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People tend to overestimate their romantic partner's intelligence even more than their own

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ABSTRACT

People can estimate their own and their romantic partner's intelligence (IQ) with some level of accuracy, which may facilitate the observation of assortative mating for IQ. However, the degree to which people may overestimate their own (IQ), as well as overestimate their romantic partner's IQ, is less well established. In the current study, we investigated four outstanding issues in this area. First, in a sample of 218 couples, we examined the degree to which people overestimate their own and their partner's IQ, on the basis of comparisons between self-estimated intelligence (SEI) and objectively measured IQ (Advanced Progressive Matrices). Secondly, we evaluated whether assortative mating for intelligence was driven principally by women (the males-compete/females choose model of sexual selection) or both women and men (the mutual mate model of sexual selection). Thirdly, we tested the hypothesis that assortative mating for intelligence may occur for both SEI and objective IQ. Finally, the possibility that degree of intellectual compatibility may relate positively to relationship satisfaction was examined. We found that people overestimated their own IQ (women and men ≈ 30 IQ points) and their partner's IQ (women = 38 IQ points; men = 36 IQ points). Furthermore, both women and men predicted their partner's IQ with some degree of accuracy (women: $r = 0.30$; men: $r = 0.19$). However, the numerical difference in the correlations was not found to be significant statistically. Finally, the degree of intellectual compatibility (objectively and subjectively assessed) failed to correlate significantly with relationship satisfaction for both sexes. It would appear that women and men participate in the process of mate selection, with respect to evaluating IQ, consistent with the mutual mate model of sexual selection. However, the personal benefits of intellectual compatibility seem less obvious.

1. Introduction

Humans can self-estimate their own intelligence with some degree of accuracy (Freund & Kasten, 2012), and the intelligence of others, too, based even on very limited information (Borkenau & Liebler, 1993). However, there is empirical evidence to suggest that humans tend to overestimate their cognitive capacities (the better-than-average effect; Mabe & West, 1982) and, theoretically, possibly the intelligence of their romantic partners (the positive illusion effect; Barelds & Dijkstra, 2009).[1] Correspondingly, humans rate intelligence highly in a prospective romantic partner (Buss et al., 1990). Furthermore, assortative mating for intelligence is well established empirically with objective intelligence tests, and, to some degree, with self-estimates of intelligence (Bouchard & McGue, 1981; Escorial & Martín-Buro, 2012). However, precisely how and why assortative mating for intelligence occurs remains an open question (Robinson et al., 2017).

The males-compete/females-choose model of sexual selection (Stewart-Williams & Thomas, 2013) suggests that women should be better at discerning the intelligence of men, in comparison to a man's capacity to discern the intelligence of women. By contrast, the mutual mate model of sexual selection (Stewart-Williams & Thomas, 2013) suggests that women and men should be able to discern each other's intelligence about equally well. To-date, these competing theories have not been tested, in this context. Furthermore, some compatibility relationship theory (Gonzaga, Campos, & Bradbury, 2007; Huston & Houts, 1998) suggests the degree of assortative mating for intelligence across couples should correlate positively with romantic relationship satisfaction, which, arguably, would promote the continuance of

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[1] For the purposes of this investigation, we considered the better-than-average effect as relevant to people's view of their own intelligence, and the positive illusion effect as relevant to people's view of their partner's intelligence. We appreciate that the better-than-average effect may be regarded as a special case of a broader conceptualization of the positive illusion effect.

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assortative mating for intelligence. To-date, this hypothesis has also not been tested extensively.

In light of the above, this investigation had four primary purposes. First, to test for the better-than-average intelligence effect and the positive illusion effect for intelligence in romantic couples. Secondly, to test the males-compete/females-choose model versus the mutual mate choice model, by estimating the association between female ratings of male partner IQ and objective male partner IQ versus the association between male ratings of female partner IQ and objective female partner IQ. Thirdly, we attempted to replicate the assortative mating for intelligence effect with a fluid intelligence test, as well as with a self-estimation of intelligence scale. Finally, we estimated the association between degree of intelligence compatibility (subjective and objective) and relationship satisfaction.

2. Accuracy of estimating one's own IQ: correlational

A substantial amount of research has established a positive correlation between self-estimated intelligence (SEI) and objectively measured intelligence ($r \approx 0.30$; Freund & Kasten, 2012; Gignac, Stough, & Loukomitis, 2004; Zajenkowski, Stolarski, Maciantowicz, Malesza, & Witowska, 2016). Thus, to some degree, people tend to have insight into their intellectual capacity. The correlation is not so large, however, as to suggest that SEI scores may be used as a proxy for objectively measured IQ scores. Instead, SEI scores are considered primarily personality trait-related variance, with some imbuement of objective intelligence (Chamorro-Premuzic & Furnham, 2004; Herreen & Zajac, 2017).

Ultimately, however, correlational research cannot provide insight into whether people, on average, over- or under-estimate their ability. That is, a large correlation between two scores can be observed, while, simultaneously, the scores may be associated with substantial mean differences. Thus, from the perspective of the convergence between SEI and objective intelligence, it is possible that, on average, people misestimate their intelligence to a substantial degree, even though there may be some level of rank-order consistency across the subjective and objective intelligence scores within a sample.

3. Accuracy of estimating one's own IQ: mean difference

Research in the broader area of the self-evaluation of abilities has found that, on average, people overestimate their abilities across a wide range of dimensions (Mabe & West, 1982). The phenomenon is often referred to as the 'better-than-average-effect' (Alicke & Govorun, 2005). With respect to intelligence, specifically, Heck, Simons, and Chabris (2018) asked a general community sample of Americans to respond to the following item: 'I am more intelligent than the average person.' They found that 65% of the participants agreed with the statement, which is greater than the null expectation of 50%. Although Heck et al.'s (2018) results provided some insight into the smarter-than-average effect, they did not have access to objective IQ test scores. Consequently, despite the general community nature of the sample, they could not assert with great confidence the degree to which people overestimate their intelligence, as the participant sample may have been, in fact, above average in cognitive ability.

To-date, little research has attempted to evaluate the degree to which people overestimate their intellectual capacity, in comparison to their performance on objective intelligence tests. In addition to the extra testing time, the reason may be related to the fact that the subjectively assessed and objectively assessed intelligence scores would need to be scored in a way as to allow for justifiable comparisons. For example, the objectively measured IQ scores and the SEI scores could be converted to have a normative mean of 100 and a standard deviation of 15, assuming they are both measured on an appropriate normative type scale. However, to-date, most SEI studies that have included an objectively measured IQ test have not reported the results in a manner to facilitate mean comparisons between the objectively measured IQ and SEI scores (e.g., Furnham, Crawshaw, & Rawles, 2006; Furnham, Moutafi, & Chamorro-Premuzic, 2005; Furnham & Rawles, 1999). In their deference, the purpose of their investigations was not to determine the degree to which people overestimate their IQ.

A rare exemption, however, is Reilly and Mulhern (1995), who had 80 first-year psychology students (45 men) write down their own self-estimated IQ, after informing them that IQ represents general mental ability, and that 100 represents the average and one sixth of the population scores below 85 and one sixth score above 115. Reilly and Mulhern (1995) reported that the men and women self-estimated IQ means of 113.9 and 105.3, respectively. In comparison to their objectively measured IQs (Digit Symbol and Vocabulary subtests from the WAIS), the men were found to have overestimated their IQ by 7.8 IQ points, on average, whereas the women, as a group, did not overestimate their intelligence (mean difference of −1.6 IQ points; not statistically significant from zero). Reilly and Mulhern's (1995) investigation may be suggested to be limited, however, as people tend not to consider the types of cognitive processes involved with completing the Digit Symbol subtest, when responding to a general SEI item. Instead, implicit lay person theories of intelligence are more likely to incorporate dimensions such as logical reasoning and problem solving (Furnham, 2001; Sternberg, Conway, Ketron, & Bernstein, 1981).

As indirectly related evidence, we note that a substantial amount of research has found that men self-estimate their own IQ higher than women self-estimate their own IQ. Based on a meta-analysis, Szymanowicz and Furnham (2011) reported an effect size of $d = 0.37$, which corresponds to an IQ difference of 5.6 IQ points. More recently, Gold and Kuhn (2017) found that men and women (high-school students) self-estimated their IQs at 117.5 and 112.4, respectively, based on a similar multi-item approach, but with a somewhat different response scale. The phenomenon is sometimes referred to as the 'hubris-humility effect' (Furnham & Mottabu, 2004), which is arguably an apt term, given that there is little in the way of difference in overall intelligence between men and women, as measured objectively with an IQ test (Halpern & LaMay, 2000). Thus, at the very least, it may be expected that, as a group, men tend to overestimate their intelligence, when compared with their objectively measured intelligence. However, more research with conventional tests of intelligence (i.e., logical reasoning) is needed.

4. Accuracy of estimating romantic partner's intelligence

On average, humans state that they value intelligence highly in a prospective romantic partner (Buss et al., 1990). Furthermore, intelligence carries with it biological advantages that can be passed onto children (see Hagenaars et al., 2016, for example). However, in order for sexual selection for intelligence to occur, humans would need to be able to perceive or discern the intelligence of prospective mates with some degree of accuracy. Empirical research suggests that even strangers can estimate a person's IQ, with some degree of accuracy, based on a small amount of information. For example, Borkenau and Liebler (1993) reported that people could predict the IQ of strangers on the basis of an audio-video recording of those strangers reading a weather report ($r = 0.38$).

In romantic relationships, there is some evidence to suggest that people tend to possess, on average, a positive bias in relation to their partner's characteristics. For example, Swami, Furnham, Georgiades, and Pang (2007) found that people rate the physical attractiveness of their partners higher than their own ($d = -0.70$). Furthermore, Barelds and Dijkstra (2009) extended the research by showing that the 'positive illusions' were likely a true effect, as they found that, on average, a person's rating of their partner's physical attractiveness was higher than the partner's rating of their own physical attractiveness (see also Barelds, Dijkstra, Koudenburg, & Swami, 2011). Finally, Barelds and Dijkstra (2009) found that the degree of positive illusion about a partner's physical attraction correlated positively with relationship satisfaction. Thus, the positive illusion effect carried with it positive characteristics for the relationship, although causality cannot be clearly inferred on the basis of these data.

To-date, a positive illusion effect for intelligence in romantic partners has not been found. In perhaps the first relevant study, Furnham, Tang, Lester, O'Connor, and Montgomery (2002) asked 253 British and 318 American university students to rate their own intelligence and the intelligence of five other people, including their partner. Furnham et al. (2002) did not report an overall difference between self-estimated IQ and partner-estimated IQ (113.12 vs. 113.19, respectively). In another study, Swami, Furnham, and Kannan (2006) found that people rated their partner's IQ essentially equal to their own (self IQ = 107.03; partner IQ = 105.92), based on a sample of 230 adult Malaysians. The failure to observe a positive illusion effect for overall intelligence in romantic partners has also been reported for British/French, Iranian, and Portuguese samples, based on the same measure and procedures (Neto & Furnham, 2006; Swami, Furnham, & Zilkha, 2009; Furnham, Kosari, & Swami, 2012).

Although the effects (or absence of effects) reported in this area appear to be robust, it would be useful to evaluate the question with a slightly different approach to measurement, in order to evaluate the generalisability of the previously reported findings. Specifically, although no measurement method may be expected to be perfect, arguably, it may be useful to ask participants to rate only their own overall IQ and their partner's overall IQ, in order to evaluate the positive illusion effect for intelligence in romantic partners. Additionally, the inclusion of an objective measure of IQ would facilitate a more insightful analysis of the positive illusion effect.

5. Are women better than men at discerning a romantic partner's intelligence?

According to the males-compete/females-choose model of sexual selection, males compete for the attention of women by displaying biologically and socially valuable characteristics to help women choose a partner with whom to mate (Darwin, 1871; Miller, 2011; Stewart-Williams & Thomas, 2013). Obviously, the characteristics displayed by men need to be perceptible to women, in order to facilitate the decision to choose one man over another. As noted above, some empirical research suggests that even strangers can ascertain, to some degree, the level of intelligence of a person with only a little exposure to the person's behaviour, particularly listening to the person speak (Borkenau & Liebler, 1993; Borkenau, Mauer, Riemann, Spinath, & Angleitner, 2004; Murphy, 2007). Although the effect size is small, there is also evidence to suggest that there are perceptible facial cues that lead to some accurate indications of objective intellectual functioning (Lee et al., 2017; Zebrowitz, Hall, Murphy, & Rhodes, 2002).

Although the research is to some degree mixed, and the effect may be largely mediated or moderated by other variables (e.g., relationship type; male earning power; Penke, Arslan, & Stopfer, 2015), intelligence has also been found to rank consistently as one of the most highly sought after characteristics in a partner by women (e.g., Buss et al., 1990; Gignac, Darbyshire, & Ooi, 2018; Goodwin & Tinker, 2002). Consequently, in conjunction with the males-compete/females-choose model of sexual selection (Darwin, 1871; Stewart-Williams & Thomas, 2013), women should not only be able to estimate the IQ of a man, they should be able to do so better than a man's capacity to estimate the IQ of a woman. Therefore, support for the males-compete/females-choose model of sexual selection would be observed, if the correlation between the estimated IQ of male partners by women and the objective IQ of men were larger than the correlation between the estimated IQ of female partners by men and the objective IQ of women.

In contrast to the males-compete/females-choose model, the mutual mate choice model of sexual selection represents the notion that both women and men evaluate perceptible characteristics from each other and participate in the sexual selection process more equally than implied by the males-compete/females-choose model (Miller, 2000; Stewart-Williams & Thomas, 2013). Theoretically, the mutual mate choice model of sexual selection is supported by the contention that sex differences in parental investment are relatively modest (Stewart-Williams & Thomas, 2013). Additionally, the self-reported mate preference differences for dimensions such as intelligence do not appear to extend to real-life face-to-face dating (Eastwick, Luchies, Finkel, & Hunt, 2014). Furthermore, some empirical evidence has accumulated to support the mutual mate choice model of sexual selection, as well. For example, there is evidence that men care more about good looks in a mate than women (e.g., Furnham, 2009; Meltzer, McNulty, Jackson, & Karney, 2014). Correspondingly, women pay more attention to their physical appearance than men (Pliner, Chaiken, & Flett, 1990). Additionally, on average, women are also rated as physically more attractive than men, when rated by observers (Feingold & Mazzella, 1998). Thus, a male preference has arguably exerted sexual selection pressure on women. Furthermore, there is evidence that both women and men rank (and rate) the attractiveness of intelligence about equally highly as a desirable quality in a partner (Gignac et al., 2018). Consequently, it may be argued that the mutual mate choice model of sexual selection is consistent with the potential observation that women and men can estimate each other's IQ with approximately the same degree of accuracy. Thus, support for the males-compete/females-choose model of sexual selection would be observed, if the correlation between the estimated IQ of male partners by women and the objective IQ of men were about equal to the correlation between the estimated IQ of female partners by men and the objective IQ of women.

6. Assortative mating for intelligence

A positive correlation ($r \approx 0.30$ to 0.40) between the objectively measured IQ scores of people in a romantic relationship has been reported (Van Leeuwen, Van den Berg, & Boomsma, 2008; Watson et al., 2004). Furthermore, the correlation does not appear to increase with age of the relationship, suggesting that the effect occurs at the selection stage (Mascie-Taylor, 1989). Consequently, the effect is known as assortative-mating for intelligence (Jensen, 1967). There is some evidence to suggest that the effect may be more substantial for verbal intelligence tests, in comparison to non-verbal/fluid intelligence tests (e.g., Watson et al., 2004). However, some other research has found the assortative mating effect to be essentially equal in magnitude across verbal and non-verbal tests (e.g., Escorial & Martín-Buro, 2012). Our review suggests that there is not a substantial amount of assortative mating research that has used non-verbal type intelligence tests, or, at least, reported the results across subtests. Thus, more assortative mating research with non-verbal intelligence tests is indicated to help verify the generalisability of the effect.

Additionally, there is some evidence to suggest that the effect of assortative mating extends to self-estimated intelligence (e.g., $r = 0.50$, Furnham et al., 2002), however, again, there is only a small amount of assortative mating for intelligence research with self-reported intelligence measures. Arguably, it would be useful to establish the assortative mating for intelligence effect with self-estimated intelligence scores, as self-perceptions of intelligence may be expected to influence decisions about dating prospects (Tidwell, Eastwick, & Finkel, 2013).

Although the observation of assortative mating for objectively measured intelligence has been reported across many studies (Bouchard & McGue, 1981; Escorial & Martín-Buro, 2012), the consequences of intellectual compatibility between romantically involved partners has been researched to a far lesser degree. Theoretically, greater intellectual compatibility may be expected to be associated with greater relationship satisfaction, as several models of relationship satisfaction incorporate partner compatibility as a key predictive factor (Huston & Houts, 1998). Intellectual compatibility, specifically, may be expected to facilitate relationship satisfaction, as people with similar levels of intellectual capacity would be expected to enjoy more similar leisure activities (Ackerman & Heggestad, 1997). Additionally, as intelligence is related to preferences for different problem solving strategies (Sternberg & Soriano, 1984), intellectual compatibility may be expected to facilitate greater conflict resolution, over the course of a relationship. In contrast to the area of personality (see Weidmann, Ledermann, & Grob, 2017, for review), to-date, only a few empirical studies have examined the association between degree of intellectual compatibility and relationship satisfaction, whether measured objectively or subjectively.

For example, based on a sample of 291 newlywed couples who completed the Wechsler Abbreviated Scale of Intelligence (WASI; Psychological Corporation, 1999), Watson et al. (2004) found evidence for assortative mating for intelligence (Full Scale IQ $r = 0.29$, controlling for age and education). However, degree of similarity in intelligence failed to evidence a statistically significant association with relationship satisfaction (for both husbands and wives). To our knowledge, Watson et al. (2004) is the only investigation that has used objectively measured IQ scores, in this area.

Wilson and Cousins (2003) created the Compatibility Quotient, a self-report questionnaire that consists of 25 items commonly considered relevant to relationship satisfaction. Of particular interest to this investigation, one of the questions was relevant to intelligence: 'How would you say your IQ compares with other people?'. The response alternatives were: 'I'd describe myself as bright,' 'I'm somewhat more intelligent than average,' 'My level of intelligence is about average,' 'I'd say I am a bit below average,' and 'I think of myself as being a little dull really.' Based on a sample of 115 heterosexual couples, Wilson and Cousins (2003) found that overall compatibility (summed across all dimensions) correlated with relationship satisfaction at $r = 0.33$ and $r = 0.28$ for men and women, respectively. However, the intelligence compatibility item, specifically, was reported to correlate with relationship satisfaction at 0.00 for both men and women. Thus, although there may be some compatibility in intelligence within couples, the degree of compatibility does not appear to relate to relationship satisfaction. However, Wilson and Cousins (2003) suggested that their data may have been associated with a lack of variability with respect to their 5-point response scale. In a follow-up study with a larger, more representative sample, and an intelligence item designed to increase variability, Wilson and Cousins (2005) found that self-rated IQ compatibility correlated with relationship satisfaction non-significantly for men ($r = 0.07$, $p = .320$) but significantly for women ($r = 0.18$, $p = .010$).

Evidently, the amount of research on the benefits of assortative mating for intelligence with respect to relationship satisfaction is small and inconsistent. Theoretically, greater objective compatibility should be correlated positively with greater relationship satisfaction (Gonzaga et al., 2007; Huston & Houts, 1998). Consequently, it was considered useful to examine whether degree of objective and subjective IQ compatibility was related to important criteria, such as relationship satisfaction, as the observation of a positive correlation between intellectual compatibility and relationship satisfaction would help support the empirical observation of assortative mating for intelligence as a genuine phenomenon, an issue that remains open to question (Robinson et al., 2017).

7. Summary

It is well-established that people can predict, to some degree, their own intelligence as well as the intelligence of others. However, despite the observation of the better-than-average effect for several abilities/competencies, the degree to which people may overestimate their own (or their partner's) intelligence has not yet been established, on the basis of comparable self-estimated IQ and objectively estimated IQ scores. Consequently, in the current study, we investigated these effects among heterosexual couples. Specifically, we aimed to investigate four issues with respect to self/partner's IQ estimation.

First, the positive illusion effect for intelligence in romantic partners has failed to be established across a few studies, however, the effect may be more easily identified with a more direct and simplified approach to measurement.

Secondly, it remains to be determined whether women and men can assess their partner's objectively measured IQ with equal accuracy. On the basis of existing theories, two different predictions can be made. Specifically, the males-compete/females-choose model of selection would suggest that women are able to estimate their partner's intelligence more accurately than men in heterosexual relationships. By contrast, on the basis of the mutual mate choice model of selection, it may be hypothesized that men and women would be able to estimate their partner's intelligence about equally accurately.

Thirdly, assortative mating for intelligence has been well-established on the basis of objectively measured intelligence, but not yet for subjectively measured intelligence.

Finally, on the basis of compatibility theory (Gonzaga et al., 2007; Huston & Houts, 1998), it was hypothesized that degree of objective and/or subjective intelligence compatibility in couples would correlate positively with relationship satisfaction.

8. Method

8.1. Sample

The original sample included 222 couples. However, one case did not have a Raven's IQ score and one case did not have a relationship satisfaction score. These two cases were omitted from the analyses. Additionally, two cases reported their ages as > 65, therefore, we excluded these two cases, as well, due to the limitations of the Raven's IQ norms. Thus, the final sample consisted of 218 heterosexual couples (age $M_{\text{men}} = 28.00$, $SD = 9.25$; age $M_{\text{women}} = 27.27$, $SD = 9.16$) who were recruited from the general community in Warsaw, Poland. As assessed by the women, the mean duration of the relationship was 71.7 months (Median = 36 months; $SD = 92.0$; skew = 2.30) and 25.8% of the couples were married. The relationship demographics were found to be nearly identical on the basis of the male responses to the same questions (see bottom of Table 1).

8.2. Measures

8.2.1. Subjectively assessed intelligence

Participants assessed their own and their partner's intelligence on a 1–25 point rating scale. Five groups of five columns were labelled as very low, low, average, high or very high, respectively (see Fig. 1). Participants' SAI was indexed with the marked column counting from the first to the left; thus the score ranged from 1 to 25 (see Zajenkowski et al., 2016 for more details). Prior to providing a response to the scale, the following instruction was presented:

> People differ with respect to their intelligence and can have a low, average or high level. Using the following scale, please indicate where you can be placed compared to other people. Please mark an X in the appropriate box corresponding to your level of intelligence.

For partner's IQ estimation, the last two sentences of the instructions were:

> Using the following scale, please indicate where your partner can be placed compared to other people. Please mark an X in the appropriate box corresponding to your partner's level of intelligence.

In order to place the 25-point scale SAI scores onto a scale more comparable to a conventional IQ score (i.e., $M = 100$; SD = 15), we transformed the scores such that values of 1, 2, 3, 4, 5… 21, 22, 23, 24, 25 were recoded to 40, 45, 50, 55, 60… 140, 145, 150, 155, 160. As the transformation was entirely linear, the results derived from the raw

Table 1
Descriptive statistics.

	Women				Men			
	M	*Mdn*	*SD*	*Skew*	*M*	*Mdn*	*SD*	*Skew*
Age (years)	27.27	24.00	9.15	1.87	28.00	25.00	9.25	1.75
Number of previous relationships	2.14	2.00	2.03	2.26	2.32	2.00	3.13	8.49
Duration of relationship (months)	71.72	36.00	92.02	2.30	71.29	36.00	91.53	2.33
Number of breakups	0.42	0.00	1.05	4.90	0.48	0.00	1.05	4.90
Estimation of partner's IQ	132.16	135.00	13.88	−0.01	131.61	130.00	14.18	−0.03
Self-estimation of intelligence (SEI)	124.47	125.00	13.55	0.20	126.10	125.00	15.70	−0.94
Objective IQ (Raven's)	94.48	95.88	10.96	−0.37	95.89	97.80	11.79	−0.82
SEI female/male Difference	*M* = 14.24; *Mdn* = 10.00; *SD* = 12.11; *Skew* = 1.84							
Objective IQ female/male difference	*M* = 9.67; *Mdn* = 8.23; *SD* = 8.29; *Skew* = 1.40;							

Note. $N = 218$ (except relationship satisfaction, female $N = 217$; number of break-ups, male $N = 217$; number of relationships, male $N = 214$).

scale SAI scores and the recoded scale SAI scores were the same.

8.2.2. *Objectively assessed intelligence*

Participants completed the Advanced Progressive Matrices (Raven, Court, & Raven, 1983). The APM is a non-verbal intelligence test that is considered to be less affected by culture and/or education (Raven et al., 1983). We used the age-based norms published in Raven (1994, p. 55) to convert the raw APM scores into percentile scores. We then converted the percentile scores into *z*-scores with the IDF.NORMAL function in SPSS. Then, we converted the *z*-scores into IQ scores by multiplying them by 15 and adding 100. Because the norms for the APM were 23 to 24 years old when the data were collected for this investigation, we adjusted downwardly the IQ scores by 6 IQ points (3 points per decade) to help account for the Flynn effect (Trahan, Stuebing, Fletcher, & Hiscock, 2014). In this sample, the internal consistency reliabilities (coefficient alpha) for the APM scores were 0.86 and 0.88 for the women and men, respectively.

8.2.3. *Relationship satisfaction*

Participants completed the well-established Relationship Assessment Scale (Hendrick, 1988; Hendrick, Dicke, & Hendrick, 1998), which consists of seven self-report items scored on 5-point Likert scale (1 = low; 5 = high). An example item includes, 'How well does your partner meet your needs?' Higher scores indicate greater relationship satisfaction (two items are keyed negatively and were reverse scored in this investigation). Evidence for validity of the RAS includes the capacity to predict relationship dissolution over time (Hendrick, 1988), as well criterion-group validity in relation to distinguishing couples in and not in martial counselling (Hendrick et al., 1998). In this investigation, the female and male internal consistency reliabilities were 0.83 and 0.78, respectively.

8.3. *Procedure*

The sample was recruited by trained pollsters who invited heterosexual couples to take part in the study using social media and personal connections. Participants were recruited in two waves. The first wave ($n = 90$) took place in the first half of 2017, while the second wave took place in the first half of 2018. In the current study, we were interested in a relatively long-term relationship, rather than a short-term sexual relationship. Because it is difficult to define precisely a time period that differentiates these two types of relationships (Buss & Schmitt, 1993), we decided to include couples in a relationship for at least six months. A similar inclusion criterion was used in previous studies (e.g. Kenny & Acitelli, 2001).

Each participant was tested individually in a quiet room selected for the purposes of the present study. Participants completed the set of measures in the presence of a research assistant in the following order. First, they completed a demographic survey and then they estimated their partner's IQ and then their own IQ. Next, they rated their relationship satisfaction. Finally, they solved the Raven's test. The order of the self-report measures and intelligence test presentation was fixed in accordance with recent longitudinal findings indicating that when objective intelligence is measured before a self-estimate intelligence people may adjust their self-perceived intelligence to the objective intelligence (Gold & Kuhn, 2017).

Partners were not allowed to discuss the nature of the study with each other, until both had completed the study. Written informed consent was obtained from all participants after careful information about the general aim of the study (i.e. intellectual functioning of couples), the study procedure and protocol clearly mentioning the anonymity and the possibility to withdraw from participating in the study. After the study, participants were fully debriefed. Participants did not receive any reward for participation in the study. The study procedure was approved by the ethics committee of Faculty of Psychology at University of Warsaw.

8.4. *Data analysis*

Most analyses were conducted in SPSS version 24. In order to test the hypothesis of an association between self-reported IQ and objectively measured IQ, we conducted a Pearson correlation between the two scores for both women and men, separately. In order to test for better-than-average effect, we tested the difference between the self-estimated IQ means and the objectively measured IQ means with paired sample *t*-tests (women and men, separately). In order to test the positive illusion effect, we tested the difference between the objectively measured IQ means and the partner-estimated IQ means with paired sample t-tests (women and men, separately). In order to test the possibility of hubris-humility effect, and any sex interactions more generally, we conducted a factorial within-subjects ANOVA on the three intelligence measurement type means: objectively measured IQ, self-estimated IQ, and partner-estimated IQ. In order to test the males-compete/females choose model of sexual selection via the capacity to discern another person's IQ, a test of the difference between the objectively measured IQ scores and the partner-estimates IQ score was conducted. Specifically, given the nature of the data, a dependent, but non-overlapping, test of the difference between two correlations was conducted (Steiger, 1980).

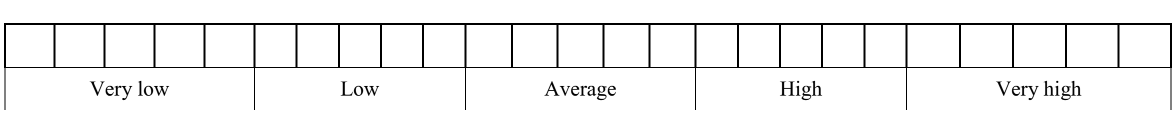

Fig. 1. The measure of self-estimated intelligence (SEI) used in the study.

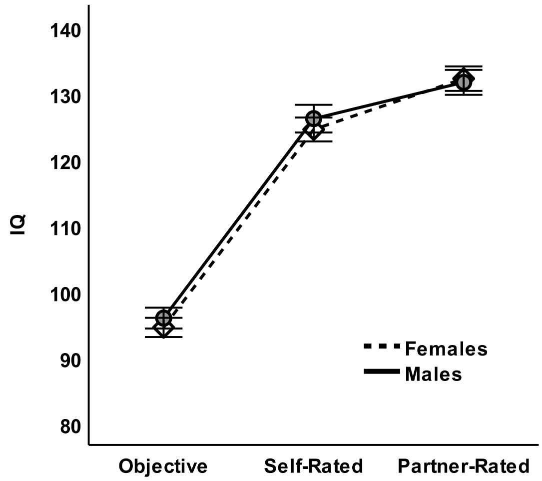

Fig. 2. Plot of means across intelligence measurement conditions (objective = Raven's IQ; self-rated = self-estimated intelligence; partner-rated = intelligence estimated by partner) and sex.

This particular test was conducted in Amos (version 24) via bootstrapping with syntax (i.e., an estimand; see Supplementary Materials). Finally, in order to test the hypothesis that intellectual compatibility would be associated with relationship satisfaction, a Pearson correlation was estimated between absolute difference scores (|Female IQ – Male IQ|) and rated relationship satisfaction (as rated by women and men, separately). However, in order to overcome the possibility of confounding any main effects (i.e., that higher levels of intelligence impact relationship satisfaction; see Watson et al., 2004), we also tested the hypothesis with hierarchical multiple regression. Specifically, we entered female IQ and male IQ at the first step and the absolute IQ difference scores at step 2. Support for the hypothesis would be observed on the basis of a statistically significant change in R^2 at step 2 (and a positive beta-weight).

Due to concerns relevant to the normality of the data (i.e., some variables skew > |2.0|; see Table 1), the statistical analyses were conducted with bootstrapped estimation (2000 re-samples; bias corrected confidence intervals). Finally, because the objective intelligence scores were norm adjusted, we did not control for age in any of the analyses. The data were uploaded to the Open Science Framework: https://osf.io/r3axq/.

9. Results

9.1. Accuracy of IQ estimates

The descriptive statistics are reported in Table 1. As hypothesized, there was a positive correlation between self-estimated intelligence and objective intelligence (APM) for both women ($r = 0.26$, 95%CI: 0.12/0.38, $p < .001$) and men ($r = 0.33$, 95%CI: 0.13/0.49, $p < .001$). However, as can be seen in Fig. 2, both women and men overestimated their own IQs, when their self-ratings were compared against their performance on the objective IQ test: female mean IQ difference = 29.99 IQ points, 95%CI: 28.01/31.91 $t = 29.61$, $p < .001$, Hedge's $g = 2.44$; male mean IQ difference = 30.11 IQ points, 95%CI: 28.12/32.31, $t = 27.98$, $p < .001$, Hedge's $g = 2.19$. Thus, on average, both women and men overestimated their IQs by approximately 30 IQ points, which was supportive of the better-than-average effect. Correspondingly, only 0.9% of women and 1.8% of men self-assessed their own intelligence as below average (i.e., IQ < 100).[2] However, according to the objective IQ test (i.e., APM), in this sample, 68.8% of women and 55.0% of men scored below average (i.e., IQ < 100).

Furthermore, on average (see Fig. 2), both women and men tended to estimate their partner's IQ higher than their own IQ. Specifically, women rated their partner's to have an IQ 7.68 points higher than their own, $t = 7.62$, $p < .001$, Hedge's $g = 0.56$ (95%CI: 5.74/9.56; $M = 132.16$, $SD = 13.88$ vs. $M = 124.47$, $SD = 13.55$). Correspondingly, men rated their partner to have an IQ 5.51 points higher than their own IQ, $t = 4.70$, $p < .001$, Hedge's $g = 0.37$ (95%CI: 3.28/7.98; $M = 131.61$, $SD = 14.18$ vs. $M = 126.10$, $SD = 15.70$). Thus, the results were consistent with the positive illusion effect. We note that although the magnitude of the effect size was larger numerically for women ($g = 0.56$ vs. 0.37), the test of the interaction failed to be significant statistically, $F(1, 134) = 0.44$, $p = .509$, partial $\eta^2 = 0.01$.

Furthermore, both women and men tended to overestimate their partner's IQ when partner ratings were compared against the partner's objective IQ scores, which, again, was consistent with the positive illusion effect. Specifically, women assessed their partner's IQ at $M = 132.16$, which was statistically significantly different to their partner's objectively measured IQ (i.e., $M = 95.89$), $t = 35.18$, $p < .001$, Hedge's $g = 2.82$. Additionally, men assessed their partner's IQ at 131.61, which was statistically significantly different to their partner's objectively measured IQ (i.e., $M = 94.48$), $t = 34.63$, $p < .001$, Hedge's $g = 2.94$. As can be seen in Fig. 2, the female and male IQ means were highly consistent across the three intelligence estimates, which was consistent with the absence of a statistically significant sex by intelligence measurement mode/type interaction, $F(1.89, 409.74) = 1.22$, $p = .296$, partial $\eta^2 = 0.01$.

9.2. Sex differences in predicting partner objective IQ

Women demonstrated some capacity at predicting their partner's objective IQ, $r = 0.30$, 95%CI: 0.17/0.43, $r^2 = 0.092$, $p < .001$. Correspondingly, men demonstrated some capacity at predicting their partner's objective IQ, $r = 0.19$, 95%CI: 0.04/0.31, $r^2 = 0.036$, $p = .005$. However, the numerical difference in the magnitude of the squared correlations was not found to be significant statistically: $\Delta r^2 = 0.056$, 95%CI: −0.048/0.154, $p = .242$. Thus, the hypothesis that women would evidence better accuracy at perceiving their male partner's IQ was not supported statistically.

9.3. Assortative mating for IQ & relationship satisfaction

The correlation between female and male objectively measured IQ was positive and significant statistically, $r = 0.38$, 95%CI: 0.26/0.50, $p < .001$. Although the correlation may be considered relatively large (Gignac & Szodorai, 2016), there were, nonetheless, a substantial amount of differences in partner objective IQs within couples (see Fig. 3, panel A). Specifically, the mean absolute objectively assessed IQ difference between members of the couples was estimated at $M = 9.67$ ($SD = 8.29$; $Mdn = 8.23$), a mean difference that was found to be statistically significantly different from zero, based on a one-sample t-test: $t = 17.16$, 95%CI: 8.60/10.76, $p < .001$. However, the magnitude of the absolute difference in objective partner IQs was not found to be correlated significantly with relationship satisfaction, whether relationship satisfaction was reported by the women ($r = -0.01$, 95%CI: −0.17/0.15, $p = .866$) or men ($r = 0.06$, 95%CI: −0.07/0.18, $p = .373$). Thus, the hypothesis that greater degree of intellectual compatibility would be correlated positively with relationship

[2] When we re-categorized the 25-point scale into a 5-point scale (1 = very low; 2 = low; 3 = average; 4 = high; and 5 = very high), we found that 0% of women rated their intelligence as 'low' or 'very low' and 80.7% as 'high' or 'very high'. Correspondingly, on the same re-categorized scale, we found that 1.4% of men rated their intelligence as 'low' or 'very low' and 85.3% as 'high' or 'very high'.

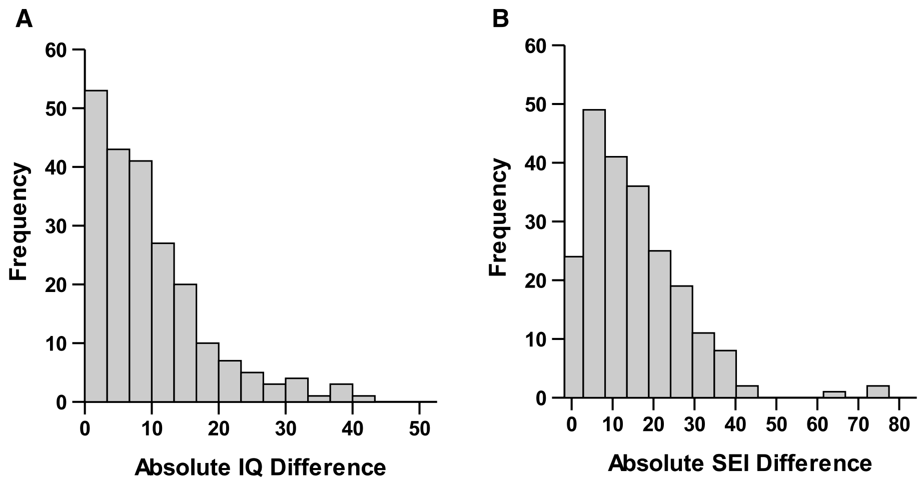

Fig. 3. Histograms of absolute IQ difference scores between partners in a relationship: Objectively measured IQ (panel A) and subjectively measured IQ (panel B); IQ = objective IQ (APM); SEI = self-estimated intelligence.

satisfaction was not supported.

The absence of a zero-order correlation between the absolute difference scores and relationship satisfaction would suggest that there was no possibility of confounding with main effects. However, in the unlikely event of suppressor effects, we, nonetheless, conducted the hierarchical multiple regressions, as recommended by Watson et al. (2004). We did not obtain any statistically significant effects (see Supplementary Results; Tables S1 and S2), confirming further the failure to support the hypothesis of an association between intellectual compatibility and relationship satisfaction.

Finally, the correlation between female and male SEI was also positive and significant, $r = 0.19$, 95%CI: 0.08/0.31, $p = .004$, suggesting some level of assortative mating for intelligence on the basis of self-perceptions. The magnitude of the correlation was considered typical for differential psychology (Gignac & Szodorai, 2016). Furthermore, as can be seen in Fig. 3 (panel B), there was a substantial amount of differences between self-estimated IQs within couples. Specifically, the mean absolute subjectively assessed IQ difference between members of the couples was estimated at $M = 14.24$ ($SD = 12.11$; $Mdn = 10.00$), a mean difference that was found to be statistically significantly greater than zero, based on a one-sample t-test: $t = 17.06$, 95%CI: 12.63/15.80, $p < .001$. The correlations between degree of subjective IQ score compatibility and relationship satisfaction, as rated by the women and men, separately, were not found to be significant statistically (female satisfaction: $r = -0.02$, 95%CI: $-0.17/0.13$; male satisfaction: $r = 0.04$, 95%CI: $-0.19/0.11$).

10. Discussion

We replicated the positive correlation between self-estimated IQ and objective IQ. However, we found that both women and men greatly overestimated their IQ, consistent with the better-than-average effect. People also overestimated their romantic partner's IQ, consistent with the positive illusion effect. We replicated the assortative mating for intelligence effect, on the basis of objectively measured intelligence, and extended the assortative mating for intelligence effect to self-estimated intelligence. However, we failed to find statistically significant evidence to support the notion that women are better than men at discerning the intelligence of a partner, which supported the mutual mate model of sexual selection. Finally, we failed to observe a statistically significant effect between degree of IQ compatibility and relationship satisfaction. We discuss each of these results in greater detail below.

10.1. Accuracy of IQ self-estimates: correlation & mean difference

Consistent with a wide body of research (Freund & Kasten, 2012), we found evidence that people can estimate their own intelligence to a certain degree, as self-estimated IQ and objectively measured IQ correlated $r \approx 0.30$ for both women and men.[3] However, we also found evidence that both women and men overestimated their intelligence by between 25 and 30 IQ points. Such a result is consistent with previously published research that people tend to overestimate their abilities (Mabe & West, 1982).

With respect to the research on intelligence, specifically, however, our estimate of 25 to 30 IQ point overestimation is clearly on the higher side than what might be expected. That is, on the basis of comparisons between SEI scores and Digit Symbol/Vocabulary, Reilly and Mulhern (1995) reported an IQ overestimation effect of 8 IQ points for undergraduate university men and essentially zero IQ points for women. However, their sample size was small ($N \approx 40$ per sex) and Digit Symbol in particular may not be considered an especially good indicator of general intellectual functioning (Jensen, 1998). In our investigation, we used the Advanced Progressive Matrices (APM; Raven et al., 1983), which has been found to be one of the most substantial individual indicators of general intelligence (Gignac, 2015). Admittedly, however, there are limitations associated with the APM's norms. Additionally, we acknowledge that the self-report scale we used, and the re-coding method employed, may not yield scores entirely comparable to objectively measured IQ scores. Thus, these two limitations preclude us making confident and precise assertions about the degree to which people overestimate their IQ. Correspondingly, our IQ difference estimate of 25 to 30 IQ points may be biased upwardly. Nonetheless, at the very least, the results suggest that most people tend to overestimate their intelligence, and they probably do so by a substantial margin. Such a finding is relatively novel, as, to-date, few investigations included (or reported) self-estimated and objectively estimated IQ scores that could be compared even in a superficially similar manner.

Evaluating the degree to which people overestimate their abilities, including intelligence, is arguably important, as some level of overestimation of abilities is consistent with a psychologically healthy disposition (e.g., low depression, high well-being; Baumeister, 1989;

[3] Although not the purpose of this investigation, we note, briefly, that preliminary analyses did not suggest the presence of Dunning-Kruger effect (Kruger & Dunning, 1999; Lichtenstein & Fischhoff, 1977). Thus, we believe the self- and other-estimated intelligence results in this investigation were not moderated by level of intelligence.

Dufner, Gebauer, Sedikides, & Denissen, in press). However, beyond a certain level of overestimation, there is evidence to suggest that the phenomenon may be indicative of a narcissism (e.g., Zajenkowski & Gignac, 2018). Furthermore, research has shown that the overestimation of abilities can lead to the greater likelihood of making poor decisions, as well as causing accidents (e.g., Plumert, 1995; van de Venter & Michayluk, 2008). Given the degree to which people were found to overestimate their intelligence in this investigation, it is plausible to suggest that some people may run into practical difficulties, on the basis of their inflated view of their intellectual capacity.

Consistent with the mean IQ overestimation effect, we also found that between 80% (women) and 85% (men) of the participants rated their intelligence as 'high' or 'very high', which is in contrast to their performance on the objective IQ test (≈ 50% above average). Thus, our results may be considered consistent with the better-than-average effect, an effect that has been observed across a variety of abilities and competencies (Alicke & Govorun, 2005). Close comparisons with other intelligence studies are difficult, however, because each study in this area tends to measure self-estimated intelligence differently.

For example, in a nationally representative American sample, Brim, Neulinger, and Glass (1965) had the participants respond to the question, "How do you think you compare to other people in intelligence?" The participants first responded to the question in comparison to their father, mother, brothers, sisters, before asking about wife/husband, and average person in the US. Furthermore, the participants responded to the question on a four-point scale: much higher, higher, same, lower, much lower. Only 21% of the participants responded higher or much higher, which is substantially lower than the estimated reported in this investigation. By comparison, Heck et al. (2018) reported that 65% of people rated their intelligence as above average, on the basis of a somewhat different question ("I am more intelligent than the average person.") and response format (Strongly Agree; Mostly Agree; Mostly Disagree; Strongly Disagree; Don't Know). Additionally, Heck et al.'s (2018) study included a larger number of other questions not directly relevant to perceptions of intelligence, which may have inadvertently impacted people's response to the intelligence item. In the area of life satisfaction, for example, it has been found that questions posed prior to the overall life satisfaction item can influence (downwardly) the manner in which people respond to the overall life satisfaction question (Schwarz, 1999). Thus, it is possible that the degree of overestimation may be influenced, at least in part, by the nature of the SEI measurement, i.e., item stem, response scale, and preceding items that were presented to the participants (see Kieruj & Moors, 2010, for general review in this area).

Additionally, when objective intelligence is measured before a self-estimate intelligence item is administered, it is possible that people gain some insight into how well they did on the test and adjust their self-perception of intelligence, accordingly. Importantly, in a longitudinal study with three time periods, Gold and Kuhn (2017) found that, on average, people reported lower self-assessed intelligence (≈ 5 IQ points), immediately after completing an objective IQ test, in comparison to participants who did not complete an objective IQ test. However, the participants' self-assessed intelligence scores recovered fully one week later, when the same participants self-estimated their IQ, again. In this investigation, the APM was administered after the participants completed the SEI item. Thus, the SEI scores were not reduced due to the experience of completing an objective IQ test, and, correspondingly, the better-than-average effect may have been revealed to its fullest degree. Given that participants reclaim their initial degree of IQ overestimation across time (Gold & Kuhn, 2017), it is arguably more valid to ask the participants to rate their IQ prior to the administration of an objective IQ test, if a person's stable, long-term view of their intelligence is sought to be measured. It needs to be acknowledged that in the current study, the subjective IQ estimation measure was administered at the beginning of the study, prior to any other tests. However, dedicated research to uncover the nature of item presentation effects in the area of SEI is encouraged.

We note only briefly that, in our sample, both men and women overestimated their intelligence to about the same degree, which is inconsistent with the hubris-humility effect (Furnham & Mottabu, 2004). Some cultural differences have been identified in the area of SEI (Furnham, 2001), and, as our sample consisted of Polish people, the results may be to some degree idiosyncratic, in this context. However, it is also possible that the hubris-humility effect is decreasing across time, consistent with the observation that female levels of narcissism may be catching up with male levels of narcissism, at least in Western cultures (Twenge & Campbell, 2009).

10.2. Assortative mating for IQ & relationship satisfaction

We found evidence for assortative mating for objectively measured intelligence, as the male and female partner scores from the APM correlated at 0.38, which is consistent with the magnitude of the assortative mating effect reported in previous investigations ($r \approx 0.30$ to 0.40; Bouchard & McGue, 1981; Escorial & Martín-Buro, 2012). Some research suggests that positive assortment for intelligence may be observed principally, if not exclusively, for verbal intelligence tests, in comparison to non-verbal intelligence tests (Watkins & Meredith, 1981). However, our results contribute to the area by suggesting that this may not be the case, as the APM is clearly a non-verbal intelligence test. Furthermore, our results accord well with the previous research that suggests that laypeople consider reasoning a key component of intelligence (Sternberg et al., 1981).

We also found assortative mating for intelligence on the basis of self-estimated intelligence scores. Our effect size ($r = 0.19$) was smaller than the effect size ($r = 0.50$) reported by Furnham et al. (2002). As more studies accumulate, a meta-analysis will facilitate the estimation of a population effect with appreciable confidence. The observation of subjectively assessed assortative mating for intelligence lends some support for the assortative mating for intelligence effect, as many people may not know their actual IQ (Heck et al., 2018). Consequently, the early stages of a romantic relationship may arise, in part, on the basis of subjectively assessed assortative mating for intelligence, rather than only objectively assessed intelligence. If objective assortative mating for intelligence is the primary effect, in this context, it would be expected that the objectively assessed assortative mating for intelligence correlation would be larger than the subjectively assessed assortative mating for intelligence correlation, particularly in established relationships. We note that, in our sample, the subjectively assessed assortative mating for intelligence correlation remained significant statistically, controlling for objectively measured intelligence ($r = 0.18$, 95%CI: 0.05/0.31). Thus, people tend to choose their partners not only on the basis of actual intelligence, but also on the basis of their perceptions of intelligence.

It needs to be acknowledged, however, that, in the current study, we examined self-estimated general intelligence. It is possible that lay perceptions of intelligence are more complex. For instance, factor analytic work suggests that people may differentiate between various ability facets (e.g. verbal, logical, and spatial vs. musical and kinaesthetic) within a broader construct of intelligence (Furnham et al., 2002). There may also be gender differences in these lower-order factors (Szymanowicz & Furnham, 2011). Thus, it remains an open question to what extent the compatibility effect is associated with more specific perceived abilities, in comparisons to general intelligence. This problem is important in light of the suggestion that the concept of general intelligence could be male-normative, i.e. people may perceive logical and spatial abilities as closer to general intelligence (Furnham et al., 2002).

Despite the evidence for assortative mating for intelligence observed in this investigation, we failed to find a statistically significant association between intelligence compatibility and relationship satisfaction, on the basis of both objectively and subjectively measured intelligence.

Such a null result is consistent with Watson et al. (2004), who also failed to find a significant effect in favour of intellectual compatibility, on the basis of the WASI, and the results reported by Wilson and Cousins (2003) and Wilson and Cousins (2005; at least for men), on the basis of self-estimated intelligence scores. Naturally, given the relatively small amount of research in the area of intellectual compatibility and relationship satisfaction, it is premature to draw any strong conclusions. However, at this stage, it may be suggested that intellectual compatibility may play, at most, a small role with respect to relationship satisfaction of established relationships.

It is possible that some range restriction in the relationship satisfaction scores may have reduced the chances of detecting a statistically significant effect, as the female and male relationship satisfaction scores were associated with coefficients of variation of only 0.13 and 0.11, respectively. However, Gignac (2015) reported a coefficient variation of 0.19 for Digit Span Forward, which, although on the lower side in comparison to other variables (e.g., ≈ 0.40 to 0.50; Block, Zakay, & Hancock, 1998), nonetheless, has allowed for the identification of statistically significant effects. In practice, couples may not be likely to agree to participate in a study about couples, unless they are relatively satisfied with their relationship. Perhaps research with couples seeking counselling may be a fruitful avenue to examine further the hypothesized effect of intellectual compatibility and relationship satisfaction.

Excluding the possibility of range restriction in the data, one possibility that may help explain the failure to identify an association between degree of intellectual compatibility and relationship satisfaction is that assortative mating for intelligence may arise due to other factors, such as educational propinquity, for example (Phillips, Fulker, Carey, & Nagoshi, 1988; but see Stevens, 1991). At this stage, it would be useful to determine whether there is *active* assortment for intelligence (i.e., consciously and actively preferring prospective mates who are similar in intelligence to oneself; not just ratings). Based on a battery of four objective intelligence tests and a sample of undergraduates, Gignac et al. (2018) failed to find a statistically significant association between degree of intelligence (objectively and subjectively measured) and degree of attraction to various levels of intelligence in a hypothetical partner. Thus, perplexingly, 'intelligent' is rated consistently as the second or third most valuable trait in a prospective partner, and, yet, there does not appear to be evidence for active assortment for intelligence, at least based on ratings. We acknowledge that there may be influential moderators on the effect intellectual compatibility and relationship satisfaction (e.g., some men may be threatened by intellectual compatibility; e.g., Karbowski, Deja, & Zawisza, 2016). Additional active assortment research is encouraged, ideally, with samples representative of the general population, as well with consideration for the evaluation of moderators of the effect.

11. Limitations

Although the sample size used in this investigation may be regarded as respectable ($N = 218$; power = 0.85 to detect a typical correlation of 0.20 as significant), unfortunately, established tests of the difference between correlations have been discovered to be underpowered. For example, when the population difference between two dependent non-overlapping correlations is equal to 0.70 vs. 0.60, a sample size of 100 was found to have power of only 0.34 (Silver, Hittner, & May, 2004). Based on analytical work by Steiger (1980), the G*Power program (Faul, Erdfelder, Buchner, & Lang, 2009) offers the option to calculate power for a test of the difference between two correlations with no overlapping variables. The difference between two expected correlations (r_{ab} versus r_{cd}) equal to 0.30 and 0.20 (and inter-variable correlations of 0.20; essentially the situation of this investigation) was found to require a sample size of $N = 1136$ to achieve statistical power of 0.80. Few studies devoted to couples research will have the resources to obtain such a large sample size. However, if empirical studies continue to be published, a valuable meta-analysis may be performed.

Additionally, objective intelligence was measured with only a single test, in this investigation. Although the Advanced Progressive Matrices is considered one of the best single indicators of general intellectual functioning, it is not isomorphic with general intelligence (Gignac, 2015). Therefore, some underestimation of effect sizes with the IQ scores used in this investigation likely occurred, if people are focussing on the substantially heritable general factor of intelligence, when contemplating the selection of a mate (Rushton, 1989). Additionally, Swami et al. (2006) found the self-ratings of verbal intelligence was the best predictor of self-ratings of overall intelligence, suggesting that our study may have been limited by using only one spatial reasoning test to estimate IQ. We also acknowledge that the norms associated with the APM may not be regarded as particularly good. Furthermore, we applied a 6 IQ point correction to the APM IQ scores to account for the Flynn effect. Such a procedure may not be entirely appropriate, given there is some disagreement on the precise nature of the Flynn effect over the last couple of decades (Bratsberg & Rogeberg, 2018). In this investigation, the sample was a general community sample, consequently, we anticipated an IQ level of approximate 100. We obtained mean IQ scores of 95 to 96, which is close to what we were expecting. Even excluding the Flynn effect correction we applied, the mean difference between how intelligent the participants were assessed to be and how intelligent they viewed themselves to be would still have amounted to a substantial amount: approximately 25 IQ points, rather than closer to 30 IQ points. Thus, overall, the key effects reported in this investigation are likely robust. Naturally, we encourage replication with other measures.

We measured subjectively estimated intelligence with a single-item, thus, we acknowledge that the reliability associated with the SEI scores may not have been particularly high, which would have led to some effect size underestimation. However, Swami (2012) reported a relatively respectable test-retest reliability (6-months) of 0.62 for a single (overall) IQ SEI item. Additionally, Paulhus, Lysy, and Yik (1998) found only modest validity benefits to employing a multi-item SEI inventory, in comparison to a single, overall SEI item. Thus, we believe our results would not have changed substantially had we measured SEI with several items.

However, whether we would have obtained different results with a different SEI scale is an important question, particularly with respect to the degree of IQ overestimation we found in this investigation. Most measurement approaches have strengths and weakness. The scale we used is relatively simple, which may be regarded as a strength, as it did not appeal to an understanding of the normal distribution or standard deviations, for example. However, the simplicity may have compromised, to some degree, direct comparisons with objectively measured IQ scores. Further research, with different, possibly superior, SEI measurement approaches is encouraged.

Furthermore, we acknowledge that the application of our SEI measure assumed that laypeople have in their mind the same notion of intelligence as researchers do. Although there is some evidence to suggest that laypeople have a somewhat more expansive view of what intelligence constitutes in comparison to academics, overall, laypeople do tend to view the notion of intelligence in a manner similar to academics (Furnham, 2001). Finally, we acknowledge that we employed a single variable-centered approach to the measurement of similarity, which may be less insightful and powerful than a multivariate couple-centered approach (i.e., profile similarity indices; Luo & Klohnen, 2005; but see Wood & Furr, 2016). A more comprehensive measurement of SEI (and objective IQ) would be required to evaluate this possibility.

12. Conclusion

Assortative mating for intelligence is a robust, empirical effect, however, beyond the consistently observed assortative mating for intelligence correlation, relatively little is known about the processes by which the phenomenon arises. Based on the results of this investigation, it appears that both women and men may participate in the process of evaluation and selection, consistent with the mutual mate model of sexual selection.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.intell.2019.01.004.

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