# JOHN CARLYLE RAVEN 1902 - 1970
# and his legacy

John & Jean Raven

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J.C.Raven's *Progressive Matrices*[1] tests are known worldwide. Yet little is known about their author. Indeed, preparation of this article was precipitated by a request from Alex Forsythe for material to include in her entry on J.C.Raven in a forthcoming book *Key Thinkers on Individual Differences* (to be published by Taylor and Francis). At the time, the only semi-accessible sources were an obituary written by Court[2] (who subsequently played a major role in the further development of the *Manuals for the Progressive Matrices and Vocabulary tests*), an article by erstwhile colleague, Ralph Hetherington[3], and a Wikipedia[4] entry. Two other articles were buried away in the *Bulletin of the Scottish Branch of the British Psychology* which had, at the request of the editor, been written as part of a quest for nominations for the title of *Scotland's Greatest Psychologist.* These were Raven[5] (1997) and Hetherington (1997[6]).

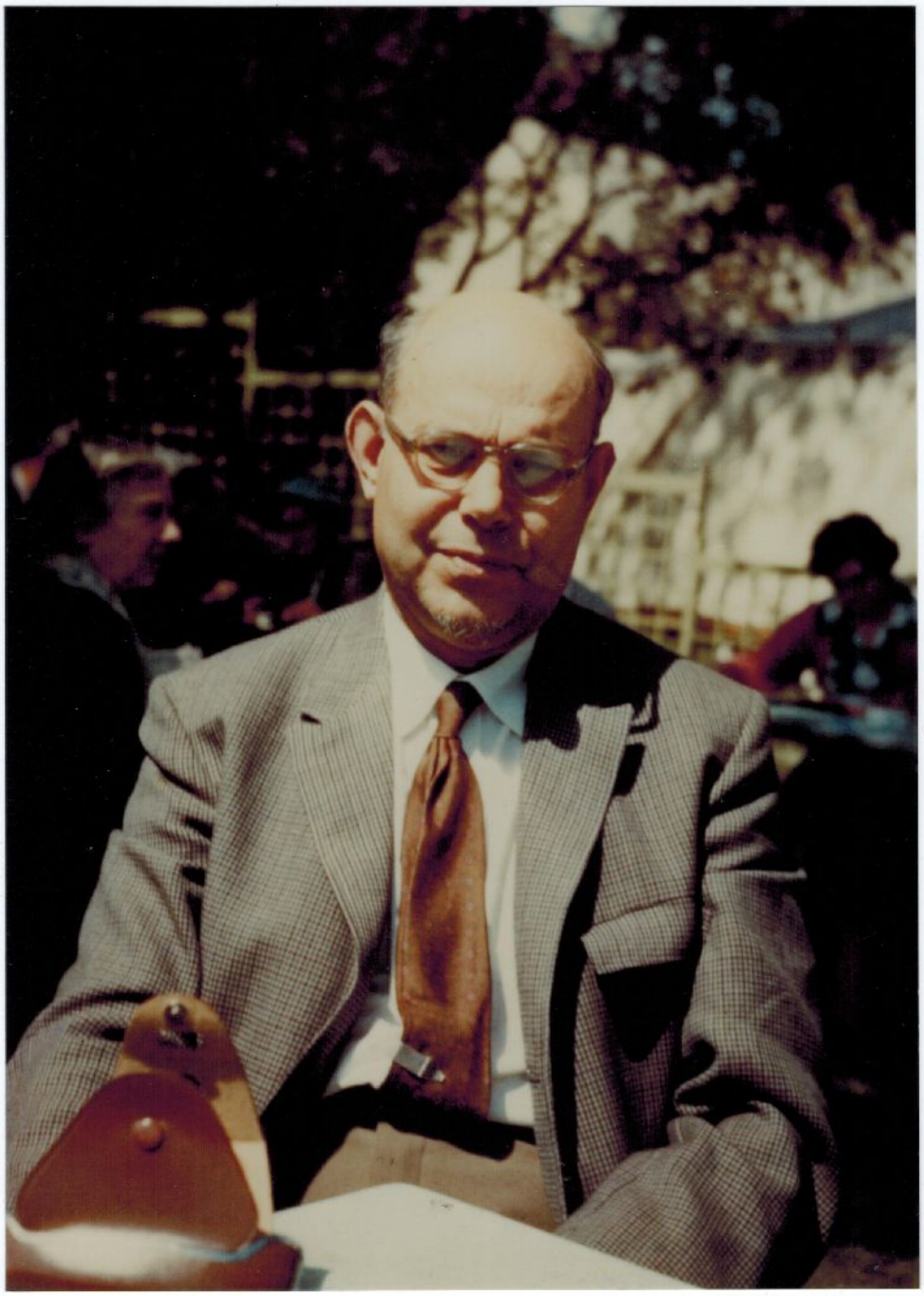
This article covers:



There is also, in **APPENDIX 1,** a somewhat random list of significant dates and significant others.

***Disambiguation: the name "John".*** J.C.Raven's father was named John, *his* son John, and his grandson John Arthur. Since all are referred to in this article it will at times be convenient to refer to J.C.Raven as JCR and his son as John Jnr.

**John Carlye Raven: The Man**



## Aspects of his Personal Life

John Carlyle Raven was born in North London in 1902 to John Raven, a warehouseman to the umbrella maker Grant Barnett (who are still in business), and Jane Elizabeth Raven (nee Martin). They had married in St. Matthew's Church, Westminster in 1894. J.C.Raven was the Ravens' third child, his two sisters being Phoebe Jane and Sarah Edith.

We know little about his early life except that he was heavily involved in the Scouting movement from an early age.

He struggled at school owing to his profound dyslexia (a category not known at the time) earning him commendation for creativity and content but criticism of presentation. Nevertheless, he went on to study at the Northern Polytechnic Institute in Holloway Rd. until 1921 (when he would have been 19 years old).

It is probable that he then took up teaching and it seems likely that it was then that he taught at St. Probus School for Boys, Salisbury, although it has not been possible to establish dates for this or much about the nature of the school at that time.

His father died in 1923, aged 54, leaving his 21 year old son with the task of providing for his mother and older sisters.

This problem was partially solved by extending the family home to create rooms for lodgers … but with the additional hope that the lodgers would marry his sisters - and, indeed, one of them did just that.

In 1923 he joined the staff of the Royal Merchant Seaman's Orphanage, Wokingham, and continued working there until 1927. The orphanage was housed in a huge mansion with extensive grounds and large ornamental lake[7]. Later in his life JCR spoke of various exploits, including having to round up the boys from various parts of the grounds on a motor bike.

He continued to be heavily involved in the scouting movement and became an Assistant District Commissioner. It seems that, during this time, he formulated and checked many of his observations about human behaviour.

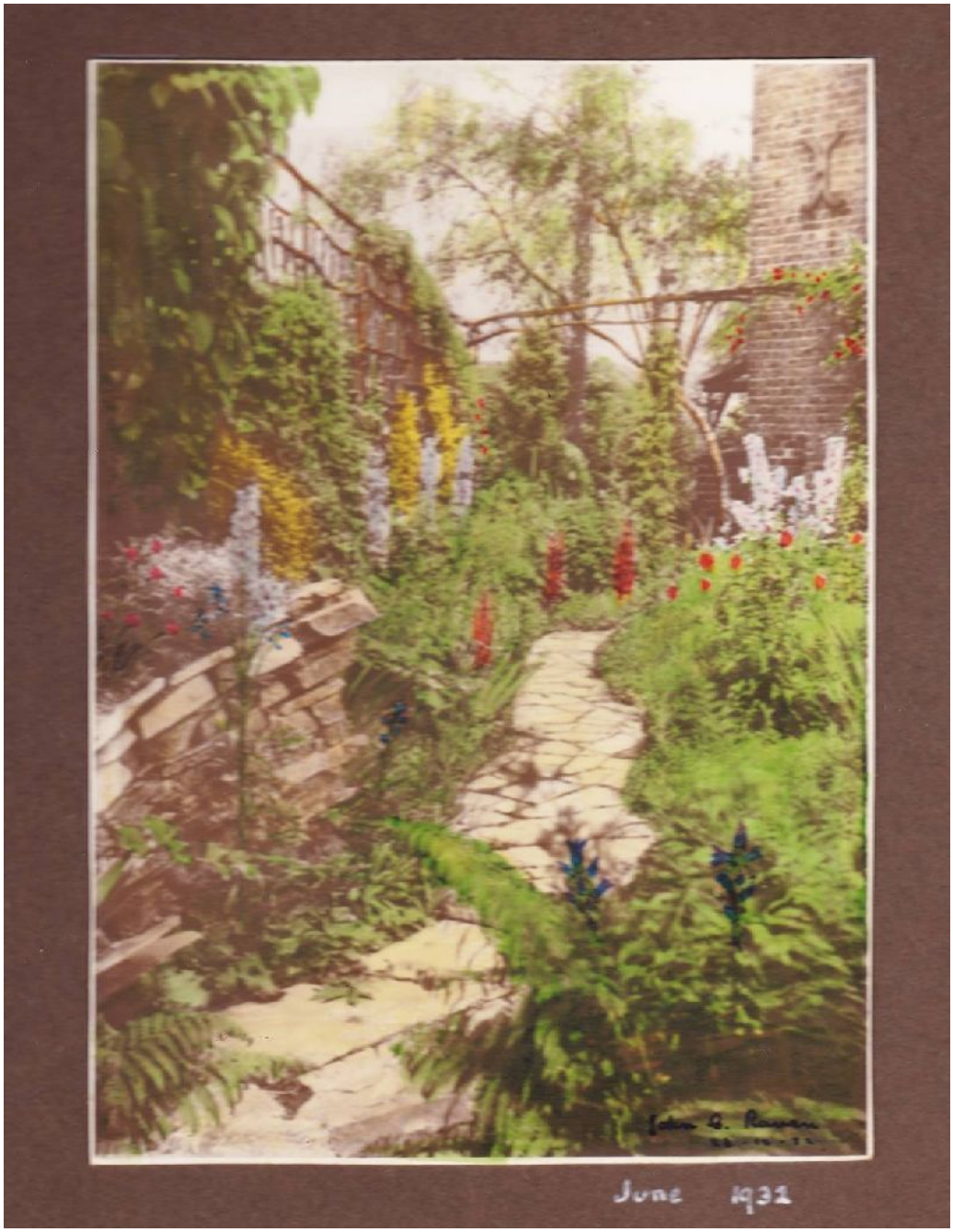
In 1934 he married Mary Elisabeth Wild at the Friend's Meeting House, Euston Road, St. Pancras, and they set up home in what had been the attic of the family home in Highbury. Mary had trained to be a teacher of disturbed children at Regent's College CHECK They had met when Mary Wild was in the course of looking for someone who would construct a fountain in her garden. Someone told her "Raven would do that".

**Mary Elizabeth Raven**

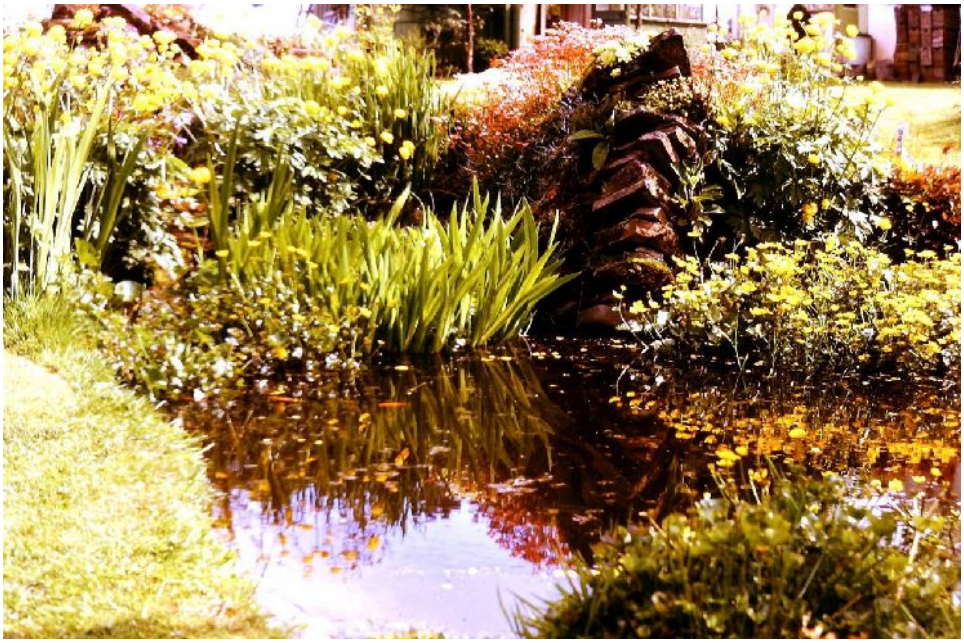
Mary's father had been an engine driver but was by then a negotiator for the railwaymen's union.

Their three sons were John (who to later carried on his father's work especially with John Court, but also internationally), Barton, and Martin who came along at the end of the war.

J.C.Raven was a keen naturalist with a particular interest in ecology, particularly human ecology. His first published paper appeared in 1932 in *School Nature Study*. It dealt with the relationships between newts and their habitats. The motto of the journal was "To see and admire; not to harm or destroy". His creativity in finding ways of making plants visible through the construction of rock gardens persisted throughout his life.




**Garden, Highbury, 1932**



**Garden at “Trees”, circa 1965**

It is probably true to say that J.C.Raven's most pervasive motivational predisposition had to do with the pursuit of design elegantly suited to its purpose and especially the progressive cyclical evolution of design and purpose. This is neatly illustrated in the items of the *Progressive Matrices* test, but even more strikingly in the evolution of his rock gardens (which continued into retirement and in the course of modifying which he died). JCR recorded his delight at coming home to find that his “heart’s desire” – a load of broken paving stones from which to construct his garden at 12 Riversdale Rd. – had been delivered.

Raven's case for registering as a Conscientious Objector was not a religious one (although he had become a Quaker), but stemmed from his observation that one of the fundamental reasons why political disagreements escalate into war has to do with people following orders unthinkingly. It followed that it was important not to put oneself in a position in which one might be expected to do this. The result was that, in a somewhat ironical kind of way, he was directed to pursue his own profession as a contribution to the war effort.

At the outbreak of the war he and his wife decided to move to the country and JCR asked a country doctor friend to find a disused cottage. This he did and the family moved.

Located near Elmstead, Essex, it had no gas, electricity, or running water.

J.C.Raven created a small holding. There he bred over 100 rabbits with different colours of pelts (black, white, brown and grey) and used them to make bed covers, coats, hats and gloves. They also kept chickens and had 7 goats.

A comic drawing of the cottage, by Joyce Collins, is reproduced below. Joyce was the wife of Henry Collins who had been recruited to produce the publishable versions of the *Progressive Matrices* test booklets. It is a not inaccurate picture of life at Larkspur cottage!

Larkspur Cottage.

John Jnr. would have been about 5 years old when they arrived and 7 when they left while his brother, Barton, 3 to 5.

Each day the two of them took 5 or 6 goats clipped to a pole along the lane to tether them to metal stakes in ground in grassed areas at side of lane.

One day, much to their disgust, they found that these spaces had been occupied by anti-aircraft guns

In fact, the house was under the flight path Germany to London and back so the German pilots offloaded bombs when they came to fear that they might not have sufficient fuel for the return trip. As a result, the fields around the house were regularly peppered with craters. JR Jnr. recalls that, one night, one of the bombs hit a barn at the farm at the end of road which was full of cattle. He recalls the stench of the burning flesh.

John jnr. recalls too that the cockerel in Joyce Collins' drawing must have been a problem for him because he remembers patting the dead bird on a cooking dish saying "Ha. Ha. Great big cockadoo. You can't peck me any more!"

JCR had tenants' gleaning rights to fields around. He constructed a huge wooden frame and suspended it to the rear of car and he and his sons toured the fields raking up hay and straw and pitch-forking it into the frame.

At one point the boys started the car while father and mother were asleep and went for a drive. In fact they probably drove it from stopping point to stopping point while gleaning in the fields.

There were problems with the well running dry. So the two boys dug another. The catch was that it too (not surprisingly!) went dry at the same time as the main well!

JCR constructed a thatched garage using full size tree trunks for uprights and roof. It later turned out that the tree trunks were intended as concealed fuel for use in an emergency. He also dug coal into the floor of the garage in the hope that any authorities who decided to come looking would not find it. It was later dug up and moved with them when they left, emerging as huge piles in their back garden.

In 1944 the family moved to Dumfries, Scotland, and lived in a three roomed lodge house in the grounds of the Crichton Royal Institution (mental hospital). JCR and his sons gradually constructed a three roomed "hut" in the garden where the three boys slept. Visitors were sometimes surprised to find themselves accommodated there.

**Crichton Hall: The Original Main Building of the Hospital**

View of "mature" hut Ladyfield

J.C.Raven and hut, Ladyfield.

John Raven Jnr's room in hut.

John Raven Jnr Garden, Ladyfield

In 1952 they moved from the lodge to a house on the outskirts of the town. Over the years, JCR constructed and reconstructed another rock garden and pond. Many of the students recall visiting for a glass of Pimms in the garden.

**The rock garden at "Trees"**

In the early 1960's Mary Raven began to suffer from a brain tumour. This meant that JCR had to spend much of his time driving her back and forth to Edinburgh for brain surgery and looking after her between operations.

She died in 1968.

Two years later he married Irene Hunter who had for many years been the hospital housekeeper and plotted with JCR to do such things as conceal empty rooms from NHS inspectors in order to keep them free to accommodate the students who came in the summers.

JCR died a year later while working in his garden.

Irene and JCR's sister, Edith, lived on at Trees for many years hosting numerous visits from John, Barton and Martin and their wives and families.

Edith died in 1978 and Irene in 1985.

Barton Raven and his sons made a midnight raid on Trees to rescue the family furniture because ownership of the house had passed to the Queen because Irene Hunter was illegitimate and had not signed her will.

**Professional Career**

It is not known what J.C.Raven studied at the North London Polytechnic, but it is probable that, given the skill he displayed in zoological and anatomical drawing in his undergraduate laboratory work (now held in the J.C.Raven archive at The Psychological Corporation's offices at San Antonio), they centred on biology. Raven records that it was at that time that he developed an interest in the connections between individual minds and the wider universe with which minds and emotions connect. It was this interest that brought him into psychology.

He began his formal studies of psychology with Aveling at Kings College, London, in 1928 and one has to suppose that there were at that time, as there were later, links between Kings and University College London, because he was also a student of Spearman's. One day in 1934, Spearman asked him to take a letter to Penrose who had asked for recommendations for an assistant. Raven took the letter, but sold himself to Penrose as the person for the job.

This resulted in his appointment as a full-time research psychologist to Penrose working at the Royal Eastern Counties Institution, Colchester.

Penrose's research was concerned with the genetic and the environmental determinants of mental defect. The fieldwork involved travelling around East Anglia and tracking down and testing all children and adults in the families of all children who had been diagnosed with mental defect. The testing was done in schools and workplaces as well as homes. The research was conducted using the Stanford revision of the Binet test. J.C.Raven found the test cumbersome to administer in many of these circumstances and the implications of the results were difficult to extract because on several sub-scales measuring different aspects of "Intelligence" were composited together in the overall score while the sub-scales were too short to be reliable on their own.

This led him to recognise the need for a short test which would cover all ranges of ability from infancy to old age, could be used with those unable to read (many of those to be tested were illiterate) or even understand the dialect of the administrator … and yet be theoretically based, clearly interpretable, and easy to administer in homes where there were family members only too willing assist, schools where there were often space constraints, and workplaces where there were time constraints and noise. (These specifications were clearly set out in his Master's thesis.)

As ever intrigued by a practical design problem, Raven set about evolving the necessary tool with vigour, producing an experimental version of the *Progressive Matrices* in 1936 and publishing it in 1938.

In his lectures, Spearman had displayed series of abstract figures and asked students to identify the rules governing their relationships. Raven's first thought was to offer a series of alternatives from which the correct answer had to be chosen instead of asking people to formulate the rule in words. His second inspiration came from the idea, seemingly prompted by a snowy day, of transforming the game known sometimes as "Noughts and Crosses" and sometimes as "Tic-Tack-toe" into a game in which each player progressively transformed the depiction of a snowflake to forge a complete 3x3 matrix.

As an aside, although he was still working with Penrose at the RECI at that time, his new test, *Progressive Matrices (1938)* was not used in those studies.

Since the procedures used to develop the test involved a precursor to what later became known as Item Response Theory it is tempting to assume that, besides Spearman, there must have been others working in London at that time who were at the forefront of test design and construction. Yet no references to other such people have been found.

In 1939 he was given a Fellowship at the London Child Guidance Clinic (Canonbury), and subsequently became psychologist to the Child Guidance Council.

During 1940, Raven was Psychologist at the London Hospital, the East London Child Guidance Clinic, the Tavistock Clinic, and at Evacuation Centres around London.

War was declared toward the end of that year and, while registering as a conscientious objector, Raven, like others he saw around him, saw the opportunity to enjoy himself by seizing opportunities to do things he would not have been able to do otherwise. Thus he joined the Mill Hill Emergency Hospital (a part of the Maudsley Hospital that had taken over the buildings of the Mill Hill public school which had been evacuated from London). He did this with a view not only to studying the more general effects of stress and injury on human behaviour but also to be in a position to promote the use of, and the collection of normative and validity data for, his *Progressive Matrices* test. As a result of his contacts, he was able to initiate research into the ability of the RPM to predict success in army training courses (the first large-scale psychological research project ever undertaken by the British army). This led to the adoption of *Progressive Matrices (1938)* as the first standard psychological test given to all recruits to the army. A short (20 minute) derivative with the items in a single sequence was prepared for use in the War Office Officer Selection Boards (WOSBY's). It was the validation of this test that provided the basis for the claim, subsequently publicised by Eysenck, that a single psychological test could provide as much information as complex Assessment Centre procedures. The Mill Hill Vocabulary test was also developed and validated at this time. As a result, it, too passed into routine use in the army, while the value of discrepancies between RPM and MHV scores proved to be of considerable value in the clinical diagnosis of patients suffering from wartime illness or accident. Amazingly, at the same time, Raven received a Medical Research Council grant to continue the genetic studies he had begun with Penrose.

Although it is something of an aside at this point, it is important to note that, as a result of agreements to share information and procedures between the Allies, it was not only the British army that came to rely on the *Progressive Matrices*. Because of its independence of the language of both administrator and respondent the test rapidly found application in the armed forces of, first, the Allies and then at least those of France, Germany, and Argentina … and then both the armed forces and the educational systems of the Soviet Union, Singapore[8], the Philippines and, indeed, to all intents and purposes, all countries of the world. By 1993 Oakland[9] had recorded that it had become, in geographical terms, the second most widely

used test in the world and must, in terms of numbers of people tested, have become by far the most commonly used.

It was while working at the Mill Hill Emergency Hospital that JCR met Mayer-Gross, the director of Clinical Research at the Crichton Royal Mental Hospital in Dumfries. This resulted in Raven being asked to form a Department of Psychological Research there, and the family moved to Dumfries in April 1944 - about one year before Germany surrendered.

**The Department**

When he joined the Crichton, JCR specifically negotiated a half-time employment contract so that he could pursue his research interests in an open-ended way without his having to pretend to know what the outcomes would be beforehand. Even the formal research programmes he negotiated with the Crichton Board on an annual basis were one year out of date so that he was in a position to answer administrators' questions.

Although much of the work conducted by the Department continued to be concerned with changes in RPM and MHV scores with age, organic defect, and social conditions, Raven sought continuously to find ways of setting the work with the RPM in the context of ways of thinking about, and assessing, a wider range of individual differences. In this context it is appropriate to note that he continuously questioned the use of the term "personality".

He presented the framework he developed for thinking about and describing "the coordinates of conduct" via a set of intersecting planes. At one point he sought to make this framework concrete by talking about himself and the determinants of his own behaviour. He wrote:

"*For me, words are never more than vehicles of communication. Left to myself I think more in terms of tensions and concentrations. Space and time are locations and directions in which I think of events happening. There are other locations and directions I can think about. There is for example, the location of consciousness between inner awareness and outer perception. I am also aware of enjoying or disliking things. The degree to which I enjoy or dislike anything may vary in intensity but it is always present, just as anything I perceive always has some degree of organised structure*."

He made various attempts to operationalise this framework, most notably in his guidelines for clinical interviews.

It is important to draw attention to the nature of JCR's "teaching" to nurses and medical staff and in the course of his seminars with staff and students in the Department. Many confessed to be puzzled by this since it no way resembled the types of teaching and lecturing commonly found in Universities. Basically, he sought to encourage his students to *be* psychologists – to develop the *competencies* of the psychologist - instead of teaching them *about* psychology.

The same philosophy informed his inputs to BPS committees where Raven made himself deeply unpopular by blocking attempts to build academic teaching and qualification empires in the guise of promoting "professionalism"[10].

*The Department of Psychological Research*[11]

It is important to note that this was a *Department of Psychological Research,* not a clinical department. Its terms of reference were "to study normal mental development, and abnormal conditions as far as these could be regarded as deviations from the normal and as such, assessed and correlated with ascertained organic conditions and social factors".

To distance the department from the medical model and the danger of being sucked into clinical work, Raven insisted that the Department be located in a building in the centre of town and not in the hospital. Paradoxically, then, he lived in the hospital grounds but worked outside in its Department of Psychological Research!

**The Department of Psychological Research**
**and staff at 20 Castle St., Dumfries**

At this time, clinical psychology in Britain was polarised by two strongly contrasted theoretical viewpoints, one which might loosely be categorised as psychoanalytical and the other as built around more conventional views about the nature of science. The former was represented by the Tavistock Clinic and the latter by the Department of Psychology at the Institute of Psychiatry at the Maudsley Hospital.

These two, both in London, together with the Crichton Royal in Dumfries, were the only places teaching clinical psychologists in the late 1940's and early 1950's.

Such psychological work in the adult clinical field as there was before this was largely psychodynamic with a little mental testing thrown in.

It was when Eysenck published his book *Dimensions of Personality* that the "scientific" approach to clinical psychology became firmly established.

There was little love lost between the Maudsley and the Tavistock especially after Eysenck delivered an onslaught on the efficacy of psychotherapy and other members of his Department set about savaging the Rorschach Test.

J.C. Raven, at the Crichton Royal, was thus in a position to provide an alternative to these two well entrenched and embattled positions, producing a viable approach which was different from both.

Well trained and experienced in biological and physiological studies on the one hand and psychometric and statistical techniques on the other Raven was no stranger to natural science and to the demands made by scientific rigour.

At the same time he was interested in such things as the nature of religious experience and the dynamic and emotional relationships that develop-between interacting individuals and took a great interest in the writings of Freud and others in the psychoanalytic tradition.

In his book *Human Nature*[12] he wrote:

*Under some circumstances people appear to be immediately aware of the affections, experiences, thoughts, hopes and intentions of another person. For this reason people will sometimes speak of telepathy between them, or of some kind of religious experience, as a result of which the experience they share seems in some way more than the experience of either person considered separately.*

This metaphysical approach to personal relationships set Raven apart from most clinical psychologists of that period, and he was looked upon, in some ways, as a bit of an oddity.

Raven's view about the role of the clinical psychologist were set out in an early paper of his[13] in in which he wrote:

*It is not the clinical psychologist's function to put other people right, either by treating them therapeutically or by fitting them into appropriate social situations. By trying to understand people we also change them; at the same time, if we try to change people or even think their conduct is pathological, we are less likely to understand them. For this reason a clinical psychologist who desires not only to understand people but also to alter them is not only in danger of being pretentious; as psychologist he is less likely to become successful.*

After a hiccup, the Board of the Crichton Royal deliberately set out to find someone who would maintain this distinctive feature of the department and appointed Miller Mair.

The success of this move can perhaps be illustrated by citing the titles of two of Mair's books *Between psychology and psychotherapy: a poetics of experience* and *Towards a radical redefinition of psychology.* Built on Kelly's personal construct theory they clearly illustrate an approach very different from psychometric approach of Maudsley.

**Raven's Research at the Crichton Royal.**

Raven's research may be summarised under two broad headings: that relating to the *development and decline of eductive and reproductive abilities* and that relating to his work on the *Coordinates of Conduct* that guide behaviour.

*Eductive and Reproductive Abilities*

There is an exhaustive summary of research this area in the *General Introductory Section* of the 1998/2003 edition of the *Manual for Raven's Progressive Matrices and Vocabulary Tests*[14].

Unfortunately, access to this is limited to registered test users so a brief summary will be offered here.

As is well known, Spearman[15] calculated the correlations between a range of school and academic tests and concluded that the pattern observable in the resulting matrix could largely be accounted for by positing a single underlying variable on which the different tests relied to varying extent.

He labelled the hypothetical underlying variable ***g***, carefully avoiding the use of the word *Intelligence*

Later he concluded from more detailed study that this ***g*** involved two very different kinds of ability which somehow interpenetrated and worked very closely together.

These he termed *eductive* (from the Latin root *educere*, meaning “to draw out” [meaning]) and *reproductive* abilities.

Raven’s *Progressive Matrices* and *Vocabulary* tests were developed to assess these two components of ***g*** as simply and unambiguously as possible.

Eductive mental activity involves making meaning out of confusion; developing new insights; going beyond the given to perceive that which is not immediately obvious; forming (largely non-verbal) constructs which facilitate the handling of complex problems involving many mutually dependent variables. These are the abilities required by children when developing a sense of the unwritten rules of language and by business managers

Reproductive mental behaviour involves mastering, recalling, and reproducing the (largely verbal) material which forms a cultural store of explicit, verbalised, knowledge.

Spearman concluded that the nature, origins, and consequences of the two abilities were very different. As Horn[16] more recently conceded, one is not a "crystallized" form of the other, but they do interact considerably in that perception and thought are generally dependent on acquired constructs, and the ability to absorb information is often dependent on being able to make meaning out of a confused area of discourse.

As discussed in the *General* section of the *Manual,* endless errors have been made in interpreting the results of the tests. For a start, Spearman noted that the correlations between what had previously been assumed to be different abilities typically become much smaller once one moves outside the traditional "academic" area – or even to other academic domains.

Although it is impossible to cite specific figures (because there are no good measures of such qualities as initiative, leadership, the ability to communicate effectively, and the ability to put others at ease and, indeed, a new psychometric model is required to assess them), critical-incident, observational and other studies conducted in homes, schools, and workplaces suggest that the correlations are of the order of .2.

Such weak correlations mean that 96% of the variance is not shared, and there is a good chance that people who perform badly in one of these areas will be able to do well in some other area.

What is more, while tests of General Intelligence and ***g*** have predictive validities of about .7 within the so-called "academic" area, their predictive validity to occupational performance is generally only about .35, thus accounting for about 10% of the variance.

These findings suggest that, while ***g*** is indeed a very useful construct which accounts for one important, if limited, domain of human abilities, the popular notion of General Ability – and with it the concept of Mental Age embedded in the educational and staff-selection practices which are associated with "Ability", "Mental Age" and "IQ" – does not merit the explanatory power and attention accorded to it by many psychologists, managers, educators, and educational theorists.

As has been mentioned, the term "eductive ability" is used to refer to the process of educing, or squeezing, new insights and information out of that which is perceived or already known.

The detection of any problem requires contextual perception. One always sets out by looking for a "gestalt", a holistic impression of the information presented. Thus one begins with a schema which "enables one to hold several things in mind at once". It is for this reason that it is misleading to say only that the RPM measures “the ability to hold several things in mind at once”.

The importance of immediate holistic understanding as a basis for further activity is not limited to pictorial material. Spearman noted, for example, that one’s immediate recollection after reading a piece of material is a concentrated awareness of its essence, rather than any of its parts. If the material is especially interesting, one might well have developed a sense of its implications above and beyond its actual content.

Concerning evidence for the existence of eductive and reproductive ability as separate components of ***g,*** Horn’s review of research conducted in the fluid-crystallized tradition has resulted in virtually complete endorsement of Spearman’s position. Horn concludes that: (a) "fluid" and "crystallized" "intelligence" are distinct at an early age, i.e. the second does not "differentiate out of" the first as he and Cattell had previously thought; (b) although equally heritable, the two have different genetic origins; (c) the two are influenced by different aspects of the environment; (d) they predict different types of (life) performance; (e) they "change" differentially with age; and (f) their neurological locals are different.

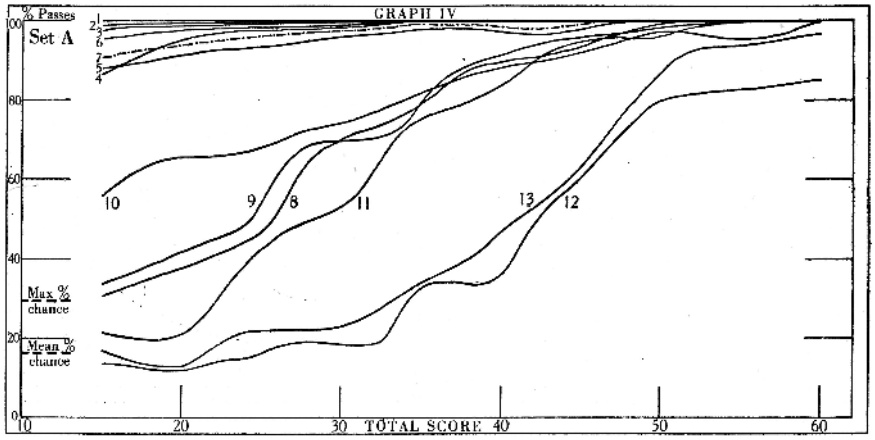
At this point it is useful to return to the item analyses conducted in the course of developing the original test.

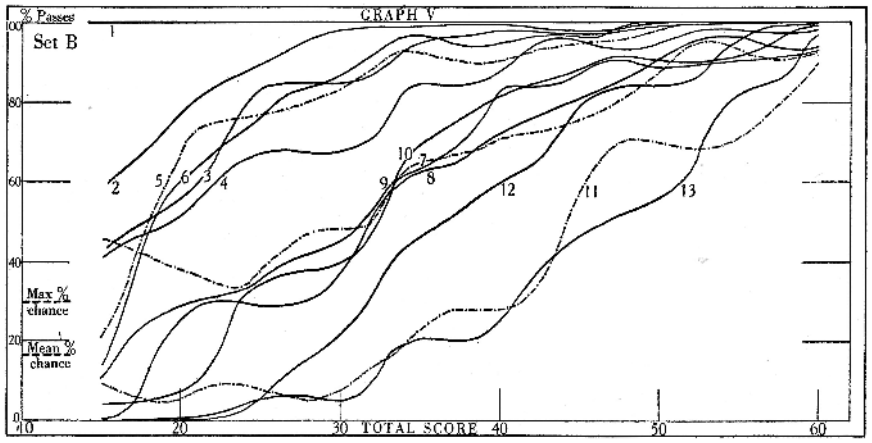
This did not rely on the general practice of intercorrelating the items in an effort to establish the internal consistency of the scale. Indeed, as a number of authors have pointed out and as Fugard and Raven[17] have more recently demonstrated such an approach would have generated nonsense … and has in fact led many researchers concerned to the (false) conclusion that the RPM composites a number of different kinds of thinking processes.

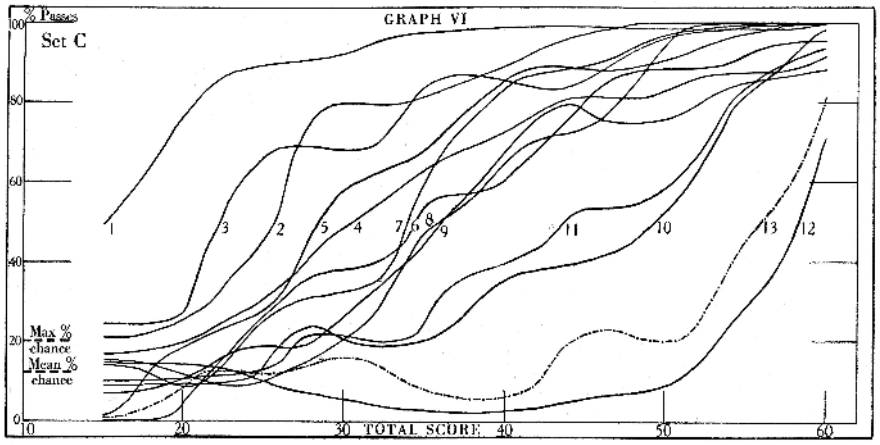
Instead it relied on graphing the way in which the ability to solve each item increased with total score.

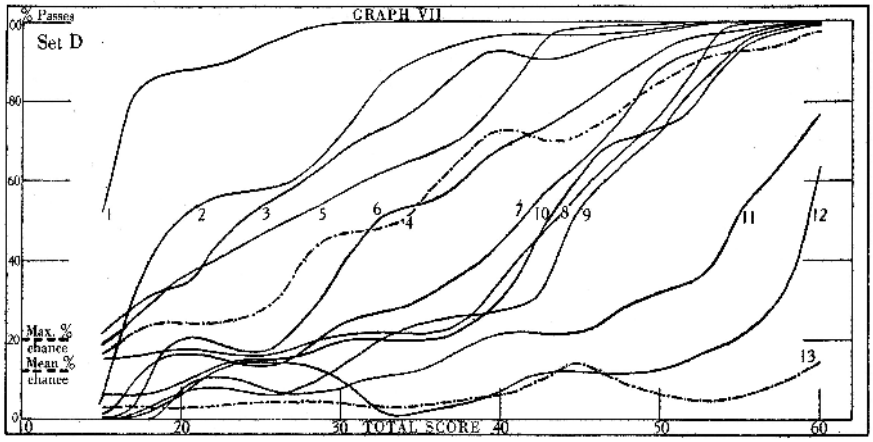
In the graphs below, Raven[18] plotted the way in which the proportion of respondents getting each item right increased with total score.

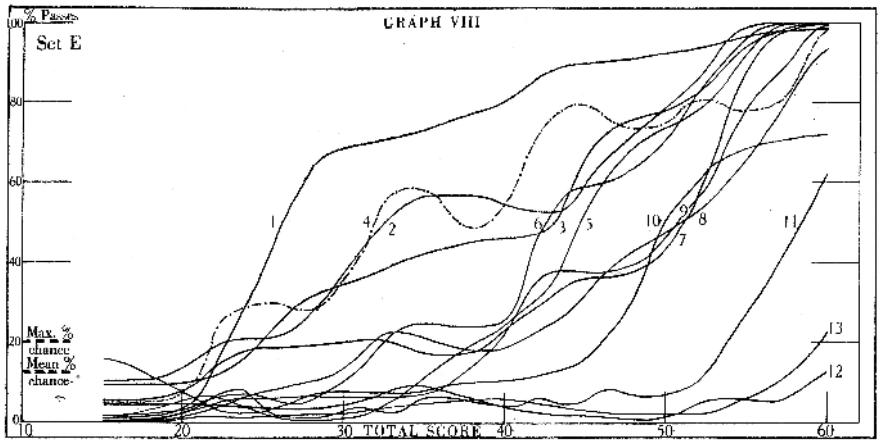
Graphs IV–IX. Standard form of the test.

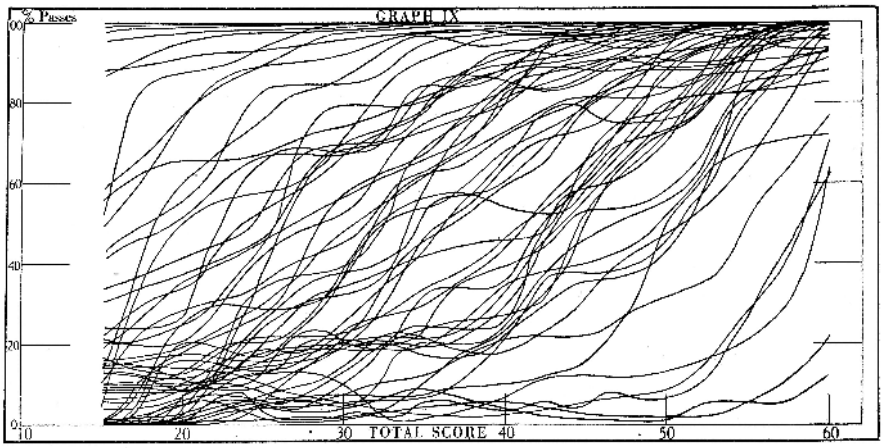




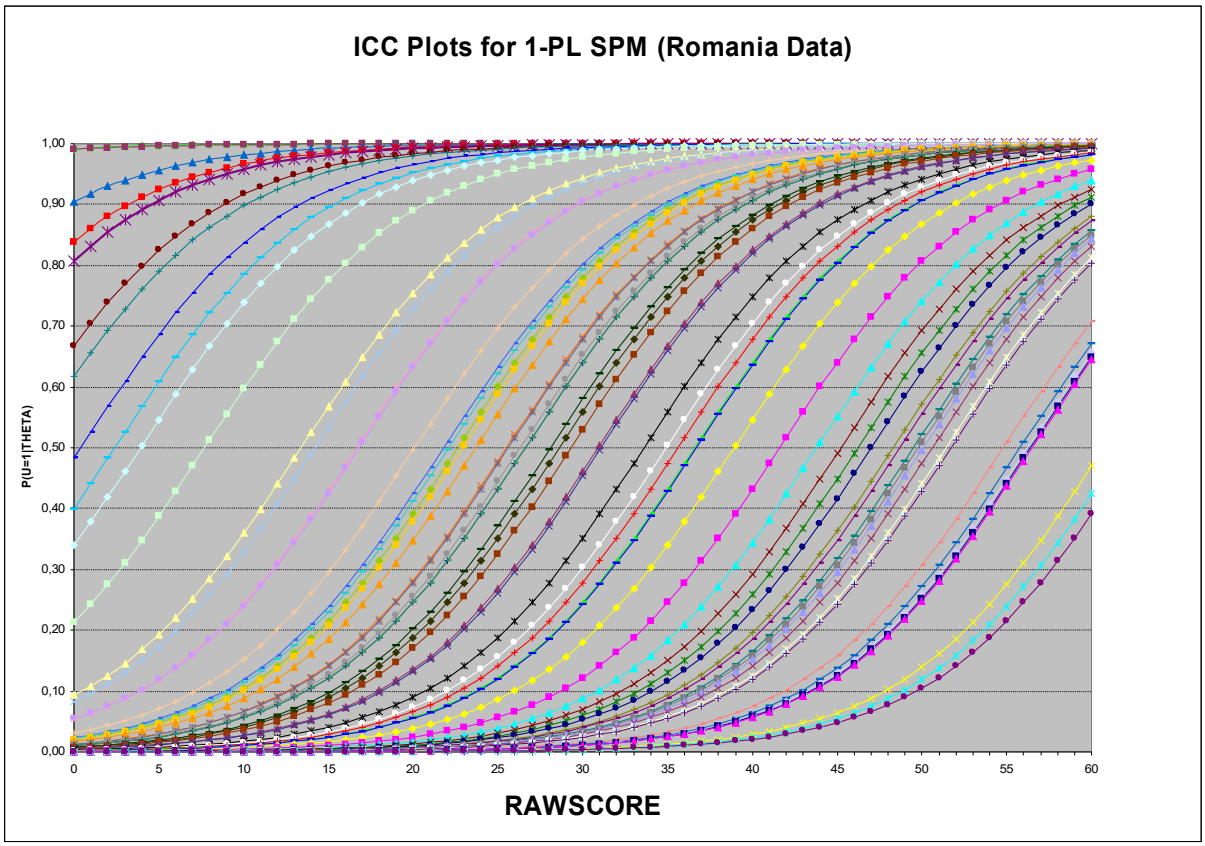



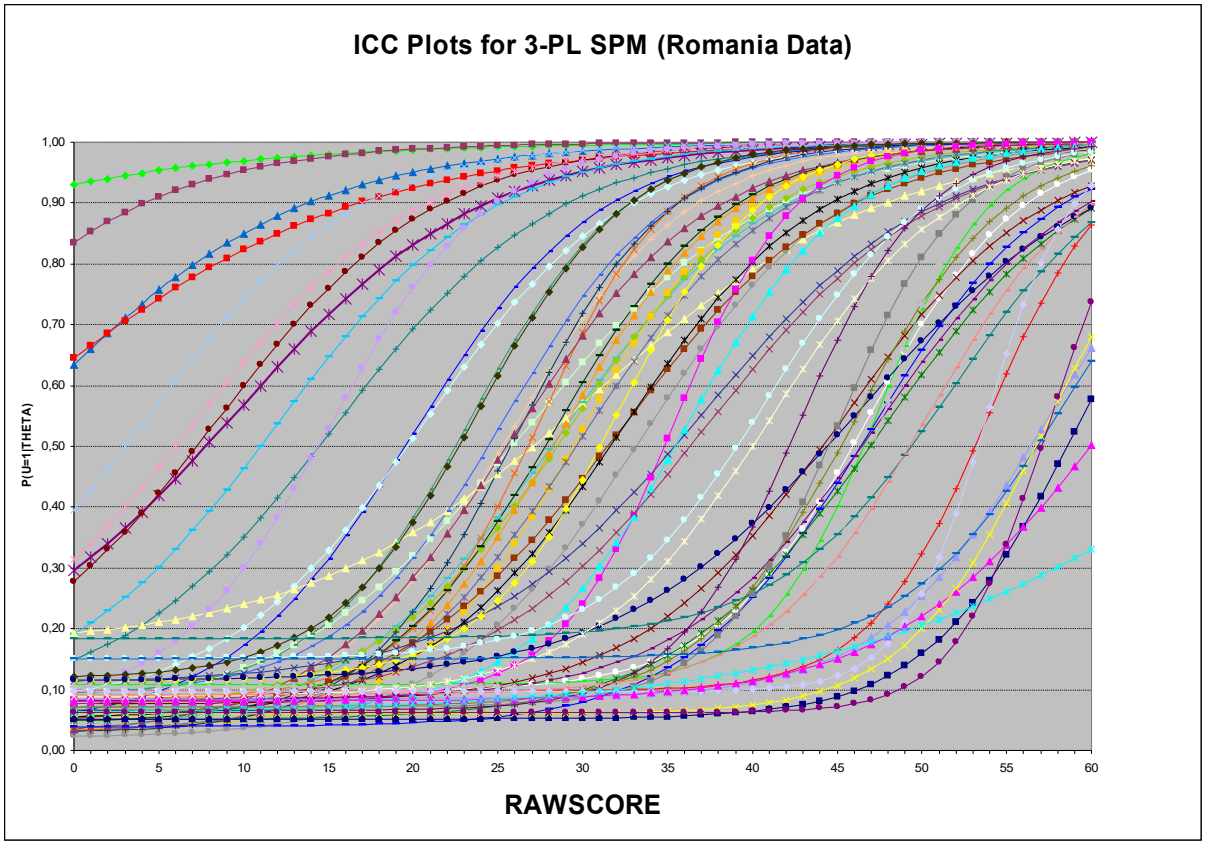




Some of the graphs increase more consistently than others … and Raven used "defective" plots to explore the reasons and, if appropriate, modify the items accordingly.

These original plots rely on raw scores. More recently, as a result of the development of Item Response Theory (IRT), they rely on item difficulties expressed in logits and computed scores on the latent variable underlying the raw scores.

More “sophisticated” plots derived from a more recent study[19] are shown in the next two plots.






As an aside, comparison of these two plots can be used to illustrate how easy it is to lie with statistics by setting the wrong parameters in the course of analyses. Had the 1PL plot alone been reported, the result would have been to create an unduly positive impression of the quality of the test. The APA Task force on Statistical Inference[20] were at pains to emphasise the importance of examining one's basic data before running seemingly sophisticated computer packages. Unfortunately, with devastating results, their recommendations have been widely ignored.

But what all three plots suggest is that the abilities required to solve the more difficult items build on and extend the abilities measured in earlier items.

Higher test scores are not achieved by introducing some other variable. The more difficult items are measuring the same processes as the easier items.

The test – the metric – is measuring the *same thing* at all levels. The same total score can, more or less, only be obtained in one way and not by different combinations of scores on different sub tests as is the case with the Stanford-Binet and other "Intelligence" tests the overall scores on which are achieved by combining scores on several subtests which are, in themselves, too unreliable to be used in theoretical analyses. All of which contributed to Raven's frustration with the test.

As Kazdin (2006) and others (look at Amer psych issue) have noted, these tests yield what are best termed *arbitrary* indices of whatever it is that they are supposed to be measuring. The same difference in scores at different points on the scale is not achieved in the same way; it means different things. The same point had earlier been made, in different language, by Guttman and more trenchantly by Hattie[21].

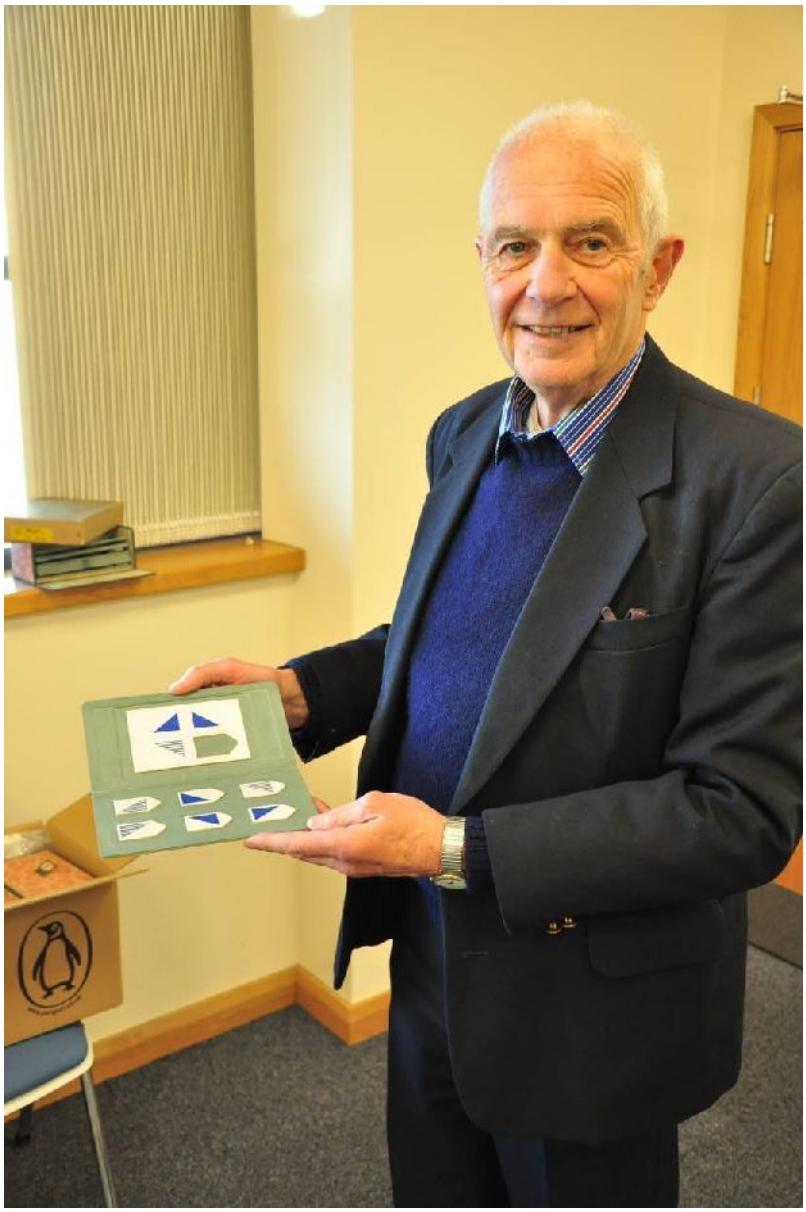
But, to return to our main point, what the IRT analyses summarised above suggest is that "cognitive ability" "exists". Although the test items are qualitatively different in character, the processes required to solve them appear to be similar cumulative. The processes required to solve the easier "perceptual" items are continuous with those required to solve the more difficult "analytical" ones; perception is a *conceptual,* process dependent on the same whole/part analytic cycles required to solve the more difficult items[22].

***Other variants of the tests***

So far, this review has focussed mainly on the SPM and MHV.

*The Coloured Progressive Matrices*

The *Coloured Progressive Matrices* consisting of Sets A and B of the *Standard Progressive Matrices* but with an additional set (Set Ab) was introduced to improve discrimination in the low ability range.



John Raven, Jnr. with an item from the Board Form of the test.

The Board form of the *Coloured Progressive Matrices,* which allowed respondents to move the alternatives from which the correct answer had to be chosen into the space to be filled in order to check their fit, was actually a derivative of the form of the test used in the initial development of the test since it facilitated experimentation with the items and especially with different variants of the alternatives from which a choice had to be made and the effects of placing the correct alternative in different places.

The *Crichton Vocabulary Test* to accompany it was developed later.

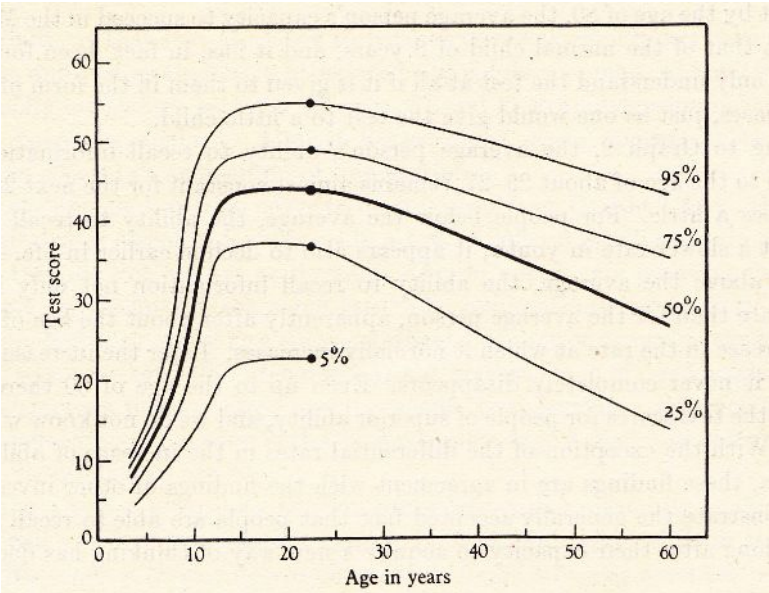
What became the *Advanced Progressive Matrices* was developed for the RAF for pilot selection and its distribution very tightly controlled via numbered test booklets. It was later modified and released for general consumption.

*Standardisations*

What became the national norms for the SPM were developed with the aid of the GPO in Dumfries with their wider use justified on the ground that the town had a balanced demographic structure. This judgment was shown to be correct in course of the national standardisation in 1979 and again relied upon in the later collection of new norms for the SPM and APM in 1992[23].

As mentioned earlier, a very important outcome of the initial work was the graphing[24] of differential development and decline eductive and reproductive abilities over the life cycle.

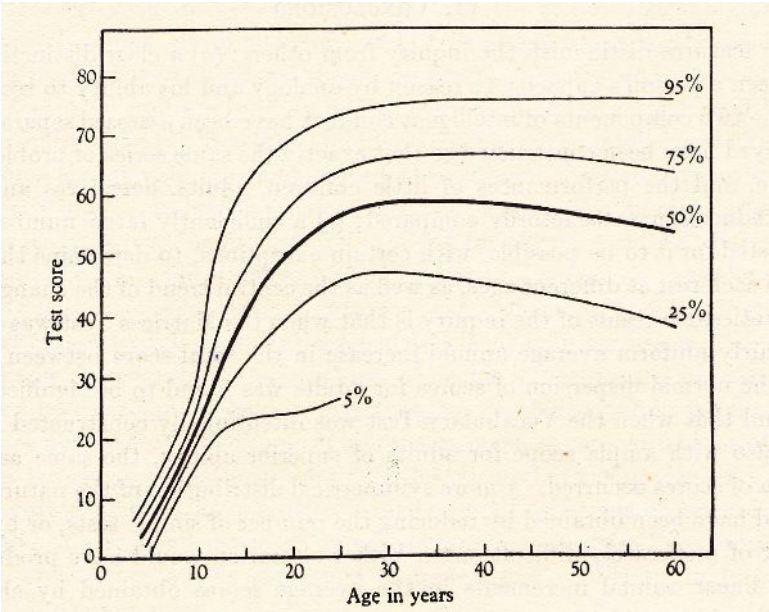
*Standard Progressive Matrices*
**The Apparent Decline in Scores as Age Increases**
UK Standardisation, circa 1947




Graph 1. Changes in the Matrices Test percentile points as age advances.

It appeared that eductive ability declined from age 20 onwards, with the scores of the least able deteriorating fastest.

On the other hand, on average, reproductive ability declined hardly at all although the scores of the more able did increase while those of the less able declined.



Graph 2. Changes in the Vocabulary Test percentile points as age advances.

As mentioned earlier, this interpretation was reversed as a result of the demonstration via the 1979 and 1992 standardisations of a secular increase in eductive, but not reproductive ability, over time.

*Back to the word* ***Intelligence.***

In the coursed of his seminars with students and staff Raven discussed his and Spearman's reasons for resisting use of word "intelligence". One discussion was particularly interesting,

The discussion revolved around the use of the word in the phrase "military intelligence" … and in the process contributed to the development of a more precise formulation of a "distributed" and "multiple-intelligence" theory of "intelligence" than that offered by Gardner.

The generation of military intelligence requires a large number of people who do very different things. It requires some field agents who rely on their feelings to tell them what is significant and then check those hunches through "experimental interactions with the environment". It requires someone who can get a team to work together. It requires someone who can see patterns in apparently disparate bits of information arriving at a centre. And it requires someone who can understand social and political systems in such a way as to be able to legitimise, and promote the flow of funds into, the work. These different activities require people who are strongly motivated to undertake very different kinds of task - but all of whom require eductive ability to undertake those activities effectively.

Couched in contemporary language, what he was leading his participants to realise was that "intelligence" is something which needs to be studied at a group or cultural, not an individual, level. It is an emergent property of groups. Furthermore, eductive activity is only one of a number of psychological processes that are required to undertake each and every one of the necessary component - and potentially engaging or motivating - activities effectively.

*Reproductive ability*

*The Mill Hill Vocabulary Test* was originally constructed as a measure of the other component of ***g*** identified by Spearman, namely *reproductive* ability - the ability to *reproduce* information and intellectual skills. The test turned out to have remarkable internal consistency, dispersion, reliability, and predictive validity to educational performance. As

Spearman anticipated, compared with *eductive* ability, reproductive ability turns out to have different genetic origins, be *less* affected by the environment, and have different implications for people's future lives and careers.

*Under the standard arrangements for individual administration the test was extremely* short, taking less than 10 minutes to produce a reliable result.

Contrary to expectations, the test turned out to withstand translation into many languages.

In various studies the scores typically correlated .8 to .95 with the scores on full length "intelligence" tests, thereby exposing them as primarily measures of *reproductive,* not eductive ability.

This was unwelcome news to the publishers of other tests because it undermined their sales of complex packages, multiple sub-scores, and training programmes.

The extensive, and remarkable, cross-cultural research carried out with the test are summarised in the MHV section of Manual.

***The Coordinates of Conduct***

Despite his contributions to psychological testing, narrowly defined, J.C.Raven regarded them as of minor importance.

More important to him was his research into what he called *the coordinates of conduct.*

The question was: "How do people utilise their present abilities, their past knowledge, and their acquired skills, to undertake activities they value and in such a way as to achieve desired future goals effectively?"

To study these things he felt that he had somehow to *start* by ***eliciting*** their thoughts[25].

His first attempts to do this were via. *Controlled Projection*[26].

In this, children were encouraged to talk about their heroes and heroines, their likes and dislikes, and their hopes and fears, while drawing.

The first edition sold well, perhaps because psychologists could exercise their imagination when interpreting the stories, but sales fell away when normative data were introduced into the second edition.

Viewing what happened in the light of subsequent developments, it would seem that the explanation may have been, not that having to compare responses with norms was off-putting, but that the scoring system did not yield information that people could use without being familiar with the framework for thinking about coordinates of conduct which Raven developed much later.

After several years, Raven returned to these questions using a variant of his Vocabulary test in which he asked people to use words as well as define them. Its great value was that it provided an entree into the study of the dis-organisation - and therefore *organisation* - of though t and behaviour.

Raven continued with the research into such things as ESP and religion and the processes of "individuation" (whereby one "individual" emerges from and interacts with a wider flow of thoughts and feelings) and projection (whereby people imbue others with their own perspectives and concerns) that had brought him into psychology in the first place[27].

These issues remain largely unresolved, although rarely discussed, today. Because they have major implications for the conduct of psychology and concepts of the nature of science and objectivity, an extract from his 1956 paper has been included as Appendix 2.

He summarised his research into the coordinates of conduct in some detail in *Psychological Principles*[28] relying on a number of diagrams of which the following are examples.

DIAGRAM I

The generative and contemporary fields of behaviour and experience.

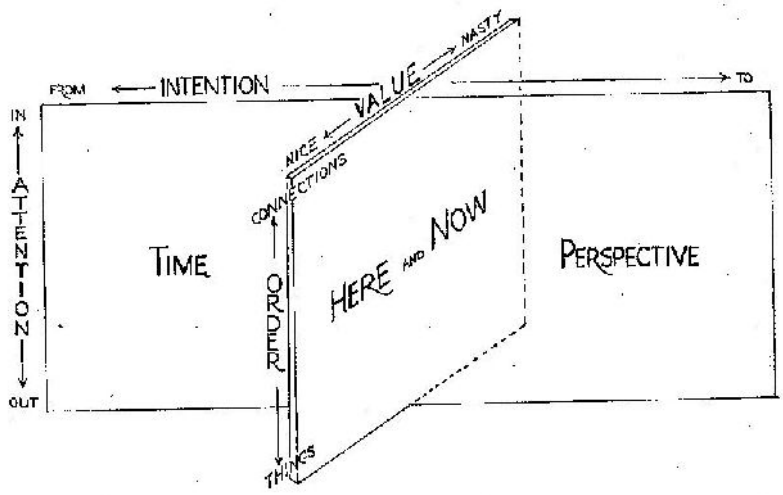
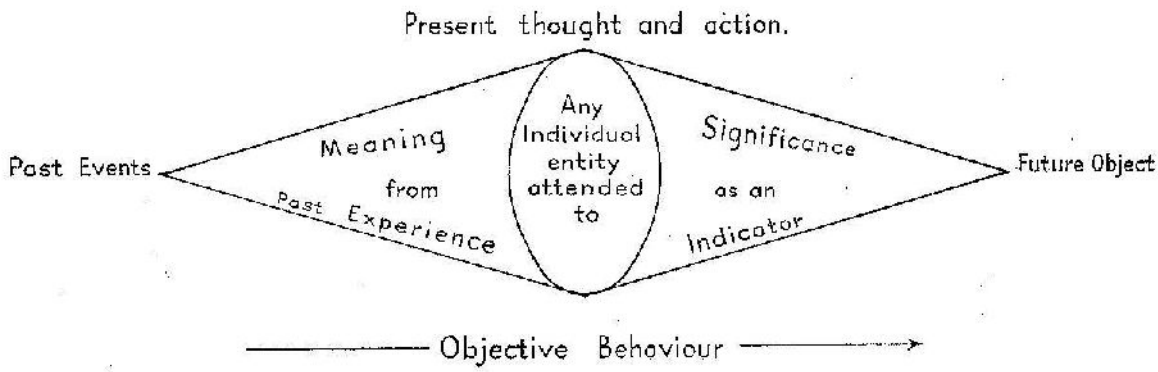



DIAGRAM III

Past and future determinants of behaviour.




In the course of this discussion he elaborated the difficulties involved in gaining meaningful insights into what differentiates one person from another. The problem is that all assessments are, in effect, conversations in which how people behave and what one person sees another, how they interpret it, and their reciprocal influences are fundamental to understanding what is

going on. In the course of this, somewhat dense, discussion he makes occasional references to the limitations for such tests as the Eysenck personality questionnaires and the MMPI. The basic conclusion is that *there is little hope of progress without challenging the fundamental assumptions on which such thoughtways and procedures are based.* How to be "scientific" under such circumstances?

His work in the area was not limited to that which came to light via the tests and clinical interviews but also informed, and was informed by, regular seminars within the Department. In the course of these he developed a strategy, which he called *comparative matching* for comparing and contrasting what people observed and recorded about others.

**The continuation of J.C.Raven's research by J.Raven, Jnr., J.H.Court and others**

John Raven Jnr.

After J.C.Raven died, John Raven Jnr. and John H. Court continued the work of collating and reviewing the international research[29] with the RPM and MHV tests and updating what were then called the "*Guides"* to the use of the various tests.

The first major step was to combine the *Guides* into a single *Manual* of 7 sections to avoid repeating the introduction and references material in each section. Had the circulation of the Manuals not been restricted to those the publishers deemed qualified to purchase the tests, the Manuals would have formed major text books on their own. In due course, the ownership of these materials was passed over to *The Psychological Corporation*. But the research continued, resulting in a 26-chapter compendium *Uses and Abuses of Intelligence: Studies advancing Spearman and Raven's quest for non arbitrary metrics* edited by John and Jean Raven[30].

*Research into Eductive and Reproductive Abilities*

*Eductive Ability*

*The 1979 standardisation of the SPM and MHV in the UK.*

By the mid 1970s a number of people were beginning to suspect that there was something wrong with the normative data in the Manuals. Either the original standardisation samples had been inadequate or the scores were going up.

Accordingly, the Social Science Research Council was persuaded to (under)fund a nationwide standardisation to be conducted by John Raven at the Scottish Council for Research in Education, which had an outstanding reputation for delivering high-quality research in the area[31].

The results[32] did confirm an increase in scores … but on eductive ability only[33].

It fell to Flynn[34] who had first stumbled across them in connection with Thorndike's[35] work with the Stanford-Binet test to highlight their significance. By changing the statistic in terms of which the data were presented he showed that, in round figures, there had been a 1 standard deviation increase in scores per generation. 80% CHECK of our grandparents would be put in Special Education classes today if they were judged against today's norms.

The discovery that scores on "IQ" tests appeared to have been increasing at all, never mind at such a rate, was a major shock to many psychologists. (It took Flynn much longer to get them to realise the implications for practice in educational and school psychology.)

There resulted endless disputation about whether the effect had occurred at all, whether it was continuous or once-and-for all and which abilities were affected[36].

In point of fact there was endless evidence that it had occurred, that it was continuous, and which abilities were affected: All one had to do was re-label the x axis on the graphs which many people (Including J.C. Raven) had prepared from cross-sectional studies to show changes with age from "age" to "date-of-birth".

The result was that some of these graphs showed that certain scores (mainly those indexing eductive ability) had increased with date of birth instead of declining with age!

*Standard Progressive Matrices*

**100 years of eductive ability in Great Britain.**

Graphed Percentile norms from the 1942 and 1992 standardisations plotted by date of birth[37].

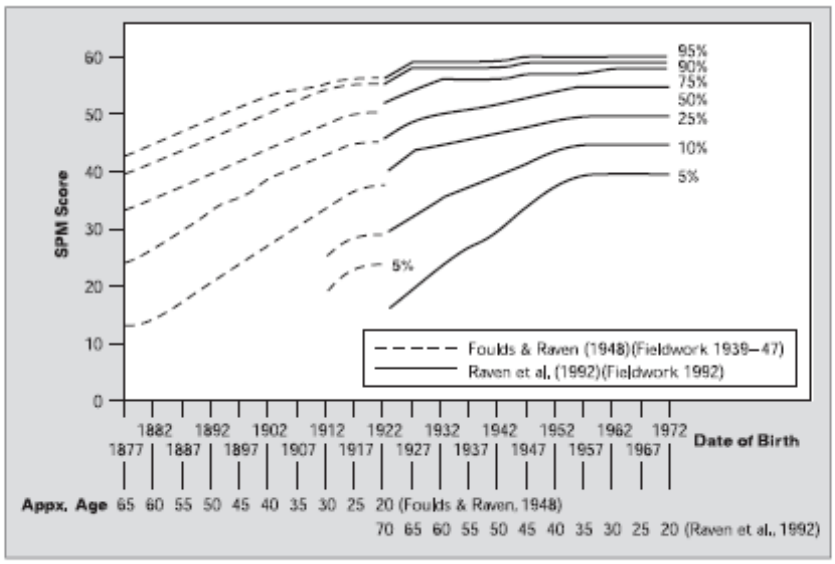



**FIG. 7.** One hundred years of eductive ability. The figure graphs the percentile norms obtained by adults of different ages (and thus dates of birth) on the Standard Progressive Matrices when a sample was tested circa 1942 (see legend to Fig. 5) in one case and in 1992 in the other. The approximate age of people born in different years in the two samples is shown below. It will be seen that those born in 1922 and tested circa 1942 (and thus approximately 20 years of age when tested) obtained similar scores to those born in 1922 and tested in 1992 when they were 70 years of age.

The quest for "explanations" continued unabated and, indeed, continue to this day. But, in reality, the cross-cultural data collected with the RPM show that most proffered explanations do not hold up because the increase shows up societies in which there is, for example, no television, no piped water, no electricity, no monetary system, no formal educational system, and very different family sizes[38].

Thus while the data show a clear effect *of the environment* the relevant variables are not those with which most psychologists and sociologists have been preoccupied in the past.

One outcome of this work is rarely noted.

These data throw dramatic light on the very questions the tests were developed to answer in the first place: What is the relative role of genetics and the environment in the determination of mental abilities and mental defect in particular? Here was a dramatic effect *of the environment.* But the aspects of the environment which were important were *not* those on which so many psychologists and sociologists had focussed so much attention in the past.

From a methodological point of view it is vital to note that arriving at this answer stems from use of the same test in the same way in many different countries over 50 years. Continuous adaptation of the test, as many had urged, would have precluded this discovery.

But note one more thing: *reproductive* ability - knowledge - has been largely unaffected by the huge increase in the time young people spend in the educational system or watching television.

And, for the sake of completeness, note this evidence of mutability does not indicate any decline in heritability.

Returning to more mundane issues by using the international data, and especially from that collected in the course of the 1979 standardisation of the SPM and MHV in the UK and many local norming studies in the USA, John Raven jnr found that it was easy to confirm that, as had been shown in the course of the initial development of the tests, that the tests scaled in

the same way – "worked" in the same way – in all … or at least most … socio-economic and ethnic groups. Any differences between groups had to be explained instead of being dismissed as "test bias". This represented a major contribution to putting to the end the proliferation of litigation and discrimination in the USA.

The international norms brought together in the SPM Section of the Manual and in *Uses and Abuses of Intelligence* reveal that the similarities between cultures are much greater than the differences despite huge differences in language, education, family sizes, and socio-economic conditions.

One final and vital contribution to scientific knowledge which the RPM made during this period came from the Minnesota twin study[39] . The results finally put arguments about the heritability of intellectual ability to rest: the estimate of the proportion of the variance that could be accounted for by genetic factors was the same as the estimate Burt had made all those years earlier to 2 decimal places.

*Development of the Standard Progressive Matrices* ***Plus***

One result of the increase in scores mentioned above was that the SPM ceased to offer adequate discrimination among those scoring above the 75th percentile.

This resulted in recognition of the need to develop a new test with more difficult items … but still of the same length and with items which matched and scores that could be converted.

Irene Styles was engaged to develop 12 new item but it quickly became clear that was not enough. Fortunately it emerged that John's nephew, Michael A. Raven (who was also seriously dyslexic) had a flair for developing such items.

John Raven Jnr. coordinated the work of very many people in several countries to construct a "*sample" which would be suitable for IRT analyses.*

Although it is not widely recognised by researchers purporting to apply *IRT* and using off-the-shelf IRT statistical packages, conformity to the requirements for scalability cannot meaningfully be assessed by applying the test to a typical random sample of respondents.

This is because the generation of the Item Characteristic Curves (which, unknown to many, lie behind the IRT indices) depends on having accurate statistics of the proportion of those with low and high scores who get *each item* right.

In a random sample, the number of people in the tails of the distribution is far too small to permit the calculation of reliable statistics on the proportion of people getting each item operational at that level that are getting it right.

From the point of view of test construction it is therefore necessary to have something approaching a rectangular rather than a Gaussian distribution of scores.

The IRT-based item analyses of the resulting data were carried out by David Andrich and Irene Styles. They reported their results in term of, what can now be seen to be somewhat suspect, IRT *indices* only. These were used in the selection of the items finally included in the test.

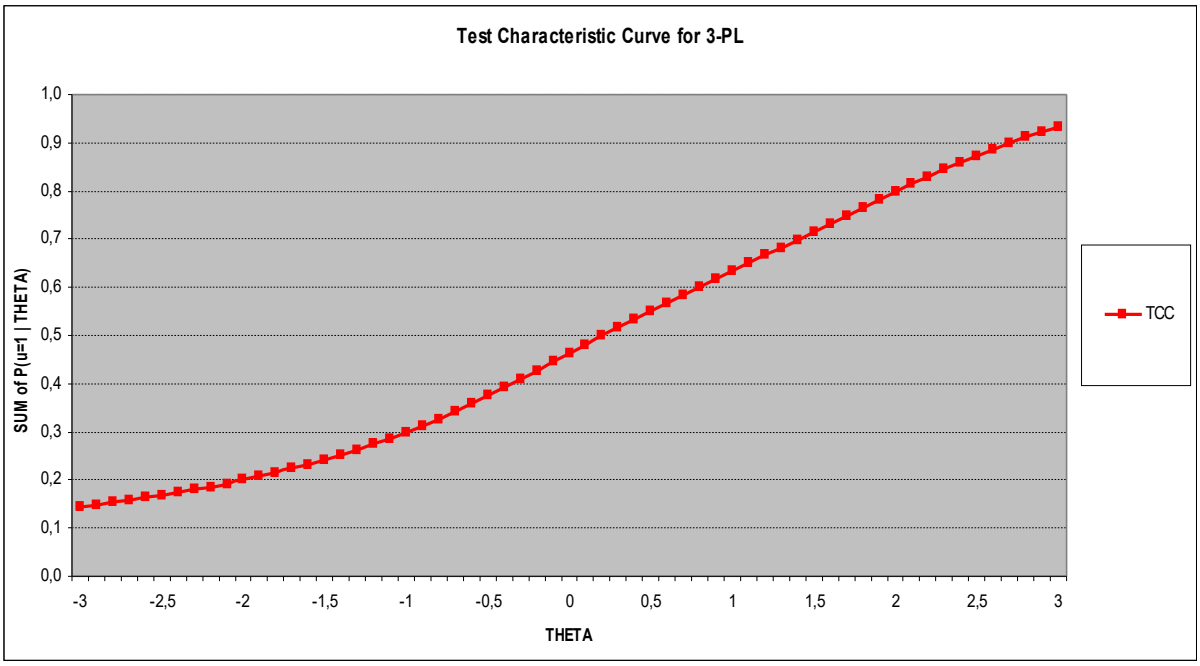
The resulting test, known as the *Standard Progressive Matrices* ***Plus,*** or SPM+

The test then required standardisation on other large, but this time, random, samples of the population. These were later contributed by Dobrean and her colleagues[40] for Romania and Rust[41] for the UK.

As discussed earlier, the plots of the ICCs from Romanian study were more revealing than Andrich and Styles' statistics but, as also discussed earlier, even these conceal info which can be useful in test construction.

But there is one more result of profound importance which emerged from the Romanian study.

The relevant graph is reproduced below.




What this shows is that the test is not merely measuring "the same thing" at different points in the scale *but the **differences** between any two scores at any point in the scale* are to all intents and purposes ***equal.***

In technical terms, what we have here is an *interval* scale analogous to a foot-rule or meter stick.

No one previously thought such a thing was *possible* in psychology.

The result is of profound importance.

Plotting the Test Characteristic Curves for virtually all psychological tests reveals, at best, a "normal" ogive.

The result is that, as Prieler and Raven[42] show, the apparent relative gains or losses of high and low scorers in response to some intervention can appear to be very different, indeed reversed, depending on the difficulty of the test, the shape of its Test Characteristic Curve, and the point on the curve at which the change is measured.

To summarise, what Raven and his colleagues have developed here is virtually the *only* psychological test which yields a non arbitrary metric in the sense that (1) the same score can, to all intents and purposes, only be obtained in one way[43] and (2) the *differences* between any two scores at any point in the scale are, again to all intents and purposes, the same.

*Reproductive Ability*

Among their other activities, Raven and his colleagues produced updated versions of the MHV sections of the Manual incorporating the results of standardisations in many countries.

These updated materials included a remarkable review of the evidence relating to the need to differentiate the eductive/reproductive ability for thinking about human abilities from the Gf/Gc framework and studies of the use of the MHV to explore the development and use of words by children the various types of comparative deterioration of different types of thinking in psychiatric groups.

*A sombering reflection*

Despite all this work, it is sombering to reflect that it has done little to follow-through on Spearman exhortation: "To understand the respective natures of eduction and reproduction - in trenchant contrast, in their ubiquitous cooperation and in their genetic interlinkage – to do this would appear to be for the psychology of individual abilities and even for cognition in general, the very beginning of wisdom".

***Work on the components of competence and their symbiotic contextualisation***

John Raven, jnr's work in this area did not arise directly from his father's work, but from the need to confirm the accuracy of parents', teachers', pupils', and businessmen's perceptions of educational objectives, their achievement, and barriers to their achievement[44].

Surveys conducted in many countries showed that the top priorities of these groups are to nurture such qualities as creativity, persistence, initiative, the ability to work with others, and the ability to understand and intervene in the workings of society.

But an even more important and more neglected is objective is to recognise and nurture the particular talents of each pupil.

How is one to think about such things? How is one to give pupils credit for possessing such talents, and teachers for nurturing them?

Without a knowledge of such things such goals are driven out of schools.

Spearman had noted the problem more than a century ago: The absence of an appropriate conceptual framework, combined with the hegemony of such notions as "ability" and ***g***, drove education out of schools as parents, teachers, administrators and politicians focussed on what could be assessed.

While concluding that neither measures of ***g*** nor the tests from the correlations between which ***g*** had emerged had any place in schools, he also noted that the psychometric tools required to identify the way in which "every normal man woman and child is a genius" did not exist.

Yet neither he nor J.C.Raven noted the paradigm shift that would be required to do this. (In practice, McClelland made that shift but, without formulating it explicitly, he himself in trouble with his work being dismissed as "unscientific" by many.)

But, make no mistake about it, the question is of extreme practical importance.

Very many research psychologists have been involved in the evaluations of educational systems that are intended to guide policy.

Yet, if there are no measures of the most important outcomes of the educational process to include in those studies how can the results be considered meaningful or objective? Yet they have been - and the results for the process of education and the education of children have been disastrous[45].

And the effect is amplified by seemingly well-intended standards for test construction and the evaluation of educational policies and programmes.

Only reliable and valid tests should be used!

Seemingly reasonable, this means that, if there are no measures of the most important outcomes that are held to be reliable and valid, the results are at best lopsided. Indeed worse than unethical. They are nothing short of criminal[46].

They discriminate *against* teachers who nurture multiple talents; parents who nurture multiple talents, and pupils who possess other talents.

So, to return to the psychometric problem and J.C.Raven.

Consider qualities like creativity, persistence, and initiative.

These are all difficult and demanding activities which will only be developed and displayed in an appropriate environment *and in relation to an activity in which the individual is strongly motivated to engage* – whether that be inventing and producing a new product, putting people at ease, creating political mayhem, or gaining control of an organisation.

A two-***stage*** measurement procedure is therefore needed.

*First* one has to find out what the individual is strongly motivated to do … and the possibilities are legion.

And then, and only then, whether, *in relation to that,* the individual demonstrates such things as self-confidence, creativity, persistence, the ability to persuade others to help, and the ability to think.

Despite what it may be thought we have said in relation to the last of these, it is important to note that Spearman wrote that "The question is not 'How well can they think?', but 'What do they tend to think *about*?"

The same applies to initiative, persistence, etc. *In relation to what* is this person confident, creative, persistent, and thoughtful? These are not (as most of those who have sought to investigate these things assume) *general* predispositions of the individual but characteristics which will only show up whilst the individual is undertaking activities he or she cares about.

This should remind us of Raven and McClelland's recognition of the need to *elicit* what the individual cares about before proceeding further.

What McClelland then did was *count up* the number of, possibly independent, components of competence the individual brought to bear to carry out that activity effectively: Did he or she make plans, monitor the effects of their actions, persuade other people to help, and so on?

What then emerged is a framework for thinking about competence which is grounded in motives or values (of which there are legion) and a seemingly more limited number of components of competence which may be brought to bear to carry out the activity effectively[47].

This is at loggerheads with classic views of psychometrics based on such notions as internal consistency.

McClelland's score is more like the multiple-correlation coefficient one gets from summing across the contributions made by various (independent) components predicting an outcome than an internally-consistent factor score.

However, a fundamental realisation that that emerged from this work is that psychologists need to develop a *descriptive* framework akin to that of Linnaeus to think about individual

differences in functioning of organisms, link it to a shared frameworks for thinking about the internal organisation of human behaviour (akin to that of the physiology of plants and animals), and then set the results in an ecological context having many symbiotic relationships instead of (yet another) attempt to map the variance in environments and their interactions with humans in a framework grounded in "variables".

But now note that, if one generalises this model of competence, as both J.C. and John Raven jnr did, it is dependent on recognising and appreciating the motives or values of the individual being assessed before proceeding further. And therein lies a problem – because middle class researchers have difficulty recognising "working class" values[48], let alone appreciating their functional significance[49]. Worse, they are inclined to set out to change them - or even stamp them out[50].

So now we turn to studies of competence at work and in society.

The number of actual studies of what makes for different kinds of competence in the workplace is trivial compared with the number of committee-generated lists of the knowledge that may one day be required and should therefore be taught[51]. And most of the studies which have been done have relied on administrating arbitrary selections of tests to try to predict such things as number of widgets produced per hour or supervisor's ratings.

Relatively few have actually studied what makes for effective performance in different roles … many of which are not what they are said to be or those which appear in formal job descriptions. It emerges that people make multiple, diverse, and often unrecognised contributions to their organisations.

A more appropriate methodology to study these things is the "critical incident" methodology developed by Flanagan and elaborated by McClelland and co-workers[52]. Note that the *criterion* of effectiveness is open-ended.

The results do not emerge as "knowledge, skills and attitudes" but as the kinds of high-level competencies discussed earlier.

In an attempt to move the discussion away from knowledge, skills, and attitudes Raven (Jnr) in 1964 participated in a, mainly US, working party which decided to adopt and promote the use of the word *competence* to signal the required change of orientation.

As with so many such attempts, the word was then seized upon and corrupted until it has come to mean exactly what it was introduced to move away from.

This is partly because many of those recruited into the field of human resource selection, management, and development have difficulty recognising anything other than verbalised techno-rational knowledge as knowledge at all. The best they can manage is the deprecating term "skill".

And it has been partly because those recruited into the field have themselves been selected and promoted for competence at temporarily mastering and parading temporary knowledge in front of authorities. It is exactly the same process that has corrupted the word "education" so that it has come to mean "teaching".

But a concern with teaching brings with it a belief system in which it is felt necessary to assess whether students have learned what the teacher thinks they ought to have learned … and that brings with it hierarchical notions of "ability" as assessed by authority.

And that in turn brings with it a predilection to prescribe standards for the assessment procedures that are to be used without much examination of the conceptual frameworks on which they are based.

At a "professional" level in psychology this results in the creation of a cadre of standards-writers and examiners bandying about such notions as construct and predictive validity, "unidimensionality", "professionalism"[53], and "education".

By and large, these terms are used in an unexamined and constricted way without examining the fundamental problems which lie behind them.

And, with the generation of rules, comes an opportunity to participate vigorously and self-righteously in the task of enforcing them[54].

The process floods out into a process of prescribing what those who are engaged as "people fixers" in clinical psychology and counselling on the one hand and teachers, social workers, and parents on the other, shall "know" and do. This results in the de-professionalisation of all of these groups via the preparation, by bureaucrats, of 600-page manuals prescribing what each shall know and do.

In an article entitled *Some criminal (if not yet criminalised) misapplications of "science", logic, and power illustrated from the field of early childhood education* [55] Raven argued that this whole process, while on the face of it admiral, like so much well-meaning policy, results in the opposite of what was intended. Thus a requirement to use only tests that have been shown to be reliable and valid in personnel assessment, in the assessment of planned interventions, and in the evaluation of educational programmes and policies results in evaluations which are anything but valid, objective or scientific. This is because the most important qualities of the individuals concerned or the outcomes of the programmes to be evaluated cannot be assessed through any of the procedures (eg group testing of randomly – assigned participants) or using any of the instruments deemed valid by the appropriate "authorities". This enable practices and procedures which do enormous damage to pupils, adults, and society to proceed without check. In short, emphasis using only tests that are valid in technical terms leads to evaluations that are invalid in any common sense use of the word.

In short, the establishment of Standards for eg tests and assessment centres may eliminate a few errors on the part of individual providers but in reality serve to legitimise activities which have very much more serious negative consequences

But there is something else to be said here. As has been mentioned several times, the imposition of standards and prescriptions for "professional" behaviour seems to be accompanied by an undue zest to impose what those concerned believe to be good and right on others … supposedly "for their own good". All this without reference to the wishes, desires, and values of those concerned, the consequences for their future lives, and the wider consequences for society.

J C Raven described this process as a form of aggression. It is perhaps more correctly recognised as the thoughtway which lies at the heart of fascism … and it is pervasive in modern society.

The desire for excuses to put people right, to prescribe how they will think and behave, shows up in the quest for ever more inclusive indices of "areas of multiple deprivation" in the case of communities and Adverse Childhood Experiences (ACE's) in the case of individuals.

From the psychologists' point of view it would seem more important to study the processes which lead people to move into and out of eg "areas of multiple deprivation" and the ways in which their values and competencies engage with the nature of those communities than to adjust and educate those who live there instead of making the assumption that since it is "obvious" why people move into high SES areas it follows that they should want to move out of areas of multiple deprivation. But, if this is the case, it is then difficult to understand why

some people move into those areas. That they must in some way be functional eludes the researches.

It also eludes those who have espoused what is perhaps the dominant framework for thinking in psychology. This has to do with differentiating between people in terms of "variables" and environments likewise. This may be characterised as the framework within which physicists work. And it can be contrasted with that of the biologist and ecologist. These embrace a descriptive framework for differentiating between species and a framework grounded in symbiosis for studying their interactions with their habitats.

More specifically, instead of a framework for differentiating between areas in terms of a single, multiple-component, "variable" one could differentiate between them in terms of types of areas having different functional characteristics. And one could differentiate between people in terms of a branching framework akin to that used in biology. And one could then study the functional and dysfunctional symbiotic relationships that develop between one and the other.

**Human ecology**

J.C.Raven was a keen naturalist with a particular interest in ecology, particularly human ecology. His first publication reported a study of the interaction between newts and their environments[56] .

Also briefly mentioned were his discussions of the varying permeability of the boundaries in the cognitive and emotional processes separating one person's thoughts and feelings from those of others … a process which he characterised as the individuation of the individual from his or her "environment".

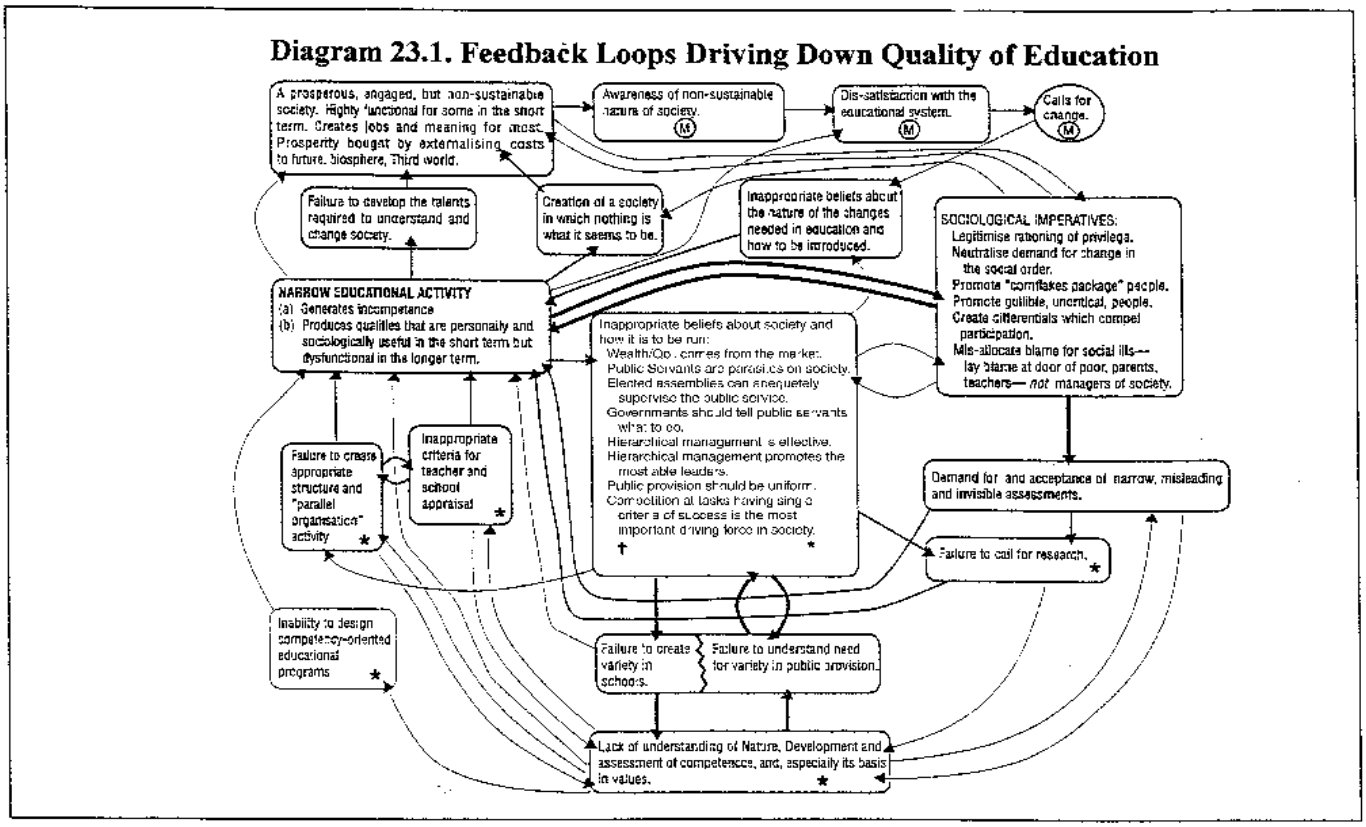
Also mentioned have been John Raven, Jnr's, observations about how emergent high-level competencies can only evolve, or even be said to exist, outwith the context of other people contributing in different ways to emergent group properties which, if positive, can sometimes be characterised as "climates of intelligence" or "enterprise" and which in turn have a recursive effect on the personal competencies people develop.

Historically, these insights emerged from work stemming from his study[57] of the processes that lead the educational system to do the opposite of what most people wat it to do.

A number of processes contribute to this. These include a lack of shared framework for thinking about the ways high level competencies are to be nurtured and recognised. But they also include a command-and-control management system which not only fails to acknowledge the importance of nurturing a diversity of talents but also fails to encourage teachers and administrators to experiment and learn.

But the most important outcome of this work was the realisation that these processes did not operate independently but formed a mutually supportive, self-perpetuating, *system* in which it was impossible to change any one part on its own without the effects being negated by the reactions of the rest of the system.

Mapping or diagramming this network of interacting social forces led to the production of the causal loop diagram, or systemogram, shown below.




* Intervention in these cells would help change the nature of the qualities nurtured and rewarded in the system. Motives which should be harnessed to do this are marked (M).

† These need to be replaced by acceptance of the need to make managed economies work—to find ways of giving effect to information concerning the public long term interest, the need to explicitly create variety and information on the personal and social consequences of the options, and to find ways of holding public servants accountable for, and getting them to act in, the long term public interest. This means systematic, broadly-based, evaluation and participative democracy.

Besides illustrating the importance of mapping the networks of social forces which control human behaviour, this diagram illustrates two things:

1. Teachers', Pupils', administrators', politicians' and parents' behaviour is not primarily determined by their individual wishes or talents but by *the operation of the system* ***qua system.***
2. The nature of the governance system shown in the central box and the sociological forces which compel hierarchy (shown in the large box to the right) play a dominant role in determining the operation of the system.

Pursuit of this line of enquiry led Raven into the field of *sociocybernetics* – viz mapping of the networks of social forces which control human behaviour.

More specifically, it led him to

1. Study of the nature of the governance system required to produce a pervasive climate of innovation – and especially one which would lead to the evolution of a sustainable society. This led to the publication of *The New Wealth of Nations: The societal learning arrangements needed for a sustainable society*[58]. The title is deliberately worded to forge a link with Adam Smith's quest for an organic governance system with multiple feedback loops and which would innovate and learn without central direction. Since Smith's "market" solution does not and cannot work [and has indeed been corrupted into its

opposite by those very same social forces], it is vital to pursue an alternative answer to the question.

2. Study the social forces which promote hierarchical, as distinct from organic, social arrangements in society. This took Raven to Murray Bookchin's book *The Ecology of Freedom: the emergence and dissolution of hierarchy*[59]. This this led him to, among other things, challenge the general notion that Darwin's observations led to the law of the survival of the fittest. It seemed more appropriate to him (and others) to frame them as pointing to the survival of the *fitting.* In place of the pervasive modern human disposition to perceive nature as mainly involving competition, comes the image of a meadow in which hundreds of species of grass and tens of thousands of other organisms live together in symbiotic relationships. This has a major impact on one's world view.

Given this perspective, Raven returned to the question of how it comes about that psychologists have become so concerned with individual "intelligence" instead of focussing on the ways in which "every normal man woman and child is a genius"[60] . He published the results of his thoughts in the area in an unwelcome chapter entitled "*intelligence, engineered invisibility, and the destruction of life on earth"*[61].

Also important was Bookchin's law to the effect that, under conditions of surplus labour, society somehow generates huge amounts of hierarchically-organised senseless work. The process gives meaning to people's lives but the process results in the destruction of the soils, seas, and atmosphere, thereby heading our species toward extinction at an exponentially increasing rate.

**Turning psychology inside out**

But the most striking outcome of all this work was the recognition of the need to "*turn psychology inside out"* in the sense in which Newton turned physics inside out.

Before Newton, if things moved or changed direction it was generally thought to be because of their internal properties: they were *animated.* After Newton it was mainly because they were acted upon by networks of invisible external forces which could nevertheless be mapped, measured, and harnessed.

The conclusion to the work just summarised is that human behaviour is *not* primarily controlled by their internal properties but by the social forces which act upon them.

The task is to conceptualise, map, measure, and harness those social forces[62].

## APPENDIX 1

## A SEMI-RANDOM LIST OF SIGNIFANCT DATES AND SIGNIFICANT OTHERS

Place of birth: London
Date of birth: June 28, 1902
Parents: John Raven, Jane Elizabeth (nee Martin)
Father's Occupation: Umbrella maker/warehouse man with Grant Barnett &Co., London EC2
Leasehold of the Raven family home in North London acquired 1897
JCRs father died: 1923
Sisters: Phoebe Jane, Sarah Edith
Married: Mary Elizabeth Wild
Date of marriage: 1934, Quaker Meeting House, Euston Rd.

Mary Elizabeth Wild: date of birth: 1903
Place of birth: East Ardsley, Yorkshire
Parents Barton Wild, Laura Pringle Wild (nee Hattersley)
Father's occupation trade union negotiator, train driver
Brothers and Sisters: Laura, Joseph, Barton, Joan
MEW family living in Petts Wood at time of marriage
MEW became a certified teacher with speciality in certain areas indicated only by letter in 1925.
JCR and MEW family: John, Barton, Martin
JCR and MEW residences: North London, Nayland, Sussex; Claygate, SW London; Elmstead, Essex; Dumfries
Moved from Ladyfield Lodge to Trees 1957
J.C.Raven left Northern Polytechnic Institute, 1921
1922 – 1934 Mathematics, Science, Biology master and then head teacher "PD school"
Worked at St Probus School, Salisbury
Royal Merchant Seaman's Orphanage, Wokingham1923-1927
B.Sc, Kings College, London 1933
MSc July 1936
JCR began work with Penrose 1934
JCR began work at Child Guidance Council November 1939
CRI 1 April 1944
Mary Elizabeth died: 1968, Edinburgh
JCR Married :Irene K. Hunter, 1969, Dumfries
Irene Hunter Born:1914
Place of birth: Aberdeen
JCR Retired 1964
JCR died 10 August 1970
Sarah Edith Raven died 1978
Irene Raven died 1985

1948 CRI incorporated into NHS

## APPENDIX 2

Extract from

J.C.Raven

### Projection as a psychological Concept and Method of Enquiry

*Rorschach Newsletter (Journal of the British Rorschach Forum), 1956*, December, 15-18.

*Projection and Individuation as Complementary Processes*

We should, I think, distinguish the processes of Projection[63] by which, once we have formed an image or idea of an object we proceed to endow it with a characteristic "content" in the sense of properties and powers of its own distinct from its "context" or "environment", and ourselves as "percipients"; we should distinguish all these processes from the more fundamental processes of "individuation"[64] by which any aspect of experience we attend to begins to differentiate from its surroundings in relation to which it requires at least some degree of systematic organization.

Gestalt psychologists following Bergson emphasise that we apprehend experience as a whole before we perceive the parts constituting it, and that according to the objective we are pursuing, we go on from the whole to the parts by a process of pragmatic analysis into figure and ground, individual and environment, self and non-self, each of which can be thought about separately although incapable of existing apart from its environment.

"Individuation" may therefore be defined as: the emergence of individual entities, objects and modes of experience and behaviour as systematically organised parts of larger unitary wholes, from which, by the process of differentiation, they acquire individual characteristics[1].

By distinguishing the processes of individuation from those of projection, we are able to follow more closely… the genesis of perception and object formation ln childhood. We are also able to give a more systematic account of our ideas of ourselves and others, and. define personality more exactly[65]

From Vernon's account of "Personality Tests and Assessments"[66], we can draw two important conclusions: The first is that all personality tests have low re-test reliability, and even lower psychological validity. The second is that a technique which in the hands of one investigator gives one set of results, in the hands of another investigator gives different results.

In the most objective test of personality, subjective judgment s are always involved. A psychological test is always a social event, and unless this is explicitly recognised so-called "measurements of personality" become meaningless.

Once we overcome the resistance to any suggestion that the observer or reporter has any effect upon the qualities of personality elicited and recorded in a personality test, a study of the part played by the psychologist in any such situation opens a field of enquiry admirably suited to systematic comparative investigation. The fact is that any and every relationship between people which can develop in a social group of two can also develop within a so-called "scientific" interview or "objective" personality test,

[1] The Oxford Dictionary defines individuation as "the processes leading to individual existence." Warren's Dictionary of Psychology defines individuation as "the differentiation or emergence of a specific and local activity out of a general mass activity"; while Jung, in "The lntegration of the Personality", says "By 'individuation' I mean the psychological process that makes of a human being an "individual" - a "unique indivisible unit."

For the comparative assessment of personality, what we can do is to record the processes of individuation observed in a given social situation or test. We can then compare our records in order to determine the responses elicited and recorded by particular observers. We can also determine group similarities and individual differences of response. We are then in a position to infer by projection the meaning and significance of the responses (a) for the person observing them; (b) for the person giving them; and (c) for any class of people sharing them.

If we make each of these steps explicit, the comparative study of personality can be quite "scientific" , and. can provide us with exact information concerning each of these three variables,

By the technique of comparative matching[67], it is possible to show the extent to which any description or test response is "common" to people ln general, "typical" of a particular "class" of people, in the sense that it occurs with a higher frequency in one class than in any other class; characteristic" , in the sense that it is found to occur in one class of people and in no other class; or "unique" to one person, in that throughout the available data, no similar response is given by anyone else. It is also possible to show the degree to which any recorded observation can be regarded as characteristic of a particular observer or test situation, as well as of any individual person or social or clinical class of people as a whole. A clearly formulated concept of projection, in turn, enables us to interpret any observation recorded, less by implicit inference, and more as an explicit method of hypothetical deductive reasoning.

*****

I have tried to show that the principle of individuation together with the concept of projection, and the technique of comparative matching, provide a framework of reference and method of comparative study having a sound scientific basis both theoretically and in its practical applications.

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[6] Hetherington, R. (1997)

[7] https://www.berksfhs.org.uk/journal/Dec2002/OrphansAtBearwood.htm

[8] A psychologist in Singapore later observed "It is used here by everybody, everywhere, for everything!" In fact it was being used to sort children at school out at age 5, 11, and 16. To select university entrants and in occupational selection. And by school psychologists, clinical psychologists, and others in the course of choosing remedial and other programmes.

[9] Oakland (1995)

[10] The topic remains of vital importance today, see Raven (2018 crim). "Professional" organisations manufacture vast committee structures to set standards for techno-rational knowledge that will quickly be forgotten and does not relate to actual competence (Raven, 1984/1997 Schon 1993 2001) It provides an excuse for university lecturers to off-load what *they* "know" without questioning whether it will really enable their students to become competent psychologists. Such lecturers would not know how to nurture competence anyway and, since the students have been selected for success in the "knowledge", not competence, game, they would, and, as Schon and Boyatsis (2001) found, resist the change. PROBABLY NOW SAID IN MAIN TEXT Add note on JCR'S "Teaching", School guidance ..fitting people into structures. See comments in quotes from Hetherington. Vocational selection authoritarian standards to prescribe what others shall do and knowledge-based credentials requiring their "teaching" generate the mountains of senseless work and qualifications that dominate the educational system today. Uncritical acceptance of word academic and professional … cf. Goodlad schools do not merit description as academic or intellectual institutions.

[11] The following discussion is largely abstracted from Hetherington (1997).

[12] Raven (1952)

[13] Raven, J.C. (1950)

[14] Raven, J., Raven, J. C., & Court, J. H. ([1992] 1998, revised and up-dated 2003)

[15] Spearman (1904)

[16] Horn (1994)

[17] Raven and Fugard (2008)

[18] Raven, J.C. (1939)

[19] Raven, J., Prieler, J. & Benesch, M. (2008).

[20] APA Task force on Statistical Inference. (1999).

[21] Hattie, J. (1985)

[22] See also Appendix 2.

[23] The sampling procedure and means of conducting this study is described in the SPM Section of the Manual: Raven, J., Raven, J. C., & Court, J. H. (2000, updated 2004)

[24] Raven, J.C. (19 48)

[25] A similar observation lies at the heart of McClelland's use of his (projective) *Test of Imagination*. As outlined in more detail in Raven (2001 MSS), the scoring system first asks "What does the person who wrote these stories care about, what kinds of things does he or she *value*?" It then asks "In relation to those activities, *and only in relation to those activities,* does the individual think, make plans, persuade other people to help, turn his or her feelings into the task, anticipate the future, bring to bear relevant information and skills from the past, and persist over a long period of time? For each of these questions answered positively, add 1 point to the score".

It is important to note that McClelland and his collaborators did not construct this system following conventional psychometric injunctions. It was developed via a content analysis of what changed as a result of experimental manipulation (starvation, sexual arousal, arousal of achievement motivation).

The result was a scoring system which was at loggerheads with the conventional psychometric concern with internal consistency. The result was a score which looked more like a multiple correlation coefficient summing the overall ability of a number of independent variables to predict success in carrying out some activity. Hence the clash with such authors as Barrett and Depinet (1991).

[26] Raven, J.C. (1944)

[27] Raven, J.C. (1956)
[28] Raven, J.C. (1966)
[29] Court, J.H. and Raven, J. (2001)
[30] Raven, J., & Raven, J. (Eds.). (2008). UAI
[31] E.g., Maxwell, J. N. (1961, 1969).
[32] Raven (1981)
[33] Raven focussed more attention on the differences between the scores from the different areas of the country which had been carefully selected by the sampling department of the Office of Population Censues and Surveys to represent the 7 clusters of areas of differing socio-economic conditions found in the UK.
[34] Flynn, J. R. (1984a & b)
[35] Thorndike, R. L. (1975, 1977)
[36] Neisser, U. (Ed.) (1998)
[37] From Raven (2000, 2008)
[38] Raven, J. (2000).
[39] Bouchard, T. J., Lykken, D. T., McGue, M., Segal, N. L., & Tellegen, A. (1990)
[40] Dobrean, A., Raven, J., Comsa, M., Rusa, C., & Balazsi. R. (2008)
[41] Raven, J., Rust, J., & Squire, A. (2008)
[42] Prieler, J. & Raven, J. (2008)
[43] as distinct from a score obtained by adding together scores from a variety of measures or items measuring different things (as in Likert scales).
[44] A short summary of this work will be found in Raven (1994).
[45] Raven (2018)
[46] Raven (2018). Plus, counterintuitively, the setting of quantitative standards *always* makes things worse: Campbell, D. T. (1979). Hence J.C.Raven's resistance to such "academic" authoritarian enterprises.
[47] See Raven (1984/1997)
[48] Raven, J. (1977, 1980, 1994)
[49] Kohn, M.L. (1977, 1986)
[50] Raven, J. (1980 a & b), Scottish Government (2014), especially "named persons" component.
[51] Mulder, M. (ed.) (2017)
[52] Raven (1997) cims, Raven and Stephenson (2001), Spencer & Spencer (1983), Schon (1983, 2001)
[53] See Schon (2001)
[54] The grossly inadequate work that is used to justify the use of tests and assessment centres in personnel selection demands special attention. The standards that are laid down assume that those who are designing these assessments know what the job for which those being selected entails despite the fact that most of the important things people do in their work are invisible and depend on what others do … and ignore the fact that the recruit will almost certainly quickly move into another job. They ignore the fact that the framework that is used by most HR specialists is, as we have seen in this article, grossly inappropriate (see Raven (2014), and Klemp, Munger and Spencer (1977)
[55] Raven, J. (2018) some criminal
[56] J.C.Raven (1932)
[57] Raven, J. (1994) mefes
[58] Raven, J. (1995)
[59] Bookchin, M. (2005)
[60] Spearman, C. (1927)
[61] Raven, J, (2008)
[62] Raven, J. (2018) Harnessing social processes
[63] Raven , J. C. (1951)
[64] Raven , J. C. (1956).
[65] Raven , J. C. (1953).
[66] Vernon, P.E. (1953).
[67] Raven , J. C. (1948).