

Prof. Rex Li's Writings

Category: Education

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Title: Nurture and Intelligence: Research Findings (1990 – 2010)

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Summary/ Abstract: I called these findings the nurture camp and I pick 5 studies from Dai (p. 53 – 63). It is worth to go deeper on findings of the last decade.

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The Nurture Camp: Ericsson, Howe, Gagne, Gaser & Schlaug, Lubinski and Others

1. Ericsson (2007) and Howe (1998)'s stringent definition of natural endowment (Dai p.53 – 59)

R: As presented by Dai, Ericsson and Howe set a very stringent definition of natural endowment, like setting up a straw man and defeat him. For them, natural endowment means.

in their words, “it originates in genetically transmitted structures” (Howe et al., 1998, p. 399); “early ability is not evidence of talent unless it emerges in the absence of special opportunity to learn” (p. 403); if talent exists, we should witness “sudden emergence of high levels of performance” (Ericsson et al., 2007a, p. 31), and “clear superior performance before the start of training” (p. 35). Cer-

(p. 58)

2. The Impossible Definition

R: This ‘innate’ definition is of course impossible to meet because talents in human endeavor are culturally imbued and embedded. For example, a linguistic talent (ability to speak many different languages) must be a result of learning and exposure. A math talent (to solve a math problem) requires familiarization and understanding of relevant math symbols. Knateres can only mean

- (a) Higher ability in processing speed, bigger working memory, quicker retrieval and recognition, perfect pitch, etc.
- (b) Tendency or disposition in favor of a certain talent. For example, the disposition to listen, communicate, to assert, to dominate and to attract followers are tendencies slowly developed and may be more or less innate.

3. Ericsson Against Galton

Ericsson's position: ‘natural endowment is not important; against Galton's “innate deterministic view”.

Innate constraints on how far one can go. Although Ericsson is skeptical about the existence of the “natural endowment” responsible for development of exceptional competence, his main concern is not whether natural talents or high-intelligent people exist, but whether they really matter as much as many giftedness researchers believe. Specifically, Ericsson and his colleagues (2007a) hold an argument against Galton's supposition that there are innately determined constraints on how far one can go (i.e., the limits or asymptotes of competence for particular individuals) along a specific line of talent or expert development. I

(p. 58 – 59)

4. Ericsson's weak form of nurture position

R: His position is that the effect of innateness is minimal. While there is individual differences, people can overcome with motivation, persistence, practice to attain superb performance.

A weak version of the nurture argument acknowledges that there might be individual differences in abilities and predilections for certain domains, but with sufficient motivation, personal determination, and extended deliberate practice, any healthy individuals without apparent mental and physical deficiencies can achieve marvelous feats. Ericsson seems to hold the latter position (e.g., Ericsson, 1998).

(p. 59)

5. Gagne (2009): IQ is a good predictor of achievement.

R: This sounds an old position

6. Gaser & Schlaug (2003) – Anatomical evidence on training

Anatomical differences in brain structure between musicians and non- musicians (p. 59)

Evidence: training and enlargement of cortical region on left hand. Also monkey training of a finger (5000 times) enlarge the related cortical region.

7. Probabilistic epigenesis thesis

corresponding areas for other fingers (see Kandel & Squire, 2001). Evidence for structural and functional organization of the brain in adaptation to musical training and development are further corroborated by cross-sectional and longitudinal evidence of effects of music training on children's brain and cognitive development (Schlaug, Norton, Overy, & Winner, 2005). The argument is consistent with a view of probabilistic epigenesis, which sees gene expressions not as unidirectionally determining psychological structures and behavior but as interacting with behavioral and neural activity in a bidirectional way, thus susceptible to environmental and experiential influences (Gottlieb, 1998). Three qualifications are in

(p.60)

8. Dai's sensible commentary (p.60)

- (a) Still there is initial genetic difference
- (b) Brain plasticity has limit – time / quantity of training
- (c) Psycho-motor training \neq higher-order training

9. Ericsson (1993, 2006): Deliberate practice

- (a) Deliberate practice (quality of practice) move people beyond a performance bottleneck.
- (b) Sternberg's objection (1996): disposition (nature) led to deliberate practice and outstanding performance.

a self-selection effect; namely, those who chose to engage in deliberate practice were the most promising ones in their respective fields, and thus the apparent effects of deliberate practice were confounded by their abilities and dispositions (Sternberg, 1996a). Only controlled experiments can untangle this dilemma. A

(p. 61)

- (c) Temperamental difference (which favor deliberate practice) may have a genetic component.

10. The issue of motivation (Dai and Sternberg 2004)

- (a) Interest
- (b) Persistence
- (c) The motivationally gifted (Gottfried, 2004)

11. Dai's summary

There is a limit to how far we can go. Some psychometric researchers and sociologists tend to believe that this capacity limit is marked by one's IQ test scores (Gagné, 2009b; Gottfredson, 1997; Herrnstein & Murray, 1994). *Evidence seems to support a multifaceted, pluralistic, equipotential, rather than essentialist, view of human potential; that is, human potential can be expressed in many ways and there is no sure way to determine its capacity; advantages afforded by natural endowment are relative, rather than absolute, ones.*

(p. 62)

12. The threshold hypothesis – Reis and Renzulli (1982)

13. The Partial Compensation hypothesis (Schneider, 2000)

14. Lubinski (2001) – comparing Top 0.25% (A) with Top 1.00% (B)

Findings: (A) consistently outperform (B) over 25 years

Lubinski et al. (2001), for example, showed that even among the top 1% scorers of SAT math at the age 13, educational and career achievement tracked for the next 25 years is closely correlated with whether they belonged to the top or bottom quartiles. Ability differences predicted creative productivity even when people with the same terminal educational degrees were compared (Park, Lubinski, & Benbow, 2008). It should be pointed out that in the above studies, SAT-Math, not general intelligence tests, was used. Supporting the threshold hypothesis regard-

(p. 62 -63)

15. William Schockley and Luis Alvarez, Nobel Laureate, not in Terman Study

16. Knowledge overcomes basic processing constraints and transforms intellectual functioning (p. 63)

R: Good, therefore it is important to identify important basic knowledge to facilitate superb performance (essentialism).

There are issues of expertise effect, working memory, cognitive representation, training, etc.