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Self-assessed intelligence is a self-esteem variable, not a test proxy measure: The relationship between personality, self-estimated and test-derived intelligence

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ABSTRACT

This research explores the relationship between personality traits, self-estimated and test-derived intelligence. Participants completed two personality tests and an intelligence test. They were also asked to estimate their intelligence. Correlations indicate that there was no relationship between test-derived IQ at both subscale and total level but that it was related to many personality traits. The regression suggests few associations of demographic, test-derived IQ, or personality trait scores. This paper discusses what IQ estimates are a function of, and limitations are acknowledged.

1. Introduction

There has long been an interest in the relationship between self-estimated and test-derived IQ (SEIQ, TDIQ) (Ackerman & Wolman, 2007; Chamorro-Premuzic et al., 2004; Freund & Kasten, 2012; Giannouli, 2023; Neubauer & Hofer, 2021; Zell & Krizan, 2014). There has also been a number of studies on sex differences in estimated IQ (Furnham, 2001; Furnham et al., 2001; Hofer et al., 2025; Rammstedt & Rammsayer, 2000; Reilly et al., 2022; Szymanowicz & Furnham, 2011). It has been suggested that men manifest hubris and women humility with respect to IQ estimates (Gignac & Zajenkowski, 2019; Storek & Furnham, 2012). In a very recent study, Hofer et al. (2025) tested 208 young people in their 20s on two measures They found that women and men performed similarly well in the spatial tests, yet women, on average, provided more negative self-estimates of their overall spatial intelligence and concrete test performance than men. In essence, women underestimated themselves, but men did not overestimate themselves.

Some studies have used multiple measures of estimated intelligence but only a simple measure of general intelligence, while others have used a simple single measure of self-estimated intelligence but asses IQ using several dimensions.

In this study, we use a validated multidimensional IQ scale and an overall self-estimate of IQ. We also examine personality trait correlates not before used in this research, which assessed traits such as Tolerance of Ambiguity and Courage (Risk Approach) which are correlates of both SEIQ and TDIQ (Furnham, 2025). We also use a percentage (out of 100) estimate of IQ as opposed to the presentation of a normal distribution. Our primary interest is in the incremental validity of test measured IQ over demographic and personality variables in an adult sample.

There have been at least three meta-analyses of this literature starting with Freund and Kasten (2012) who examined the relationship between self-estimated and psychometrically measured cognitive ability in meta-analysis including a total of 154 effect sizes reported in 41 studies. They reported an overall relationship estimated of $r = 0.33$. Others have included Zell and Krizan (2014) who found the mean correlation between ability self-evaluations and performance outcomes across meta-analyses was ($M = 0.29$, $SD = 0.11$) and that the relation was stronger when self-evaluations were specific to a given domain rather than broad and when performance tasks were objective, familiar, or low in complexity.

In a more recent meta-analysis, Howard and Cogswell (2018) examined the relationships of SEIQ with four categories of variables: constructs associated with intelligence (Openness, Emotional Intelligence), tendencies and opportunities to develop intelligence (Conscientiousness, education, age, socioeconomic status (SES), prior IQ test experience), constructs associated with biased self-assessments (Extraversion, Neuroticism, narcissism, honesty-humility, race), and positive states and life achievements (positive self-regard, psychological well-

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Table 1
Sample sizes, means, standard deviations, and correlations.

	n	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
1. Self-reported intelligence	1888	75.93	13.97	–																		
2. Sex	1874	1.44	0.50	0.15***	–																	
3. Age	1880	45.60	11.03	0.02	0.02	–																
4. Degree	1877	0.67	0.47	0.18***	−0.07**	−0.08***	–															
5. (GIA) Overall	199	57.98	31.72	0.12	0.08	−0.19**	0.12	–														
6. Reasoning	199	39.26	10.66	0.02	−0.04	−0.15*	0.11	0.82***	–													
7. Perceptual speed	199	42.33	7.21	0.06	0.00	−0.12	0.04	0.76***	0.62***	–												
8. Numerical	199	14.22	6.27	0.07	0.15*	−0.15*	0.08	0.74***	0.57***	0.51***	–											
9. Word meaning	199	30.94	5.73	0.03	−0.02	0.03	0.15*	0.7***	0.63***	0.44***	0.46***	–										
10. Spatial visualisation	199	10.80	4.87	0.10	0.24***	−0.10	−0.03	0.64***	0.42***	0.43***	0.52***	0.32***	–									
11. Conscientiousness	1888	70.29	9.00	0.25***	−0.01	0.14***	0.02	−0.10	−0.11	−0.10	−0.16*	−0.06	−0.11	–								
12. Adjustment	1890	63.25	12.20	0.15***	0.06**	0.19***	−0.04	0.03	0.02	−0.04	0.04	0.02	0.07	0.26***	–							
13. Curiosity	1890	68.21	8.84	0.23***	0.03	0.00	0.13***	0.08	0.02	0.02	−0.02	0.09	0.07	0.34***	0.16***	–						
14. Risk approach	1890	63.36	9.92	0.25***	0.19***	0.19***	−0.01	−0.04	−0.07	−0.02	−0.06	0.00	0.01	0.52***	0.49***	0.46***	–					
15. Ambiguity accept	1890	50.50	10.06	0.14***	0.08***	0.22***	0.09***	0.11	0.12	0.01	0.16*	0.22**	0.04	0.21***	0.45***	0.33***	0.49***	–				
16. Competitiveness	1890	48.71	11.81	0.20***	0.18***	−0.16***	0.03	0.00	0.01	0.01	0.08	−0.02	−0.03	0.32***	−0.04	0.12***	0.30***	0.07**	–			
17. Dominance	971	−1.40	6.39	0.20***	0.13***	0.08**	0.10**	0.07	−0.05	0.04	0.08	0.06	0.03	0.29***	0.06	0.29***	0.45***	0.31***	0.38***	–		
18. Influence	971	0.09	4.97	0.04	−0.08**	0.05	0.02	0.06	0.11	0.02	0.10	0.17*	0.11	−0.05	0.17***	0.12***	0.12***	0.21***	0.07*	−0.07*	–	
19. Steadiness	971	0.46	4.91	−0.22***	−0.10**	−0.06	−0.07*	−0.05	0.00	−0.03	−0.07	−0.12	−0.11	−0.30***	−0.08*	−0.23***	−0.42***	−0.30***	−0.41***	−0.76***	−0.28***	–
20. Compliance	971	−0.32	4.26	−0.08*	0.04	−0.09**	−0.08*	−0.14	−0.09	−0.06	−0.17*	−0.19*	−0.10	−0.04	−0.20***	−0.29***	−0.33***	−0.33***	−0.16***	−0.46***	−0.62***	0.32***

Note. Sex: Female = 1, Male = 2; Degree: Not obtained = 0, Obtained = 1.
* $p < .05$.
** $p < .01$.
*** $p < .001$.

being, academic achievement). They found that almost all variables from these four categories significantly relate to SEIQ, with the exception of prior IQ test experience. They concluded that future research should continue to study SEIQ and psychometric intelligence together, and explore the idea that psychometric intelligence may not entirely generalize to SEIQ.

To summarise the literature, there are few and small but consistent correlations between specific traits (e.g. Conscientiousness) and test-derived IQ scores; people are "reasonably good" at predicting their test-derived personality trait scores; there are consistent and replicated sex differences in self-estimated intelligence; and correlations between estimated (SEIQ) and test-derived IQ (TDIQ) scores are inconsistent and low, usually below $r = 0.30$.

One central question for this research is the validity of the IQ test used. Studies have used very different tests. Thus, Chamorro-Premuzic et al. (2004) used two short tests, the Wonderlic Personnel Test and the Baddeley Reasoning Test, while Neubauer and Hofer (2021) used the Intelligenz-Struktur-Test 2000-R, which takes three scores and summates them into a total score. In this study, we use a robust and validated IQ test, as well as two multidimensional measures of personality: the High Potential Trait Indicator (HPTI) (MacRae & Furnham, 2020) and Dominance Influence Steadiness and Conscientiousness DiSC (Price, 2015). Thus in this study we examine the relationship between SEIQ and IQ measures that robustly assessed both fluid and crystallised intelligence.

In this study, we are also assessing personality using two different measures. We use the *High Potential Trait Indicator* (HPTI), which was constructed to predict workplace behaviour and has good psychometric properties. Each of the six factors has an alpha between 0.72 and 0.80, a good fit, convergent validity with the established NEO-PI-R (NEO personality inventory revised), and predictive validity with management level (MacRae & Furnham, 2020). Several of the traits also overlap with the Big Five namely *Conscientiousness, Adjustment* (low Neuroticism), *Curiosity* (Openness) and *Competitiveness* (Low Agreeableness). Two traits are not covered by the Big Five. *Ambiguity Acceptance* (Tolerance to Ambiguity) is associated with how people process and perceive unfamiliarity or incongruence; they perform well in new or uncertain situations, adapt when objectives are unclear and are able to learn in unpredictable times or environments. There are now a number of studies showing this trait related to IQ (Cuppello et al., 2023a, 2023b). The final trait of *Courage, or Approach to Risk,* is the ability to combat or mitigate negative or threat-based emotions and broaden the potential range of responses. Courage is exhibited as the willingness to confront difficult situations and solve problems in spite of adversity. Recently Olschewski et al. (2023) found self-report measures, we found small but consistent positive correlations between working memory capacity/numeracy, facets of cognitive abilities, and risk tolerance.

We are also used the Personal Profile Analysis (PPA) based on the famous DISC model which was in our data bank. It has four dimensions. *Dominance*, *Influence, Steadiness*, and *Compliance* (Thomas International, 2020).

Thus we were able in this study to examine the relationship between ten personality traits and five IQ, as well as a total IQ scale. Based on the previous literature, we predict: H1, Females would have lower SEIQ than males; H2, There would be no sex difference in TDIQ scores; H3, Personality traits Conscientiousness (H3a), Adjustment (H3b), Curiosity (H3c) and Dominance (H3d) would be positively correlated with both SEIQ and TDIQ; H4, Correlations between SEIQ and TDIQ would be low, all $r < 0.30$.

2. Method

2.1. Participants

The data for this study were drawn from two sources: the Thomas International database and the Thomas Research Panel. The database comprises individuals who completed various Thomas assessments for applied purposes such as recruitment or development, while the research panel includes individuals who participated in surveys specifically for research. All participants in this study had completed the SEIQ and demographic questions as part of the research panel, and their responses were matched with psychometric data from the database. However, not all participants completed every assessment, resulting in a progressive reduction in sample size across analyses. To address this, the

Table 3
Linear regression of cohort 2 with self-evaluated intelligence as the dependent variable, and demographic, HPTI, and PPA traits as independent variables (n = 956).

	B	SE	β	t	p-Value
Sex	3.12	0.88	0.11	3.55	<0.001
Age	0.06	0.04	0.05	1.57	0.120
Degree	5.64	0.89	0.19	6.31	<0.001
Conscientiousness	0.14	0.06	0.09	2.32	0.020
Adjustment	0.11	0.04	0.10	2.67	0.008
Curiosity	0.24	0.06	0.15	4.23	<0.001
Risk approach	0.06	0.07	0.04	0.90	0.370
Ambiguity acceptance	−0.06	0.05	−0.10	−1.30	0.210
Competitiveness	0.14	0.04	0.11	3.08	0.002
Steadiness	−0.24	0.1	−0.10	−2.40	0.010
Compliance	0.16	0.11	0.05	1.40	0.160
F (df)	18.287 (11, 944)***				
Adjusted R^2	0.170				

Note. Sex: Female = 1, Male = 2; Degree: Not obtained = 0, Obtained = 1.
*** $p < .001$.

Table 2
Hierarchical linear regression of cohort 1 with self-evaluated intelligence as the dependent variable, and demographic and HPTI traits as independent variables (n = 1860).

	Step 1					Step 2				
	B	SE	β	t	*p*-Value	B	SE	β	t	p-Value
Sex	4.42	0.63	0.16	6.98	<0.001	3.47	0.63	0.12	5.53	<0.001
Age	0.05	0.03	0.04	1.75	0.080	0.03	0.03	0.02	0.98	0.330
Degree	5.83	0.67	0.20	8.74	<0.001	5.20	0.65	0.18	8.05	<0.001
Conscientiousness						0.19	0.04	0.12	4.47	<0.001
Adjustment						0.10	0.03	0.09	3.37	<0.001
Curiosity						0.21	0.04	0.13	5.29	<0.001
Risk approach						0.04	0.05	0.03	0.92	0.360
Ambiguity acceptance						−0.02	0.04	−0.02	−0.59	0.560
Competitiveness						0.14	0.03	0.12	4.80	<0.001
F (df)	39.704 (3, 1856)***					36.795 (9, 1850)***				
Adjusted R^2 (Change)	0.059					0.150 (0.091)				

Note. Sex: Female = 1, Male = 2; Degree: Not obtained = 0, Obtained = 1.
*** $p < .001$.

sample was organized into three overlapping cohorts: Cohort 1 (n = 1860) included individuals who completed the SEIQ, HPTI, and demographic questions; Cohort 2 (n = 956) added the PPA; and Cohort 3 (n = 169) further included the GIA. Each cohort was analysed separately using regression models to preserve as much data as possible. While the attrition may appear substantial, it reflects the structure of the archival dataset and differential client engagement with specific assessments, rather than systematic or non-random missingness. Nonetheless, the potential for bias due to missing data is acknowledged, and findings should be interpreted with this limitation in mind.

2.1.1. Cohort 1

This cohort consisted of 1860 respondents, who had completed the SEIQ, HPTI, and demographic questions. Slightly more than half were female (56 %). Most were British (52 %), followed by South African (16 %), Canadian (9 %), American (8 %), European (5 %), Australian (4 %), Asian (2 %), Irish (2 %), and Other/Not specified (2 %). Two-thirds (66 %) indicated that they had obtained a degree. The youngest participant was 18, and the oldest 73 (M = 45.6, SD = 11.0).

2.1.2. Cohort 2

This cohort further included individuals who had completed the PPA, reducing the cohort size to 956 participants. This cohort consisted of a similar demographics to the first cohort, with 56 % being female, half of the cohort being British (50 %), followed by South African (17 %), Canadian (9 %), American (8 %), European (6 %), Australian (3 %), Asian (2 %), Irish (2 %), and Other/Not specified (2 %), just over two-thirds (68 %) having obtained a degree, and the youngest being 18, and oldest 73 years of age (M = 45.8, SD = 10.9).

2.1.3. Cohort 3

This cohort further included individuals who had completed the GIA, reducing the coort size to 169 respondents. The demographics were similar to the first and second cohort, with just over half (52 %) being female, 52 % being British, followed by South African (16 %), Canadian (8 %), American (7 %), European (6 %), Australian (4 %), Asian (2 %), Irish (2 %), and Other/Not specified (2 %), with 68 % indicating having obtained a degree, and the youngest being 18, and the oldest being 72 years of age (M = 44.3, SD = 11.7).

2.2. Materials

General Intelligence Assessment (GIA): The GIA assesses an individual's cognitive abilities by measuring their speed and accuracy across five dimensions relevant to *Reasoning* (problem-solving abilities), *Perceptual Speed* (information checking accuracy), *Number Speed* (numeracy capability), *Word Meaning* (vocabulary-related knowledge), and *Spatial Visualisation* (Dann, 2015; Furnham & Treglown, 2018; Treglown & Furnham, 2022). Its aim is to primarily measure an individual's mental speed of processing (fluid intelligence) rather than depth (crystallised intelligence). It reflects an individual's ability to quickly process novel information, learn, develop, and apply new skills (Dann, 2015). The GIA represents a computer-based cognitive ability assessment that was derived from a battery of tests (see Collis et al., 1995; Dann et al., 1991). The GIA has been shown to have high internal reliability (test-retest correlations ranging from 0.75 to 0.86) and concurrent validity (correlations with Raven's progressive matrices; r = 0.74; Dann, 2015).

High Potential Trait Indicator (HPTI; MacRae & Furnham, 2020). The HPTI measures personality traits specifically within a workplace context. It comprises six factors. The inventory is 78 items in length. The alphas for the traits were Conscientiousness 0.72, Adjustment 0.82, Curiosity 0.75, Risk Approach 0.76, Ambiguity Tolerance 0.75, Competitiveness 0.80. It has been used in a number of studies (Cuppello et al., 2023a, 2023b; Furnham & Treglown, 2018; Teodorescu et al., 2017).

Table 4
Linear regression of cohort 3 with self-evaluated intelligence as the dependent variable, and demographic, HPTI traits, PPA traits, and overall GIA as independent variables (n = 169).

	B	SE	β	t	p-Value
Sex	2.57	2.29	0.09	1.12	0.263
Age	−0.04	0.10	0.00	−0.40	0.717
Degree	5.85	2.30	0.20	2.55	0.012
Conscientiousness	0.27	0.15	0.17	1.80	0.074
Adjustment	0.13	0.11	0.11	1.22	0.226
Curiosity	0.09	0.14	0.05	0.63	0.528
Risk approach	0.12	0.17	0.08	0.68	0.499
Ambiguity acceptance	−0.09	0.13	−0.10	−0.70	0.485
Competitiveness	0.10	0.10	0.08	0.91	0.362
Steadiness	−0.49	0.27	−0.20	−1.90	0.066
Compliance	0.32	0.30	0.09	1.07	0.285
(GIA) Overall	0.05	0.03	0.11	1.51	0.133
F (df)	3.979 (12, 156)***				
Adjusted R^2	0.180				

Note. Sex: Female = 1, Male = 2; Degree: Not obtained = 0, Obtained = 1.
*** $p < .001$.

The *Personal Profile Analysis* (PPA; Thomas International, 2020) is a 24-item, self-reported instrument (Owen et al., 2017). It is designed to assess four work-related behavioural preferences: Dominance, Influence, Steadiness, and Compliance, linked to the early work of William Marston (1928) and Marston et al. (1931). The PPA has been evaluated to have sufficient internal consistency reliability and test-retest reliability (Dominance: α = 0.89, r = 0.91; Influence α = 0.83, r = 0.87; Steadiness α = 0.82, r = 0.88; Compliance α = 0.79, r = 0.83; Thomas International, 2020).

Self-Assessed IQ: Participants answered the following question "On a scale from 1 to 100 (100 being extremely high) how would you rate your intelligence (IQ)? *(Very unintelligent)* 1…100 *(Very intelligent)*. Earlier work had used a Bell Curve but the results indicated that participants tended to over use standard deviation scores (e.g. 115, 130) and not make finer distintions. More recent work has used the "percentage" approach which has proved both reliable and replicated previous studies (Furnham, 2025).

2.3. Procedure

Participants were recruited from a pool of individuals by test publisher Thomas International and had volunteered to take part in psychology research, understanding the analysed results would be published. Participants were encouraged to take part by being offered personalised brief feedback on their results. They were emailed to inform them of the study and provide them with a link to voluntarily complete it. The study was conducted on an online survey platform. The research was approved by the committee LSA/TI/2022. Finally, participants were debriefed, thanked for their time, and provided feedback on their scores. The anonymised data set was analysed using SPSS 28.

3. Results

Table 1 presents the results of the correlations. Self-estimates were correlated with demographic, IQ test, and personality test variables. There was a well-reported sex difference, with males giving higher estimates than females (confirming H1) but no age difference. Also, those with a degree (i.e. graduates) gave higher estimates than non-graduates. There was no sex difference on the overall IQ test score (confirming H2), although there were small significant differences in numerical and spatial intelligence. Older people gave significantly lower overall scores, which is probably accurate. All correlations between the IQ subtests were significant ($32 < r < 0.84$).

All six HPTI personality variables were similarly significant, particularly Conscientiousness and Risk Approach; this confirms H3. Three of the four DiSC variables were related to, predominantly, Dominance and Steadiness. None of the correlations, though positive between the SEIQ and IQ test scores (total and subscale) were significant, which contradicts much previous research, which would have expected correlations $0.10 < r < 0.30$, and partly supports H4.

Table 2 shows the results with an $N = 1860$, with demography and HPTI. The first step showed that sex and degree status accounted for 6 % of the variance in SEIQ. The second step added the six HPTI personality variables, and this accounted for an additional 9 % of the variance. It indicates that four traits: Curiosity, Competitiveness, Conscientiousness, and Adjustment were significantly related to SEIQ.

Table 3 with a reduced $N = 956$ added the two DISC measures. Because of multicollinearity (Dominance and Steadiness, and Influence and Compliance are highly correlated), we entered the former and latter pair separately so the model does not provide distorted estimates. In this case the same demographic and HPTI factors remained significant but Steadiness was also a significant and negative predictor.

In the final regression we entered the GIA overall measure, which was not significant. In the final step, we accounted for 17.5 % of the variance, with graduate status (degree) being the only significant factor.

4. Discussion

This test confirmed the results of other studies using different measures of both personality and ability: people are not good at estimating their test-derived intelligence, which is partly a function of their demography and personality. Females consistently provide lower estimates than males, and graduates obtain higher scores, which may be accurate. However, correlations between SEIQ and TDIQ in this study were all non-significant and lower than in other studies. It is not clear why this was the case but may be a function of the particular test used, which was more biased toward fluid, compared to crystalised intelligence. Further, our sample was primarily of middle-aged professional with a possible restriction of range in IQ scores. Certainly this issue warrants further investigation (Table 4).

Our studies show that Curiosity (Openness) was the highest correlate of the SEIQ in the regression. Indeed, the literature on the relationship between personality and intelligence would confirm this relationship (Furnham, 2023). By including the DiSC measure, this study was unique in examining the relationship between these four traits and SEIQ. Interestingly, the results showed a significant negative relationship; Steadiness- which appears to be related to low Competitiveness (high Agreeableness) and Curiosity- was a negative correlate of SEIQ. This variable may be related to overall humility rather than hubristic traits. However it is important to note that personality-SEIQ relations disappear in the final model which includes the IQ test.

In their study over 25 years ago, Paulhus et al. (1998) asked: are IQ self-estimates a useful proxy for IQ tests? This study would suggest that the answer is no but that SEIQ may better indicate personality and self-esteem. Indeed, the results support Neubauer and Hofer (2021), who found that self-estimates of abilities were a better reflection of individuals' personality traits than of their abilities. In this sense, one might ask, are IQ self-estimates a useful proxy for personality tests, particularly Conscientiousness and Openness? Although the results seem relatively consistent across studies, they also seem too low even to serve that purpose.

One clue as to what SEIQ assesses can be found in the studies examining the relationship between SEIQ and other self-estimates. In over a dozen studies, Furnham and colleagues have looked at the correlation between self-estimates of intelligence (cognitive ability), emotional intelligence, physical attractiveness, and physical health (e.g. Furnham & Cuppello, 2023). In every study, the correlations have exceeded $r > 0.70$, which led them to aggregate scores (all with Alphas > 0.70) and call the variable self-esteem. It is this self-confidence factor, clearly related to personality, that is the predictor of SEIQ. Similarly, Freund and Kasten (2012) concluded, that the assessment of self-estimates provides diagnostic information about a person's self-concept, part a function of their personality.

One question is how people acquire an accurate insight into their ability/intelligence and, indeed, the benefits of this accurate insight. A number of early studies show that people who reported having done and received feedback on their intelligence test scores gave higher estimates, which was interpreted in terms of the sort of people who sought out feedback (Furnham & Ward, 2001). One question is the effect of accurate feedback on an IQ test when the score is low. The *Dunning–Kruger Effect* is a well-known and debated form of overconfidence in which people with limited competence (e.g. IQ) in a particular domain overestimate their abilities: people with low ability are unaware of their comparative score (Kruger & Dunning, 1999).

Like all studies, this had strengths and weaknesses. Unlike a number of studies in this area, we had a robust and valid multidimensional measure of intelligence. We also had data from two personality tests. However, in our final analysis, we only had 169 adults from a relatively homogenous background, being middle-aged professionals. To some extent it could be argued that there was non-random missingness in the data though it is not clear how that would influence the results. It is possible that with a larger, more intellectually diverse population, the relationship between SEIQ and TDIQ would be higher.

Registration

This paper was not pre-registered with the journal.

CRediT authorship contribution statement

Adrian Furnham: Writing – review & editing, Writing – original draft, Visualization. **David S. Semmelink:** Validation, Methodology, Data curation.

Informed consent

Participants gave consent for their anonymised data to be analysed and published.

Ethics

This was sought and obtained (SLA/2022/TI/02). The study involved secondary analysis of anonymised data, collected from a non-vulnerable population in a panel with informed consent that allowed the use of the data by third-party researchers.

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Declaration of competing interest

There is no conflict of interest in this research or paper.

Data availability

Data will be made available on request.

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