Intelligence is associated with being non-binary and with unusual sexuality: Rare sexual orientation, gender non-conformism and intelligence in a large dating sample

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Some studies have indicated that there may be intelligence differences between different sexual orientations or gender identifications. We investigated whether intelligence was predicted by sexual orientation and gender identity in a large sample of dating site users from OKCupid (N = ~36,866). In our regression model, we found that homosexuals were slightly below heterosexuals in intelligence, β = -0.07 (corrected -0.09), while bisexuals were slightly higher, β = 0.17 (cor. 0.22), and people with less common orientations were much higher, β = 0.73 (cor. 0.93). There was no interaction between orientation and gender. Furthermore, women obtained lower scores than men, β = -0.14 (cor. -0.18, -2.67 IQ), and individuals who adopted non-binary gender identity had about average intelligence, β = 0.03 (cor. 0.03). It was found that non-binary gender identity predicts substantially higher intelligence when analysed alone, but this was mediated by its statistical association with rare sexual orientations. Results were discussed in the light of a development of Kanazawa's Savanna-IQ Interaction hypothesis and the Cultural Mediation hypothesis.

Keywords: dating sites; gender; intelligence; sexual orientation; regression analysis

Some studies have found that homosexual orientation correlates either with intelligence or components of intelligence, such as Kanazawa (2012a). Xu et al. (2017) conducted a meta-analysis in which they found that homosexual males were relatively female-like in terms both of their spatial intelligence (lower than heterosexual males) and their verbal intelligence (higher than heterosexual males) whereas lesbians had higher spatial ability than heterosexual females but were not different from them on verbal intelligence.

A similar relationship was observed for what might be called one's place on a gender spectrum. Elevated boyhood femininity has been found to be associated with higher adult IQ among even heterosexual males, while elevated girlhood femininity correlated with lower IQ scores among heterosexual females (Rahman et al., 2012). Weinrich (1978), in an early literature review, found that homosexuals had higher average IQ than controls, while Raboch and Sipova (1974) suggested, based on small samples, that transwomen, and certainly homosexual males, might have elevated IQ. A 2005 study found that being non-binary was associated with elevated intelligence (Smith et al., 2005). Lawrence and Bailey (2009) have presented evidence that autogynephilic (late onset) transwomen are particularly interested in computers and gravitate towards computer-based jobs and hobbies. This could reflect high intelligence, a correlate of which is interest in and ability in science and mathematics (Dutton & Lynn, 2014), or the fact that autism predicts an interest in highly systematic and mathematical subjects (Wei et al., 2013) combined with the fact that autism is elevated among autogynephilic transwomen (Dutton & Madison, 2021), or it could reflect a combination of both factors. These relationships have not been observed among 'homosexual transsexuals' of the male-to-female variety; those who have a strong feeling of gender dysphoria from a very young age rather than one beginning in late childhood or in adolescence (Lawrence & Bailey, 2009).

In light of this research it would be useful to test, using a relatively large sample, whether there is a relationship between intelligence and either gender identity or forms of non-heterosexuality. This is what we will do in this study, drawing upon the large Ok Cupid dataset. Understanding this relationship is important because it may help to explain the way in which sexuality and sexual identity have become such a prominent component of contemporary discourse. There is evidence that non-heterosexuality is associated with Dark Triad traits; Narcissism, Machiavellianism and Psychopathology (Jonason & Luoto, 2021). Transgenderism is associated with the same traits (e.g. Meybodi et al., 2014). Achieving high levels of power and influence has been shown to be associated with Dark Triad traits, at least when combined with high intelligence (Post, 1994; Dutton, 2022). If non-heterosexuals and those with atypical gender identity or atypical sexual practices are of elevated intelligence, then we would expect them – as an organised minority - to be better able to organise in their own interests and better able to achieve goals such as recognition and empowerment (see Parvini, 2022; Dutton & Woodley of Menie, 2018).

METHOD

We employed data from the OKCupid sample (Kirkegaard & Bjerrekær, 2016). This is a dataset of more than 60,000 profiles scraped (automatically downloaded) from the dating site OkCupid.com in 2016. The dataset consists mostly of people from Western (95%), and Anglophone (85%) countries. The mean age was 31.7, and contained 60.6% men and 39.1% women. Prior studies using the dataset have found that well-established associations can be replicated in the dataset, and thus it seems suitable for analysis and adequately representative (DiPiero, 2018; Figueroa, 2018; Hauser, 2018; Kirkegaard, 2018; Kirkegaard & Bjerrekær, 2016; Kirkegaard & Lasker, 2020; Rudder, 2015).

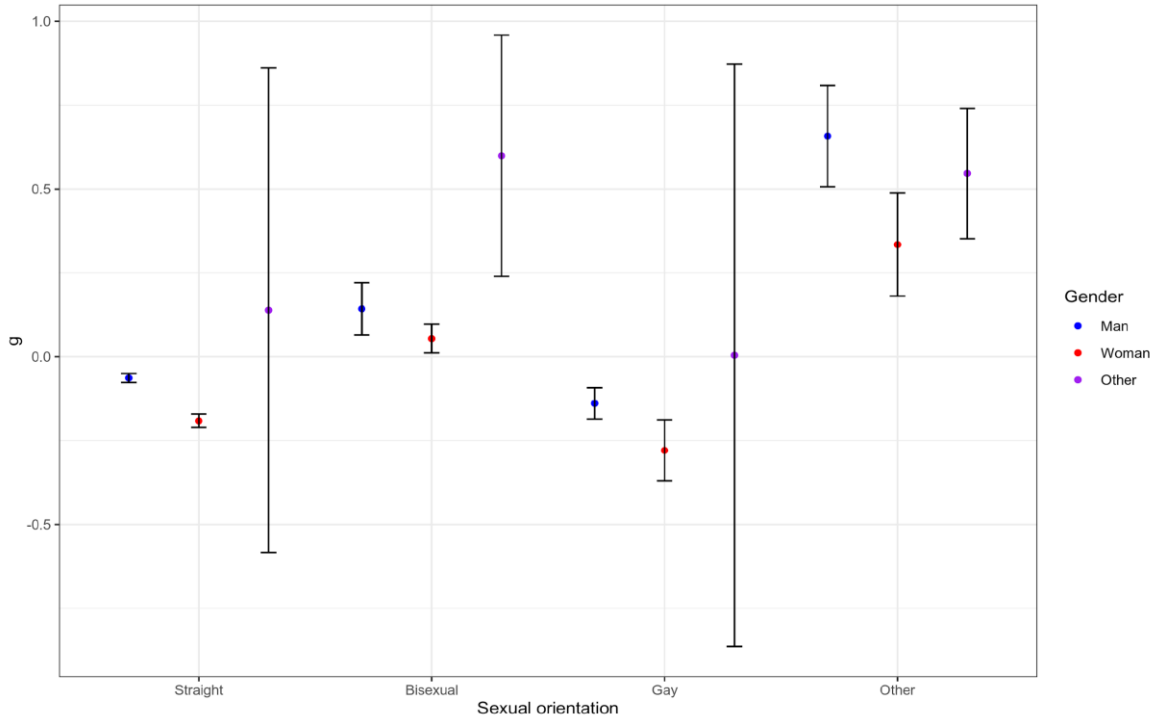
In their profiles, users were asked to select a gender identity as well as a sexual orientation. There was a large list of options for both, though most users chose one of a few common options. For instance, the most common gender identity that wasn't (cis) man or (cis) woman was gender-queer with n = 7 persons. This means that a person identifies neither as male nor female. The options for sexual orientation included pansexual (a person who is attracted to people of all sexes and gender-identities), questioning, asexual and grey-sexual (only rarely experiencing attraction). We recoded these data into new variables. For gender, we coded each person as man, woman, or other. Variants like "cis man" were coded as "man." For orientation, we coded subjects as straight, bisexual, gay, or other. We used the terms employed on the site as opposed to more modern or academic terms to stay closer to the source material.

We scored intelligence as in prior studies, though it should be noted that this was a relatively crude instrument with a reliability of only 0.62. Users of the website had the opportunity to fill in an

extremely lengthy survey consisting of thousands of questions. Each question was multiple-choice, with 2 to 4 options. Most of the questions were user generated, but a few of the most popular ones were created by the site staff. Because not all users fill out many thousands of questions on a dating site, we could only use question data from users who did fill out enough of them. Intelligence was scored based on a collection of 14 items. Because users are allowed to skip questions, this is not an ideal measurement. Nevertheless, despite its brevity, prior studies, cited above, have shown it functions well as an intelligence test. We analysed subjects using item response theory using the mirt package based on the available items. Finally, we limited the dataset of analysis to subjects who had answered at least 5 of the 14 intelligence items, resulting in a sample size of 37,714. The reliability of the test in this subset was 0.62, which is suboptimal but nevertheless useful. The intelligence scores were then standardized to the White (European) subset, so as to have approximate comparability with other studies. We note, though, that the use of the subsample with at least 5 answered intelligence items results in some self-selection for higher intelligence.

RESULTS

Figure 1
Simple means by orientation and gender



It can be seen that men obtained higher scores no matter the orientation, though the difference was fairly small, congruous with other studies of male-female IQ differences (see Lynn, 2021). There doesn't appear to be an interaction between orientation and gender, though we wished to test this formally in a regression model. In the model we also control for age and race, which might otherwise confound the results. For example, there is evidence that non-heterosexual identification, though not practice, is increasing among younger cohorts, possibly because it is a way of being part of a supposedly marginalised minority in a society that increasingly promotes to prominence members of such minorities (Kaufmann, 2022). Results are shown in Table 1.

Table 1
Main results of regression models predicting IQ.

Predictor/Model	Main effect	Interact	Full
Intercept	-0.09 (0.025, <0.001***)	-0.09 (0.025, <0.001***)	0.08 (0.027, 0.002**)
gender = Man	(ref)	(ref)	(ref)
gender = Woman	-0.12 (0.012, <0.001***)	-0.12 (0.013, <0.001***)	-0.14 (0.013, <0.001***)
gender = Other	0.10 (0.107, 0.335)	0.20 (0.322, 0.531)	0.03 (0.352, 0.942)
orientation = Straight	(ref)	(ref)	(ref)
orientation = Bisexual	0.24 (0.021, <0.001***)	0.21 (0.040, <0.001***)	0.17 (0.041, <0.001***)
orientation = Gay	-0.08 (0.023, <0.001***)	-0.07 (0.026, 0.004**)	-0.07 (0.026, 0.009*)
orientation = Other	0.59 (0.062, <0.001***)	0.72 (0.097, <0.001***)	0.73 (0.098, <0.001***)
Age	0.00 (0.001, 0.33)	0.00 (0.001, 0.328)	0.00 (0.001, 0.025)
gender = Woman * orientation = Bisexual		0.04 (0.047, 0.413)	0.05 (0.049, 0.301)
gender = Other * orientation = Bisexual		0.26 (0.418, 0.538)	0.30 (0.457, 0.513)
gender = Woman * orientation = Gay		-0.01 (0.054, 0.812)	0.00 (0.056, 0.997)
gender = Other * orientation = Gay		-0.06 (0.527, 0.916)	-0.02 (0.569, 0.975)
gender = Woman * orientation = Other		-0.20 (0.131, 0.131)	-0.21 (0.132, 0.112)
gender = Other * orientation = Other		-0.31 (0.356, 0.382)	-0.20 (0.385, 0.608)
race = White			(ref)
race = Mixed			-0.14 (0.019, <0.001***)
race = Asian			-0.15 (0.026, <0.001***)
race = Hispanic / Latin			-0.55 (0.027, <0.001***)
race = Black			-0.52 (0.027, <0.001***)
race = Other			-0.26 (0.033, <0.001***)
race = Indian			-0.08 (0.054, 0.119)
race = Middle Eastern			-0.35 (0.080, <0.001***)
race = Native American			-0.76 (0.118, <0.001***)
race = Pacific Islander			-0.55 (0.121, <0.001***)
R^2 adj.	0.008	0.008	0.033
N	36975	36975	33931

* = $p < .01$, ** = $p < .005$, *** = $p < .001$. Values in parentheses are standard errors and p values.

The regression models show that there was no interaction between gender and orientation to predict intelligence (all $p > .05$, compare model 1 vs. 2/3). Furthermore, controlling for race and age did not alter results noticeably (compare model 2 vs. 3). Overall, men obtained $\beta = 0.14$ higher scores than women (about 2.1 IQ points); bisexuals $\beta = 0.17$ higher scores, homosexuals $\beta = 0.07$ lower scores, and other sexual orientation $\beta = 0.73$ higher scores than heterosexuals. The order of the racial groups was in line with typical results with the exception that Asians had a slightly lower score than Whites, $\beta = 0.15$.

With regard to the small group of people who identified as non-binary gender, n = 109, we did not see any difference from the men, $\beta = 0.03$ ($p > .05$). However, the standard error was very large (0.35), so this estimate is very uncertain. When gender identity is examined alone, persons reporting a non-binary identity do show elevated intelligence, with a mean of 0.49, which is also true for persons reporting rare sexual orientations when analysed alone, mean = 0.50. We fitted additional models where we entered orientation, gender, and both to examine this. We find that due to the strong association between non-binary gender identity and rare sexual orientation, the model is unable to pull the effects apart given the small sample sizes, and the validity is assigned to sexual orientation.
It is necessary to adjust the results for measurement error (Hunter & Schmidt, 2015). Because the variable with error is the outcome, one just has to adjust each predictor by dividing by the reliability, 0.62. The list of adjusted results: female $\beta = -0.18$ (-2.67 IQ), bisexuality $\beta = 0.22$, gay $\beta = -0.09$, other sexual orientation $\beta = 0.93$, mixed race $\beta = -0.17$, Asian $\beta = -0.20$, Hispanic $\beta = -0.69$, Black $\beta = -0.66$, other race $\beta = -0.33$, Indian $\beta = -0.11$ ($p > .05$), Middle Eastern $\beta = -0.44$, Native American $\beta = -0.96$, Pacific Islander $\beta = -0.69$.

DISCUSSION

We found a substantial intelligence advantage for non-binary gender identity and rare sexual-orientation groups, while the intelligence differences between the common three orientations (heterosexuals, bisexuals, and homosexuals) were relatively small. There are a number of possible explanations that might make sense of this. However, it should be emphasised that caution is necessary in this regard due to the difficulties with the intelligence-measuring instrument to which we alluded earlier.

Kanazawa (2012b) has proposed the Savanna-IQ Interaction Hypothesis whereby he argues that humans are, essentially, evolved to the African Savanna. Intelligence was strongly selected for after humans left the Savanna, and thus intelligence should be associated with 'evolutionarily novel' preferences that would have been rare on the Savanna, such as atheism, vegetarianism and homosexuality. Dutton and Van der Linden (2017) have critiqued and developed this model. They have argued that evolution sped up after we left the Savanna and that the division between 'evolutionarily novel' and 'evolutionarily familiar' made by Kanazawa does not allow predictions to be made as many notions can be classified as both. They aver, however, that an element of intelligence involves rising above cognitive biases or instincts. And, indeed, there is evidence that high intelligence is associated with heightened environmental sensitivity or environmental plasticity. For example, in a sample of 11,000 twin pairs, 'individuals with high IQ show high environmental influence on IQ into adolescence (resembling younger children), whereas individuals with low IQ show high heritability of IQ in adolescence (resembling adults), a pattern consistent with an extended sensitive period for intellectual development in more-intelligent individuals' (Brant et al., 2013). For this reason, then, being attracted to non-instinctive possibilities – allowing one to rise above instinctive reactions and coldly solve problems – may be associated with intelligence. Independently, Nyborg (2013) proposed group-level inverse relations between selection for intelligence and selection for impulsivity, which might, likewise, render the more intelligent less instinctive. Consistent with this, it has been found that Openness-Intellect, and especially its intellectual curiosity component, is associated with intelligence (Nettle, 2007). This would render the more intelligent more open to unusual and non-instinctive possibilities in terms of sexuality and identity which less intelligent people would be better able to ignore or to suppress.

A second possibility, potentially acting in conjunction with the first, relates to what is known as the Cultural Mediation Hypothesis (Woodley of Menie & Dunkel, 2015). Intelligence is associated with the ability to understand what the dominant set of cultural norms are, understand the benefits of conforming to these (especially in a competitive manner where you signal your conformity) and having the effortful control to force oneself to believe them. Accordingly, we would expect intelligence to predict noticing the now widely documented cultural shift towards 'Woke' ideology, wherein a kind of status is accrued if you are able to demonstrate that you are part of a 'marginalised' group, such as a sexual minority (see Dutton & Rayner-Hilles, 2022). More intelligent people, in around 2016 when our data was accrued, would be prescient in noticing the beginnings of this shift, incentivising them to identify as non-binary, pan-sexual or whatever it may be. In this regard, it has been found that, among younger cohorts, there is a strong relationship between being left-wing and identifying as non-heterosexual, despite not, in practice, being non-heterosexual. In the US, as of 2021, 20% of those under the age of 30 identified as "LGBT," but this does not reflect their sexual behavior: it seemingly reflects young women increasingly identifying as bisexual or non-binary. Among extreme liberal heterosexuals, 15% identified as LGBT in 2016 but by 2021 it was 33%. In this age-group, liberalism, identifying as LGBT, and depression seemed to be underpinned by a single variable which explained 50 per cent of the variance (Kaufmann, 2022).

Related to this, there is substantial evidence of a relationship of non-usual sexuality and non-usual sexual identification with mental illness, including depression and borderline personality disorder (Reuter et al., 2015; Russell & Fish, 2016). Depression is strongly associated with leftism (Kirkegaard, 2020) and this, in turn, is associated with Machiavellianism and so a desire for status (Moss & O'Connor, 2020). Thus, it might be the case that intelligent people who are status-seekers understand that a way of achieving this is to signal ever more unusual sexual preferences, in a context in which even homosexuality and transgenderism are widely discussed and even normalized, and convince yourself, through effortful control, that this is what you are. Doing so, being high in openness and low in instinct, will be relatively less difficult for you. However, it must be appreciated that this is merely a suggestion at this stage. More research is needed to really interrogate this possibility.

A third possibility relates to our earlier brief discussion of the relationship between intelligence and environmental plasticity. It may be that, for this reason, intelligent people need to be placed, by society, on the precisely evolutionarily adaptive road map of life in order for their sexuality and sexual identity to develop in an adaptive fashion. Since the 1960s, many of the traditional methods of raising children have come into question, been limited and even been dropped including raising them in fixed and stereotyped gender roles, corporal punishment, and exposure to religion which inculcates children with traditional values (see Dutton & Rayner-Hilles, 2022). It may be that this is germane to the associations which we have found, though, again, this needs to be examined in greater depth elsewhere.

CONCLUSION

The race differences in intelligence found in this dataset are smaller than those seen in representative samples (see Lynn, 2006). This is probably due to the use of self-selected samples. After adjustment for imperfect reliability, the gaps were still somewhat smaller than representative samples, e.g. the Black-White gap was 0.66 d versus about 1.00 d (IQ 15) typically found (Roth et al., 2001, Frisby & Beaujean, 2015, Fuerst et al 2021, Lasker et al., 2019, Kirkegaard et al., 2019).

First, we relied on self-reports of gender and sexual orientation. These are both to some extent fallible as indicators of actual behaviour, e.g. some men who report being heterosexual have sex with other men (e.g. for pay), some men who report being women do so in order to enter female prisons and rape women (e.g. Howes, 15th January 1922). Future research would benefit from employing objective assessments of sexual orientation, such as by measuring levels of arousal in response to specific sexual stimuli.

Second, our intelligence measure was crude with a reliability of only 0.62. This presents relatively few problems for our results because it is easy to adjust for imperfect reliability of the outcome variable in a regression model. Still, given the sampling of items, and people's ability to skip items if they suspected they got them wrong, the measure is still suboptimal. Accordingly, it would be useful to re-conduct this study with a instrument that has higher reliability. Third, our dataset was large, but mostly limited to Western, English speaking populations. Because it was sampled from a dating site, it is also somewhat limited in age towards the younger side, and of course, is necessarily limited to people who spent their time on a dating site. There is however no particular reason to think these selection factors impacted our results much, aside from the smaller than usual race/ethnic gaps observed. Nevertheless, any future study would benefit from employing a more clearly representative sample.

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