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Hans J. Eysenck and Raymond B. Cattell on intelligence and personality

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ABSTRACT

The two most prominent individual differences researchers of the twentieth century were Hans J. Eysenck and Raymond B. Cattell. Both were giants of scientific psychology, each publishing scores of books and hundreds of empirical peer-reviewed journal articles. Influenced by Hebb's distinction between physiological (Intelligence A) and experiential (Intelligence B), Eysenck focused on discovering the underlying biological substrata of intelligence. Analogously, Cattell proposed the Gf–Gc theory which distinguishes between fluid and crystallised intelligence. Cattell's *Culture Fair Intelligence Test* (CFIT), a measure primarily of fluid intelligence, was constructed specifically to minimise differences in test bias in IQ scores between different ethnic/racial groups. Within the personality realm, Eysenck adopted a pragmatic three-factor model as measured via the *Eysenck Personality Questionnaire* (EPQ-R) and its variants. In contrast, Cattell employed a lexical approach that resulted in a large number of primary and secondary normal and abnormal personality trait dimensions, measured via the *Sixteen Personality Factor Questionnaire* (16PF), and the corresponding *Clinical Analysis Questionnaire* (CAQ), respectively. Recent molecular genetics findings provide empirical confirmation of Eysenck and Cattell's positions on the biological underpinnings of personality and ability traits, allowing an improved understanding of the causes of individual differences.

1. Introduction

The study of personality and individual differences in the second half of the twentieth century was significantly influenced by two prominent figures: Hans J. Eysenck and Raymond B. Cattell. Both have their roots in British psychology. While Eysenck gained his PhD under Burt's supervision at University College, London, Cattell earned his PhD at King's College, London under the supervision of Francis Aveling — then President of the *British Psychological Society*. Both Eysenck and Cattell were key players in the movement to promote scientific psychology, as currently advocated expressly by the *Association for Psychological Science*. As Boyle (1998, 'Remembering R. B. Cattell', para. 2) stated:

> "Two of the greatest and most prolific contributors to the science of human personality during the 20th century were Professor Raymond B. Cattell, Ph.D., D.Sc., and Professor Hans J. Eysenck, Ph.D., D.Sc. While Cattell pursued his academic career in prestigious USA universities (Harvard, Clark, Illinois), Eysenck undertook his lifelong work at the Institute of Psychiatry, University of London. It is indeed ironic that the world would lose the two most eminent personality researchers within the space of only a few weeks. So prominent were these two men, that their work is now enshrined in the Cattellian and Eysenckian Schools of Psychology, respectively."

Both Eysenck and Cattell were ranked among the most highly cited psychologists of the twentieth century. Indeed, Eysenck was the most highly cited psychologist of his generation (Gray, 1997). Based on the peer-reviewed journal literature alone (Haggbloom et al., 2002, Table 1), Eysenck was the 3rd most highly cited psychologist (after Freud, and Piaget, respectively), while Cattell was 7th most highly cited. In relation to Cattell's impact on the field of psychology, Eysenck (1985, p. 76) remarked that:

> "Cattell has been one of the most prolific writers in psychology since Wilhelm Wundt….According to the Citation Index, he is one of the ten most cited psychologists, and this is true with regard to not only

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citations in social science journals but also those in science journals generally. Of the two hundred and fifty most cited scientists, only three psychologists made the grade, namely, Sigmund Freud in the first place, then the reviewer [H.J. Eysenck], and then Cattell. Thus there is no question that Cattell has made a tremendous impression on psychology and science in general."

Illustrative of the esteem in which these two giants of psychology were held by their peers, Buchanan (2010, p. 4) wrote about Eysenck:

"There can be little argument about the importance of Eysenck as an historical figure. His name ranks alongside American contemporaries such as Gordon Allport, B.F. Skinner, and Raymond Cattell… and he hardly had a rival on the UK scene…"

Likewise, Horn (2001, p. 72) wrote about Cattell:

"The seven past-presidents of the American Psychological Association who selected [Cattell], despite his controversial writings, for a lifetime contributions' award were correct in their judgment. He must rank among the most important contributors to psychological science."

Clearly, both Eysenck and Cattell have left their mark on the study of human intelligence and personality. Eysenck's contribution to the assessment of intelligence is augmented by his various attempts to discover its biological bases. Cattell will be remembered largely for his ideas about cognitive functioning and his theory of fluid and crystallised intelligence.

With respect to personality assessment, although Eysenck utilised both self-report measures and psychophysiological measures, Cattell systematically constructed measures of personality traits in different media of measurement – Life-Record including ratings of/by others (L-data); self-report Questionnaire (Q-data); and Test (T-data). With regard to T-data, Cattell and Warburton (1967) compiled a list of over 2000 objective test measures of personality and motivation, and constructed the Objective-Analytic Test Battery (OAB) that measures 10 factor-analytically derived personality trait constructs — see Schuerger (2008).

It has often been assumed that Eysenck used his knowledge of psychopathology to derive theoretically-based 'top-down' measures of personality traits, whereas Cattell relied on an atheoretical 'bottom-up' lexical approach. However, Eysenck's approach was not entirely theoretically driven. As Goldberg wrote to Eysenck (February 6, 1995; see van Kampen, 2009, p. 13):

"It is not clear to the world at large how your PEN model is not well described as an example of the heuristic school, given that you explicitly adopted 'some psychiatric system of classification' for [Psychoticism and Neuroticism], and you used your own 'notion of what traits might be important' to select [Extraversion]."

Nevertheless, Eysenck's pragmatic approach clearly contrasted with Cattell's emphasis on the empirical lexical approach. Accordingly, the measures and theories of personality structure that resulted from their respective factor-analytic studies emerged with some distinct differences. Boyle (1998, 'Remembering R. B. Cattell', para. 2) pointed out that:

"Critics of the psychology of individual differences have often claimed naively that the use of factor analysis in test construction has 'only led to confusion – since Eysenck found three factors, while Cattell found 16 factors' within the personality domain. Yet … Eysenck and Cattell were talking about personality measurement at different levels within the hierarchical trait model. Cattell concentrated on primary factors, while Eysenck focused on broader secondary dimensions. Indeed, at the second-order 16PF level, the degree of communality between the Eysenckian and Cattellian factors was striking!"

Clearly, Eysenck and Cattell's contributions to the delineation of personality structure were compatible. As Eysenck (1984, p. 336) himself stated:

"The Cattell and Eysenck constructs and theories should be seen, not as mutually contradictory, but as complementary and mutually supportive."

On the other hand, Cattell was not so willing to readily accept the compatibility between his and Eysenck's approaches. According to Cattell (1986, p. 153):

"Eysenck's resort to 3 factors is shown to be theoretically faulty and unable to equal the criterion predictions obtainable from the 16PF primaries."

Indeed, the empirical evidence does support Cattell's argument about the greater predictive variance obtainable from a larger number of primary factors than from a smaller number of broad secondary factors (Mershon & Gorsuch, 1988).

Eysenck and Cattell investigated individual differences using the hypothetico-deductive method (or inductive-hypothetico-deductive method — Cattell, 1978). In other words, Eysenck attached considerable importance to theoretically-driven research, whereas Cattell was much more skeptical about theory preceding empirical evidence. Although, historically, there had been a gap between differential and experimental psychology (Cronbach, 1957), Eysenck (1997a) explicitly combined both experimental and correlational approaches, while Cattell was at the forefront in promoting multivariate experimental research (Cattell, 1966a; Nesselroade & Cattell, 1988).

Both Eysenck and Cattell subscribed to the prevailing positivist paradigm and to the nomothetic approach (e.g., Allport, 1937; Cattell, 1973; Eysenck, 1954; Piekkola, 2011). It is worth examining this predilection in some detail if only because committing one's research program to a particular paradigm inevitably alienates it from other paradigms. The twofold temptation may then arise to turn a blind eye to the limitations of the chosen paradigm and to attempt to disparage alternatives (cf. Eysenck, 1986). Yet, Eysenck's critique of non-positivist approaches such as psychoanalysis (Eysenck, 1952), contrasted with his willingness to entertain other controversial topics, such as parapsychology (Eysenck, 1982) and astrology (Eysenck & Nias, 1982, 1987). Presumably, one of the reasons for Eysenck's dislike of psychodynamic psychology was that its tenets could not easily be put to the empirical test (see Kline, 1972), whereas Eysenck considered that valid experiments could be carried out to test parapsychological and astrological predictions.

However, the chasm between nomothetic and idiographic approaches is not conducive for a holistic psychology with the individual person as its main focus. The tendency of trait psychologists to align with nomothetic approaches, which they equate with 'scientific,' and to distance themselves from idiographic approaches, which they equate with 'unscientific', is problematic for at least two reasons. Firstly, it vastly underestimates the ineradicable contributions of giants of psychology, such as Freud, Jung, Maslow, and Piaget, who worked mostly within the idiographic tradition. Secondly, and perhaps more importantly, the uncritical overreliance on nomothetic approaches, as typically applied in mainstream personality psychology, has brought about a 'triumph of the aggregate' (Danziger, 1990) that is threatening to establish a personality psychology devoid of the person.

Cattell and Eysenck worked at a time when the foundations of contemporary academic psychology as we know it were being laid. They spearheaded the movement towards a quantitative psychology, which they perceived as equivalent to a scientific psychology and which eventually became the dominant paradigm. Their key ideas for a scientific