

Giftedness and Expertise: The Case for Genetic Potential

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Abstract

We focus here on child prodigies to make the case that all high-level achievement—whether we call this giftedness or expertise—depends in part on genetic potential. Of course, high achievement also requires hard work (some call this “deliberate practice”), but hard work depends on two factors: the inborn ability to make progress (without this, children are likely to be frustrated and give up) and strong intrinsic motivation, which we call a *rage to master*. High ability is typically (but not always) coupled with a rage to master, and this combination leads to the extraordinary achievements of child prodigies. We provide examples from the domains of reading, number, drawing, and music to support our position that high ability makes itself known prior to any deliberate practice. We conclude by considering the vexed relationship between being a child prodigy and becoming a domain creator in adulthood.

Introduction

The term gifted suggests innate potential without any reference to the end-state, whereas the term expertise suggests a high level of achievement without any reference to the cause. The view that expertise is sufficiently explained by deliberate practice (Ericsson, Krampe, & Tesch-Romer, 1993), with the exception made that height and body size may play a role in expertise in certain sports, might lead some to think that we can reject the concept of innate talent, and hence reject the concept of giftedness. It might also lead some to think that anyone can achieve greatness. We argue here that all high-level achievement depends on genetic potential, whether we want to call that achievement “expertise” or “giftedness.” Of course, giftedness does not emerge fully formed, and hard work (whether we call this deliberate practice or something else) is needed for children with innate potential to reach high levels of achievement. In other words, expertise cannot be present at birth. However, deliberate practice itself requires intense intrinsic motivation—we refer to this as a rage to master. This kind of motivation, which is critical for mastery, is very likely a part of the child’s genetic potential. We conclude by considering why so many child prodigies with clear genetic potential fail to achieve adult eminence as major creators in their domains.

The Case for Innate Differences in Domain-Specific Potential

The claim that expertise in a domain can be accounted for entirely (or even mostly) by amount of deliberate practice has thus far been refuted in two domains: chess and music. Three kinds of evidence undermine the argument that deliberate practice is all one needs for the attainment of expertise. First, the amount of practice is not sufficient to account for level of attainment. In the case of music, half of the variance in piano sight-reading skill is accounted for by working memory, which remains unaffected by

increases in hours of practice (Meinz & Hambrick, 2010). In the case of chess, there is wide variability in hours of practice associated with becoming a chess master, and even 20,000 hours of deliberate practice does not guarantee becoming a chess master (Campitelli & Gobet, 2011). Second, high (if not world-class) levels of performance can be reached with no deliberate practice, at least according to one report: a six-year-old child was described by Ruthsatz and Detterman (2003) as a piano prodigy who had not engaged in any activity that could be considered deliberate practice. And third, the disposition to practice itself is under genetic control, as shown in Mosing, Madison, Pedersen, Kuja-Halkola, and Ullén’s (2014) behavioral genetics study of music. These researchers reported that the predisposition to practice (what we would call rage to master) was 40 to 70 percent heritable.

In our work, we have examined child prodigies (children who before age 13 show extremely high levels of performance sometimes even surpassing what we see in a typical adult) to make the case that deliberate practice cannot account for the phenomenon of the prodigy. We rely primarily on the second type of evidence above: high levels of performance prior to any plausible case for engagement in deliberate practice. We use examples of prodigies in the domains of reading, number, music, and drawing. We focus here on what we believe are the three most typical features of prodigies: precocious achievement prior to practice (true by definition), intense drive (rage to master), and marching to their own drummer in the sense of needing little or no adult scaffolding.

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