The psychologist as philosopher

Sandy Lovie and **Pat Lovie** on the life and influence of Charles Edward Spearman

To most psychologists, Spearman is the person who 'invented' Spearman's *rho*, that well known measure of rank correlation, and factor analysis. In fact, attributing rank correlation to Spearman would have caused him much grief (see Lovie, 1995). Spearman himself would have pointed to his cognitive theory of *noëgenesis*, or the creation of new knowledge, as being at least on a par with his two-factor theory of intelligence and associated technology. Our thesis here is that Spearman's work on intelligence and cognition is as much the product of philosophical concerns as they are psychological ones.

Spearman's life and career can be briefly summarised: born in 1863, he was successively a soldier, then a student at Leipzig nominally under the tutelage of Wilhelm Wundt, followed by Reader then Professor first of philosophy (Grote Professor of Mind and Logic), and latterly of psychology at University College, London. He died in 1945 (see Lovie & Lovie, 1996, for more details of his life).

Psychologists with an interest in the history of their subject usually argue that their discipline is the legitimate offspring of older areas of intellectual endeavour, particularly philosophy. However, they would also claim that any attachment was cast off well before the 20th century, citing the 19th-century experimental work of figures such as Fechner and Wundt in support. While psychologists turned to experimentation as their principal source of knowledge, philosophers continued in their old habits of armchair speculation – so the theory goes.

Perhaps the more knowledgeable amongst our notional historians might also claim that, as psychology is only a recent discipline, anomalous figures such as the 17th-century philosopher Descartes – who performed dissections of the eye and the brain, thus making empirically based claims about their operation – could perhaps be considered as working at a time before the professional lines between the disciplines had been drawn up and patrolled. But there are other, more difficult problems with this neat and absolute demarcation between the two areas. For example, Fechner's experimental work reflected his ideas (whose origins were essentially philosophical) about the relationship between the mind and the body, while Wundt's debt to philosophers such as Kant and Herbart is well documented. And it should not be forgotten that William James, whose 1890 book *Principles of Psychology* is widely acknowledged as being one of the most important works in modern Western psychology, was a philosopher who was nevertheless prepared to seriously consider psychology as an experimental enterprise (despite, in the end, becoming disillusioned with the project). Philosophy, it appears, has covered rather more psychological issues than some psychologists have imagined.

> "Spearman made a wider contribution than is generally remembered"

Spearman was, however, no armchair psychologist/philosopher; his 1923 book on intelligence and cognition, for instance, contains many introspective studies of the sort that were still fashionable at that time. Consequently, he spun his elaborate conceptual webs from material which could in principle be supported by systematic experiment and observation. Indirect support for this position can be found in his accusation that the Gestalt movement was essentially non-experimental, since it only offered top-down mechanisms of perception and action whose instantaneous operation and holistic nature made them essentially untestable or unexaminable (see his scathing attack on Gestalt thinking: Spearman, 1925).

Further, he frequently argued that many experimental observations were themselves based on underlying mechanisms whose existence and form could only be inferred, only understood as essentially higher-order concepts. This is the essence of Spearman's approach to the factor analytic theory of intelligence, where intelligence was a general property of the mind, but one which could only be understood and measured indirectly. What this meant, in practice, was that the structure that intelligence took was essentially a given property of the mind, an *a priori* characterisation that Spearman defended for his entire life. This led to Spearman's well known measures of *g* or 'general intelligence' underlying every ability, and *s* or 'special' ability associated uniquely with a particular task. Thus the results of a test of any ability can be decomposed into no more than two components (see Spearman, 1927, for his mature view). This contrasts with the later work of Thurstone, whose empirical approach to the factor analytical structure of intelligence eschewed the obviously *a priori* and also generated much more complex factorial structures.

Our next section concerns Spearman's neglected work on intelligence and its cognitive basis: that is, noëgenesis. His background remarks in the first chapter of his 1923 book about the people who had inspired the work point strongly to the philosophical as well as the psychological origins of his thinking. For instance, he cites the philosophers Aristotle and the medieval Schoolmen (famed for their rigorous defence of Christianity at a time of increasing

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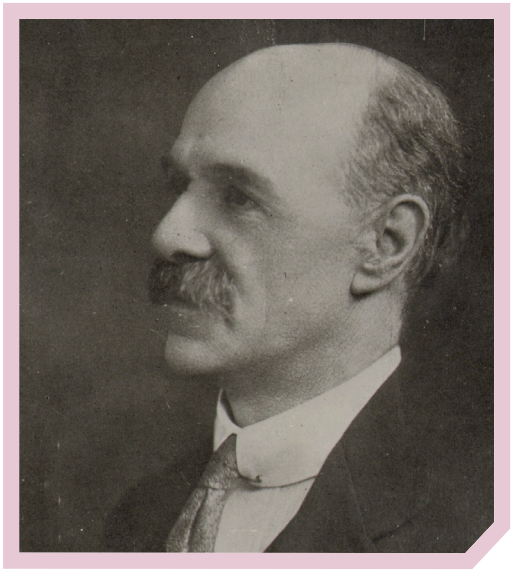
challenges to its authority), as well as the psychologists Ebbinghaus, Binet and C.S. Myers (amongst others). For Spearman, the philosophers provide a 'beautiful' definition of intellect as 'the power to conceive universal ideas' (note the active nature of this power). Unpacking and expanding this short definition of intelligence for a modern audience was the major purpose of Spearman's account.

Spearman's exposition of the more detailed operation of intelligence consists of a series of laws, most if not all of which would seem reasonable to modern workers in the field. For instance, people have limited cognitive resources, but can flexibly allocate them to different tasks; attention is an example that Spearman cites here. However, he noted that the re-allocation of attention can change the experience of the events. Furthermore, any event immediately brings with it a situating knowledge of the event, as well as relevant self-knowledge to the person experiencing the event. In other words, all events are instantly interpreted, contextualised and personalised, so that they are immediately available for use: thus perception grounds and potentiates both personalised knowledge and action. Also immediately available is meta-cognitive knowledge of the events, that is, the 'cognizing of cognition' (as Spearman put it) which means that people are capable of commenting on both their own thinking and behaviour, and on that of others.

His next two principles can be treated together and are termed the *eduction of relations and correlates*, where eduction is a logical operation lying midway between induction and deduction (assuming givens as with deduction, but then using them to extract new knowledge as with induction). The simplest example is the analogical reasoning task, for example, as White is to Black, so Yes is to…? Here, the first stage is the extraction of a relation between the two items, for example, oppositeness, while the second process attaches this relation to the third item to creatively generate a plausible correlate or related answer. Eduction of relations and correlates can be represented by hierarchically structured diagrams, with the most specific information about an object or an event at the bottom and increasing levels of abstraction above (see, for example, Spearman, 1923, pp.63–64, 99). Note that in such hierarchies there are fewer items per level as you ascend to more abstract levels.

Spearman referred to these three rules as the Qualitative Principles. The matching Quantitative elements are subdivided into five Principles and three Processes. We will summarise the major points very briefly. Firstly, the mind has a limited amount of mental energy which



can be allocated in part by the operation of the person's will. Further, the occurrence of a cognitive event makes that event more likely to occur again; a related issue is that cognitive events usually start and cease more slowly than their apparent causes. In addition, cognitive events, by occurring, tend to re-occur more easily. There is also a counter effect of fatigue, which decreases the tendency to repeat an action. Finally, there is the matter of individual differences upon which the earlier principles are superimposed. Underlying all these principles are three empowering processes which allow for the mechanical repetition of actions, the loss of psychological material from consciousness and variations in the perceived detail of material as attention is voluntarily switched from one part of the field to another.

Anyone with knowledge of the history of psychology would immediately point out that what Spearman proposed is certainly not novel. Rather, what we have in noëgenesis is the synthesis of much ancient and modern thinking into a unique system, one which has had many actual and potential applications in psychology. Unfortunately, the rather heady mixture of ancient and modern philosophy, together with the infusion of recent psychology, makes for a difficult meal for today's reader. However, what we hope to have done is to show that Spearman made a wider contribution to psychology than is generally remembered today.

It is worth mentioning a couple of contemporary applications of Spearman's approach to cognition: one, Sternberg's study of analogical reasoning (1977), explicitly acknowledged his influence, while the other, Rosch's work on the hierarchical structure of categories (see 1973, for example), is a more indirect reflection, but one which can nevertheless be said to be in the same intellectual stream. Interestingly, from the point of view of our thesis, Rosch cited the later work of the philosopher Wittgenstein as her inspiration, in particular his notion of family membership.

Tackling the more general historical and conceptual issues concerning the relationship between psychology and philosophy would have taken us too far afield. However, what we can say is that Spearman's unswerving and lifelong commitment to general intelligence means that he was arguing from both a philosophical position as well as from an empirical one. In addition, the complexity, scope and depth of his system of noëgenesis implied an equally strong commitment to untested yet plausible knowledge which could in essence be evaluated empirically at some stage, a position which also makes him both a speculative thinker and an experimentalist.

Sandy Lovie *is in the School of Psychology, University of Liverpool*
pirx1@liverpool.ac.uk

Pat Lovie *is in the School of Computing and Mathematics, Keele University*

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