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PSYCHOMETRIC STUDIES: REVIEW ON THEORIES OF INTELLIGENCE AND ACHIEVEMENT

By

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ABSTRACT

There are a multitude of different theories on intelligence and achievement. While intelligence theory remains a highly contentious issue, there are commonalties among prominent research based and non-research based theories, particularly the adoption of belief over testable theory by researchers. The embracing of speculative theory exemplifies a serious dilemma when combining multiple theories to create an archetypal definition. Conjecture can often take the place of measureable analysis. Shedding light on a single pinnacle theory of intelligence remains conjectural, due to the highly complex and nuanced nature of human development. Furthermore, there are immeasurably different perspectives on the meaning of intelligence, and the implications of intelligence theory in general. However, exhaustive research based theories often produce the greatest impact when tested effectively and placed within the context of investigative evaluation. This paper seeks to examine the various components of intelligence theory in order to develop a more comprehensive approach that identifies how intelligence is a complex combination of many different factors.

Keywords: Intelligence Research, History of Intelligence Theory, Measureable Inquiry, Different Theories of Intelligence and Achievement.

INTRODUCTION

Theory of Intelligence and Achievement

There are a multitude of different theories on intelligence and achievement. Intelligence theory remains a highly contentious issue. The adoption of belief over testable theory by researchers illustrates how conjecture can often take the place of measureable analysis. While there are different perspectives on the meaning of intelligence, and the implications of intelligence theory in general, exhaustive research-based theories produce the greatest impact when tested effectively in real world environments.

1. Objectives

This paper seeks to develop a directed multiple trajectory research-based approach that identifies how intelligence is a combination of many different factors.

2. Achievement and Intelligence

Identifying a single pinnacle theory however, between the constructs of intelligence and achievement, remains conjectural. On one hand, quantifiable intelligence is very complex to measure. Intelligence can be associated with a multitude of factors, and the degrees of aptitude that can be measured, and ultimately reproduced, are based on overall assessment reliability. Achievement can often interrelate with intelligence and expertise, but in order for its component parts to be identified it too must be examined as a separate theory. Achievement is arguably not a fixed quantity of intelligence, and can often be disregarded when defined as simple component of inherited intelligence. That is, achievement and intelligence theory correlate, yet both constructs contain separate nuances associated with genetic, and socio-cultural contexts.

While intelligence and achievement are interconnected, it is important to understand the components of each construct in order to better cognize their implicit and explicit meaning. Theory without practical application is

often difficult to tangibly express, and can often be abstracted by popular belief. In order to avoid conjecture-based correlations, a testable theory, or even an explanation that can be somehow verified, is needed. Achievement is often viewed as a possible correlative of competence and self perceived abilities, such as amount of experience. For example, Schneider posits that non-cognitive factors are "motivation, concentration and endurance as well as parental and school support systems seem responsible for exceptional performances in later life" (Schneider, 1993, p 312). Schneider offers a curious point, and it is critical to investigate a diversity of possible variables that contribute to achievement and intelligence. Nevertheless, it is realistic to consider genetic factors along with non-cognitive factors and to identify how intelligence is an outcome of both genetics and achievement.

2.1 Inherited Qualities: Beyond the Popular Measure

Genetic factors, while no longer a popular explanation, are often implicated in psychometric studies that substantially influenced subject's achievement. For example, "contrary to extant theories, SPAs are substantially influenced by genetic factors, and they are influenced by genetic factors at least as much as IQ is. We found evidence that the phenotypic associations among IQ, SPAs, and achievement" (Greven, Harlaar, Kovas et al., 2009). That is, the data strongly points in the direction that while environmental and non-cognitive factors may have a small impact, to a certain point, the majority of substantial influencing agents originate from genetic factors.

In the proposed theory, intelligence and achievement are often inherited qualities that cannot be trained and environmentally altered no matter how much auxiliary preparation, or experience is afforded. Even with daily practice, this is a major obstacle for human development in so far as training humans to achieve expertise. For instance, when examining the role of chess masters, Campitelli found that, "results suggest that starting playing chess at young ages contributes to the acquisition of expert performance beyond [daily practice], possibly due to higher brain plasticity at younger ages" (Campitelli & Gobet, 2011). Training the mind at a specific task in early developmental stages is often the most effective way to achieve a targeted result. However, this does not guarantee mastery. This can be further illustrated by reviewing fraternal twin testing, and how these tests illustrate that genetics constitute a major co-factor in lifelong achievement, outside of environmental postulates. While popular science has moved the bar to a notion that any person can train their brains enough to achieve an expert level of mastery; this overlooks the fact that genetics is just as much a factor at predicting intelligence and achievement as any other environmental influence. According to Lichtenstien and Redersen (1997), academic achievement is almost entirely a correlation between genetic factors, and early educational accomplishment, in so far as high mental acuity is measurable in viewing fraternal twins reared together and reared apart. Researchers considered it obvious that individuals with highly perceptive mental skills must be innately different, and this is defined very early in life. Namely, high achieving individuals "must possess unique talents that cannot be developed by experience or training" (Ericsson, et al., 2005, p. 287). Those talents can be encouraged and expanded at a very young age, and then arguably maintained at a baseline through maturity, or even old age.

This is further illustrated in comprehensive adoption studies, where a shared family environment has an appreciable influence on intelligence when adolescents are very young, yet environment becomes a minor contributing factor by the time children are late adolescents (Loehlin, Horn, & Willerman, 1994). This evidence can often be contradictory when compared with the idea that the evaluation of achievement should represent a culturally measurable outcome of competence. That is, if one derives a measure in one's own culture as "achievement", and simply applies it in another culture, it is a measure not based on an understanding of the second culture (Tudge, Hogan, Snezhkova, Kulakova, & Etz, 2000). While many cultural beliefs are often derived ad hoc, it is imperative for researchers to look beyond the popular measure in order

to analyze the methodical hypothesis based results that are testable, and reproducible.

3. Expertise Acquisition

The continued development of expertise past physical maturity exemplifies that expertise involves genetic factors, and can conceivably be combined with cultural experience, to facilitate increased cognitive development. Evidence for the role of extended practice in "expertise acquisition is that even the most 'talented' need around 10 years of intense involvement before they reach an 'international level', for most individuals, it takes considerably longer" (Ericsson, Nandagopal, & Roring, 2005, p. 292). However, this is perhaps a one-sided analysis by Ericsson et al., in so far as the researchers maintain they "have not uncovered any evidence for innate, unmodifiable gifts necessary for the attainment of high levels of performance, with the exception of height and body size" (Ericsson, Nandagopal, & Roring, 2005, p. 292). By not assessing the multiple component parts, researchers can overlook the enumerative data sets, often inexorably pinpointing data that are traditionally unpopular (Reynolds, Finkel, McArdle, Gatz, Berg, & Pedersen, 2005). As researchers move further and further away from identifying the genetic components that constitute human achievement, and inherent intelligence, researchers can overlook the fact that genetics do play a major role in intelligence and achievement. This can be a difficult notion as it is unpopular in our cultural context. Nevertheless, a majority of studies illustrate that genetic and hereditary factors are responsible for "about half of the phenotypic correlation between measure of the environment and measure of behavior" (Plomin & Asbury, 2005, p. 90). Despite popular belief, genetic analysis can reveal innate predictors for success that move beyond body height and size.

Conclusion

Ultimately, intelligence and achievement are related. Achievement can often interrelate with intelligence and expertise, but in order for its component parts to be identified it must be examined as a separate theory. Achievement is not a fixed quantity of intelligence, yet it can often be combined as a potential outcome of intelligence. That is, genetic predictive factors maybe easier to measure in a vacuum, but when applied to cultural beliefs these factors have less of an influence within a culture that values non-cognitive abilities over analytical thinking, or complex calculation. In multiple psychometric studies achievement and intelligence theory connect, yet both constructs contain separate nuances associated with genetic, and socio-cultural contexts. Therefore, it is important for researchers to recognize the components of each construct in order to pinpoint a testable hypothesis that can be reproduced successfully and perhaps be culturally acknowledged.

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