intelligence percentiles was rejected, $F(1.71, 652.59)$ = 410.74, *p* < 0.001, partial η^2 = 0.519. As can be seen in Fig. 3(panel A), the mean levels of attraction to intelligence (sexual attraction specifically and partner interest conditions collapsed) increased across the various levels of intelligence (1st to 99th percentile). However, the effect was not entirely linear. Furthermore, based on a trend analysis, the pattern of means was found to be consistent with a cubic effect, $F(1, 381)$ = 245.14, partial η^2 = 0.392. The statistical significant cubic effect implied that there were two bends in the pattern of means. As can be seen in Fig. 3 (panel A), the first bend was consistent with a non-linear increase in rated attraction from the 1st to the 50th percentile. By contrast, the second bend was consistent with an inverted U-shaped effect from the 50th to the 99th percentile. Thus, the results appeared to be essentially consistent with the threshold IQ 120 hypothesis.

Next, the main effect of condition (sexual attraction specifically versus partner preference) was also found to be statistically significant, $F(1, 381)$ = 23.81, *p* < 0.001, partial η^2 = 0.059 (sexual attraction specifically: *M* = 3.70, *SD* = 0.64; partner interest: *M* = 3.59, *SD* = 0.68). However, the condition by intelligence percentile interaction was also significant statistically, $F(3.73, 1421.49)$ = 42.10, *p* < 0.001, partial η^2 = 0.100. As can be seen in Fig. 3 (panel B), the magnitude of the differences between the rated IQ percentile means were not equal across both conditions (sexual attraction specifically versus partner interest).

To uncover the precise nature of the interaction, a series of contiguous 2 × 2 factorial repeated measures ANOVAs were performed. The analyses uncovered the statistically significant omnibus 2 × 7 interaction effect was due principally to two areas. Specifically, a classic, disordinal interaction (crossed means) was observed between the two conditions across the 50th and the 75th intelligence percentiles, $F(1,$
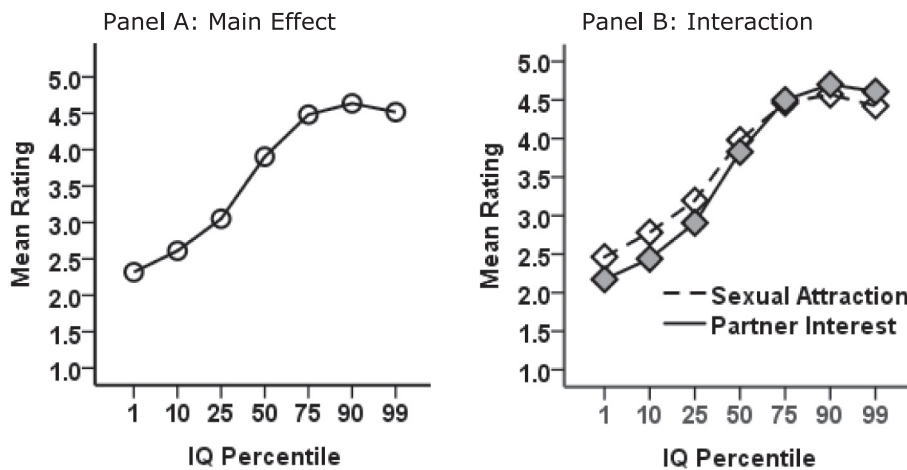
Panel A: Main Effect

Panel B: Interaction

Fig. 3. Rated sexual attraction and partner interest means associated with the seven intelligence (IQ) percentiles (*N* = 382).

381) = 20.84, $p < 0.001$, partial $\eta^2 = .052$ (see Fig. 3, panel B). In plain language, the magnitude of the increase in the means from the 50th to 75th intelligence percentiles was statistically significantly greater for the partner interest condition, $t(381) = -13.92$, $p < 0.001$, $d = -0.71$, in comparison to the sexual attraction specifically condition, $t(381) = -11.45$, $p < 0.001$, $d = -0.58$. Additionally, a similar 2×2 interact effect was observed between the 25th and 50th percentiles, $F(1, 381) = 8.96$, $p = 0.003$, partial $\eta^2 = .023$. As can be seen in Fig. 3 (panel B), there was a more substantial increase in the partner interest condition rating means across the IQ percentiles, in comparison to the sexual attraction specifically condition rating means.

It will be noted that a statistically significant interaction was not observed between the 90th and 99th percentiles, $F(1, 381) = 3.44$, $p = 0.064$, partial $\eta^2 = 009$. Both the sexual attraction specifically and partner interest conditions evidenced statistically significant reductions in mean ratings across the 90th and 99th percentiles: partner interest, $t = 2.67$, $p = 0.008$, $d = 0.08$; sexual attraction specifically, $t = 3.96$, $p < 0.001$, $d = 0.13$. Additionally, there was a significant increase in the mean ratings from the 75th to the 90th percentiles, $F(1, 381) = 15.68$, $p < .001$, partial $\eta^2 = .040$. Thus, the 90th IQ percentile was rated the most preferred level of intelligence from the perspective of sexual attraction specifically and partner interest. Such results support the threshold IQ 120 hypothesis.

5.3. Gender differences: Likert-rated data

In order to evaluate the possibility that gender may have interacted with the results depicted in Fig. 3 (panel B), a $2 \times 2 \times 7$ mixed-design factorial repeated measures ANOVA with gender as a between-subjects factor, condition as a within-subjects factor (sexual attraction specifically and partner interest), and percentile level of intelligence as a within-subjects factor (seven intelligence percentiles) was performed. The between-subjects main effect was not significant statistically, $F(1, 377) = 0.58$, $p = 0.810$, partial $\eta^2 = 0.001$ (Males $M = 3.64$, $SD = 0.95$; Females $M = 3.66$, $SD = 0.82$). Thus, with the two conditions and the seven intelligence percentiles combined, no statistically significant difference was observed between males and females in the ratings of sexual attraction specifically and partner interest (combined). Furthermore, gender was not found to be an interacting variable in any of the other factors: gender by condition two-way interaction ($F(1, 377) = 0.24$, $p = 0.628$, partial $\eta^2 = 0.001$); gender by intelligence percentile two-way interaction ($F(1.72, 647.38) = 1.05$, $p = 0.342$, partial $\eta^2 = 0.003$); gender by condition by intelligence percentile three-way interaction ($F(3.74, 1411.03) = 0.16$, $p = 0.951$, partial $\eta^2 = 0.001$). Thus, no statistically significant differences between the genders was observed in this investigation, based on the percentile

method of measurement.

5.4. Sapiosexuality Questionnaire (SapioQ)

The mean inter-item correlation associated with the nine SapioQ items was 0.23. An examination of the inter-item correlations revealed a number of non-significant correlations between the positively keyed and negatively keyed items (see Table 1). Furthermore, an initial factor analysis suggested the presence of a negatively keyed item factor. As negatively keyed items have been shown to be often psychometrically problematic (Roszkowski & Soven, 2010), we decided to continue the analyses with only the six positively keyed items associated with the SapioQ.

Based on the six positively keyed SapioQ items, the Kaiser-Meyer-Olkin measure of sampling adequacy was estimated at 0.78, which suggested the data were appropriate for data reduction (Kaiser & Rice, 1974). The parallel analysis suggested the presence of one large factor and the possibility of a second, much weaker factor. The single-factor model solution was defined by respectable standardized loadings (i.e., > 0.30) across all six positively keyed SapioQ items: item 1 = 0.37; item 2 = 0.77; item 4 = 0.71; item 6 = 0.53; item 8 = 0.66; item 9 = 0.66. The absolute residual correlation matrix was associated with a mean $r = 0.07$. The largest residual correlation was between items 1 and 9 ($r = 0.17$). The extraction of two factors with a promax rotated solution yielded a second factor that was not considered interpretable, as it was defined by a single item with a pattern matrix loading of 0.99 (i.e., item 9). Consequently, the single-factor solution was considered the most psychometrically defensible. Internal consistency reliability of the SapioQ composite scores was estimated via coefficient α at 0.78.

As can be seen in Fig. 4 (panel A), participant total scores on the

Table 1
Inter-item Pearson correlations and descriptive statistics: Sapiosexuality Questionnaire.

Item	1.	2.	3.	4.	5.	6.	7.	8.	9.	*M*	*SD*
1.	1.0									2.73	1.02
2.	0.25	1.0								3.22	1.04
3.	0.23	0.11	1.0							3.38	0.90
4.	0.24	0.50	0.04	1.0						2.66	1.06
5.	0.07	0.11	0.32	0.06	1.0					4.11	0.88
6.	0.13	0.44	0.11	0.42	0.16	1.0				3.27	0.94
7.	0.23	0.08	0.23	0.16	0.09	0.10	1.0			2.84	1.10
8.	0.20	0.64	0.07	0.40	0.10	0.36	0.04	1.0		3.73	0.95
9.	0.41	0.43	0.14	0.57	0.00	0.30	0.32	0.35	1.0	2.90	1.09

N = 383; Items 5, 7, and 9 were omitted from the full analyses, as they were found to be associated with a negatively keyed item factor; correlations > 0.10 were statistically significant ($p < 0.05$).

Panel A: Total Sample
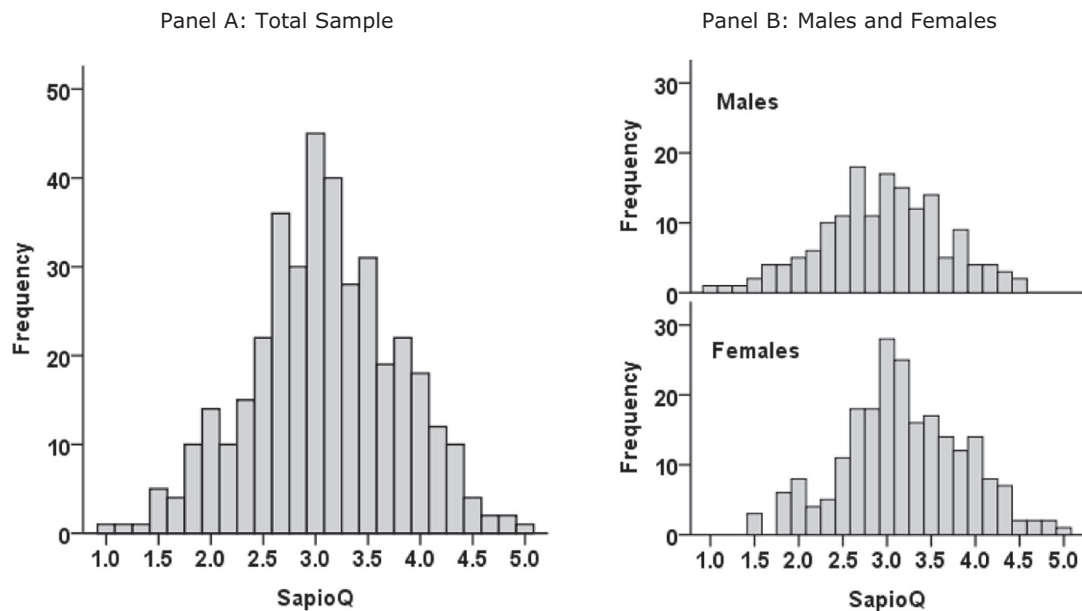
Panel B: Males and Females

Fig. 4. Histograms associated with the Sapiosexuality Questionnaire total scale scores (averaged across the 6 positively keyed items).

SapioQ (averaged across the 6 positive items) ranged from 1.0 to 5.0 (theoretical maximum range: 1 to 5). No outliers were identified based on the interquartile range rule with a 3.0 multiplier (Hoaglin & Iglewicz, 1987). The data were remarkably normally distributed (skew $= -0.08$; kurtosis $= -0.10$) and had a mean of 3.09 ($SD = 0.71$). Furthermore, 8.1% and 1.3% of the sample had a SapioQ score > 4.0 and 4.5, respectively. Only one person responded 'strongly agree' to all six SapioQ items. Thus, some plausibility for the sapiosexuality construct was observed. The supplementary materials include additional item analyses (e.g., item score frequency tables) and a percentile table for the SapioQ composite scores.

5.5. Gender differences: SapioQ

An independent samples Welch's t-test found that females ($M = 3.19$; $SD = 0.69$) scored, on average, higher than males ($M = 2.95$; $SD = 0.70$) on the SapioQ, $t(336.40) = -3.31$, $p = 0.001$. The effect size was $d = -0.34$ (95%CI: $-0.11/-0.54$), which is between a small and medium effect, based on Cohen's (1992) guidelines. Of the 31 people who scored higher than 4.0, 17 (54.8%) were female. As can be seen in Fig. 4 (panel B), a visual depiction of the male and the female distributions on the SapioQ suggested they were similar, although with a slight upward shift associated with the female distribution. The supplementary materials include 2×5 contingency table analyses that test the difference between males and females across the SapioQ items.

5.6. SapioQ, intelligence, and percentile IQ rating preferences

As can be seen in Table 2, SapioQ scores correlated positively and statistically significantly with rated specific sexual attraction at the 75th, 90th, and 95th IQ percentiles ($r = 0.18$, $r = 0.34$ and $r = 0.39$, respectively). By contrast, a weaker trend of negative correlations was observed for the 1st, 10th, and 25th IQ percentiles (e.g., 25th percentile; $r = -0.11$). With respect to rated interest in a potential partner, SapioQ scores correlated positively and statistically significantly with the 90th and 95th percentiles ($r = 0.26$ and $r = 0.35$, respectively). As per sexual attraction specifically, a weaker trend of negative correlations was observed for the 1st, 10th, and 25th percentiles (all $r \approx -0.12$; see Table 2).

Finally, objective general intelligence correlated negatively with

individual differences in specific sexual attraction to people at the 25th ($r = -0.25$, $p = 0.001$; $r_d = -0.32$, $p = 0.006$) and 50th ($r = -0.21$, $p = 0.004$; $r_d = -0.27$, $p = 0.018$) percentiles of intelligence. Correspondingly, objective general intelligence correlated negatively with individual differences in interest in a potential partner at the 25th ($r = -0.21$, $p = 0.004$; $r_d = -0.27$, $p = 0.018$) and 50th ($r = -0.25$, $p = 0.001$; $r_d = -0.32$, $p = 0.006$) IQ percentiles. However, none of the correlations between the objective intelligence subtests and SapioQ scale were significant statistically (range $r = -0.09$ to 0.04). Furthermore, the correlation between the objective general intelligence scores and the SapioQ scale scores was also non-significant, $r = -0.02$, $p = 0.765$ ($r_d = -0.03$, $p = 0.810$), 95%CI: $-0.18/0.15$. A Bayes factor estimate of $BF_{01} = 12.84$ suggested that the data were 13 times more likely to occur under the null model (i.e., the absence of an association between objective general intelligence and sapiosexuality).

6. Discussion

Four novel, empirical findings were reported in this investigation. First, the association between mean ratings of desirability and IQ percentiles was markedly curvilinear, for both the sexual attractiveness specifically and the interest in a partner conditions. Specifically, mean sexual attractiveness specifically and mean rated partner interest ratings increased substantially between the 25th and 50th intelligence percentiles, and then decreased moderately from the 90th to the 99th intelligence percentiles. Secondly, individual differences in a sapiosexuality were measured, based on a newly developed Sapiosexuality Questionnaire (SapioQ), which was found to be associated with basic psychometric properties (i.e., factorial validity for a single-dimension and Cronbach's $\alpha = 0.78$). Approximately 8% of the sample scored above 4.0 on the SapioQ. Thirdly, individual differences in SapioQ scores were found to correlate positively with individual differences in ratings of sexual attractiveness and partner interest for a hypothetical person at the 90th and the 99th intelligence percentiles. Finally, individual differences in general intelligence were found to be unrelated to individual differences in self-reported levels of sapiosexuality ($r = -0.02$; $BF_{01} = 12.84$). We discuss these key results in detail below.

Table 2
Descriptive statistics associated with rated sexual attraction and rated partner attraction across the hypothetical IQ percentiles: Pearson correlations with sapiosexuality (SapioQ) and general intelligence (g).

IQ Percentile	Rated sexual attraction				Rated partner interest			
	Descriptives		Correlations		Descriptives		Correlations	
	Mean	SD	SapioQ	g	Mean	SD	SapioQ	g
1st	2.46	1.29	− 0.09	− 0.06	2.17	1.30	− **0.13**	− **0.14**
10th	2.78	1.23	− 0.07	− 0.11	2.44	1.26	− **0.12**	− **0.13**
25th	3.20	1.08	− **0.11**	− **0.25**	2.91	1.29	− **0.13**	− **0.21**
50th	3.98	0.83	− 0.06	− **0.21**	3.83	1.00	− **0.12**	− **0.25**
75th	4.46	0.81	**0.18**	− 0.09	4.50	0.90	0.06	− 0.15
90th	4.57	1.06	**0.34**	− 0.01	4.70	1.06	**0.26**	− 0.03
99th	4.42	1.28	**0.39**	− 0.08	4.61	1.28	**0.35**	− 0.06

Note. Correlations with SapioQ $N = 382$; correlations with general intelligence (g) $N = 177$; correlations in bold were statistically significant ($p < 0.05$); SapioQ = Sapiosexuality Questionnaire total scores (positively keyed items only); IQ percentiles correspond to rated sexual attraction or partner interest associated with a hypothetical person with a particular IQ percentile.

6.1. Rank and semi-continuous measurement

First, it will be noted briefly that the mean rank results associated the Partner Preference Scale obtained from this investigation's sample replicated those from previous investigations very closely. In particular, 'intelligent' was found to the second most highly ranked trait among the 13 traits, behind only 'kind and understanding'. Thus, the results of this investigation are consistent with the literature which suggests that 'intelligent' is a highly ranked characteristic in a prospective mate (Goodwin & Tinker, 2002; Kamble et al., 2014; Perilloux et al., 2011; Stone, Shackelford, & Buss, 2012).

Moving beyond the limitations of rank measurement, the results based on the intelligence percentile ratings suggest that the association between attractiveness and intelligence is conspicuously curvilinear (cubic function). Perhaps most noteworthy was that an intelligence level at the 90th percentile was, on average, the most desirable with respect to both sexual attraction specifically and interest in a hypothetical partner. As the 90th percentile corresponds to a z-score of 1.28 within the standard normal distribution, it may be suggested that an IQ of approximately 120 was considered, on average, the most desirable (assuming IQ $M = 100$ and $SD = 15$; thus, $IQ = 1.28 * 15 + 100 = 119.2$). Consequently, the results may be suggested to be essentially consistent with the threshold IQ 120 hypothesis, rather than the threshold IQ 100 hypothesis. However, it cannot be ignored that the preference ratings decreased statistically significantly from the 90th to the 99th IQ percentiles, which is not consistent with any previously reported relationship between intelligence and a socially valuable variable.

The observation of a statistically significant reduction in attractiveness of intelligence beyond an IQ of 120 is consistent with Regan et al.'s (2000) suggestion that there may be negative elements to extremely high levels of a desirable trait. One can only speculate what Regan et al. (2000) implied by the possible negative elements associated with extreme levels of intelligence, as no details were provided. In the context of intelligence, it is possible that Regan et al. (2000) hinted at possible deficits in inter-personal skills, but it may be the case that some participants.

Empirical research relevant to the inter-personal skills of highly intellectually able people is decidedly mixed. For example, Neihart's (1999) review of the literature on gifted children concluded that, based on overall measures of psychological adjustment, gifted children were equally well-adjusted as those who were not gifted. However, when social competence was considered, specifically, there was some evidence of difficulties among gifted children, particularly verbally precocious children. In contrast to Neihart (1999), Zeidner and Shani-Zinovich (2011) reported that very intelligent Israeli adolescents (top 1 to 3%) scored relatively higher on openness to experience and agreeableness, and lower on neuroticism. Other research in the area suggests

essentially no difference between highly intellectually abled people and typically intellectually abled people in social aspects of life (e.g., Bergold, Wirthwein, Rost, & Steinmayr, 2015).

Somewhat more consistent is the research relevant to the stereotype that highly intellectually abled people suffer from social and/or emotional difficulties (Baudson & Preckel, 2013; Preckel, Baudson, Krolak-Schwerdt, & Glock, 2015). Thus, it may be the case that some participants in this investigation appealed to the stereotype that highly intellectually abled people suffer from inter-personal problems, when they evaluated the 99th intelligence percentile item. Extreme levels of intelligence may not be the only trait that invokes negative stereotypes. That is, some people may rate very high levels of several socially desirable attributes as somewhat less attractive (e.g., physical attraction, kindness, wealth, etc.), because they may fear a lack of compatibility with the prospective partner, or that such extreme traits may be associated with corresponding less attractive characteristics. Further research in this area is encouraged.

It is interesting to note that Greengross and Miller (2011) reported a positive correlation ($r = 0.23$) between crystallised intelligence and a scale of short-term mating success (e.g., lifetime number of sexual partners, one-night stands, threesomes, etc.) in a sample of 400 university students (50% female). The results of this investigation suggest that the effect may be curvilinear. Specifically, it would be reasonable to hypothesize that people with an IQ of approximately 120 may be the most successful at short-term mating. In light of the results reported in this investigation, researchers in the area are encouraged to complement their analytic strategy with appropriate curvilinear/trend analyses.

The statistically significant interaction depicted in Fig. 3 (panel B) supported the notion that progressively higher levels of intelligence are regarded progressively more favourably for a partner in a high-investment relationship context, in comparison to considerations restricted to sexual attraction. Such a result is consistent with Kenrick et al. (1993) and Regan (1998) who found that minimum expected intelligence levels increased across four levels of relationship investment. The novel contribution of this investigation was the statistically significantly greater increase in rated partner interest across the 25th to 75th percentiles, in comparison to the increase in sexual attraction specifically. Thus, the effect can be specified precisely across the intelligence continuum. Admittedly, in absolute terms, the magnitude of the effect was not large. However, from the perspective of standardized effect, the effect size was moderate in magnitude (Cohen, 1992).

6.2. Sapiosexuality Questionnaire (SapioQ)

The positively keyed and negatively keyed SapioQ items did not correlate with each other sufficiently strongly to merit combination into

a single composite score. Furthermore, there was some indication that the negatively keyed items formed a factor separate to the positively keyed items. The negatively keyed items were principally included in the SapioQ to help reduce acquiescence response bias, as commonly recommended (Oskamp & Schultze, 2005). However, an accumulation of research suggests that negatively keyed items are less valid than positively keyed items and often produce more problems than they solve (Van Sonderen, Sanderman, & Coyne, 2013). Consequently, some do not recommend including negatively keyed items in self-report scales (Roszkowski & Soven, 2010; Schriesheim & Eisenbach, 1995). With respect to the original 9-item SapioQ, we endorse the recommendation to exclude the negatively keyed items, until further research helps evaluate whether the positively keyed and negatively keyed SapioQ items both measure substantively relevant constructs. A few more negatively keyed items will likely need to be generated, however, as the internal consistency reliability associated with the negatively keyed item composite scores was only 0.43. For thoroughness, we reported the correlations between the SapioQ negatively keyed composite scores and the IQ desirability percentile scale in the supplementary materials (Table S6). Several of the correlations were statistically significant and consistent and theoretically congruent. Given the moderate correlation between the SapioQ (positive) and SapioQ (negative) composite scores ($r = 0.25$, $p < 0.001$), it may be speculated that there is an important distinction between viewing relatively low intelligence as unattractive and viewing relatively high intelligence as attractive.

In contrast to the negatively keyed items, the SapioQ's positively keyed items were associated with essentially a single dimension and respectable factor loadings. Additionally, the internal consistency reliability was found to be acceptable for basic research ($\alpha = 0.78$). Consequently, the 6-item SapioQ utilised in this investigation may be regarded to be associated with some basic psychometric properties. Thus, total scores derived from the 6-item SapioQ may be provisionally regarded as a valid indication of the degree to which a person is inclined toward a sapiosexual orientation. It will be acknowledged, however, that more research on the measurement of sapiosexuality is merited, as face validity in the eyes of a small number of researchers was the primary criterion in its development. Consequently, all things considered, the SapioQ should be regarded as only a reasonable first step in the evaluation of a new construct.

The distribution of the overall scores on the SapioQ as normal, as per many other dimensions in differential psychology (e.g., Cooper, Smillie, & Corr, 2010; Keith, Reynolds, Patel, & Ridley, 2008). Such a result suggests that the construct of sapiosexuality may be best considered a continuum. However, a relatively normal distribution of data does not necessarily imply that a construct is best characterised as purely a continuous phenomenon. For example, based on a sophisticated taxometric analysis of the scores from the Dissociative Experiences Scale (Carlson & Putnam, 1993), Waller, Putnam, and Carlson (1996) uncovered two types of dissociators: non-pathological and pathological. Future research with a larger sample size ($N > 1000$), may help determine whether sapiosexuality is best considered a continuum or a taxon.

A total of 8.1% and 1.3% of the sample scored > 4.0 and 4.5 on the SapioQ, respectively. The observation of several high scores on the SapioQ may be viewed as plausibility for the notion that there are some people with inclinations toward sapiosexuality. It is difficult to rule out the some of the high scoring participants may have completed the questionnaire in a non-serious fashion. However, the fact that only one participant responded 'strongly agree' to all six positively keyed items suggests that they were probably responding to the items in a considered fashion. As the samples were drawn from Australia and the United States, it can only be assumed that the results are generalizable to other areas. Further cross-cultural research is encouraged.

6.3. Objective intelligence and ratings of attractiveness/interest

This investigation uncovered two statistically significant, negative correlations between objective intelligence and the rated sexual attractiveness of a hypothetical person at the 25th and 50th intelligence percentiles. Thus, higher objective intelligence was associated with lower ratings of sexual attractiveness for those two percentiles. Perhaps surprisingly, the investigation failed to uncover statistically significant, positive correlations between objective intelligence and rated sexual attractiveness of a hypothetical person at the higher-end of the intelligence percentile spectrum (e.g., 90th percentile). Thus, in this investigation's sample, a person with average intelligence was just as likely to rate a person at the 90th percentile of intelligence to be very sexually attractive as someone with above average intelligence. The overall pattern of correlations was consistent across both the sexually attractive and partner interest conditions. It is difficult to explain why the ratings of sexual attractiveness and partner interest of a hypothetical person at the lower- to mid-level of intelligence percentiles more substantially differentiated raters' intelligence, in comparison to higher-levels of intelligence percentiles. Perhaps it is the case that relatively intelligent people do not differentially value intelligence in a prospective mate, or at least not substantially so. Instead, relatively intelligent people appear to consider avoiding (less attracted/interested) someone with below average and average intelligence, in comparison to less cognitively abled people. Ultimately, the assortative mating correlation for intelligence appears to be only about $r \approx 0.40$ (Van Leeuwen et al., 2008; Watson et al., 2004), which suggests that intelligent people may consider one or more factors much more differentially important than intelligence, when considering the attractiveness of a prospective mate.

This investigation also failed to observe a positive correlation between objective intelligence and individual differences in sapiosexuality, as measured by the newly developed SapioQ ($r = -0.02$). Although a null hypothesis is arguably never supported, the data were nearly 13 times more likely under the null hypothesis, in this case. Thus, it would appear that factors other than intelligence impact the degree to which a person identifies themselves as a sapiosexual. Personality attributes such as the 'intellect' facet from the Big Five personality model (John & Srivastava, 1999) and need for cognition (Cacioppo, Petty, & Kao, 1984) are reasonable candidates to suggest as predictors of sapiosexuality. It should also be acknowledged that a very strong sexual preference can often develop in a highly idiosyncratic fashion (Chalkley & Powell, 1983). Thus, a comprehensive delineation of the antecedent nature of a typical sapiosexual may not be possible. Further research in this area is encouraged.

6.4. Gender differences

No statistically significant differences between males and females were observed for any of the IQ percentile ratings across the sexual attractiveness and the partner interest conditions. Furthermore, gender was not found to interact between IQ percentile ratings and the sexual attractiveness and the partner interest conditions. These results may be considered at odds with the modified parental investment model (Kenrick et al., 1993). That is, it was expected that females would rate intelligence as more sexually attractive than males. One possible explanation for the absence of an effect is that this investigation did not focus upon minimal levels of intelligence (as per Kenrick et al., 1993). Instead, participants simply rated more freely the degree to which they found an intelligence level sexually attractive or preferred in a partner. The results of this investigation suggest that there are little in the way of differences between males and females with respect to their preferred levels of intelligence in a prospective partner. Thus, the modified parental investment model may be restricted to minimal expectations of intelligence.

In contrast to the intelligence percentile ratings, females were found

to score somewhat higher on the SapioQ than males equal to a moderate effect size ($d = -0.34$). The difference between the SapioQ results and the sexual attraction specifically percentile rating results across the intelligence percentiles may be ascribed to differences in reliability. That is, scores from a single-item are known to be less reliable than composite scores (Gliem & Gliem, 2003). However, it is also possible that the SapioQ taps a construct slightly different to that of the sexual attraction IQ percentile rating scale. In particular, the SapioQ does have items directly relevant to sexual arousal. Overall, the gender differences results reported in this investigation are not obviously consistent with the males-compete/females-choose (MCFC) model of sexual selection. Instead, they are more consistent with the empirical research in favour of a mutual mate choice (MMC) model of mate selection (Conley, Moors, Matsick, Ziegler, & Valentine, 2011; Miller, 2000; Pedersen, Putcha-Bhagavatula, & Miller, 2011; Stewart-Williams & Thomas, 2013).

6.5. Limitations

Perhaps the most serious limitation to this investigation is the nature of the sample upon which the objective intelligence analyses were based: first-year university students. Consequently, the reported correlations between objective intelligence and rated preferences for intelligence were likely attenuated, to some degree, due to range restriction. As the nature of the intelligence tests used in this investigation do not have published norms, it was not possible to evaluate the degree of intelligence test score range restriction. If past research with first-year undergraduate psychology students can be used as an indicator (e.g., Gignac et al., 2004; Osmon & Jackson, 2002), we would predict the IQ standard deviation to be approximately 10. Consequently, the statistically significant correlations of -0.21 and -0.25 reported in Table 2 may be better represented by -0.31 and -0.36, based on the well-known Thorndike (1949) case II range restriction correction formula.

We also acknowledge that no adjustment was applied to the multiple correlational analyses conducted in this investigation to help maintain a familywise error rate at 0.05. Consequently, some of the statistically significant results may have arisen due to a Type I error. However, we also note that many of the statistical analyses were not independent (e.g., the correlations reported in Table 2), which would imply that an adjustment, such as a Bonferroni correction, would be much too conservative, in this case. Ultimately, we encourage replication across independent samples to evaluate the stability of the effects reported in this investigation.

Finally, we note that the measurement of sapiosexuality via the SapioQ may be, in part, confounded by individual differences in overall sex drive. That is, it is possible that people who have a tendency toward sapiosexuality may not score particularly highly on some of the SapioQ items, in comparison to non-sapiosexuals, because their overall sex drive is relatively low. A confound of such a nature in the measurement of sapiosexuality would affect (reduce) the magnitude of theoretically expected correlations between the SapioQ and various criteria. Consequently, in future research, it could prove useful to include one or more items to control for individual differences in overall sex drive.

7. Conclusion

The value of high levels of intelligence appears to extend to specific sexual attraction, rather than restricts itself to potential survival and parental benefits (i.e., partner benefits). Furthermore, for some people, the perception of high levels of intelligence in another person is so substantial that it may induce sexual arousal, more so than any other attribute. For any species that reproduces through sexual activity, and particularly for which evidence of assortative mating is present, mating decisions can be expected to impact the evolution of that species in a substantial way. Consequently, based on the results of this investigation, it may be concluded that intelligence will continue to play a role in the evolution of humans.

Appendix A

Sapiosexuality Questionnaire (SapioQ)

Please respond to the items below on the response scale provided. When considering your responses, assume the person/mate is of your preferred gender.

Item #	Item stem
1.	A physically attractive person with only average intelligence is a turn off for me.
2.	Listening to someone speak very intelligently arouses me sexually.
3.	My preference for a mate is someone with average intelligence.
4.	A very high level of intelligence alone is enough for me to be attracted to someone sexually.
5.	I cannot imagine myself in a sexual relationship with someone who works in a very intellectually demanding job.
6.	I would likely feel sexually attracted to someone significantly more intelligent than me.
7.	I could potentially feel sexually attracted to someone significantly less intelligent than me.
8.	It would excite me sexually to have an intellectually stimulating conversation with a potential partner.
9.	A very high level of intelligence in a partner is necessary for me to be attracted to them sexually.

Note. Items 3, 5 and 7 are keyed negatively; item 5 was dropped from the analyses due to poor psychometric properties; items were responded to on a 5-point Likert scale: Strongly Disagree = 1; Disagree = 2; Neutral = 3; Agree = 4; Strongly Agree = 5.

Appendix B

Intelligence Sexual Attraction Percentile Preference Scale

Version 1 (Sexual Attraction): Suppose you were single (if you're not) and you met someone single that, at first sight, potentially interested you. How sexually attracted to the person would you be, if you later learned that their intelligence level was such that they were...

	Extremely unattracted	Very unattracted	Unattracted	Attracted	Very attracted	Extremely attracted
Smarter than 1% of the population	☐	☐	☐	☐	☐	☐
Smarter than 10% of the population	☐	☐	☐	☐	☐	☐
Smarter than 25% of the population	☐	☐	☐	☐	☐	☐
Smarter than 50% of the population	☐	☐	☐	☐	☐	☐
Smarter than 75% of the population	☐	☐	☐	☐	☐	☐
Smarter than 90% of the population	☐	☐	☐	☐	☐	☐
Smarter than 99% of the population	☐	☐	☐	☐	☐	☐

Version 2 (Partner Interest): Suppose you were single (if you're not) and you met someone single that, at first sight, potentially interested you. How interested would you be in the person as a potential partner (e.g., marriage, children), if you later learned that their intelligence level was such that they were….

Appendix C. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.intell.2017.11.009.

References

Armor, D. J. (1973). Theta reliability and factor scaling. *Sociological Methodology, 5*, 17–50.

Barkow, J. H. (1989). *Darwin, sex, and status: Biological approaches to mind and culture.* Toronto, Canada: University of Toronto Press.

Baudson, T. G., & Preckel, F. (2013). Teachers' implicit personality theories about the gifted: An experimental approach. *School Psychology Quarterly, 28*(1), 37–46.

Bergold, S., Wirthwein, L., Rost, D. H., & Steinmayr, R. (2015). Are gifted adolescents more satisfied with their lives than their non-gifted peers? *Frontiers in Psychology, 6*.

Bobko, P., & Rieck, A. (1980). Large sample estimators for standard errors of functions of correlation coefficients. *Applied Psychological Measurement, 4*(3), 385–398.

Buhrmester, M., Kwang, T., & Gosling, S. D. (2011). Amazon's Mechanical Turk: A new source of inexpensive, yet high-quality, data? *Perspectives on Psychological Science, 6*(1), 3–5.

Buss, D. M., Abbott, M., Angleitner, A., Asherian, A., Biaggio, A., Blanco-Villasenor, A., ... Ekehammar, B. (1990). International preferences in selecting mates: A study of 37 cultures. *Journal of Cross-Cultural Psychology, 21*(1), 5–47.

Buss, D. M., & Barnes, M. (1986). Preferences in human mate selection. *Journal of Personality and Social Psychology, 50*(3), 559–570.

Buss, D. M., Shackelford, T. K., Kirkpatrick, L. A., & Larsen, R. J. (2001). A half century of mate preferences: The cultural evolution of values. *Journal of Marriage and Family, 63*(2), 491–503.

Cacioppo, J. T., Petty, R. E., & Kao, C. F. (1984). The efficient assessment of need for cognition. *Journal of Personality Assessment, 48*(3), 306–307.

Carlson, E. B., & Putnam, F. W. (1993). An update on the dissociative experiences scale. *Dissociation, 6*, 16–27.

Chalkley, A. J., & Powell, G. E. (1983). The clinical description of forty-eight cases of sexual fetishism. *The British Journal of Psychiatry, 142*(3), 292–295.

Cohen, J. (1992). A power primer. *Psychological Bulletin, 112*(1), 155–159.

Conley, T. D., Moors, A. C., Matsick, J. L., Ziegler, A., & Valentine, B. A. (2011). Women, men, and the bedroom: Methodological and conceptual insights that narrow, reframe, and eliminate gender differences in sexuality. *Current Directions in Psychological Science, 20*(5), 296–300.

Cooper, A. J., Smillie, L. D., & Corr, P. J. (2010). A confirmatory factor analysis of the Mini-IPIP five-factor model personality scale. *Personality and Individual Differences, 48*(5), 688–691.

Coyle, T. R., Rindermann, H., Hancock, D. G., & Freeman, J. (2017). Nonlinear effects of cognitive ability on economic productivity: A country level analysis. *Poster for 29th APS-Convention 2017 in Boston, 25–28 May 2017*.

Duan, B., & Dunlap, W. P. (1997). The accuracy of different methods for estimating the standard error of correlations corrected for range restriction. *Educational and Psychological Measurement, 57*(2), 254–265.

Feingold, A. (1992). Gender differences in mate selection preferences. *Psychological Bulletin, 112*(1), 125–139.

Games, P. A., Keselman, H. J., & Rogan, J. C. (1981). Simultaneous pairwise multiple comparison procedures for means when sample sizes are unequal. *Psychological Bulletin, 90*(3), 594–598.

Gangestad, S. W., Thornhill, R., & Garver-Apgar, C. E. (2010). Men's facial masculinity predicts changes in their female partners' sexual interests, whereas men's intelligence does not. *Evolution and Human Behavior, 31*(6), 412–424.

Getzels, J. W., & Jackson, P. W. (1962). *Creativity and intelligence: Explorations with gifted students.* New York: Wiley.

Gignac, G. E., Shankaralingam, M., Walker, K., & Kilpatrick, P. (2016). Short-term memory for faces relates to general intelligence moderately. *Intelligence, 57*, 96–104.

Gignac, G. E., Stough, C., & Loukomitis, S. (2004). Openness, intelligence, and self-report intelligence. *Intelligence, 32*(2), 133–143.

Gliem, J. A., & Gliem, R. R. (2003). Calculating, interpreting, and reporting Cronbach's alpha reliability coefficient for Likert-type scales. *Paper presented at the Midwest research-to-practice conference in adult, continuing, and community education, Columbus, OH, USA.*

Goodwin, R., & Tinker, M. (2002). Value priorities and preferences for a relationship partner. *Personality and Individual Differences, 32*(8), 1339–1349.

Greengross, G., & Miller, G. (2011). Humor ability reveals intelligence, predicts mating success, and is higher in males. *Intelligence, 39*(4), 188–192.

Guilford, J. P. (1946). New standards for test evaluation. *Educational and Psychological Measurement, 6*(4), 427–438.

Haselton, M. G., & Miller, G. F. (2006). Women's fertility across the cycle increases the short-term attractiveness of creative intelligence. *Human Nature, 17*(1), 50–73.

Hayes, A. F. (1998). SPSS procedures for approximate randomization tests. *Behavior Research Methods, Instruments, & Computers, 30*(3), 536–543.

Hill, R. (1945). Campus values in mate selection. *Journal of Home Economics, 37*, 554.558.

Hoaglin, D. C., & Iglewicz, B. (1987). Fine-tuning some resistant rules for outlier labeling. *Journal of the American Statistical Association, 82*(400), 1147–1149.

Jacobs, K. E., & Roodenburg, J. (2014). The development and validation of the self-report measure of cognitive abilities: A multitrait–multimethod study. *Intelligence, 42*, 5–21.

Jaeggi, S. M., Studer-Luethi, B., Buschkuehl, M., Su, Y. F., Jonides, J., & Perrig, W. J. (2010). The relationship between n-back performance and matrix reasoning—Implications for training and transfer. *Intelligence, 38*(6), 625–635.

Janssen, E., McBride, K. R., Yarber, W., Hill, B. J., & Butler, S. M. (2008). Factors that influence sexual arousal in men: A focus group study. *Archives of Sexual Behavior, 37*(2), 252–265.

John, O. P., & Srivastava, S. (1999). The Big Five trait taxonomy: History, measurement, and theoretical perspectives. In L. A. Pervin, & O. P. John (Eds.). *Handbook of personality: Theory and research* (pp. 102–138). (2nd ed.). New York: Guilford Press.

Kaiser, H. F., & Rice, J. (1974). Little jiffy, mark IV. *Educational and Psychological Measurement, 34*(1), 111–117.

Kamble, S., Shackelford, T. K., Pham, M., & Buss, D. M. (2014). Indian mate preferences: Continuity, sex differences, and cultural change across a quarter of a century. *Personality and Individual Differences, 70*, 150–155.

Keith, T. Z., Reynolds, M. R., Patel, P. G., & Ridley, K. P. (2008). Sex differences in latent cognitive abilities ages 6 to 59: Evidence from the Woodcock–Johnson III tests of cognitive abilities. *Intelligence, 36*(6), 502–525.

Kenrick, D., Groth, G. E., Trost, M. R., & Sadalla, E. K. (1993). Integrating evolutionary and social exchange perspectives on relationships. *Journal of Personality and Social Psychology, 64*(6), 951–969.

Kenrick, D. T., Sadalla, E. K., Groth, G., & Trost, M. R. (1990). Evolution, traits, and the stages of human courtship: Qualifying the parental investment model. *Journal of Personality, 58*(1), 97–116.

Kuncel, N. R., & Hezlett, S. A. (2010). Fact and fiction in cognitive ability testing for admissions and hiring decisions. *Current Directions in Psychological Science, 19*, 339–345.

Li, N. P., Bailey, J. M., Kenrick, D. T., & Linsenmeier, J. A. (2002). The necessities and luxuries of mate preferences: Testing the tradeoffs. *Journal of Personality and Social Psychology, 82*(6), 947–955.

Mascie-Taylor, C. G. N. (1989). Spouse similarity for IQ and personality and convergence. *Behavior Genetics, 19*(2), 223–227.

McCombs, E. (2015, January 6). Sapiosexuality is the new online dating buzzword and it annoys the everloving crap out of me. Xojane.com. Retrieved from http://www.xojane.com/sex/sapiosexual-online-dating.

Miller, G. F. (2000). *The mating mind: How sexual choice shaped the evolution of human nature.* New York, NY: Anchor Books.

Mooney, C. Z., & Duval, R. D. (1993). *Bootstrapping: A nonparametric approach to statistical inference.* Newbury Park, CA: Sage.

Muller, C. B., Ride, S. M., Fouke, J., Whitney, T., Denton, D. D., Cantor, N., et al. (2005). Gender differences and performance in science. *Science, 307*, 1043.

Murphy, N. A., Hall, J. A., & Colvin, C. R. (2003). Accurate intelligence assessments in social interactions: Mediators and gender effects. *Journal of Personality, 71*(3), 465–493.

Neihart, M. (1999). The impact of giftedness on psychological well-being: What does the empirical literature say? *Roeper Review, 22*(1), 10–17.

Nunnally, J. C., & Bernstein, I. H. (1994). *Psychometric theory* (3rd ed.). New York: McGraw-Hill.

O'Connor, B. P. (2000). SPSS and SAS programs for determining the number of components using parallel analysis and Velicer's MAP test. *Behavior Research Methods, 32*(3), 396–402.

Oskamp, S., & Schultze, P. W. (2005). *Attitudes and opinions* (3rd edition). New York: Psychology Press.

Osmon, D. C., & Jackson, R. (2002). Inspection time and IQ: Fluid or perceptual aspects of intelligence? *Intelligence, 30*(2), 119–127.

Peckham, A. (2012). *Urban dictionary: Freshest street slang defined. Vol. 3*. Kansas City, MO: Andrews McMeel Publishing.

Pedersen, W. C., Putcha-Bhagavatula, A., & Miller, L. C. (2011). Are men and women really that different? Examining some of sexual strategies theory (SST)'s key assumptions about sex-distinct mating mechanisms. *Sex Roles, 64*(9–10), 629–643.

Pedhazur, E. J., & Schmelkin, L. P. (1991). *Measurement, design, and analysis: An integrated approach.* Hillsdale, NJ: Erlbaum.

Perilloux, C., Fleischman, D. S., & Buss, D. M. (2011). Meet the parents: Parent-offspring convergence and divergence in mate preferences. *Personality and Individual Differences, 50*(2), 253–258.

Preckel, F., Baudson, T. G., Krolak-Schwerdt, S., & Glock, S. (2015). Gifted and maladjusted? Implicit attitudes and automatic associations related to gifted children. *American Educational Research Journal, 52*(6), 1160–1184.

Prokosch, M. D., Coss, R. G., Scheib, J. E., & Blozis, S. A. (2009). Intelligence and mate choice: Intelligent men are always appealing. *Evolution and Human Behavior, 30*(1), 11–20.

Prokosch, M. D., Yeo, R. A., & Miller, G. F. (2005). Intelligence tests with higher g-loadings show higher correlations with body symmetry: Evidence for a general fitness factor mediated by developmental stability. *Intelligence, 33*(2), 203–213.

Raab, D. (2014, August 26). Sapiosexuality: What attracts you to the opposite sex? Retrieved from https://www.psychologytoday.com/blog/the-empowerment-diary/201408/sapiosexuality-what-attracts-you-the-opposite-sex.

Raven, J. C. (1966). *Advanced progressive matrices.* New York: Psychological Corporation.

Regan, P. C. (1998). Minimum mate selection standards as a function of perceived mate value, relationship context, and gender. *Journal of Psychology and Human Sexuality, 10*(1), 53–73.

Regan, P. C., Levin, L., Sprecher, S., Christopher, F. S., & Gate, R. (2000). Partner preferences: What characteristics do men and women desire in their short-term sexual and long-term romantic partners? *Journal of Psychology and Human Sexuality, 12*(3), 1–21.

Robertson, K. F., Smeets, S., Lubinski, D., & Benbow, C. P. (2010). Beyond the threshold hypothesis: Even among the gifted and top math/science graduate students, cognitive abilities, vocational interests, and lifestyle preferences matter for career choice, performance, and persistence. *Current Directions in Psychological Science, 19*(6), 346–351.

Roszkowski, M. J., & Soven, M. (2010). Shifting gears: Consequences of including two negatively worded items in the middle of a positively worded questionnaire.

Assessment & Evaluation in Higher Education, 35(1), 113–130.

Salthouse, T. A., Toth, J., Daniels, K., Parks, C., Pak, R., Wolbrette, M., & Hocking, K. J. (2000). Effects of aging on efficiency of task switching in a variant of the trail making test. *Neuropsychology, 14*(1), 102–111.

Schriesheim, C. A., & Eisenbach, R. J. (1995). An exploratory and confirmatory factor-analytic investigation of item wording effects on the obtained factor structures of survey questionnaire measures. *Journal of Management, 21*(6), 1177–1193.

Stewart-Williams, S., & Thomas, A. G. (2013). The ape that thought it was a peacock: Does evolutionary psychology exaggerate human sex differences? *Psychological Inquiry, 24*(3), 137–168.

Stone, E. A., Shackelford, T. K., & Buss, D. M. (2012). Is variability in mate choice similar for intelligence and personality traits? Testing a hypothesis about the evolutionary genetics of personality. *Intelligence, 40*(1), 33–37.

Thorndike, R. L. (1949). *Personnel selection: test and measurement techniques.* New York: Wiley.

Timpf, K. (2015, April 21). 'Sapiosexual' deemed new 'uber-trendy sexual orientation'. *National Review*. Retrieved from http://www.nationalreview.com/article/417246/sapiosexual-deemed-new-uber-trendy-sexual-orientation-katherine-timpf.

Torrance, E. P. (1962). *Guiding creative talent.* Englewood Cliffs, NJ: Prentice-Hall.

Trivers, R. L. (1972). Parental investment and sexual selection. In B. Campbell (Ed.). *Sexual selection and the descent of man 1871–1971* (pp. 136–179). Chicago: Aldine.

Unsworth, N., Brewer, G. A., & Spillers, G. J. (2009). There's more to the working memory capacity—fluid intelligence relationship than just secondary memory. *Psychonomic Bulletin & Review, 16*(5), 931–937.

Van Leeuwen, M., Van Den Berg, S. M., & Boomsma, D. I. (2008). A twin-family study of general IQ. *Learning and Individual Differences, 18*(1), 76–88.

Van Sonderen, E., Sanderman, R., & Coyne, J. C. (2013). Ineffectiveness of reverse wording of questionnaire items: Let's learn from cows in the rain. *PLoS One, 8*(7), e68967.

Wai, J., Lubinski, D., & Benbow, C. P. (2005). Creativity and occupational accomplishments among intellectually precocious youths: An age 13 to age 33 longitudinal study. *Journal of Educational Psychology, 97*(3), 484–492.

Waller, N., Putnam, F. W., & Carlson, E. B. (1996). Types of dissociation and dissociative types: A taxometric analysis of dissociative experiences. *Psychological Methods, 1*(3), 300–321.

Walton, M. T., Lykins, A. D., & Bhullar, N. (2016). Beyond heterosexual, bisexual, and homosexual: A diversity in sexual identity expression. *Archives of Sexual Behavior,* 1–7.

Watson, D., Klohnen, E. C., Casillas, A., Nus Simms, E., Haig, J., & Berry, D. S. (2004). Match makers and deal breakers: Analyses of assortative mating in newlywed couples. *Journal of Personality, 72*(5), 1029–1068.

Wechsler, D. (2008a). *Wechsler adult intelligence scale-fourth edition.* San Antonio, TX: Pearson Assessment.

Wechsler, D. (2008b). *Wechsler adult intelligence scale-fourth edition: Administration and scoring manual.* San Antonio, TX: Pearson Assessment.

Zeidner, M., & Shani-Zinovich, I. (2011). Do academically gifted and nongifted students differ on the big-five and adaptive status? Some recent data and conclusions. *Personality and Individual Differences, 51*(5), 566–570.