There is no such thing as culture-free intelligence

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ABSTRACT
Cognitive scientists and psychometricians are unaccustomed to thinking about culture, often treating their measures—memory, vocabulary, intelligence—as natural kinds. Relying on these measures, behavioral geneticists likewise seem to not wonder about their origin and cultural provenance. I argue that complex human traits—the sort we are most interested in measuring—are cultural products. We can measure them and their heritability, but to conclude that what we have measured is unbound to a time and place is hubris.

MAIN TEXT
Uchiyama, Spicer, and Muthukrishna (USM) conclude that "Nothing in behavioral genetics makes sense except in the light of cultural evolution." This claim may seem like an exaggeration, but like USM, I think human genetics cannot be considered without recourse to culture because *so many* of our behaviors—indeed most of what makes humans unique—do not exist outside of culture. Absent cultural support, not only do we lack skills like reading, arithmetic, and rugby, but also species-typical behaviors like a compositional and productive communication system (i.e., natural language). Absent culture, we can't even feed ourselves! Our digestive system has adapted to cooked food (Wrangham, 2009) and how many of us would invent *de novo* control of fire and rediscover cooking? With such behaviors being at the mercy of cultural learning, can we really talk about heritability of a trait without understanding its cultural underpinnings? I will argue that we cannot.

A common way of thinking about environmental effects on heritability is in terms of environmental deprivation that masks genetic potential. For example, a person's height may be stunted by malnutrition preventing them from reaching their "genetic potential" and reducing measured heritability (Perkins et al., 2016). The intuition is that the person's true potential is being masked. If only they had received the normal amount of nutrition, they would grow to the height their genes prescribe.

But just on the other side of this equation is the *unmasking* of traits by culture. And here, our intuitions begin to break down. Consider De Moor et al.'s (2007) calculation of a .66 heritability of being a UK high school or university athlete. This seems impressive, but what would it have been if the study took place in a place with no school sports, or in the UK 500 years ago? If the answer is, that doesn't even make sense because there

would be no outcome to observe, that is precisely the point. Cultural institutions have created a domain—competitive sports—whose heritability we can measure. But that measurement is necessarily restricted to a particular time and place.

Perhaps no other human trait has been the subject of more attempts at heritability estimates than intelligence, with estimates running as high as 0.8 (Plomin & Deary, 2015) leading to the puzzle of "missing heritability" (Feldman & Ramachandran, 2018). Similarly to Feldman and Ramachandran, USM argue that the resolution of the puzzle lies in integrating culture. It is worth elaborating on some of the problems with attempts to view intelligence as a culture-free trait.

While the goal of conventional tests is to measure knowledge or ability, the goal of IQ tests is to measure intelligence itself. This is justified by the observation that when people are tested on a variety of cognitive measures: vocabulary, analogies, figuring out what rule a sequences of shapes follow, remembering numbers, the scores are positively correlated. Some people excel more on some tasks than others, but in general, doing well on one means doing well on the others. This so-called positive manifold is reasoned to have a common cause which is *g* (Ritchie, 2015). Estimates of heritability of intelligence are estimates of the heritability of *g*. The problem is that measures of intelligence (IQ tests) are ineluctably cultural products, making heritability estimates based on them culturally linked.

There are several objections to the claim that IQ cannot be dissociated from culture. First, it may be argued that although some IQ subtests such as vocabulary are culturally loaded, others such as fluid reasoning are not (Jensen, 1980). Problematically for this contention, the more culturally-loaded tests show *greater* heritability than putatively culture-free tasks (Kan et al., 2013). Moreover, the claim that assessments of fluid reasoning are culture free because they are nonverbal is naïve to the reliance of these tests on culturally learned patterns and symbols (Richardson, 2002; Rosselli & Ardila, 2003; Roebuck & Lupyan, under review).

Second, it may be argued that although any specific IQ test is a product of a specific time and place, the quantity it measures generalizes beyond cultures and time periods. This idea is made more vivid with a thought experiment. Take 100 modern Americans whose measured adult IQ scores span a wide range and transport them (as infants) to various times and places. Allow them to grow up and be enculturated at their destinations, and then test them *on that culture's version of an intelligence test* (one having similarly high predictive validity in life outcomes as our IQ tests). If IQ tests measure *g*, then the person scoring in the top 1% would come out on top regardless of the time and place they were transported to thanks to the preservation of their intelligence-coding genes. The person at the 30%ile would likewise stay around there. The rank correlation would be preserved. Perhaps it would. But this assumption has zero empirical support and there are good reasons to doubt it.

Consider: for most of human existence, someone with poor wayfinding abilities would be at an extreme disadvantage and likely considered rather unintelligent. Now, they can just use their phones. Variation in wayfinding has become masked and is certainly not

something we include in IQ testing. If we did, it might decrease the strength of the positive manifold (Hegarty et al., 2006). Conversely, individual differences in logical reasoning, reading, and the ability to sit still for long periods would be of little consequence in times past, but have now unmasked by culture. The former two are explicitly measured by intelligence testing; the latter is an implicit pre-requisite (DeDeo, 2018; Stephenson, 2012). Is it not hubris to think that figuring out shape sequences is a proper measure of "general intelligence" while wayfinding is a mere specialized skill?

It is time to recognize that culture is not a peripheral appendage on the leash of our genes (*pace* Wilson, 2004), but is the vehicle that makes possible many of our most important behaviors.

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