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Evolutionary Psychology and Intelligence Research Cannot Be Integrated the Way Kanazawa (2010) Suggested

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Evolutionary psychologists search for human universals, differential psychologists for variation around common human themes. So far, evolutionary psychology and differential psychology seem somewhat disparate and unconnected, although Kanazawa (May–June 2010) is certainly not the first to attempt integrating them (see Penke, 2010, and references therein). Kanazawa uses intelligence to elaborate his view of integration. His evolutionary theory of intelligence is based on two assumptions: (1) General intelligence (*g*) is both an individual-differences variable and a domain-specific adaptation, and (2) the domain to which general intelligence is adapted is evolutionary novelty. Both claims are erroneous.

Kanazawa (2010) defended his first assumption by arguing that there are individual differences associated with any adaptation. To use one of his illustrations: Bipedalism is a universal human adaptation, but there are individual differences in running speed. In the same vein, Kanazawa claimed that general intelligence is a universal human adaptation but that there are also individual differences in general intelligence. He then inferred that *g*, an individual-differences variable, can be used as a "measure" or "indicator" of a general intelligence adaptation. This line of reasoning is troublesome. As Borsboom and Dolan (2006) have spelled out, *g* is a psychometric construct, reflecting positive correlations between scores on different cognitive tests (i.e., the positive manifold). To interpret *g* as something other than a psychometric construct is to go far beyond the data. Specifically, in contrast to adaptations such as language acquisition or color perception, *g* refers exclusively to human individual differences, not to a human universal. Individual differences certainly exist in the efficiency, size, quality, sensitivity, or performance of adaptations, but these differences are not the basis of their existence (Borsboom & Dolan, 2006; Penke, 2010). The existence of *g* does not indicate that general intelligence is present within every normal human, but that every human occupies one of its levels, which is a completely different statement. In short, *g* is not an *adaptation* or *causal mechanism*, but a *variable*.

A variable is not necessarily associated with just one modular adaptation (or mechanism/process/cause). Running speed is associated with bipedalism, but also with the cardiovascular system, with the achievement motive to train harder, and so forth—arguably adaptations in their own rights. A given variable can indicate parameters of adaptations (Penke, 2010), but the variable is never tantamount to the adaption. In addition, a variable is not the cause of the existence of an adaptation (running speed is not the cause of bipedalism), nor does the existence of an adaptation explain the nature of individual differences (bipedalism is not the cause of differences in running speed).

The empirical observation of *g* in itself tells us nothing about the causal reasons why people show individual differences in *g*. Kanazawa (2010) assumed that *g* is the result of a single domain-specific adaptation. If this were true, then different individuals with the same *g* score (or rank on the dimension described by *g*) should have this score for the same reasons; that is, *g* differences reflect differences in the performance of a single coherent adaptation. The available biological evidence, however, points to causal heterogeneity underlying *g* and thus against the single-intelligence-adaptation hypothesis: Different individuals seem to use their brains differently to solve intelligence tests equally well, and different rare (probably private or family-specific) mutations likely contribute substantially to the genetics of *g* in different individuals (Deary, Penke, & Johnson, 2010; Penke, 2010). Thus, although one cannot rule out the single-intelligence-adaptation hypothesis a priori, the biological evidence does not support it.

We need to keep in mind that the *g*-factor is just one among many models for describing the actual empirical observation, namely, positive-manifold correlations among cognitive tests. Equally plausible and explanatory models exist: For instance, Godfrey Thomson (1881–1955) presented a "bonds" model based on random sampling of cognitive processes for solving test items, thus positing heterogeneity rather than homogeneity in those cognitive processes (Bartholomew, Deary, & Lawn, 2009). Van der Maas et al. (2006) proposed a second plausible model that explains *g* by positing mutualistic developmental interactions among distinct cognitive processes. These models are irreconcilable with Kanazawa's (2010) claim that *g* reflects a single domain-specific adaptation.

Kanazawa's (2010) second assumption, that general intelligence is a specific adaptation to the domain of evolutionary novelty, is also questionable. "Evolutionary novelty," which is defined by exclusion (i.e., as everything previously not encountered in our evolutionary past), is not a coherent characterization of an adaptive problem. Selection can only tailor domain-specific adaptations to common problem structures. So which structural feature do lightning, flash floods, television characters, genetically unrelated groups, and electric light have in common? According to Kanazawa, their communality is that they pose problems that are logically solvable. But what is *logically* correct about being politically liberal when living in unrelated groups or about being slightly more nocturnal when having electric light? Furthermore, there is no coherent computational mechanism that embraces "methods of induction . . . deductive reasoning . . . , analogy, abstraction, and so forth" (Kanazawa, 2010, p. 283) and could thus be called a domain-specific general intelligence adaptation. Finally, novelty violates requirements for rational decision theory (including logic), as by definition relevant information is unknown or has to be estimated from small samples when encountering novelty (Gigerenzer & Brighton, 2009). More plausible evolutionary responses to novelty include simple heuristics (Gigerenzer & Brighton, 2009), open developmental programs (Mayr, 1974), and domain-specific adaptations supporting social/cultural learning (instead of widespread individual reasoning) (Henrich & McElreath, 2003).

To conclude, while evolved adaptations can and often do vary in certain parameters, an individual-differences variable need not correspond to a specific underlying adaptation. Because *g* is an individual-differences variable, it is uninformative about whether a domain-specific adaptation for evolutionary novelty exists. This undermines Kanazawa's (2010) integration of evolutionary and differential psychology as well as his empirical evidence for his evolutionary theory of intelligence—all based on *g*—completely. In

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addition, neither "evolutionary novelty" nor "general intelligence" as a computational mechanism is a coherent concept. Any integration of evolutionary and differential psychology must acknowledge that there can be more than one causal adaptation or mechanism underlying any dimension of individual differences.

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AUTHOR QUERIES

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