Frank Plumpton Ramsey | Encyclopedia.com

(*b*. Cambridge, England, 22 February 1903; *d*. London, 19 January 1930), *philosophy, logic, mathematics, economics, decision theory*.

For the original article on Ramsey see *DSB*, vol. 11.

Admiration of Ramsey's brilliant career continues to grow. Despite having lived only twenty-six full years, his seminal work in various fields puts him in the top rank of twentieth-century scientists. His contributions to mathematical logic, combinatorics, and economics—which T. A. A. Broadbent describes in his *DSB* article—were quickly appreciated and are still influential. His contributions to decision theory, philosophy of science, semantics, epistemology, and metaphysics—some appearing in posthumous publications as late as 1990—took many years to gain the attention they deserve. They show that he anticipated several currents of thought in twentieth-century philosophy. Ramsey's ideas have lasting significance for many disciplines. The following summary emphasizes components of his work entering the limelight after Broadbent wrote.

Logic and the Foundations of Mathematics Bertrand Russell and Alfred North Whitehead in *Principia Mathematica* sought to derive mathematics from logic. Ramsey simplified their theory of types and dispensed with their axiom of reducibility. His proposals are in "The Foundations of Mathematics" (1925) and "Mathematical Logic" (1926).

Mathematics Ramsey's article "On a Problem of Formal Logic" (1928) treats decision procedures in logic. Along the way, it proves two major theorems in combinatorics. The theorems describe structural patterns appearing in groups. For example, any group of six people contains either three who know each other or three who do not know each other. These theorems generated a thriving branch of mathematics known as Ramsey theory. A typical question asks, what is the minimal number of members that ensures a group's having a certain structure? Certain Ramsey numbers, as they are called, exist but are unknown.

Economics Ramsey's articles "A Contribution to the Theory of Taxation" (1927) and "A Mathematical Theory of Saving" (1928) lay the foundations for the theory of optimal taxation and the theory of the optimal rate of saving for future generations. Ramsey's approach to these topics endures in macroeconomics.

Decision Theory Ramsey's groundbreaking paper "Truth and Probability" (1926) presents the main ideas of decision theory. It proves a theorem establishing the existence and uniqueness, given a choice of scale, of probability and utility functions representing preferences among gambles. The demonstration uses simple assumptions about structure and coherence to show that preferences may be represented as agreeing with expected utilities. Ramsey also observed that having degrees of belief conforming to the probability axioms is necessary for avoiding Dutch books, that is, systems of bets that guarantee a loss. Later, he established results about the value for decision making of gathering information.

It took decision theorists some time to grasp the significance of Ramsey's results. Theorists such as John von Neumann, Oskar Morgenstern, and Leonard Savage obtained similar results during the middle of the twentieth century. They roused enthusiasm for Ramsey's approach to probability and utility and prompted rediscovery of Ramsey's pioneering work. Representation theorems such as Ramsey's are the foundation of Bayesian methods in decision and game theory.

Philosophy of Science An interpretation of scientific theories must decide how to understand theoretical entities such as electrons and genes. In "Theories" (1929) Ramsey takes a theory to assert that the roles of its theoretical entities are occupied. The Ramsey sentence for a theory makes this claim explicit. To obtain the Ramsey sentence, begin with a big sentence stating the theory, replace its theoretical terms with variables, then existentially generalize the variables of that open sentence. The resulting sentence asserts that the theory is true under some interpretation of its theoretical entities. Ramsey's treatment of theoretical terms explains, for example, why their meanings may vary as a theory changes.

To distinguish the causal laws of science from accidentally true generalizations, Ramsey takes the laws as rules of inference in a formalization of complete knowledge of the world. David Lewis later advanced a similar view.

Semantics and Philosophy of Language In "Facts and Propositions" (1927) Ramsey expresses pragmatism concerning truth, belief, and meaning. His aim is a simple, naturalistic account of these subjects. Ramsey's theory of truth observes that an assertion of the truth of a sentence claims no more than the sentence itself. For example, to say that it is true that Caesar was murdered is to say just that Caesar was murdered. His account of acceptance of conditional sentences simplifies their interpretation, too. The Ramsey test says that you accept the conditional, "If p, then q," just in case when you add p to your

beliefs, minimally revising to maintain consistency, you also add q. The Ramsey test continues to guide accounts of the semantics and pragmatics of conditionals and also accounts of belief revision.

Analyzing the content of a true belief, Ramsey relied on the belief's effect on behavior. A belief is true if and only if it generates successful acts. For example, a chicken's belief that a caterpillar is poisonous is a true belief if and only if the chicken benefits from not eating the caterpillar. A true belief's content depends on the type of success holding the belief ensures. This principle, called Ramsey's principle, inspires a field known as "success semantics." Philosophers such as Fred Dretske, Ruth Millikan, and David Papineau have articulated Ramsey's naturalistic account of the contents of beliefs.

Epistemology In a short note titled "Knowledge" (1929), Ramsey presents an account of knowledge according to which it is defined as true, full belief acquired by a reliable process. Epistemologists, such as Alvin Goldman, who hold similar views, note the advantages of making knowledge depend on a belief's source rather than on evidence supporting the belief. Reliabilism explains, for instance, why a child may acquire knowledge through perception. The child may learn that a ball is red by perceiving its color. No review of the evidence concerning its color is necessary.

Metaphysics In "Universals" (1925) Ramsey denies the metaphysical significance of the grammatical distinction between subject and predicate. The sentence "Socrates is wise" is equivalent to the sentence "Wisdom is a characteristic of Socrates." Hence, it is arbitrary to take Socrates as a particular and wisdom as a universal.

Besides pursuing lines of thought that Ramsey initiated, scholars have also shown their esteem for Ramsey by naming awards after him. The Decision Analysis Society awards its Ramsey Medal to outstanding decision theorists. The journal *Macroeconomic Dynamics* awards its Ramsey Prize to eminent economists.

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