

FRANK RAMSEY'S COMMITMENT TO IDEOLOGY

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Pejorative references to ideology have become so commonplace in political bickering that even an editorial touting one's intellectual pedigree mouths the specious arguments. After failing to be confirmed to an appointment Federal Reserve, the Nobel-wielding economist Peter A. Diamond wrote a New York Times editorial, "When a Nobel Prize Isn't Enough", that informs the greater New York area of the Congressional Republicans' short-sightedness and ignorance of economic matters, concluding with the paragraph:

Analytical expertise is needed (...) to make government more effective and efficient. Skilled analytical thinking should not be drowned out by mistaken, ideologically driven views that more is always better or less is always better. I had hoped to bring some of my own expertise and experience to the Fed. Now I hope someone else can.¹

The usual cursory reading given to the opinion section of a newspaper may tempt agreement that "[s]killed analytical thinking should not be drowned out by mistaken, ideologically driven views", but, upon reflection, the distinction between skilled analytic thinking and mistaken, ideologically driven views becomes fuzzy. Obviously, Diamond believes economists of his persuasion exercise the former while the contrarian Republicans stymying his appointment espouse the latter. Unfortunately, a flippant reference to ideology suffices for an acceptable scapegoat in political bickering, allowing Diamond to mask his personal distaste for Republican tactics. The attack, however, works because ideologies are commonly believed to be oppressive in so far as they exclude possibilities from being decidable; ideologies have the power to curtly dismiss, or completely ignore, evidence that may falsify the theory. This ability to exclude evidence resides in the authority of the ideology: the facts, i.e. the world, are interpreted via the ideology, determining the limits of admissible evidence. Here, I will show that, structurally, even skilled analytical thinking, that rarefied air breathed by economists, will harbor the virus of ideology, suggesting the complications in believing in an objective, and true, interpretation of the world around us. This exposure of

¹ http://www.nytimes.com/2011/06/06/opinion/06diamond.html?_r=1&hp

ideology can most readily be shown through the works of Frank P. Ramsey's "Theories" and Jaako Hintikka's "Ramsey Sentences and the Meaning of Quantifiers", who, respectively, show the separation between theory and facts, and the logical relationship embedded in model formation.

Analytical thinking can be broadly considered as the process of distilling the complex into its simpler components, and this process seems to have been most acceptably shown by Ramsey. In his 1929 article "Theories", Ramsey constructs what he considers to be the general form of a theory, which consists of the traditional separation of a primary system and a secondary system. The primary system is that system which concerns the facts to be explained; the secondary system includes all those parts of theory that do not directly confront the evidence: mathematics, logic, scientific laws, axioms, and, of course, their concomitant theoretical terms. Theories can be written solely in a primary system, but, if one chooses to do so, then the theory cannot say anything beyond the evidence, leaving a purely descriptive and largely useless theory. For a theory to be interesting, and applicable to other situations, the theory will often include theoretical terms, which, in brief, can be defined as terms that are not reducible to an observation statement.

Much of Ramsey's work concerns the relationship between the theoretical and the empirical, and his posthumously-attributed eponymous contribution to philosophy, the Ramsey-sentence, directly addresses the incorporation of theoretical terms within an empirical testable theory. The theoretical terms are replaced by observable qualities via a dictionary. All the original theoretical terms occurring within the theory, apart from logical and mathematical symbols and things like functions and variables, are replaced with unnamed variables. The dictionary corresponds these variables with observational predicates and/or relations. Thus, a theory retains all of its empirical power while shedding the theoretical sin of misunderstanding. In "Theories" Ramsey writes:

The best way to write our theory seems to be this $(\exists \alpha, \beta, \gamma) : \text{dictionary} . \text{axioms}.$ ²

² 1929, 231.

Years later, Carl Hempel would label this a ramsey-sentence.³ Axioms refer to propositions of the secondary system fixing “truth-functions of the values of α , β , γ etc.”;⁴ and, the dictionary is “a series of definitions of the functions of the primary system $A, B, C...$ in terms of those of the secondary system α, β, γ etc.”⁵ This is a fairly standard understanding of theory that relates a primary system, the “facts to be explained”⁶ with a the secondary system, the systematic representation of those facts. The novelty lies in the insertion of the existential quantifier, \exists , that grants existence to the theoretical terms occurring in the secondary system, α, β, γ and the dictionary that corresponds the theoretical terms as equivalences to the observational terms occurring in the primary system, A, B, C . These equivalences substitute for any uninterpreted theoretical terms that occurred in the original theory, and thereby transforms a theory that included abstract and untestable references into an empirically equivalent and decidable alternative⁷.

This may be a formalized example of Diamond’s skilled analytical thinking. Given the correspondence between the variables replacing the theoretical terms and the observational predicates and/or relations carried by the variables, one may argue that Ramsey has done away with ideology. If ideology resides in the theoretical terms, then stripping a theory of its theoretical terms will also strip a theory of its ideology. Ideology, according to Diamond, is in opposition to analytical thought; analytical

³ See pg 80 of “The Theoretician’s Dilemma: A Study in the Logic of Theory Construction” Minnesota Studies in the Philosophy of Science Vol II. University of Minnesota Press, Minneapolis. 1958, pp 37-98.

⁴ 1929, 214.

⁵ 1929, 215.

⁶ 1929, 212.

⁷ See Rudolf Carnap (1966), Ch 26, “The Ramsey Sentence”, pp. 247-256 where Carnap presents a theory, TC, that includes theoretical postulates (T), postulates for correspondence rules (C) and six theoretical terms: molecule, hydrogen molecule, temperature, pressure, mass, and velocity: (TC) ... Mol ... Hymol ... Temp ... Press ... Mass ... Vel ... ; ... Temp ... $O1$... $O2$... $O3$... Press ... $O4$... Om (Temperature’s three observable terms, $O1, O2, O3$, refer to the relation among the tested body, the time point of observation, and the corresponding number on the thermometer. Likewise, pressure will refer to the observable terms, $O4 - Om$, dictated by (C)). To ramseyfy, the theoretical terms must be replaced by variables: $C1$ and $C2$ will replace the class terms, molecule and hydrogen molecule; and, $R1$ to $R4$ will replace the relation terms, Temp, Press, Mass, and Vel. The result is the open formula: ... $C1$... $C2$... $R1$... $R2$... $R3$... $R4$... ; ... $R1$... $O1$... $O2$... $O3$... $R2$... $O4$... Om Next, the imposition of existential quantifiers transforms the above open formula into the ramsey sentence: (RTC) ($\exists C1$) ($\exists C2$) ($\exists R1$) ($\exists R2$) ($\exists R3$) ($\exists R4$) (... $C1$... $C2$... $R1$... $R2$... $R3$... $R4$... ; ... $R1$... $O1$... $O2$... $O3$... $R2$... $O4$... Om ) RTC is the ramseyfication of TC .

thought, I suppose for Diamond, is something akin to the scientific method with its reproducibility, inductive reasoning, and clear definitions. Thus, substituting the theoretical with the empirical will melt the ideological commitments of the theory. Unfortunately, the increasing encroachment of quantitative methods into political decisions encourages one to believe that empirical science has kicked free of ideology, and Diamond, obviously, holds such a belief. A cursory glance at Ramsey, however, reveals this as a sleight of hand. If the theoretical terms have been banished, why do they continue to appear in theory? If they can be neatly substituted, then why have them at all?

In response, Ramsey suggests that theories are akin to narratives that include theoretical terms because theoretical terms accommodate amendment and theory growth. Ramsey offers the example of a fairy tale in which the story can be changed as long as the characters remain the same. Thus, ramseyfication is empirically equivalent to the theory-laden original, but it is not exactly the same. The original theory, as the origin, has a particular sway over the existentialized result, and, although the substituted variables replace theoretical terms, they may not be reducible to those substitutions. Therefore, the original holds a surplus value beyond the empirical equivalent. Ideology lurks within this surplus value. Moreover, and easier to show than lurking ideology, the dictionary is an act of selection: substituted variables are assigned values, and this assignation will depend on factors other than empirical facts.

The ideology is expressed through the dictionary. The dictionary is as an act of selection, in so far as the substituted variables are assigned values, and this assignation depends on an ideology. It assigns these empirically-decidable terms via functions, but the resulting empirical theory hides the substitution as the work of a choice function. Ramsey-sentences replace the theoretical terms with variables, but these variables have to be assigned possible values, which demand a correspondence with the world. This can be easily shown through Jaako Hintikka's model-theoretic interpretation of Ramsey-sentences.

Jaako Hintikka's "Ramsey Sentences and the Meaning of Quantifiers"⁸ reveals the relationship between first-order and second-order theories. Disagreeing that Ramsey-

⁸ *Philosophy of Science*, Vol 65, No. 2 (Jun., 1998), University of Chicago Press, pp. 289-305.

sentences eliminate all theoretical concepts, he argues that although Ramseyfication eliminates the theoretical terms occurring in the axioms and the bridge laws, Ramsey-sentences introduce high-order quantifiers when the theory moves from what was a first-order theory, the original theory that included primitive constants, to a second-order theory, which existentially quantifies over variables that substitute nameless classes and relations for the original theoretical terms. Hintikka argues that the second-order theory introduces a theoretical content that may have not been present in the first-order theory. In explanation, he offers,

$$T [O_1, O_2, \dots, H_1, H_2, \dots],$$

as an example of a first-order theory with $O_1, O_2 \dots$ being the primitive observational terms and H_1, H_2, \dots being the primitive theoretical terms. The ramseyfication of the first-order theory replaces the theoretical terms, H_1, H_2, \dots , with the variables X_1, X_2, \dots , imposes existential quantifiers onto those substitutions, making the ramsey-sentence, $(\exists X_1) (\exists X_2) \dots T [O_1, O_2, \dots, X_1, X_2, \dots]$.

Although the theoretical terms, H_1, H_2, \dots , are eliminated from the theory, the Ramsey-sentence cannot be correctly deemed to be free of all theoretical concepts just because the primitive theoretical constants have been eliminated in favor of existentially-quantified variables. Assuming that either H_1, H_2, \dots do not encompass the whole of the theoretical content or that the movement from a first-order theory to a second-order theory incorporates theoretical content, Hintikka shows that the elimination of H_1, H_2, \dots does not eliminate all theoretical content within the second-order Ramsey-sentence. Hintikka clarifies this by offering an analogy that concerns the role theoretical terms play within a theory. He writes

$$M(O_1, O_2, \dots, H_1, H_2, \dots)$$

as a model of the first-order theory that includes both the observational and theoretical terms. Subtracting the sub-structure that only includes the observational terms, Hintikka produces the observational model

$$M(O_1, O_2, \dots).$$

Hintikka argues that even though the model only includes the observational terms O_1, O_2, \dots , the model still includes theoretical concepts. These theoretical terms, however, did not necessarily occur in the original first-order theory. The theoretical terms of first-order theory, H_1, H_2, \dots , had been removed when constructing $M(O_1, O_2, \dots)$, which

rejects them as possible candidates of carrying theoretical content, yet something must constrain $M(O_1, O_2, \dots)$, otherwise the observational terms, O_1, O_2, \dots , could not be included within a model.

The constraint on $M(O_1, O_2, \dots)$ is the fact that it is imbeddable within $M(O_1, O_2, \dots, H_1, H_2, \dots)$, which is a model of $T[O_1, O_2, \dots, H_1, H_2, \dots]$. This imbeddability requirement reveals the important implications of moving from a first-order theory to a second-order theory. While the constraint is indirect, imbeddability is a structural requirement imposed upon $M(O_1, O_2, \dots)$, and, regardless of it being a structural, Hintikka notes that the requirement need not be deemed trivial, particularly because imbeddability drags along theoretical concepts into the second-order theory.

Hintikka writes that “[t]he imbeddability requirement is the way in which the theoretical terms of a theory contribute even to its observational component, not through some tacit definitions or bridge laws” but through the imbeddability of a model within another model. The imbeddability requirement is revealed in the relationship created by imposing an existentially-quantified variable bounded by a universal quantifier, as is the case when Ramseyfication replaces the theoretical terms of the original theory with variables. Thus, he shows, the imposition of quantifiers instantiates theoretical concepts despite the removal of theoretical terms from the original first-order theory, leaving a situation that includes traces of theoretical concepts within the first-order theory.

Hintikka writes “combinations of interacting first-order quantifiers can also introduce nontrivial theoretical concepts into a (formal but interpreted) language”, which, here, refers to the existentially-quantified variable bound by a universal quantifier operating as a function in so far as a function interprets a variable in first-order logic. For example, Hintikka shows that the existence of a satisfying variable, y , in the formula

$$(\forall x)(\exists y) S[x, y]$$

which says “that it is possible to choose, for any given value of x , a value of y such that $S[x, y]$ ”, can also be expressed as a Skolem function,

$$(\exists f)(\forall x) S[x, f(x)],$$

resulting in that the “dependent quantifier $(\exists y)$...introduces in effect the choice function f ”. Hintikka notes that along with the incorporation of theoretical concepts when a first-order theory becomes a second-order theory, the above shows that

dependent first-order quantifiers can also bear theoretical concepts. In the above example, the first-order quantifier, $(\exists y)$, is dependent on, or quantified over by, the universal quantifier, $(\forall x)$, are the interacting first-order quantifiers that incorporate theoretical concepts.

The formation of a Ramsey-sentence produces the same theoretical concepts. While the movement from a first-order theory to a second-order theory removes the theoretical terms, it fails to eliminate the theoretical content that gets hidden within the function that replaces the existentially-bound variable that is quantified over by a universal quantifier. The function is the choice of the satisfying object that is bound by the universal quantifier. The satisfying object is either constrained by the function or by the quantifiers, but, either way, it is constrained by a theoretical concept.

As seen above, the imbeddability to which Hintikka refers concerns the relationship between the Ramsey-sentence and the original theory. Likewise, a model of the original theory will relate in the same way to any substructure of the model. Ramseyfication preserves the structure of the original and all of its observational consequences, but the elimination of theoretical terms does not deny the theoretical terms' organizing effect on the observable terms, which, via their organizing effect, incorporates theoretical content apart from the theoretical terms themselves. Despite the belief that a mature scientific theory can solely be concerned with the empirical, Hintikka has shown that theoretical content cannot be eliminated from a scientific theory. Theoretical terms may be removed via ramsey-sentences, but residual theoretical content will remain within the structure that the observable content must be imbedded.

Hintikka's elaboration of Ramsey-sentences is consistent with Ramsey's other writings. For instance, in "Mathematical Logic" (1926) Ramsey suggests this imbeddability while referring to the mathematician Weyl, writing:

If, Weyl says, knowledge is a treasure, the existential proposition is a paper attesting the existence of a treasure but not saying where it is. We can only say 'There is a prime number' when we have previously said 'This is a prime number' and forgotten or chosen to disregard which particular number it was. Hence it is never legitimate to say 'There is a so-and-so' unless we are in possession of a construction for actually finding one. In consequence, mathematics has to be very considerably altered; for instance, it

is impossible to have a function of a real variable with more than a finite number of discontinuities.⁹

The existentialized theory, the Ramsey-sentence, only makes sense when constrained by the original theory. Otherwise, the existential proposition is not a judgment. The knowledge of the function is the possession of a construction for finding what the existential proposition asserts. The construction of a model, as a possible interpretation of a theory, depends upon the theory because the model bears the constraints of the theory, the substituted variables can only operate within the interpretation of the theoretical terms.

If the model, a first-order theory, is constrained by the second-order theory, then we may assume that, although the ideology has been hidden, it has not been stripped because the structure that constrains the interpretation of the model also bears the theoretical commitments of the original theory. The functions bear this commitment, and thus, suggest that empirical theories are not free from ideological commitments. Therefore, Diamond's separation of ideology and skilled analytical thinking becomes suspect because every theoretical explanation of the world has to be founded in an ideology. Although certain values may be adopted to prefer some theories over others, the imposed, substituted values will assert models that restrict the facts to certain interpretations, thereby excluding other, possibly competing, interpretations. Thus, all application of theory constricts the world of facts to a set of potential satisfying objects, and this can be clearly seen through the choice function that assigns values to the facts that the theory intends to explain. However, much Diamond's skilled analytic thinking is needed in government, distinguishing ideology from an objective, value-free, analysis is impossible.

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⁹ Found in *Foundations*. ed. Mellor. Routledge, London, 1978. 213-232. p. 218.