Rule-Following in Grammar and Behavior

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In recent years transformational linguists have with increasing articulateness and effectiveness expressed concern over the apparent inadequacy of learning theory in accounting for the acquisition and exercise of the syntactic structures which are believed to mediate verbal behavior. For example, a recent exchange between Braine (1965) and Bever, et al (1965a, b) is concluded with the following admonition from the linguists: "As the empirical basis for assuming an abstract underlying structure in language becomes broader and the explanatory power of that assumption becomes deeper, we recommend to all psychologists that they seriously question the adequacy of any theory of learning that cannot account for the fact that such structures are acquired" (Bever, Fodor, and Weksel, 1965b).

The present paper will not deal with specific contentions about alternative grammatical formulations or alternative associationistic representations of grammatically structured behavior. The purpose is, rather, to extend the scope of the dialogue in such a way as to remove the basis for contention. Briefly, I shall try to show that although the specific criticism directed toward associationist learning theory appears to be justified at the present time, the demand that psychological theory should provide the mechanisms for acquiring and exercising linguistic competence is a move which violates the methodological character of transformational theory itself. I shall try, by indicating an alternative formulation of psychological theory, to show that that move is also an unnecessary one.
The alternative formulation (Ossorio, 1966a) is one which is likely to be unfamiliar to the reader. The theory has important continuities with the recent "Ordinary Language", or "Oxford", tradition in philosophy. However, it goes significantly beyond previous formulations in scope and systematization, and is psychological rather than philosophical. It may be characterized as a systematization of what has previously been informally identified as the "rule-following model" of human behavior (e.g., by Mischel, 1964).

Four points need to be made about the theory by way of summary and introduction: (1) It is fundamentally different. In terms of Morris' classic (1938) distinction of syntactic, semantic, and pragmatic, the rule-following model is a pragmatic theory having the reflexive character of natural language, whereas the commonly known behavior theories in psychology are semantic theories and are subject to the linguistic stratification characteristic of artificial languages. (2) It is the methodological counterpart, in Psychology, of transformational theory in Structural Linguistics. (3) Substantively, it is a "theory of performance", in the linguists' sense, but because two key concepts within the system are "competence" concepts, any systematic description of a particular sort of competence, including transformational or other descriptions of linguistic competence, can be assimilated in toto. (4) The relation of the two "competence" concepts to the system as a whole and to each other guarantees that the conclusion that an English
speaker does not, in general, know how to use the grammatical structures of English is non-paradoxical and has no pernicious consequences for either the behavioral account or the grammatical one. But then also, there is no problem of explaining how the speaker learned to use those grammatical structures. The two distinct competence concepts neatly separate the loci of relevance of grammatical theories and learning theories within psychological theory.

The Rule-Following Model

Ordinarily, the task of presenting a psychological theory in a limited space is the task of summarizing what the theory says. This is because we seldom see any problem in how to use the theory, since our psychological theories, following the familiar pattern of semantic theory, are presented as putatively true descriptions of the world, and we have standard ways of using something of that sort, so that the specific use of the theory follows readily from its content. In fundamental contrast, the rule-following model is primarily a formulation of use, and it is the content which "follows" from the use. It literally does not, and could not "say" anything at all, since it is a single, complex concept and not a set of propositions.

The single concept in question is the concept of a person. ("Rule-following model", "concept of a person", and "Person concept" are used interchangeably.) Curiously enough, and also of vital
importance, the use of that concept provides the primary exemplar of that concept (i.e., the concept codifies its own use), so that someone who understood the use of that concept would also understand the concept itself. The indicated form of presentation of the concept is, therefore, training in the use of the concept as formulated, and that has indeed proved to be by all odds the most effective. Clearly, some bootstrapping is called for if it is to be presented in an expository fashion.

We may hope to accomplish that bootstrapping in the following way: First, the concept of intentional action is introduced, intentional action being both the basic unit of behavior and the "universal law" of behavior. The use of concepts (any concept, including that of intentional action) is shown to be an aspect (a parameter) of intentional action. Second, the concept of intentional action is shown to be a logical component of a more complex concept, i.e., the concept of a person. Finally, the circle is closed by saying that the use of a certain concept, i.e., the concept of a person, is a case of intentional action and is what qualifies an individual as a person. If an individual has the competence to use the concept of a person, then necessarily, he is a person.

Thus, the rule-following model is both a "theory of competence" and a "theory of performance", in spite of the fact that in linguistics these are generally considered to be sharply differentiated, if not mutually exclusive. 4
In this section, the two basic concepts, or paradigms (intentional action; individual person) will be presented, with major emphasis on the first. The two concepts constitute the "content" of the rule-following model, and presenting them is as close as one can come to summarizing "what the theory says". In the primary formulation presented in "Persons" (Ossorio, 1966a), the two paradigms are embedded in an extensive methodological complex. In that presentation, several hundred pages of argument, analysis, illustration, and comparison are given, all of which amount to implicit training in the use of the two paradigms. That cannot be abstracted and summarized. What is given below, in addition to the two paradigms, is a set of comments on the features of the model which are most relevant to the present discussion. The comments are designed to provide a guide to the use of the Person concept and to head off the most likely errors in its use, but of course, they cannot deal with every type of question that might arise.

Paradigm of Intentional Action (PIA)

The first paradigm, that of intentional action, is commonly presented as a diagram consisting of a diamond with the corners labelled successively "Know", "Want", "Know How", and "Performance". This is a useful visual aid for representing logical symmetry and acausality. The point of the diagram is that in any intentional action a person necessarily (a) is trying to achieve something he
wants, (b) has the relevant knowledge for making the attempt, (c) is recognizably doing the sort of thing one would do in order to achieve that, and (d) his doing that is neither accident nor coincidence, luck, chance, etc., but the exercise of acquired skills. That is the paradigm of intentional action.

Comments on PIA

(1) The primary use of PIA is in accordance with the following maxims. M1: "If a person has a reason to do X, he will do it—unless he has a stronger reason to do something else" (a principle of "response selection" in motivational terms). M2: "If a person recognizes an opportunity to get something he wants, he has a reason to try to get it" (a principle of response selection in cognitive terms). M3: "If a situation calls for a person to do something which he does not know how to do, he will do something he does know how to do" (a principle of response selection in terms of competence). We use these maxims, together with PIA, to arrive at an understanding of what we observe.

(2) There are obvious parallels between PIA and other general behavior theories. There is substantial evidence to support the claim ("Persons", Parts IV and V) that every viable psychological theory of behavior (e.g., S-R, Expectancy, psychoanalytic, Self, and Field theories) has at its core some paraphrase of both PIA and M1 and that its use conforms to M2 and M3 as well (see also comment #9). There are decisive reasons for avoiding technical
psychological terminology in PIA, a most important one being that since such technical terms have only an invented use they cannot in fact be effectively used in the reflexive, pragmatic way, but are restricted to a "simple descriptive," semantic use (see 6, below). The asymmetry is illustrated by the following: Given PIA, one fairly readily identifies the paraphrases in the several theories; in contrast, it is so far from evident that any portion of one such theory is legitimately characterized as a paraphrase of some portion of another such theory that they are regarded as simply incommensurable in a standard textbook in personality theory (Hall and Lindzey, 1957). Nor is there any question of which is a paraphrase of which, for the ordinary language terminology of PIA antedates any psychological theory by a very respectable margin. The systematization provided by the rule-following model gives to much of ordinary language a methodological status heretofore thought to be restricted to technical terminology, particularly "theoretical constructs."

(3) What is represented by PIA is that the basic unit of behavior (intentional action) has those four parameters. The latter are to be distinguished from either constituents or causes. The four parameters are not four classes of objects, events, or processes which, when suitably combined, bring about a different event or process called "behavior." Neither do "want," "know," and "know how" identify three types of event, process, or condition which cause the fourth ("performance") to happen, nor do they designate anything
occult, hypothetical, or physiological. Rather, what we observe by way of behavior is always intentional action, and the four parameters codify the fundamental kinds of distinction we make between one action and another. If that seems strange or forced, that will be because it contrasts with the causal-process model which we commonly take for granted in our technical behavior descriptions. We can easily find appropriate familiar analogues. For example, "brightness," "hue," and "saturation" have an analogous relationship to "color." That is, they codify basic ways we have (actually have, not merely logical possibilities) of distinguishing between different colors, and they are not, e.g., parts of colors, separate items which when brought together form a color, or prior things which cause colors. What we observe are colors. And what we observe are intentional actions.

(4) If the color analogy suggests that we have reverted to "mere taxonomy," "Aristotelian thinking," or something equally pernicious, it would be well to remember that intentional action per se is an observable behavioral process which is so out and out dynamic that even when a person is standing stock still with his eyes closed it will make sense to ask and answer the question, "What is he doing now?" In the rule-following model, "active organism" is not a daring theoretical postulate, but brute fact simply acknowledged.

(5) "Intentional action" designates a concept, not a statement or proposition, and so it is "non-empirical" not in the sense of legislating facts as opposed to discovering them, but because it
no more could be either true or false than a table could. Con-
cepts are pre-empirical, not anti-empirical.

(6) Ascriptions of particular intentional actions to some indivi-
dual, P, are the way we formulate our understanding of P's behavior.
That is common to both social scientists and non-scientists. But
the strategic point of technical psychological application of the
concept is not in a simple, direct description of P, which we then
try to verify (that is the common psychological approach, the "sem-
antic model"). Rather, it comes in our seeing intentional action
as the concept which P necessarily uses in his observations of
other persons, and in his understanding of them and behavior toward
them, and toward himself as well. But P's use of that concept
(see below on "using concepts") is itself a case of intentional
action, since the use of concepts of whatever kind is what is codi-
fied by the "know" parameter of intentional action. Thus, "in-
tentional action" does, after all, describe P's behavior, but now
in a reflexive sense which goes far beyond simple description. PIA
now operates not as a falsifiable description of what goes on,
but as a rule for constructing descriptions and as a standard for
what qualifies as a possible description. What is empirical is
which action it is that takes place, and for answers of that sort,
we depend on our observational skills, and, occasionally, on in-
fERENCE. PIA is not a hypothesis, but rather, a "mechanism",
a computational device for making the transition from observation
to action.10 Clearly, this feature has many significant methodo-
logical ramifications only three of which will be mentioned here:
The rule-following model is a so-called "rational" model of man. Psychological theorists have long given wide berth to "rationalistic" conceptualizations of human behavior for the very good reason that there is a significant contrast to be drawn between meeting our standards of achievement or reasonableness, on the one hand, and "what actually happens," on the other. This is one of the primary bases for Miller's (1965) claim that psychology ought to provide "performance models" embodying mechanisms which will account not merely for verbal behavior which measures up to the linguists' standards of correctness, but also for slips, errors, omissions, etc.—that is, "what actually happens" when a person speaks. This is the "theory of performance" vs "theory of competence" distinction again. It is important, therefore, to point out that because of the reflexive character of the concept of intentional action and its pragmatic and "computational" character, PIA permits us to characterize the "irrational" instances and aspects of human behavior with unparalleled cogency. This is so because the systematization provides a characterization of the irrationality itself, since both the relevant standards and "what actually happens" are within the scope of the rule-following model. In contrast, our psychological conceptual systems have heretofore provided no more than a rationale for the occurrence of irrationality to a theorist who was required to have a specification of what it was that occurred already given in extra-theoretical terms (because causal-process models can deal with events and occurrences, but
not with standards). Characterization of an individual's relevant knowledge, skills and wants (and his individual difference characteristics—see below) is just as surely a characterization of the constraints on his possible behaviors (recall M1, M2, M3 as principles of response selection) as would be provided by reference to underlying processes or structures, e.g., hypothetical "storage capacity", "mediational bonds", "channel capacity", "level of activation", etc. The evidence to date (cf "Persons", Part IV) indicates that any of these latter are paraphrases of some of the former, but not vice versa. Thus, as part of a "theory of performance", PIA is, on the face of it, the resource par excellence for saying "what actually happens" in human behavior.

(6b) Ever since the formulation of semantic theory in essentially its present logical form the semantic theory of truth has served as the primary (philosophical) model of what a scientist is engaged in doing (he is searching for truth) and what he does it with (a theory which is a putatively true description of the world). That formulation was accomplished at the cost of an indefinitely deep stratification (in principle, infinite) of a given language into distinct languages (object language, meta-language, meta-meta . . . . etc.). This was done in order to eliminate self-reference and the logical antinomies associated with self-reference. But that reflects the limitations of semantic theory and is not plausibly presented as a feature of the phenomenon of natural language. Neither linguist nor layman, for example, would take seriously the
suggestion that, contrary to all appearances, English speakers really speak an indefinitely large number of distinct languages just because in English one can talk about talking about English in English, or because one can talk about what one is saying.

Psychologists need not take that suggestion seriously either, although the form and use of our psychological theories shows that in fact they have. After all, saying something is a form of human behavior, and if the natural phenomenon of a speaker saying something has a reflexive logical structure, then so must the general case of human behavior. That is precisely what is codified by the reflexive formulation of intentional action as the basic unit (in terms of content) and the universal law (in terms of use) of human behavior, and it is one of the most important things which our more familiar psychological theories fail to encompass.

(6c) Given that the rule-following model is primarily a formulation of use rather than content, a significant consequence of its reflexive character is the considerable simplification of a number of problems presented by limiting cases and boundary conditions in the use of psychological theories in the conduct of psychological science. For example, the methodological resources of the rule-following model are sufficient to deal with the following problems without requiring any ad hoc supplementations: (a) a theoretical boundary condition—"Well, you always have to make some assumptions"; (b) a subject-matter boundary condition—"You have to take the observation language as given"; (c) a technical boundary
condition—the necessity for giving a second description of "the response" or of "the stimulus" in the form of "cues", "controlling variables", "physical parameters", or whatnot; and (d) a methodological boundary condition—the necessity for exempting the psychologist from the scope of his application of his theory (see Bakan, 1965), together with the attendant necessity for a separate, non-psychological and even non-scientific, theory (our "philosophy of science") of scientific human behavior. Here we encounter the performance vs competence distinction again. Because scientific behavior involves an essential reference to standards, no causal-process theory (and, it would seem, no theory subject to the boundary conditions above) can provide an adequate conceptualization of that form of behavior (cf Wick, 1964).

(7) It should be clear that the rule-following model does not require an appeal to new kinds of facts in order to understand human behavior (though one might get greater mileage from the same set of observations—cf "Persons", Part III and Ossorio, 1966b). The facts adduced by the associationist, the psychoanalyst, the existentialist, and the operant conditioner, and the interpretations made of these facts by recourse to these theories are all, on the present evidence, intelligible within the rule-following formulation (cf "Persons", Part IV, V). The difference is that the rule-following model presents a greater logical complexity (e.g. reflexive vs simple descriptive) and a greater methodological scope (deals with both the pre-empirical and the empirical, rather than merely
the latter, and with both content and use rather than merely the former) within which existing theories may be represented as simplified limiting cases. The simplification may be carried out in three steps:

(a) Restrict the concept of "explanation" to include only those instances which have the linguistic form "X causes Y" or can be so paraphrased;

(b) Restrict the use of the conceptual apparatus to the simple descriptive use, excluding the occurrence of self-instantiation;

(c) Restrict the substantive terminology to new terminology, and to terms which are used ambiguously in regard to whether they refer to behavior or to a physical system.

(8) The use of a concept and the use of an underlying constituent structure are commonly assimilated to the paradigm of the use of a tool. Indeed, we often hear "Language is a tool for . . . (fill in the blank)". That is precisely the wrong assimilation. Compare the following: (a) He used the pliers to tighten the bolt; (b) He used patches of flaming colors to create a sombre effect; (c) He used a Ruy Lopez opening to win the first game. Reference to the colors in (b) and the Ruy Lopez opening in (c) are a way of distinguishing what was done, whereas reference to the pliers in (a) is a way of identifying what something was done with. Specifying the concepts, structures, or knowledge relevant to an intentional action is a way of specifying what action it was, not what caused it or what it was done with. Thus, references to what a
person knows (or wants or knows how to do) is not a reference to unobservables in a hypothetical realm called "mind" (see below), but rather, is our way of codifying our ability to distinguish one observable behavior (there is no other kind) from another.

(9) There is no general problem of "explaining behavior" any more than there is a general problem of "explaining physics" or "explaining the world" (see below on the rule-following model as a domain of discourse). There are, instead, specific problems having the form "Why this behavior (or this kind) here now rather than some other (or some other kind)?" Answers to such questions are given in accordance with the following maxim. M4: "The behavior that was engaged in was what it was because the circumstances of its occurrence were what they were." This maxim has a verbal form that is clearly parallel to that of a simple S-R formulation, and the parallel is a genuine one. The difference is one of conceptual and methodological scope (see 7 above). The explanatory force of the "because" is not restricted to the causal paradigm, which could only connect events with events. (Among the relevant circumstances are the individual difference characteristics--see below--of the particular person whose action is in question). Circumstances do not produce behavior; rather, differences among circumstances are lawfully related to differences among behaviors, and that is why reference to the former helps us to understand the latter. And, of course, reference to circumstances is already contained within the Person concept, e.g., in what the person "Knows".
The Individual Difference Paradigm (ID)

The intentional action paradigm represents only the "universal law" aspect of behavior, and that is what is primarily relevant to the present paper. It may be noted briefly that the second basic component of the rule-following model is the individual difference paradigm (ID), in which the constituent formal concepts are "trait", "attitude", "interest", "value", "style", "mood", "state", "status", "need", "ability", and "intentional action". More accurately, the second paradigm, which includes PIA, is the rule-following model, and it is the concept of an individual person.

The relation between PIA and ID is given by the following two summary statements: (a) An intentional action is what a person does; and (b) A person is an individual whose history is a history of intentional actions articulated into the individual difference format.13

Comments on ID

(1) The concept of a person, the ID paradigm, is the concept of a part-whole structure (a life history) in which the basic elements are behavioral process units (intentional actions) assimilated to one or more of the formal ID concepts listed above.

(2) This "assimilation" represents something quite different from mere classification. What is involved in any such assimilation is a logical function which, though not mathematical, is quite analogous to a mathematical function such as the "square root"
function or the "logarithm" or "sine" or other functions.

For example, to see an intentional action as being of type X (e.g. hostile action) is simply to classify it as being a particular case of PIA. To see that behavior as an expression of a mood (here, an "irritable" mood) is to see it as being an action which is different from either (a) one which is merely a type X action or (b) a type X action which is the expression of an attitude (here, a "hostile" attitude) or of any of the other ID formal concepts. The type X action which is the expression of a mood has a particular logical relation to one which is merely a type X action. The relationship is that of a functor (mood) to its argument (type X action). To speak of "the mood function of hostile action" is quite analogous to speaking of "the square root function of the number two". Just as we have no simple designation for the number which has the relation "square root of" to the number "two", for which we do have a simple name, we also have no simple name for the action which has the relation "expression of mood" to the action "hostile action", for which we do have a simple characterization.

And just as we classify together "square root", "sine", "logarithm", etc. as "mathematical functions", which take numbers as their arguments and have numbers as their values, the formal ID concepts are correctly described as a set of logically interrelated "person functions", which take intentional actions as their arguments and have intentional actions as their values. Thus,
the concept of a person is a domain of discourse, i.e., the domain defined by intentional actions and person functions, and is not merely a nominal categorization for a set of objects.

(3) As in the case of intentional action, the concept of a person is not used as a simple description of certain kinds of individuals (persons). Rather, it is the concept which one person uses in his intentional actions vis a vis other persons and himself. One might say: What makes an individual a person is not that the concept applies to him, but rather, that he applies it to others. But of course, if he does that, then the concept does apply to him. Thus, like PIA, which it includes, the concept of a person is a reflexive concept, and as with PIA, its primary function is as a computational device for transforming observations to actions rather than as a simple description of what is "out there".14

(4) The formulation of the rule-following model is responsive only to methodological considerations and never to merely technical ones. Thus, the introduction of an individual difference system is not merely a pessimistic concession to the fact that there is "error variance" associated with our current "universal law" formulations of behavior. Rather, it is a recognition that universal laws could not be applied (or discovered) except in connection with distinguishable initial conditions. Thus, if we take the familiar "nomothetic model" (Mischel, 1964) to be summarized as "universal causal laws applied to initial conditions", then, in much the same way as the rule-following model replaces "cause" with the less restricted
"because", it also replaces "initial conditions" with the more noncommittal "individual differences", and the parallel summary may be given as "one explanatory law applied to particularized individuals".

(5) Within the concept of a person there are two "competence" concepts. One is the PIA concept "know how" and the other is the ID concept of "ability". There are crucial differences between the two.

(5a) To say that a person has the ability to do X is to say that there is a type of achievement, X, which we may expect him to accomplish if he tries. The ability to do arithmetic, to speak English, to hit a target, to walk from one place to another, to distinguish round objects from square objects, are examples. The fact of a person's having a particular ability is conceptually quite independent of any facts about how he came to have that ability.

(5b) To say that a person's doing Z represents the exercise of skills is to say that his performance was not the result of accident, coincidence, luck, or chance, and that he would be able to do it again in similar circumstances. The alternative to its being luck, chance, etc. is that it is something he learned to do— that is what backs up the expectation that he would be able to do it again. But to say that he learned to do this is only to say that his learning history was of the right sort, that it contrasts with possible other histories given which he would not now be able to perform as he does. In particular, what is not implied is either (1) that he can do
anything else, not even other, similar performances, or (2) that he has ever done before what we now say he could repeat.

For example, his bringing "War and Peace" from the third shelf to the desk is something he need never have done before in order for us to say that his doing so reflects his learning or that he could do it again. Of course, we might say that he acquired "visual motor skills," but that would be as noncommittal as saying that a person has acquired "verbal skills."

(5c) Thus, the two "competence" concepts in the rule-following model have basically different roles in the system and provide characterizations which have a different basis and a different significance and explanatory force. Each provides a principle for grouping performances (i.e., those that are alike, and those which share a history) but there is neither guarantee nor presumption that any grouping arrived at via the "skill" concept will coincide (contain the same set of performances) with any grouping arrived at via the "ability" concept. There is therefore no presumption that the empirical laws which characterize performances grouped in one way will coincide with--or, indeed, bear any resemblance whatever to--the regularities associated with the other grouping. The "skill" characterization is essentially a historical one that tells us only that one of the necessary conditions for his doing Z to have been a case of intentional action at all has been met. The "ability" characterization is an essentially taxonomic one which tells us what his achievement was and informs us that he would also be successful in accomplishing other achievements which are different from this one but are nevertheless of the indicated same kind.
A General Comment on the Rule-Following Model

The preceding provides the needed backdrop for making the following summary formulation intelligible: Osgood is quoted by Dulaney (1967) as worrying that "It is one thing to use notions like "competence," "knowledge," and "rules" as heuristic devices, as sources of hypotheses about performance; it is quite another thing to use them as explanations of performance--unless, of course, one is ready to give up his behavioristic moorings entirely in exchange for a frankly dualistic mentalism."

The response to such a statement is provided by the rule-following model in three parts: (a) The concept of "behavior" is the same concept as the concept of "mind" and the phenomenon of behavior is identically the same as the phenomenon of "mind." Moreover, that single "phenomenon" is more aptly characterized as an entire domain of phenomena our independent access to which is codified by a characteristic form of discourse (the rule-following model). (b) A decisive turning point in the history of psychological explanation was the acceptance of the equivalence of "physical" and "observable" (a consequence of the ambiguity of "physicalistic"). The rule-following model corrects this gross and fundamental error. The great divide is not between "behavior" and "mental," but between "behavior" and "movement." In this respect it does not matter whether the movement is an inner, physiological one, a directly observable one, or an invisible, hypothetical one. What does matter is the logical status of these two concepts. Behavior is no more a species of movement than the queen of hearts is a species of cardboard. (c) It is one thing to use our technical competence at
manipulating physiological or broader circumstances so as to extend the practical range of our intentional actions, for example, in predicting or influencing the actions or personal characteristics of others; it is quite another thing to hypostatize this practical knowledge into a physiological or quasi-physiological underlying causal process explanation of behavior—unless, of course, one is ready to give up his behavioristic moorings entirely in exchange for a frankly dualistic materialism.

Instead of making the a priori decision that one type of observable phenomenon (physical or physiological objects, processes, events) is more real than another type of observable phenomenon (behavioral processes, events, objects), the question of systematic relationships of detail between observables is left open to empirical investigation, and no sense can be made of any putative statement of the general relationship between these major kinds of observables. There need not be a general relationship.

Postscript

Some number of questions are bound to arise which could not be dealt with in a paper of limited scope. Perhaps it is worthwhile to indicate several points which are not difficulties but are likely to seem so: (a) The rule-following model does not apply only to adult human beings (another objection to "rational" models). A general methodological principle referred to as "paradigm case formulation" (cf Persons, Introduction) not only permits application to nonverbal infants and nonhuman animals, but makes that application intelligible. The urge for continuity does not here require the usual sacrifice of real differences. (b) There
is no priority argument of the form "But physics *is* basic, after all, because everything is physical, but only some of the things within the physical world are persons." Possibly "everything there is" can be expressed in physical terms (we cannot do it now). Certainly "everything there is" can be expressed in psychological terms, today. There is no asymmetry here favoring physics. (c) The concept of a person is as culture-free as the concept of a physical particle or of a living cell or of arithmetic. But more than this, the concept of a person is what makes the question of cultural relativity intelligible (e.g., by virtue of "status" and the other formal ID concepts generally) as well as providing the framework for obtaining empirical answers (specific ID characterizations) and codifying our limitations in this respect at any given time (competence and knowledge characterizations). There is nothing parochial about the rule-following model.

The Rule-Following Model and Transformational Grammar

Because the domain of human behavior is intrinsically dynamic, no special dynamic constructs are required (even "want" is not "dynamic" in the ordinary causal sense which is here seen as a degenerate case of intentional action). No causal constructs are needed, though some features of the model (see, e.g., the paragraph on "skill," above) could be formulated in causal terms. Because the basic formulation is "*this* behavior, rather than some other because *these* circumstances rather than some other," the major enterprise is to distinguish one behavior from another and to delimit intelligibly what qualifies as an instance of "behavior"
at all (recall that the relevant circumstances are built into the intentional action description itself). It is in this connection that the similarity to generative grammar and the continuity with generative grammar becomes evident.

Similarity to Generative Grammar

The task of generative grammar is to delimit intelligibly what qualifies as an instance of English (for convenience of reference only—it could be language X). A generative grammar of English is a set of rules for generating all and only English sentences. This is accomplished by a procedure which may be described as "instantiation". That is, the rules have the general form R1: "Any case of alpha is a case of either function 1 of beta_1 or beta_2 or ... or beta_n or function 2 of beta_1 or ... or beta_n or function m of beta_1 or beta_2 or ... or beta_k." A special case would be R2: "Any case of alpha is a case of either beta_1 or beta_2 or ... beta_k." And an even more restricted case would be R3: "Every case of alpha is a case of beta_1 and beta_2 and ... beta_m." For example, the initial formulation "S → NP + VP" has the form of R3 and may be read as "every instance of a sentence is an instance of a noun phrase and a verb phrase" (since there is only one such rule for S, there is no difference between "may be rewritten as" and "is a case of"). The further developments usually have the form R2; for example, "Every case of a noun phrase is either a case of a solitary noun or a case of a noun preceded by an article or ..." Finally, the most detailed developments (e.g., transformation...
rules) are likely to have the form Rl. Eventually, the substitutions have English words as their instances, and so, if we can distinguish one word from another, the grammar serves to identify which sequences of English words are English sentences.

In the case of behavior, we have a similar situation. The initial formulation is given by PIA, and it, too, has the form of R3, above. "B → W + K + KH + P" may be read as "Every instance of behavior is an instance of wanting something and knowing something and knowing how to do something and engaging in some performance". The latter is recognized as a paraphrase of the characterization of PIA, "in any intentional action a person necessarily (a) is trying to achieve something he wants, (b) has the relevant knowledge for making the attempt, (c) is recognizably doing the sort of thing one would do in order to achieve that, and (d) his doing that is neither accident nor coincidence (etc.), but the exercise of learned skills". The difference between the two formulations is that the latter makes clear that the permissible substitutions under any one of the parameters K, KH, W, and P are not independent of the permissible substitutions under the others. As in the grammatical treatment of S, the further developments of PIA have the form of R2. For example, any case of wanting is a case of either wanting x or desiring y or being anxious to get q, or being determined to avoid r, or ... or having a reason to accomplish z. Finally, the most detailed developments have the form of Rl. These occur when the ID paradigm is brought into play. "Angry action" is
a PIA description, but any angry action which is the expression of a trait is different from one which is the expression of a mood or the symptom of a state of the expression of an attitude or the manifestations of an ability or lack of ability, etc. It is important to the understanding of the rule-following model to see that the form R1 is exactly the right form for expressing the relationship between a particular intentional action and the individual difference format into which it is assimilated. Here, the functions in question are person functions. The analogous functions, the "transformations" of generative grammar, are, of course, grammatical function.

Clearly, there are limits to the similarities that can exist between a pragmatic system and any purely syntactic system. The force of the foregoing is that the similarities between the rule-following model and transformational syntax are part of the basic methodology of both. The similarities are perhaps best summarized by saying that both are descriptive in spirit and instantiative in their procedure. There is also a historical parallel in that the emergence of each presents a contrast to a predominant existing order of positivistic, reductive theorizing.

Continuity with Generative Grammar

One notable difference between grammar and intentional action is that, at least in gross description, there is a much tighter structure of internal constraints (redundancy) in connection with
intentional action than there is in connection with sentences. Whereas any substitution instance of NP may be combined with any instance VP and the result is still S, by no means is it the case that any combination of instances of W, K, KH, and P will be a case of B. "The colorless green idea slept furiously" is a genuine instance of S, but the combination of knowing the name of the capital of China, wanting fame, knowing how to ride a bicycle, and sucking one's thumb does not instantiate any intentional action.

The discrepancy between the weak constraint on sentences and the strong constraint on actions may be expressed in the following way: Not every sentence can be used to say something, and not every case of uttering a sentence, even a sentence that can be used to say something, is a case of saying something.16, 17

When a given intentional action is a case of a person doing something by means of saying something by means of uttering sentence s, specifying that it was that action is to specify, among other things, that he knew how to say something by engaging in a performance which is correctly described as "uttering s." If "S₁" is a grammatical description of s, then that performance would be correctly described as "uttering S₁" and we could then also say that that person had succeeded in uttering S₁ and that saying something by uttering S₁ was something that he had accomplished. There would be an important difference in that achievement depending on whether it was an isolated case or whether it was exemplary of his general...
level of success with S. To describe his achievement as the expression of a particular ability and to identify that ability by reference to the grammatical theory of S is to provide the information that the second of these two alternatives is the case. Thus, one of the direct, substantive continuities between the rule-following model and a generative theory of grammar is that S may be substituted directly under the ID concept of "ability."

There are other connections that are worth noting. For example, if P's performance qualifies as "uttering $s_1$" then there are individuals, O, who know how to use S to describe performances such as P's. If such an individual, O, were to use S to describe P's performance, we could characterize O's behavior by substituting S or some derivative of S under KH in PIA. Of course, O would most likely be a grammarian. Other substitutions in PIA are also possible. For example, if a person drove home a point in linguistic methodology (that was his intentional action) by saying or writing "Colorless green ideas sleep furiously," we might very well find it impossible to articulate what action it was if we were not in a position to say that he knew about some of the underlying constituent structures in the grammatical theory of S. Here we would substitute S under K in PIA. Or again, the actions of a person who was trying to teach a child to speak English might require that we refer to the underlying constituent structures under W (that is what he wanted the child to master) in order to give an adequate account of what he was doing.
Since the use of S as an ability characterization is applicable to entire populations of speakers whereas the substitutions under PIA apply only to exceptional individuals such as grammarians, the former is here regarded as the principal continuity between the rule-following model and generative grammar as a theory of linguistic competence. The PIA continuities reflect the fact that the rule-following model is a theory of performance as well as a theory of competence.

The Use of Grammatical Structures

We may now turn to the thesis that English speakers do not in general know how to use the underlying constituent structures of English, and so there is no general problem of explaining how it comes about that they do know how to do this. The basis for the thesis may be summarized by saying that the theory of S, including that portion which deals with underlying constituent structures, is a resource which some of us have for characterizing the linguistic achievements which all of us in the language community regularly accomplish, and as such, it has nothing to do with how any such achievement comes about. More briefly, the theory of S provides us primarily with "ability" characterizations and has at most an incidental and peripheral value with respect to systematic "skill"
In contrast, the primary task for learning theory is the systematic description of sufficient conditions for additions to (or subtractions from) a performance repertoire i.e., "skill" characterizations. That is intelligible in terms of the formal distinction given above between "skill" and "ability" concepts, but it bears some illustrative elaboration. This will be given first by a heuristic analogy and then in a direct statement.

In those actions in which something is said, a statement of those competences of the person which were involved in that action would include reference to the particular one of knowing how to utter a sentence which is "on target" in that it 'says' what the person says. If that seems forced, compare: In those actions in which something is kicked, one of the relevant competences is that of knowing how to kick a selected target, rather than merely knowing how to kick and in sharp contrast to not knowing how to kick at all.

It is because there are human behaviors which qualify as "kicking X" that there are certain performances which qualify as "merely kicking." If we had no such behaviors as "kicking X" what we now call "merely kicking" would not then be what it is now, and we would not have the reasons we do, and perhaps no reason and no ability
at all, to distinguish anything as being that sort of performance. Likewise, it is because there are human practices of saying something by uttering words or sentences that it is possible for some performances to qualify as merely uttering words, or sentences. What characterizes merely kicking is that the performance is one which would have qualified as "kicking X" if there had been an X there to be kicked. Likewise, what characterizes the mere uttering of a sentence is that the performance is one which would have qualified as saying something if there had been anything of the sort to be said there then. (An intermediate case: Uttering the sentence "I now pronounce you man and wife" is a performance which would qualify as having performed a marriage if the speaker had certain ID characteristics, e.g., had the status of a minister, and if there were a marriage to be performed there then.)

Performances describable as "kicking" could be systematically articulated and described by mapping them into a geometric framework. We could then use that framework to distinguish one kick from another, identify kicks that had never been accomplished before, and recognize several instances of kicks that were "the same kick" under the geometric description even though there was no obvious visible resemblance. In exceptional cases, we might try to achieve a kick which was described only in terms of the geometric framework. Our level of competence at applying a geometric descriptive system in this fashion would be an empirical matter largely unrelated to our kicking practices and no doubt would change in the course
of our social history (it might increase, decrease, fluctuate, vanish, etc.). However, whereas we should want to ask how a person learned to kick something, we should hardly want to ask what it was he learned that enabled him to satisfy particular geometric descriptions.

We should hardly want to ask that because we should not know what we were asking or whether we were asking anything at all by uttering those words ("Do colorless green ideas sleep furiously?" is anything being asked here?) For the only answer that we know makes sense is the one that was already given. That is, what he learned was how to kick something, and having an answer (if there is such a thing) to our new question (if that is what it is) is not a condition for understanding or explaining that.

The new 'question' here prejudges a crucial issue. What enabled him to satisfy those geometric descriptions was not some additional thing that he learned how to do, but rather the additional fact that doing that was the same as kicking something, the latter being something he surely did know how to do. The opportunity for bringing it off lay in the circumstances by virtue of which doing the one was the same as doing the other. The achievement lay with us, the observers, in seeing (or arranging it) that doing one was the same as doing the other, not with him in bringing it about, for there was nothing other than kicking something that he had to accomplish in order to satisfy those geometric descriptions.

To be sure, it might be of some interest to plot empirically
the course of a person's learning to kick X, using the geometric frame of reference for plotting the successive achievements. But it would be highly misleading, if not actively irrational, then to turn around and suggest that his having learned to kick X is accounted for by his having learned the succession of achievements (or any function thereof) which we plotted. And if the empirical information could be summarized in a general formula which was successful across persons (a mathematical model of kick-learning) it would make no more sense then to say that his having learned to kick X is accounted for by his having learned whatever we might say the formula signified. S-R and other underlying process theories of learning may be characterized as attempts to find that magic formula. There need not be any. In contrast, operant conditioning formulations are likely to be directly relevant to "skill" characterizations. The operant conditioning emphasis on training procedures, as contrasted with hypothesis testing, makes possible some relatively unambiguous coordination of present know how and past learning episodes.

Psychological theorists have commonly taken the kind of position that is exemplified by the thesis that there has to be an answer to the 'question' of what that kicker learned that enabled him to satisfy the geometric description, and that we must have an answer of this sort in order to understand, i.e., have a scientific explanation of, his coming to be able to kick (see, e.g., Miller, 1965; Fodor, 1965). One renly would be to point out that to
equate understanding X with having an explanation of X would leave us with an infinite regress from which nothing could emerge. We block the regress by recognizing that unless an explanation for a phenomenon already exists, there is nothing of that sort about the phenomenon that we have failed to understand if we do not have that explanation.

But there is a second form of reply which is perhaps more instructive. That is that the thesis appears to represent a simple logical error the nature of which is well codified in the literature of logical theory as the problem of preserving truth under substitution. In that literature there is no serious challenge to the conclusion that if (a) I believe that that object is a lion, and (b) that lion is in fact harmless, it does not follow that (c) I believe that that object is harmless. The feature of not preserving truth when something is substituted in a true sentence for something else that is "the same" is a common characteristic of "mental" or "intensional" phenomena. For example, the human activities which we describe by reference to "believes X", "knows X", "means X", "wants X", or "intends X" have this characteristic. The logical error to be pointed out here lies in not recognizing that "learned how to do X" and "knows how to do X", have this feature also, whereas "achieves X" and "is able to do X" and "succeeds in doing X" do not have this feature. Note that in none of the following does (w) follows from (u) and (v), even where (y) might be demonstrably the case:
(a) u. I learned how to pick red hats from other hats.
v. The red hats are the same hats as the French hats.
w. I learned how to pick out French hats from other hats.
y. I regularly succeed in picking out French hats from other hats.

(b) u. I know how to kick a field goal.
v. To kick a field goal is to satisfy the differential equations "E".
w. I know how to satisfy the differential equations "E".
y. I regularly achieve satisfaction of the equations "E".

(c) u. I know how to pitch a strike.
v. To pitch a strike is to satisfy the geometric description "G".
w. I know how to satisfy the geometric description "G".
y. I am able to satisfy the geometric description "G".

We do not need a long list of examples. "Knows how to do X" has the non-substitutivity feature because "intends to do X" has it. It is not a mere matter of fact, but a conceptual necessity that whatever I know how to do I can also intend to do and that what I do not know how to do I also cannot intend to do (though I may wish, try, hope, succeed). It is precisely that conceptual necessity which is codified by formulating "know how" as a parameter of intentional action. The fact that not merely wanting, knowing, and intending, but also learning and the basic form of competence have the characteristic mark of "mental" phenomena is
part of the force of saying previously that the concept of "behavior" in psychology and the concept of "mind" are the same concept.

The moral to be drawn from the "nonsubstitutability" feature of competence concepts is that if P does X (an intentional action description) or if P knows how to do X (a competence description) neither such fact will be explained or even demonstrated to be the case by virtue of any one or more facts of the following sorts: (1) Z (an underlying process or event) occurs; (2) P accomplishes Z; (3) accomplishing Z is in fact the same as accomplishing X; (4) P knows how to do Z. Action and competence descriptions are what we establish by observation definitively and independently of any underlying processes. It will follow that achievement and learning which can be expressed only in hypothetical causal underlying process terms can be related to human behavior only as potential references to empirical correlates or as more or less redundant technical paraphrases, but not as having any explanatory force. The substantive value of any such hypothetical process whose hypothetical function is to "explain" behavior is therefore entirely questionable.

The alternative to supposing that psychologists who have opted for learning "mechanisms" underlying our demonstrated skills and abilities have made a crude error is to say that in fact they have tried to deny the failure of mental phenomena to preserve truth under substitution, probably without knowing that this is what they have been doing. This is to say that they have tried to treat persons as non-persons, and more specifically, as material objects,
since it is in statements dealing with material objects that we do find truth preserved under substitution. This is the move that is implicit in the standard format for a psychological behavior theory, where cognitive, motivational, and associational "factors" or "processes" are represented as the causal antecedents of behavior (where "behavior" = "movement", but implicitly so, and disguised by the ambiguity of technical terminology). And this is part of the force of saying that any causal-process account of behavior, be it of the SR, psychoanalytic, or operant conditioning variety, will, if we take it literally and seriously instead of merely exploiting it for whatever practical and heuristic value it may have, require that we give up our behavioristic moorings entirely in exchange for a frankly dualistic materialism.

It merely remains to translate the heuristic analogy into a direct statement: Performances which qualify as "saying something" could be systematically articulated and redescribed by mapping them into a set-theoretical frame of reference. We could then distinguish one case of "saying" from another, identify cases of saying that had never been accomplished, and recognize cases of saying which were "the same" under a grammatical description which might be as cumbersome as one might imagine (for example, it could be replete with underlying constituent structures). However, whereas we should want to ask how a person learned to say something, we should hardly want to ask what it was he learned that enabled him to satisfy that grammatical description. For if there is any
answer to that, then considering the derivation of the grammar from linguistic performances, the only answer that we know makes sense was already given—he learned to say something. (There is a different sort of question that makes sense, i.e., "How come he learned?", and the historical-circumstance answer to that might well be "I taught him". Descriptions of causal connections translate into possible intentional actions, a fact which is exploited but not systematically formulated in operant conditioning.)

To be sure, it might be of some interest to us to use the grammatical descriptive system as a frame of reference within which to plot the course of his learning how to say things. (That would be like plotting the course of a person's Rorschach responses over his formative years, using the Rorschach conceptual system of "content", "movement", "form level", etc. as a framework.) But it would be highly misleading then to turn around and suggest that his having learned to satisfy certain grammatical descriptions is what enables him to say things or what accounts for his saying things. If the empirical information could be summarized in a general formula, e.g., a grammatical rule or set of them, we might summarize our findings by talking about the set of rules (or, e.g., underlying constituent structures) whose he had acquired. But there would be no more point than previously in asking what it was that person learned that enabled him to follow that rule or use that underlying constituent structure.

What is commonly overlooked is that "competence" concepts have
essentially the same significance within the domain of behavior that mechanisms used to have within the domain of physical particles before they were replaced by deterministic rules in quantum mechanics. That is, they provide stability, regularity, predictability in the transition from one state of affairs to another within the domain in question. This is why when a materialistic predilection leads us to look for "mechanisms" in behavior, our answers may have some heuristic value. But that is also why mechanisms are superfluous. One might say, they are epiphenomena relative to mind or behavior.

Conclusion

The view presented here is that although linguists appear to be justified in appraising current associational learning theories as inadequate to deal with the problem of the acquisition and exercise of underlying constituent structures in language, psychological theory is in no such straits, for with respect to the latter there is no such problem to begin with. Very likely, this conclusion will be unacceptable to both the linguists and the psychologists who have been involved in the recent disputes. For the linguists, despite their anguish, have been asking for psychological mechanisms from psychological theory, whereas on the present account it is their function to articulate something akin to mechanisms for psychological theory. And of course, it would be difficult for an associationist to accept the conclusion that his theory is
fundamentally inadequate. The present discussion may, however, be both informative and of some comfort to those perplexed but not so innocent bystanders whose primary concern is with the implications of the transformationalist-associationist dispute for an appraisal of the present and prospective state of the art in our accounts of human behavior.
1) The present paper reflects the many helpful suggestions and critical comments by Keith E. Davis and Lyle Bourne in connection with earlier drafts.

2) We do not have any familiar pragmatic theory to serve as a model or as a paradigm case, and so saying that the rule-following model is a pragmatic theory is less of a positive help than a warning not to confuse it with a putatively true description of human behavior.

3) Some examples of complex concepts: "baseball", "person", "number", "physical object", "automobile", "science".

4) The distinction in linguistics is closely parallel to the psychological distinction between "learning" and "performance" and to the more down to earth distinction between what one knows and what one does.

5) In earlier formulations either "overt attempt" or "try to get" have been used in place of "performance".

6) "Wants" and "has a reason" are here used interchangeably, with appropriate grammatical changes.

7) The latter is the usual format for a psychological theory.

8) The required qualifications are not to the point here.
9) This is the reflexive use, the "pragmatic model". See Ossorio and Davis (1967) for an analysis of "self" concepts in terms of the rule-following model. In the current computer implementation of the rule-following model, this feature is referred to as "observer focus", since the individual whose behavior is to be reproduced is himself necessarily an observer.

10) Even this is misleading if it suggests that what is observed is "given" or is "input" or that PIA refers to something which occurs after observations and prior to behavior. The transition in question is more accurately described as a transition from one behavioral state of affairs to another. This is why a computer system, which is a rule-following individual (artifact) is the "natural" technical implementation of the Person concept.

11) See Carnap, 1958, for a recent formulation.

12) Kimble's (1967) position in discussing "the basic tenet of SR theory" is that M4 literally does represent the significance of the S and the R in SR theory, and that the causal-process and physiological-substrate implications commonly associated with SR theory are really extraneous. Since he takes M4 to be a self-evident description of the facts of psychology he concludes that therefore any psychology must be an SR psychology. (By no coincidence, the systematization of the rule-following model is part of the more extensive task of providing the initial
substance of a new, foundational psychological discipline designated as Descriptive Psychology.) Kimble's conclusion will probably be rejected by non-SR psychologists as being simply imperialistic. However, reflection upon it shows it to be the same conclusion as the following: There is no such thing as an SR psychology, and to speak of either "stimuli" or "responses" is, substantively, entirely gratuitous. In the latter form, Kimble's conclusion may be generally acceptable.

13) Again, there are relevant qualifications to be given within the system.

14) See footnote 9.

15) There are variations of R1 and R2 which are not to the point here.

16) That is how antinomies are dealt with in a pragmatic, reflexive system—a person who utters one of those sentences is not saying anything.

17) Saying something is logically prior to uttering sentences, even though the latter is an activity which has systematic extensions beyond the former. The priority is best given via a "paradigm case formulation." That is illustrated below in the reference to "merely kicking." For the present, we might say: In terms of Morris' (1938) classic distinction, syntax is an abstraction from the phenomenon of language, and semantics is also such an abstraction, but pragmatics deals with what that phenomenon is. Intentional action and the rule-following model qualify as a pragmatic formulation in Morris' sense, and in this sense are logically prior to grammatical abstractions.
18) The general case of an ability description or an achievement description is a third person description. That is, in general, what a person may be said to accomplish depends on the descriptive apparatus available to an observer. The number of different and incommensurable descriptions of what a person accomplishes, even, what he regularly accomplishes, is potentially unlimited. It would be both methodologically reckless and anti-empirical in spirit to insist in advance of demonstration, that all such descriptions can be derived analytically as outcomes of a learning process at all, much less of a single learning process. However, we do need some way of identifying particular kinds of performances, and a grammatical description would be one such way. The experimental paradigms of learning theorists provide another such way. Neither has any guaranteed value.

19) One of the fundamental facts for the intelligibility of learning theory is that although behavior is generally "overdetermined" in terms of motivation, it is certainly "underdetermined" in terms of learning. Although the number of distinguishable human behaviors is unlimited (even the subclass of verbal behavior has this feature) the number of distinct learning episodes is certainly quite finite. A given learning episode or set of episodes must, in general, account for a multiplicity of performances and performance capabilities, hence the central place of the concept and problems of "generalization," "transfer,"
"inhibition," etc., in learning theory. But also, this is why a "know how" parameter is an indispensible part of the concept of behavior.

20) As indicated previously, neither domain is more extensive than the other. Persons are commonly regarded as peculiarly complex physical objects, but it is no less apt to regard physical objects as peculiarly simple persons. The proper question is not whether one or another of these characterizations is true, but rather when is there a point in using one or the other characterizations.
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