

HOW THE CONCEPTS OF FUNCTION AND STRUCTURE WORK

This paper has two main aims. (1) To show that the study of structures and the study of functions are two complementary aspects of a single process: the establishment of a taxonomy within which scientific investigations can get under way. (2) To prove that functional analyses have special characteristic features appropriate to a certain stage of investigation, and are therefore not identical with sociological analysis as a whole. Functional analyses are, furthermore, teleological, contrary to what most functionalists claim.

(1) To start with, I should like to dispense quickly with a red herring. It is often said that functionalism in anthropology relies on an analogy between a society and a biological organism. The notion of 'function', it is said, has its primary use in connection with parts of the body, such as the heart, the lungs, the kidneys, and so on. The function of these organs is to pump blood, extract oxygen from the air, and to excrete waste fluids, all of which conduce to the survival of the organism. However, I believe that talk of the function of an animal part is itself based on an analogy between animals and machines, and the primary use of the term 'function' occurs in connection with machine components which have been designed and brought into existence with some purpose in mind. It would be a long job to defend my double analogy thesis on historical grounds. To do so would be partly to trace the history of the argument from design. I do not propose to do so here, for in any case the question of whether functional analyses of social units are historically based on an analogy is irrelevant to us now. No one claims, surely, that a functionalist must actually think of a society as an animal in order to count as a functionalist, nor indeed that he should make any use of the alleged analogy in the process of coming to functionalist conclusions. So as far as the logic of functional analysis is concerned, if it has a logic, we may ignore the question of analogy. The subject-matter of a functional analysis is only relevant here in so far as different types of entity may impose different methodological constraints on us in our attempt to identify their function. Exactly the same considerations apply to the question whether structural analysis in anthropology is based on an analogy with organic structure, and whether organic structure is analogous to machine structure. It will be obvious from this preliminary remark that I propose to deal with the relation between structure and function in abstracto. I do not worry too much whether my examples are mechanical, biological or cultural, because from the cybernetical point of view the formal relationships are identical, whatever the status of the terms of the relations.

My first job is to show how the study of function and the study of structure are inextricably intertwined. I define these terms in the same way as the Concise Oxford Dictionary.

Function: activity proper to anything, mode of action by which it fulfills its purpose.

Structure: manner in which a building, or organism or other complete whole is constructed, supporting framework or whole of the essential parts of something.

In anthropological literature there is a convenient ambiguity between "X is a structure" and "X has a structure", which mirrors the confusion in English over notions like 'shape', 'colour', etc. Is a structure or a shape or a colour an abstract particular, or is it a property of a concrete particular? The C.O.D. says that a structure is a manner in which X is constructed, thus opting for the latter usage. I propose to ignore this distinction since anything I say in one way can be translated into the other.

It is a platitude that the things that may be said to have functions are entities or units of some sort. In other words, it is a truth of logic that X must be something before it can do something. Among the things which have functions, an important subclass consists of things which have internal structures, or if you prefer, things which are structures. Not all things which have functions need to have a structure, however, since from the point of view of the investigation in hand, a given unit may be taken to be the smallest or most basic, and so no attempt is made to break it up into smaller parts or to analyse its structure. Of course, a different, more molecular investigation may be interested in doing just that, but then this new investigation will in turn treat some other units as unanalysed. The dichotomy between part and whole is like a grid that can be shifted around on top of the data, relative to our interests. However, in using the terminology of 'part' and 'whole', we do presuppose that something has a structure, namely the whole. The clue to the structure of the whole is the relations between its parts. Thus, whenever we propose to analyse the function of something when that thing is taken to be a part of some bigger thing, we set out presupposing that the bigger thing has a structure. Given the relativism of parts and wholes, the whole logical space of possible investigations divides itself into a hierarchy. At the apex is a whole which is not itself a part; at the base are parts which are not taken to be composed of parts. The apex may or may not have a function, but any unit below the apex must have a function, in the sense that it plays a part in the wider system. The units at the base may or may not have structure, but any unit above the base must have a structure, since it is composed of parts. Thus, every unit, except for those at the bottom and the one at the top, must have both a structure and a function. That is, apart from the exceptions at the top and bottom, the same things that have structures have functions, and the same things that have functions have structures.

Now the question arises for any branch of science: What are the appropriate units of study for our science? This is the question Durkheim asked in the first section of his essay on Montesquieu (1965). Of course, no science is totally in the dark about its own range of subject-matter when it asks this question. It must have some idea of its external boundaries, otherwise nobody would suspect that on the tree of knowledge it constituted a branch. Yet it may have but a hazy idea of how to chunk up the area of reality that lies within its boundaries. Zoology, for example, did not exist as a systematic discipline until Darwin's theory of evolution by natural selection provided a

comprehensive method for defining and classifying the entities that are its subject-matter. It is a simple matter to show that for any set of data, there are indefinitely many ways of describing and classifying it, so Darwin's theory is just one of a number of possible theories compatible with the same data. What makes Darwin's theory of descent with modification the right theory is that it brings systematic unity to the whole of zoology by means of a hierarchical diachronic taxonomy into which all future paleontological, morphological and embryological findings will fit. Similarly, in any other branch of science, anthropology for instance, there will be an indefinite number of possible ways of chunking up the subject-matter into units. The right way, if as I assume we can talk in terms of there being a right way at all, is the way which brings as much systematic unity as possible to the whole field. If there were no right way, then the field could not be systematised, and so could not count as amenable to scientific treatment. So the task for a rational study of structures is always to taxonomise, to create or discover the appropriate units of study, with an eye to introducing system into the mass of data. Structuralism, in particular the work of Lévi-Strauss, seems to me to represent an attempt to create the right taxonomy for anthropology. Of course, the study of structures, and the analysis of structures into component structures, just is taxonomy. The point of good taxonomy is to group structures in theoretically interesting ways, so that once it is done, we can make generalisations and construct theories about the entities which our taxonomy has crystallised out. The permutation of elements which is widely believed to be the hallmark of structuralist taxonomy is in fact characteristic of other fields as well as linguistics and anthropology. For example, Darwin's concept of species as dynamic entities is now understood via the concept of the gene-pool, defined as the sum-total of genetic information in an interbreeding population. The number of possible gene-combinations in a gene-pool greatly exceeds the number actually realised by the members of the species. New generations are reshufflings of genes. But the new gene-combinations are always drawn from the original structural matrix of possible combinations, which defines the genetic potential of the species.

Defining one's units of study is not just a preliminary, however, especially in subjects where the data is complex, since one must not suppose that the units will, so to speak, fall out in advance of theory-building. Rather it is through theory-building and testing that we successively approximate to a rational taxonomy.

This is where functionalism comes in. Let us imagine that we find ourselves in the initial stages of carving out a science. We don't yet know, in a strict sense, what are the appropriate units of study. We may have certain terms at our disposal, such as the term 'biological family', but we have reason to believe that these terms are not going to be able to support an edifice of systematised knowledge of the sort that we hope to achieve, and so we are looking for new units. Useful units may not yet have words to describe them in our language. Our job is therefore to create taxonomic units and to invent words for them if necessary. The sorts of units that look as though they will be fruitful may be abstract, because the relationships between their parts may be more important than the identity of their parts. This does not bother us, as we have a handy substantive which enables us to talk of relationships themselves as

units or entities. This substantive is 'structure'. What, however, are the constraints which regulate our imaginative task of creating new structures? There must be some constraints, for we know a priori that the number of possible structures that can be abstracted out is limitless. We want to put forward only useful ones, ones that will be illuminating from the wide perspective of systematic anthropology as a whole. The main constraint, I suggest, is that the structure distilled from the amorphous network of data, let us say data concerning kinship phenomena, should actually do something interesting. Out of the whole range of things it does, the most interesting things will be those that pertain to its role in larger structures of which it is an element. Indeed its role (a functional notion) is the main guide to its location in the larger structures ('location' being a structural notion). This is, I submit, the constraint that Lévi-Strauss was working with when he suggested, in his early work The Elementary Structures of Kinship, that the basic unit or, as he says, 'atom' of kinship is the structure (brother, sister, father, son). Why did he choose this instead of choosing the relationship between, say, grandfather and sister, or that between mother, father, sister, brother, and patrilineal parallel cousin, or any other logically possible combination of terms? The reason is that Lévi-Strauss' unit of kinship is the minimum necessary to understand the avunculate, and thus the key to understanding how kinship systems work.

It is the minimum unit for logical reasons. As he says in his paper Structural Analysis (1958, chap.II), "In order for a kinship structure to exist, three types of family relations must always be present: a relation of consanguinity, a relation of affinity and a relation of descent -- in other words, a relation between siblings, a relation between spouses, and a relation between parent and child." (1958, p. 46). He accounts for the avunculate by showing that it is basic, because it is constitutive of the basic unit. "The primitive and irreducible character of the basic unit of kinship, as we have defined it, is actually the direct result of the universal presence of an incest taboo. This is really saying that in human society a man must obtain a woman from another man who gives him a daughter or a sister. Thus we do not need to explain how the maternal uncle emerged in the kinship structure. He does not emerge, he is present initially. Indeed the presence of the maternal uncle is a necessary precondition for the structure to exist." (1958, p. 46).

Finally, and most importantly, he explains how kinship systems can be shown to function when we view them as composed of the basic unit. "We must understand that the child is indispensable in validating the dynamic and teleological character of the initial step, which establishes kinship on the basis of and through marriage. Kinship is not a static phenomenon; it exists only in self-perpetuation. Here we are not thinking of the desire to perpetuate the race, but rather of the fact that in most kinship systems the initial disequilibrium produced in one generation between the group that gives the woman and the group that receives her can be stabilised only by counterprestations in the following generations." (1958, p. 47). Thus a functional constraint is built into Lévi-Strauss' choice of (brother, sister, father, son) as his basic unit. He recognises that we could conceive of an analogous symmetrical structure, equally simple, where the sexes would be reversed. This structure, involving a sister, her brother, brother's wife, and brother's daughter, would obviously satisfy the three logical constraints just as well. But

this theoretical possibility is eliminated on empirical grounds, since such a structure would be incapable of performing the function which he was all along bearing in mind. As he says in Les Structures Elémentaires: "If, then, in the final analysis, marriage with the father's sister's daughter is less frequent than that with the mother's brother's daughter, it is because the second not only permits but favours a better integration of the group, while the first never succeeds in creating anything but a precarious edifice." (Needham, 1962).

I think we see here a paradigm of taxonomic reasoning, involving, first, a substratum of empirical information about the prevalence of matrilineal cross-cousin marriage; second, an explicit statement of the logical requirements to be satisfied by any putative kinship unit if it is to be capable of yielding systematisation; third, a reciprocal adjustment of structural possibilities to functional requirements. My main intention is to draw attention to the third. The study of any branch of science in the process of establishing a decent taxonomy reveals that decisions to adopt such and such as the basic unit in terms of which agreed facts can be stated are regulated throughout by functional hypotheses. We choose what things to talk about with an eye always on their explanatory potential. What the units at the basic level do determines what the units at higher levels are, hence explains why they are as they are. The failure of purely functionalist attempts to explain social facts can be viewed as partly the result of incorrect taxonomy. Unless one sees the factors constraining one's choice of appropriate units from a wide perspective, one is sure to choose arbitrary, ephemeral and parochial units. These will break down under the rigid formal discipline of functional explanation à la Hempel, for example, since their identity conditions, and correspondingly the identity conditions of the systems of which they are parts, are incapable of being fulfilled over reasonable stretches of time. However, once one develops the overview of a taxonomist, one sees that structural analysis and functional analysis are not only complementary, but also that together they exhaust the logical space which all sociological theories occupy. It is not only absurd to think of structuralism and functionalism as opposed to each other, but it is also senseless to think of either of them as being opposed to theories on a lower logical level, i.e. theories defined in terms of their characteristic subject-matter, or their characteristic methods.

(2) My second part is a proof that functional analysis is teleological. To do this I need to define functional analysis. But a lot of definitions of it have been given by functionalists, all different. Impatient perhaps with the vagueness surrounding this topic, Kingsley Davis (1959) suggested that functional analysis was no different from sociological analysis as a whole, since it was concerned in a quite general way with the inter-relations between the elements that make up society. He proposed on these grounds that the notion should be scrapped. There is, I think, much to be said for this conclusion, but unfortunately Davis' grounds are not correct: functional analysis is a special kind of analysis, because a function is a special kind of activity, as I shall show in a minute. It is not, therefore, identical with anthropological analysis as a whole, but is merely an essential aspect of it, just as structural analysis is an essential aspect of it, but not identical with anthropology as a whole.

Functional analysis has been attacked on all sides. Hardline positivists say that functional explanations are invalid backward causal explanations, or that they are unverifiable, or that they are mere heuristic devices; while Verstehen theorists and Wittgensteinian philosophers argue that the sort of insight they provide into social facts is not the objective scientific sort that most functionalists take it to be. It has been criticised both for being merely causal and for not being genuinely causal; both for being linked with evolutionism and for being incapable of explaining changes through time. In a spirit of friendliness, Nagel and Hempel among philosophers, and Merton, Talcott Parsons, Homans and many others among sociologists, thought they would inject functional analysis with respectability by tightening it up, by defining its terms. The philosophers, especially, thought the main sources of trouble were untestable teleological assumptions implicit in functional ascriptions. If only, they felt, talk of functions could be empirically cashed in terms of the survival of something, as Darwin had done for species, then the teleology would be made manageable! The result of their efforts to formalise it has not been a resurgence of functional analysis, however, because what they call a logically proper piece of FA has to satisfy so many difficult methodological conditions that it is practically impossible to carry one out. In any case, the enterprise of formalisation was motivated by a muddled reductionism among the philosophers of science, who did not understand the positive role of teleological sentences in the activity of theory construction.

Hempel, in The Logic of Functional Analysis (1959) starts by correctly pointing out that not all the consequences of the heart's beating are functions of the heart. "A function of the heart is to circulate the blood" is true, whereas "A function of the heart is to produce heart-sounds" is not true, though it is true that the heart does produce heart-sounds. The difference lies, he says, in the fact that circulation of blood is a necessary condition of the survival of the organism, while the production of beating-sounds is not. He then formulates the general conditions for the truth of a functional ascription of the form "A function of X is to do F". These are (i) that X should in fact do F, (ii) that F should be a necessary condition of the survival and well-being of the whole of which X is a part. This general schema is then applied to functional analysis in sociology, where problems immediately arise over the term 'necessary condition' and over the definition of 'survival' and 'well-being' when predicated of society as a whole. If the problem of functional equivalence and the problem of defining the 'functional unity of the whole', to use Radcliffe-Brown's terminology, could be overcome, the teleological connotations of the functional statement would be tamed by treating a society as a homeostatic system, in which deviations from the normal values of given social variables would be compensated by corresponding adjustments in social variables elsewhere in the system. Nagel has set out such a formal model in his paper 'A Formalization of Functionalism' (1956 : pp. 247-83). To explain how a social practice or institution performed its hypothesised function would then amount to showing that it was interrelated in the reciprocal manner outlined. Since this interrelation is an empirical matter, functional ascriptions would be subject to experimental confirmation. Once they have accounted for functional statements in this way, Nagel and Hempel have, they think, analysed what it means to call a whole system teleological, and so there is no longer any sting left in the epithet.

This is what is called a reductionist approach to teleology, because it reduces teleological systems, by definition, to systems incorporating negative feedback mechanisms. From one point of view it brings teleological

systems into the realm of scientific investigation. From another point of view it completely misses what is essential about teleological language in science. The view you take depends on how you conceive of teleology. I believe that if we do define it in Hempel and Nagel's way, we needlessly rule out certain intuitively acceptable functional ascriptions, and we fail to capture the essential point of making functional claims in science.

Remember that Hempel is putting forward an analysis of what functional claims mean. He says that "X has a function" means "X conduces to the maintenance of a system of which it is part". This is quite a plausible hypothesis when X stands for an internal organ of an animal. But it is quite implausible when applied to everyday tools, and not very plausible when applied to social structures. If Hempel were right, we could not say that hammers and screwdrivers had functions, since they are plainly not essential for the survival of a system of which they are part. The claim that they are essential is in any case vacuous unless Hempel can specify what systems they are parts of. But it is not clear in advance that a hammer is a part of any system at all. Perhaps 'function' is being used in a different sense when applied to artefacts designed for a human purpose. But the trouble is, these same objections apply to social phenomena. If Hempel's linguistic recommendation caught on, we should be unable to put forward speculative functional hypotheses like, Veblen's theory of conspicuous consumption, where we do not wish to imply that impressing one's neighbours is a necessary condition of survival. In a word, the suggested definition is far too strict. Survival is not the only ultimate goal which validates a functional ascription, though it is a very important, indeed privileged, one.

This strict legalistic conception of functional analysis commits what Whitehead called 'the fallacy of misplaced concreteness'. It ignores what is essential about attributions of function. They are inherently free and easy, and need to be so in order to fulfil their characteristic scientific role of suggesting new experiments. They do this primarily by generating new data and directing observations. Consider two scientists looking through a microscope at some living scab tissue, one of whom knows that the function of scab formation is to facilitate the regeneration of normal skin, while the other does not. For both, the microscope reveals a number of cellular activities, but for the one who does not know the point of what is going on, the movements of the particles have no meaning. He cannot integrate the separate events into a single goal-directed process, and so he cannot sum them up with an overall description. Without a functional hypothesis to regulate his observations, he will not know which changes are significant, nor what objects in the picture to attend to. Sometimes, unless he can classify the entities in broadly functional terms, he will not even know what counts as an object and what is mere background. This illustrates that one of the roles of functional language in science is, roughly, to organise one's observations.

A functional hypothesis is, according to my definition, a hypothesis of the form "X does F in order to achieve G", where G stands for a goal. The presence of the phrase 'in order to', or 'for the sake of' marks the sentence as unmistakably teleological. G can stand for anything you like, as long as you view it as something that must get done. There is no need to say that this is how you are viewing it, however, since your commitment to the teleological sentence form already indicates that you regard G as a future state to which some value is attached. Thus if anyone put forward the functional hypothesis that the function of heart-attacks is to produce quick deaths, it would be obvious from the fact that he was using the functional sentence form that he was presupposing a pro-attitude towards quick deaths. Because the positive evaluative element is implicit in the description of some object or activity as 'functional', it is misleading to talk, as Merton does (1959, esp. Chpt. 1.)

of the 'dysfunctions' of social phenomena. All he means by 'dysfunction' is 'unfavourable consequence from the point of view of a wider system'. But as I have shown, once one has adopted one's standpoint whatever it may be, unless the activity of an item is being viewed as good or useful from that standpoint, it is not being viewed as a function of that item at all. That is why we do not say "The function of the heart is to produce heart-sounds"; though of course we might say it if we had a physiological theory which said that heart-sounds were useful.

Let me make this clearer. Any functional sentence, e.g. "A function of witchcraft persecutions among Navaho Indians is to lower intragroup hostility" (Kluckhohn : 1944) can, in my view, be transformed into a sentence with 'in order to' or 'for the sake of' in. Thus we get "Witchcraft persecutions among the Navaho lower intragroup hostility for the sake of G". In my analysis, a new term G occurs which lay below the surface in the original. What does it stand for? As far as logic is concerned, it can refer to any future state you like. The important thing is its relational property of being something that is being regarded as a goal towards which the phenomena are teleologically directed, that is, something which stands out as a destination. The fact that we do not need to specify what it is explains why it is left in the deep structure of the original functional sentence. In this example, its force is already negatively encapsulated in the term 'hostility'. Its role is to add emphasis to the statement that witchcraft persecutions do, de facto, decrease internal tensions, by suggesting that there is a pressure of events to make sure that this gets done. The idea that something more than mere contingency is involved manifests itself in the assertion that if some obstacle should prevent witchcraft persecutions from performing their postulated job, then Navaho society would overcome or bypass the obstacle, say by throwing up a different practice that did the same job.

The fact that G has some imperativeness attached to it explains why most people who have written on this topic identify G with some biological, psychological or social need ultimately cashable in terms of individual or group survival. But it is wrong to do this, as a hypothetical case invented by Sorabji (1964) illustrates. Suppose there were an organ which only came into operation when a person had incurable cancer, and which cut off all pain from the cancerous area. We should not hesitate to say that doing this was its function, even though it had no survival value. My theory can explain why it is so tempting to link function with survival by definition. The ultimate validation of any functional ascription must be a future state that is regarded as valuable, or part of the essence of the thing manifesting the state. Vital needs are privileged candidates for this position because if they were unfulfilled the system would soon cease to exist. From the system's point of view it is better to exist than not to exist. Survival, maintenance of equilibrium, adjustment to the environment etc. are privileged G's, in the sense that without them there would no longer be a system to talk about. But equally, there may be another point of view from which it appears better that a certain system should not exist. It seems to me that an item which secures the self-destruction of the system of which it is a part may without contradiction be said to have this job as its main function, and not merely as an unwanted side-effect of some other function. The only requirement for so viewing it is that there should be a perspective or a theory in which this case of auto-destruction is right and proper.

But not all functional hypotheses are equally useful. What are the constraints on theoretical perspectives within which a given activity may be viewed as functional, apart from the rock-bottom empirical constraint that the item should in fact perform the activity which is being presented as one of its functions? The main constraint is the same general taxonomic consideration

which regulates structural hypotheses, namely that the functional ascription should lead to systematisation of a wide field of data. Ideally, the function we assign to an item in a larger whole should fit in to a hierarchical organisation of functions. Once again we see why survival-value has a privileged position among possible functions: it unifies a mass of disparate functions by organising them into a hierarchy of which survival is the apex. But there may be more than one hierarchy and more than one apex. Anthropological taxonomists have a wide-open field where they can construct alternatives. In these circumstances, the more functional hypotheses we can concoct the better, so long as we bear in mind that ingenuity must eventually meet the harsh demands of systematics, i.e. simplicity, consistency, coherence. To quote from Lévi-Strauss's essay 'Social Structure' (1958 : 280): "Though many models may be used as convenient devices to describe and explain the phenomena, it is obvious that the best model will always be that which is true, that is, the simplest possible model which, while being derived exclusively from the facts under consideration, also makes it possible to account for all of them. Therefore the first task is to ascertain what those facts are."

To sum up. I have tried to prove two points. First, structural hypotheses are regulated by hunches about possible functions, and functional hypotheses are tailored to our choice of structural units. Rational taxonomy proceeds by the mutual adjustment of function and structure, and provides the framework within which particular anthropological theories can be stated and tested. Second, functional hypotheses are teleological ways of looking at things. They have an empirical aspect, because "A function of X is to do F" cannot be true unless X does do F. But they also have a non-empirical aspect, since the goal-directedness we impute to X is projected on to it rather than discovered in it by examination. The main point of describing the facts by means of a teleological sentence, which asserts more than is strictly warranted by the facts, is that each functional ascription represents a mini-theory that can generate new observations and suggest new avenues of research. Most will be knocked down, but some will stand provided they are capable of fitting into a systematised body of knowledge. The ones that pass through the filter will be ones that ascribe functions to genuine structural units rather than arbitrary units. As the system grows and the right structures get crystallised out, the functional ascriptions become increasingly entrenched until there ceases to be any point in saying that they are not objective. Like the sentence "The function of the eye is to see", they turn into tautologies, as performance of the function is seen to be constitutive of the identity of the structure.

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