Reply to Damien Morris: Heritability of education remains associated with social mobility

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Abstract

This letter responds to Morris, D. M. (2020). "Too early to declare a general law of social mobility and heritability for education." This is a preprint of the submitted version, identical except for additional information that appears in endnotes and an appendix.

Damien Morris has read our paper (1) and concluded that it suggests a "general law" such that "heritability rises whenever social mobility increases and falls whenever it decreases" (2). Although we are flattered, our own ambition was more modest: to assess the available evidence—mostly from rich, Western democracies—for a theoretically expected but relatively undocumented empirical pattern.

Let us first emphasize that we share the author's zeal for transparency. So much so, in fact, that in our original analysis we supplied more than 400 alternative specifications using different codings and inclusion criteria (`https://osf.io/r9kp2/`). These supplementary analyses bolster our conclusions, but there are nuances: for example, the association between social mobility and shared environmental influences is more robust than that between social mobility and heritability (1). Morris sets out to examine the latter association, with 3 further tests.

He first substitutes our mobility estimates for Norway with data from a different source (3). This moves Norway from the top to the bottom of the mobility league table. If true, it would invalidate one of the better documented findings to emerge from cross-country comparative research: that social mobility is higher in Scandinavia than elsewhere (4–8). We suspect a more mundane explanation: mobility estimates using different samples and procedures are not comparable, and mixing them should be avoided.[1] As we show in supplementary

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materials, our results are robust to the exclusion of Norway, or any other country, from the data.[2]

A second test involves weighting each data point by its inverse sampling variance. In practice, what this analysis does is compare three countries (Denmark, Finland, Sweden) that together account for 68% of the total weights.[3] The correlation between mobility and heritability is no longer significant, but that with shared environmental influences is (r=0.488, CSE=0.093).[4] There are sound reasons against the use of regression weights (9–10). In our view, weighting has few benefits when examining heterogeneity as we do, as opposed to in meta-analysis where the goal is to produce a single pooled estimate of an assumed common association (11).[5]

The third test concerns a question that we did not address in our analysis, namely whether the relationship between mobility and heritability holds within subpopulations over time. As Morris has noticed, the data here are too sparse to sustain a conclusion either way—which is, indeed, why we refrained from addressing this question. Other studies have examined subgroup trends and while several of them find heritability rising over time, evidence is mixed (see references in 2). This question certainly warrants further study but with data other than those considered here.

In sum, we thank Morris for his careful engagement with our paper. We certainly agree with his overall message of caution—indeed, the statement of universal laws is generally to be discouraged in social science. More to the point, however, his comment does not lead us to reevaluate our original analysis or conclusions.

Notes

[1]There are many reasons why the Heath et al. (3) intergenerational correlations may not be comparable to the representative estimates from the World Bank. Perhaps the most crucial is that Heath et al. report the polychoric correlation, a different parameter which as a rule tends to be higher than the linear correlation in years of education. This is less important for the genetic variance components that we rely on from the same study, as it affects MZ and DZ correlations similarly, and thereby will tend to cancel out.

[2]See Figure S3 in our original supplementary material at: `https://osf.io/r9kp2/`.

[3]We present the cumulative distribution of these inverse variance weights in an appendix. Three Nordic countries (Denmark, Finland, Sweden) get exceptionally high weights due to the large sample size of twin registries there. These countries account for 68% of the total weights, while the 5 countries with the largest weights (Denmark, Finland, Sweden, Norway, Italy) together account for 87%. More than half of the samples receive a weight of 1% or less.

[4]See Table S4 in supplementary material to Morris (2).

[5]If one were to weight estimates (which we advocate against), one should take into account the variability of both heritability and mobility estimates. A procedure to do so is described in: York, D., Evensen, N. M., Martınez, M. L., & De Basabe Delgado, J. (2004). Unified equations for the slope, intercept, and standard errors of the best straight line. American Journal of Physics, 72(3), 367-375.

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Appendix

Inverse variance weights for heritability calculated as described by Morris (2).

	Country	Gender	Cohort	Weight	Prop.	Cumul.
1.	Finland	Female	1940	1902.57	0.23	0.23
2.	Denmark	Male	1970	1404.89	0.17	0.39
3.	Finland	Male	1940	1315.66	0.16	0.55
4.	Sweden	Mixed	1940	1156.77	0.14	0.68
5.	Italy	Female	1940	530.57	0.06	0.75
6.	Norway	Female	1950	392.10	0.05	0.79
7.	Norway	Female	1940	263.11	0.03	0.82
8.	Italy	Male	1940	192.17	0.02	0.85
9.	Norway	Male	1950	164.20	0.02	0.87
10.	United Kingdom	Mixed	1940	133.56	0.02	0.88
11.	Australia	Female	1940	128.08	0.02	0.90
12.	Australia	Female	1950	104.23	0.01	0.91
13.	Spain	Female	1950	99.87	0.01	0.92
14.	Norway	Male	1940	99.26	0.01	0.93
15.	United Kingdom	Mixed	1960	70.83	0.01	0.94
16.	United States	Female	1940	66.92	0.01	0.95
17.	Germany	Female	1940	61.97	0.01	0.96
18.	Australia	Male	1960	59.33	0.01	0.96
19.	Australia	Male	1950	53.15	0.01	0.97
20.	Spain	Male	1950	51.11	0.01	0.98
21.	Australia	Female	1960	42.14	0.00	0.98
22.	United States	Male	1940	41.76	0.00	0.99
23.	Australia	Male	1940	36.93	0.00	0.99
24.	United States	Female	1980	36.48	0.00	1.00
25.	United States	Male	1980	24.08	0.00	1.00
26.	Germany	Male	1940	12.47	0.00	1.00