THE ANALYSIS OF VERBAL BEHAVIOR

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I. PSYCHOLOGY AND THE STUDY OF LANGUAGE

Psychology, it has been alleged, has sadly neglected the study of language. Still, it could be argued that there exist dozens of psychological studies of selected problems in this area; as examples, investigations of vocabulary, child speech, and language ability could be cited. Moreover, we need only mention the writings of Gardiner (8), Kantor (10), Bühler (3), and De Laguna (6) to show that psychological theories and interpretations of language are not lacking. But it must be admitted that there has been a lack of progress on the part of psychology in arriving at a comprehensive theory of verbal behavior which will include a treatment of the heterogeneous facts established by formal linguistics and which at the same time can be integrated with systematic psychological theory. It is the purpose of this paper to attempt to present an outline of such a general theory.

II. THE DESCRIPTION OF THE LINGUISTIC RESPONSE-TYPE

Despite its great complexity, verbal behavior consists of a series of movements or responses. This statement is made at a level of discourse which is not concerned with whether these responses express 'thoughts,' 'ideas,' or 'meanings,' whether they are adjust-

1 In the absence of an adequate terminology, the phrases 'verbal behavior' and 'linguistic behavior' as used in this article generally refer not only to speech but also to gesturing, writing, and all other forms of behavior which involve conventionalized media of expression and communication. The term symbolic behavior is avoided because of several ambiguities which have arisen in connection with it.

mental in character, or even whether they are in any sense signs. Our study is concerned, in the first instance, with the characteristics of verbal responses, the frequency with which these responses are emitted, the sequences in which they are patterned, and the general conditions of their occurrence. Linguistic psychology must focus its attention upon the verbal responses of the human organism as responses. Such an approach has been implied by Skinner:

When we say that a man uses a certain number of expressions—when we refer to his 'vocabulary'—we say nothing about the relative importance of each expression in his behavior. A 'vocabulary' does not exist in a uniform state of strength. A verbal response may be so weak as to be evoked by its appropriate stimulus only after a considerable period of time, as when we have difficulty in recalling a name. On the other hand it may be so strong as to be evoked upon practically any occasion, as when we mention the name of a favorite person at every opportunity. A science of verbal behavior must deal with the conditions of latent speech, whether or not they are significant in a test of the personal organization of the individual (17, pp. 71-72).

The concept of the verbal response as a rallying-point for linguistic psychology has several advantages over such concepts as 'ideas,' 'meanings,' and 'intelligible purposes' which have engaged the attention of many writers. The linguistic response, the definition of which will be developed later, is first of all directly observable and identifiable. The study of linguistic responses does not necessarily involve any men-

2 Esper (7) gives a good discussion of some of these mentalistic approaches.
talistic assumptions. Secondly, the linguistic response in many ways takes its place alongside the rest of the observable behavior of the organism. It can be studied as any response is studied—in terms of the stimuli with which it is associated or in terms of its rate of occurrence under specified conditions. The linguistic response qua response can thus be treated behavioristically. The linguistic response has the particular advantage that it can be treated readily in terms of the laws of learning. Thirdly, the linguistic response is countable; it is thus amenable to statistical and psychometric treatment, particularly when numbers of responses are studied.

In using the term linguistic response we are not committed to any specific linguistic unit such as the word, the sentence, the phoneme, and the like. It is the task of linguistic psychology to determine the psychological status of various types of linguistic responses—not only the responses embodying the units postulated by formal linguistics but also any other responses which may appear to be units in verbal behavior.

Having addressed ourselves to the study of the conditions of linguistic responses, without specifying in advance which types of responses are to be treated, we must observe actual verbal behavior and note the regularities which are to be found (a) in the behavior itself and (b) in the relations between the behavior and other observable events.

In examining the former type of regularity, we may find much of our work already accomplished by formal linguistics, as represented, for example, in the work of Bloomfield (2). Contemporary linguistic analysis consists of the identification and description of recurrent elements and the determination of the sequences and patterns in which these recurrent elements are found.

This powerful but essentially simple technique—directed towards finding "what goes with what" in a language system—is the foundation of all linguistic analysis. A recent specimen of the results to be obtained through its use is to be found in Trager's description of noun classification in Russian (20). Verbal behavior as studied with such a technique is patterned in what Gardiner calls "a formal system of knowable linguistic facts" (8).

One of the chief claims of formal linguistics upon our attention is its description of a number of units, such as the phoneme, the morpheme, the tagmeme, and the like, which emerge from a systematic analysis of speech samples and which can be defined on operational principles. Notwithstanding the opinion of Gardiner (8) that the true unit of speech is the sentence it is possible that a science of verbal behavior may wish to utilize the units of linguistic analysis.

The uniformities in speech behavior discovered by linguistics may be regarded as potential or actual speech habits in the members of a given speech-community. Nevertheless, these uniformities do not enjoy the status of general psychological laws like the laws of learning. 3 A science of verbal behavior must endeavor to find general psychological laws which are assumed to be inherent in all verbal behavior. Formal linguistics has made little attempt to

3 Whorf (21) points out that because linguistics discovers certain rigid uniformities in phonemic patterning, "linguistics, like the physical sciences, confers the power of prediction." He does not, of course, mean to imply that linguistic uniformities are perfectly analogous to the uniformities or laws discovered by the physical sciences; rather, he stresses the similarity of the techniques of linguistics and the physical sciences. As compared with linguistic uniformities, which are merely cultural norms, the psychological laws which we hope to discover are more akin to physical laws because of their presumed universality.
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study the psychological aspects of speech habits or indeed to relate language to behavior in any way, except when it finds it necessary to specify the conventional 'meanings' of linguistic forms. Many linguists have affirmed little interest in the behavioral relations of language, directing their attention to language as a generalized abstraction from behavior. Such a point of view is quite defensible on grounds of the division and specialization of scientific labor, but it has limitations when broad applications of linguistics are in question. A careful reading of Bloomfield's chapter on the applications of linguistic study (2, Chap. 28) will convince one that many of his recommendations are based not on linguistic but on psychological premises. Linguistics, furthermore, has paid little attention to certain communicative habits which do not specifically involve the speech mechanism; namely, non-vocal gestures, expressive movements, and other conventionalized responses. The mere fact that there is no 'syntax' of gesture in at least most speech-communities should not exclude such behavior from consideration. It is strange that although linguistics has always at least implicitly recognized linguistic norms as types of cultural norms, it has not seen that in some circumstances certain of the latter (e.g., tipping the hat) can be regarded as communicative symbols comparable to language symbols. Formal linguistics, therefore, though highly valuable for its analyses of linguistic structure, does not seem to provide a sufficiently broad base for a science of verbal behavior.

We may now turn to an examination of a recent theory bearing on communicative behavior which may be relevant to our problems, namely C. W. Morris's semiotic (13). This is described as the science of signs, or more exactly, the science of 'semiosis,' which is 'the process of a mediated taking-account-of.' Semiotic is broader in scope than formal linguistics in at least three important respects: (1) it deals not only with natural languages like English, French, and Hottentot, but also with languages constructed *ad hoc* for formulating special scientific problems; (2) it studies not only the linguistic system as such but also its relations with behavior and the social setting; and (3) it deals not only with sign-systems of social, arbitrary origin, but also with what may be called natural signs (such as smoke as a sign of fire). Morris believes that although his account does not commit itself to any psychological theory of semiosis, it "lends itself to treatment from the point of view of behavioristics" (13, p. 5). It has progressed towards a correct evaluation of the problem of meaning through a careful elaboration of the dimensions and levels of sign-behavior. Morris's work thus undoubtedly represents an advance over the classic volume of Ogden and Richards (14). Nevertheless, semiotic at present remains essentially a theoretical framework and contains few specific suggestions towards integrating the process of semiosis with behavior as a whole. Furthermore, at the risk of being accused of psychologism, I believe that Morris's treatment of linguistic *rules* is too formalistic and that it smacks of the paradoxical. There is insufficient emphasis on the fact that semiotical rules exist only as habits of behavior. It is true that Morris's *pragmatics* (a branch of semiotic) purports to study the relations between signs and living organisms, but I feel that in its present state pragmatics is too restricted for our purposes, inasmuch as the pragmatical rule, the
central concept of pragmatics, seems to be defined as a formal element of a language, not as a statement about behavior. To be more explicit, it would seem that a pragmatological rule, according to Morris, defines the conditions under which a given sign-vehicle functions as a sign; hence it is merely a convention to the effect that X sign-vehicle is to be recognized as a sign when used by certain interpreters. A pragmatological rule conceived in this way could not say anything regarding the psychological properties of the response. An important variable which must be studied in linguistic psychology is the presence or absence of a given linguistic habit in a given individual. This variable cannot be regarded as a function of the 'rules' of a language. The rules of a language, which exist only as habits of behavior among the members of a speech-community, can only be stated, if at all, in a conditional form like "if event x or response X occurs, then response Y is to occur." They do not, then, prescribe that a given linguistic habit must be present in a given individual. Such rules determine the sequence or pattern of speech responses wherever the latter occur, but they do not determine the occurrences themselves. Of course, there may exist strong social pressures determining the presence of a certain habit (e.g., Heil Hitler!) such that an individual not possessing the habit is severely handicapped or penalized, but these social pressures do not constitute linguistic rules. It is unfortunate that Morris's brief monograph does not satisfactorily explain the scope of pragmatics. It may be argued that the point of view expressed in the present paper is an elaboration of pragmatics, i.e., a series of statements, at a certain level of discourse, about pragmatological rules, but I do not favor this formulation without a number of reservations.

In view of the apparent failure of formal linguistics and of semiotic to make explicit their relations with behavior, it seems to be the task of psychology to provide the necessary bridge. In doing this, however, we must avoid starting from any preconceptions of what is meant by linguistic behavior. Instead, we must examine the total range of behavioral responses and select those types or modes of response which play a distinctive role in communicative behavior conceived in the widest possible sense. We are not committed in advance to study only that behavior which conforms to a particular concept of symbolic behavior, for it may appear that communicative behavior involves elements which would not be characterized as symbolic, judged by given criteria. The distinction between 'linguistic' and 'non-linguistic' behavior (or between 'symbolic' and 'non-symbolic' behavior, if these terms are used) is emergent and cannot be defined until a wide range of behavior is studied systematically. Practically, however, our problem may be formulated as follows: What common behavioral structure is exhibited by the responses involved in what we call language in the ordinary sense of the term? Is this behavioral structure to be found in responses not immediately related to language and speech behavior?

Morris's views on the behavioral structure of linguistic responses may be examined with profit. We shall direct attention to his remarks on linguistic signs, i.e., signs the usage of which is determined by social convention, as contrasted with natural signs. According to Morris, semiosis is the process of "a mediated taking-account-of"
where "something takes account of something else mediately, i.e., by means of a third something." Semiosis thus involves three interdependent entities: (1) the sign-vehicle, which becomes a sign by virtue of its functioning as such; (2) the designatum, what is taken account of (roughly equivalent to Ogden and Richard's referent); and (3) the interpretant, the taking-account-of effect produced in the interpreter. At first blush this formulation may appear to exclude the producer of the sign-vehicle, if the sign happens to be produced by a living organism. But it must be understood that in the process of semiosis as formulated by Morris both the hearer and the speaker may be interpreters, since the interpretant of the speaker is essentially the same as that of the hearer. The speaker reacts to his own sign as a sign in the same way that he intends the hearer to react to the sign. Morris here follows closely G. H. Mead's account of the sign-situation (12).

Morris discusses the stipulation that the linguistic sign-response "must be capable of voluntary use for the function of communicating" (p. 36), and does not depart much from Mead's views on this point. Granting that this is an important characteristic of linguistic sign-responses, we may now inquire whether all types of communicative behavior are indeed capable of voluntary use. It appears that while certain linguistic movements are nearly always capable of voluntary production, at least for a majority of individuals, this is not true of all linguistic movements. For example, certain sounds occurring in normal speech cannot be uttered in isolation by most speakers. For English speakers this is true of the unaspirated \( t \) in \textit{stop}, which contrasts with the aspirated initial \( t \) of \textit{top}. It has also been observed that certain British speakers cannot produce the sound [hw] as it occurs in the American pronunciation of words like \textit{where}, \textit{which}, etc., although they are able to produce an almost identical sound in the process of blowing out a candle (16). Furthermore, if we grant for the moment that a word-order pattern may be regarded as a linguistic response, we may note that such a pattern, taken in isolation, is not strictly capable of voluntary production on request even though it functions as a behavior habit. At least, it cannot readily be said that a speaker uses or selects a word-order pattern in the same way that he uses or selects a word. Nevertheless, the responses in the cases mentioned here may be characterized as voluntary if by voluntary we mean that the individual normally has direct or indirect control of the mechanisms by which the response is produced. The mechanisms producing the sign may even be external to the organism, as when a person rings a door-bell. We may use this concept of voluntary control of sign-producing mechanisms as one of the defining properties of a linguistic as opposed to a non-linguistic response.

Nevertheless, it should be noted that in saying that linguistic responses must somehow be capable of production on request we do not imply that any given utterance involving a linguistic response is necessarily voluntary in the usual sense. Such an utterance may be an 'involuntary' slip of the tongue; it may be a case of automatic writing, or it may have been made as a result of hypnotic suggestion. On most occasions, of course, linguistic responses are 'voluntary'—that is to say consciously and deliberately produced. 6 Still, on some occasions a sign is to 61 do not mean to imply that a voluntary-response is produced by a fiat of will; instead, we must regard a voluntary response as the end result of the operation of certain action systems.
be taken as linguistic or non-linguistic according to whether it is produced voluntarily or not. Let us consider the case of the automobile tail-light which is lighted automatically with pressure on the foot-brake. Generally the tail-light functions merely as a non-linguistic sign or indication that the vehicle is decelerating; the operator of the vehicle may not be at all aware that this sign is functioning. Sometimes, however, when the driver deliberately wishes to signal to the rear, he puts pressure on the foot-brake with the realization that this movement will result in the illumination of the tail-light which in turn will serve as a signal. In this case, the tail-light is in many respects analogous to the usual type of linguistic sign. The driver to the rear will probably regard the sign in either case as a warning signal and not as a deliberately produced signal. However, a certain degree of conventionalization enters into the sign on account of its being red according to a social norm. Other cases where the deliberate production of a response confers upon it a linguistic nature will be discussed later. But the distinctions between 'natural' signs produced by nature, 'natural signs' appropriated by man, and 'linguistic' signs will always be hard to draw.

We may turn to the problem of whether it is necessary to consider as linguistic responses only those responses which are directly meaningful or symbolic. Some of the units isolated in formal linguistics are not directly meaningful, functioning only as segments of larger and meaningful units. The phoneme, for example, is only meaningful to the extent that an alteration in the phonemic structure of a linguistic form may produce a semantic differentiation. An intonation or a stress pattern is meaningless except when superimposed on various lexical forms. Although the responses underlying phonemes, intona-

107

1am indebted to "Whorf (21) for this example. Similar examples can be multiplied at will.
For example, the lexical form *dog* may be taken as a response-type, while a particular utterance of the sounds *[dog]* would constitute a linguistic response. This distinction is quite similar to C. S. Peirce's distinction between *token* and *type* (14, Appendix D), and is made in order to avoid the confusion between the specific and the generic usages of the term *response* often encountered in psychological writings.

It goes without saying that linguistic response-types are in the nature of social conventions. The notion (though not the process) of conventionalization is generally understood in social psychology and need not be discussed here. However, the extent of conventionalization for any given response-type may vary. The widest possible conventionalization occurs when the response-type is familiar and available to all speakers of a language. A low degree of conventionalization is possessed by a response-type which because of its novelty has not spread to all speakers of a language. We must also consider the social dimensions of the language-system to which a response-type may belong. We may approach this problem through the concept of the speech-community. According to Bloomfield, the speech-community is "a group of people who use the same system of speech signals" (2, p. 29). But "the term speech community has only a relative value" (p. 54), since most speech-communities, *e.g.*, the English-speaking world, include a number of local dialects and a number of levels of standard and sub-standard speech all of which may themselves constitute smaller but well-defined speech-communities. For our purposes, we may define the speech-community for any given response-type as a group of individuals who are distinguished from other individuals by their common possession of a certain cluster of response-types, a cluster which tends to include the response-type under consideration. A speech-community may consist of any number of individuals. A speech-community of one individual is exemplified by the person who ties a string on his finger as a reminder, or who coins a word for the representation of a novel scientific concept. Somewhat wider speech-communities are found in school classes or other small social groups which come to use certain novel linguistic signs—the case of children's secret languages comes readily to mind. The cant of the criminal underworld is the language of a still wider speech-community. For any given response-type it is of interest to specify, accordingly, the limits of the speech-community to which it belongs and the extent of its conventionalization within that speech-community.

The attempt to define the linguistic response-type meets certain difficulties when we consider the fact that responses conforming to a given response-type are not exactly uniform but present a certain range of non-distinctive variations. In English, for example, the phoneme *[p]* is uttered with varying lip placement, intensity, and aspiration; these variations are non-distinctive since they do not affect the meaning of words in which *[p]* appears. In other languages such variations may be distinctive, giving rise to two or more phonemes, say, an aspirated *[pʰ]* and an unaspirated *[p]*. In isolating a response-type, then, we must specify the range of variations accepted in the speech-community as not producing differences in the hearer's interpretation of the response.

8The statistically minded may think of a speech-community as possessing a common set of highly correlated response-types. It should be possible to delineate overlapping speech-communities factorially, by the analysis of either the correlations between a set of response-types or the correlations between persons with respect to their knowledge of a set of response-types.
III. KINDS OF LINGUISTIC RESPONSE-TYPES

Although it is not advisable at this stage to specify precisely which linguistic forms constitute response-types, a convenient classification of linguistic response-types can be offered.9

1. Sign-vehicle response-types.—When an individual utters the word *Here!* and moves his finger in a beckoning gesture, the sounds and the movements, respectively, constitute sign-vehicles since they perform a symbolic function in a linguistic sign-situation. If these sounds and gestures are frequently and regularly observed in a speech-community it may be inferred that corresponding response-types exist in the speech-community. Though these response-types may possess 'meanings,' we are not concerned here with these meanings, but merely with the fact that uniform responses occur. The response *Here!* and the beckoning gesture thus correspond to sign-vehicle response-types. Sign-vehicle response-types are always embodied by concrete movements or aggregations of movements which at least in some situations have a directly symbolic function. It is probable that all lexical forms and conventionalized gestures are sign-vehicle response-types. Other examples will be discussed later.

2. Segmental response-types.—These are similar to sign-vehicle response-types except that the movements underlying them do not themselves function as signs, but are segments of larger wholes which do function as signs. Phonemes, the non-meaningful sound units of a particular language, are the chief examples of such segmental response-types.

3. Semantical response-types.—This category is composed of those response-types or speech habits which embody semantical rules, *i.e.*, rules governing the relations between signs and the objects to which the signs are applicable. Thus, the habit pertaining to a given 'meaning' of a given word is a semantical response-type. The utterance of a sign-vehicle response-type in a suitable context or situation is evidence that the speaker possesses a semantical response-type associated with the sign-vehicle. It should be noted that the possession of a sign-vehicle response-type by a speaker does not necessarily imply the possession of an associated semantical response-type. It is frequently observed that an individual knows that a certain word (sign-vehicle) exists in the language of his speech-community but is ignorant of the 'meaning' of the word (semantical rule).

4. Syntactical response-types.—These are response-types embodying syntactical rules, *i.e.*, rules or habits pertaining to the relations between signs. Any lawful ordering or patterning of linguistic units may constitute such a response-type, provided that the units entering into the pattern are to some extent interchangeable. When a set of units governed by syntactical rules has become crystallized in such a way that the elements are not interchangeable (as in *forget-me-not*) the set of units must be regarded as a sign-vehicle response-type. Syntactical response-types are in any case always patternings of linguistic units rather than concrete sequences of such units. The tagmemes of Bloomfield's analysis (2, p. 166) are typical examples of syntactical response-types. It is possible that the rules governing the patterning of phonemes should also be included here.

5. Pragmatical response-types.—We are speaking here primarily of those pragmatical rules or speech habits which concern the specific social conditions under which the use of certain words and other linguistic units (Good morn-
According to Morris, however, "any rule when actually in use operates as a type of behavior, and in this sense there is a pragmatical component in all rules." A strict formulation would hence indicate that all response-types possess associated pragmatical response-types insofar as the individual is aware that a given response-type belongs to a particular language. It is not clear at present whether such a formulation will have any psychological importance in future investigation.

It is of interest to examine the range of behavioral responses which may be embodied in linguistic response-types. Any type of behavior or patterning of behavior which in any way comes under the voluntary control of an individual is potentially a linguistic response-type provided that situations arise which encompass the response with at least a semantical rule, if not also syntactical and pragmatical rules.

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<thead>
<tr>
<th>Non-linguistic Responses</th>
<th>Conventionalized Sign-Vehicles</th>
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<tbody>
<tr>
<td>Respiratory processes:</td>
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<tr>
<td>Breathing ..................</td>
<td>Sigh (of grief, of boredom)</td>
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<tr>
<td>Blowing through nares ......</td>
<td>Sneeze (scorn)</td>
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<tr>
<td>Coughing ....................</td>
<td>'Ahem'</td>
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<tr>
<td>Hiccough ....................</td>
<td>Deliberate suggestion or imitation of intoxication</td>
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<tr>
<td>Facial movements:</td>
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<tr>
<td>Blinking of eyes ..........</td>
<td>Blink of surprise</td>
</tr>
<tr>
<td>Wrinkling of brows ........</td>
<td>Deliberate suggestion of puzzlement</td>
</tr>
<tr>
<td>Emotion, etc.:</td>
<td></td>
</tr>
<tr>
<td>Laughter ...................</td>
<td>Forced 'ha-ha-ha'</td>
</tr>
<tr>
<td>Crying ........................</td>
<td>'Boo-hoo'—imitation of crying: crying for a reward, sympathy, etc.,</td>
</tr>
<tr>
<td>Fainting ...................</td>
<td>A conventionalized response of the Victorian woman</td>
</tr>
<tr>
<td>Postural movements:</td>
<td></td>
</tr>
<tr>
<td>Searching ...................</td>
<td>Peering (to suggest careful scrutiny)</td>
</tr>
<tr>
<td>Autistic gestures:</td>
<td></td>
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<tr>
<td>Drumming with fingers ......</td>
<td>Deliberate suggestion of boredom or of impatience</td>
</tr>
<tr>
<td>Nail-biting ..................</td>
<td>Playful suggestion of shyness, remorse</td>
</tr>
<tr>
<td>Pulling at beard ...........</td>
<td>Pulling at chin—a good-natured affectation of wisdom</td>
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These non-semantic responses become conventionalized sign-vehicles only under certain conditions. Otherwise they are merely non-linguistic signs or symptoms; indeed, they may possess no sign function at all. Spontaneous emotional reactions, overt physiological movements (coughing, breathing), signs of an individual's intentions (looking around a room in search of something), and the like are non-linguistic responses which nevertheless are signs or indications of adaptations and other miscellaneous activities of the individual. But interestingly enough, many of these behavioral signs have become conventionalized response-types which according to certain pragmatical rules may be used in certain situations with semantic values. In our own culture, at least, there is a surprising correspondence between certain non-linguistic activities and linguistic signs having semantical and pragmatical rules.
sponds to his own sign $S$ in the same way that he intends $B$ to respond. An illustration may serve to make these statements clearer. Suppose $B$ is reading aloud to $A$ a letter from a friend which deals a bit carpingly with $A$’s personal characteristics and idiosyncrasies. Should $A$ cough during the reading, his response may result either from natural stimulation in the throat or from mild embarrassment. $B$, reading the letter, may interpret $A$’s cough in either way, but only $A$ can tell us which it is—a non-linguistic response or a conventionalized sign-vehicle intended to denote embarrassment.

The importance of the study of meaningful, conventionalized gestures in a study of linguistic behavior should not be underestimated. Hundreds of such gestures can be collected in our own culture, and anthropological studies would undoubtedly reveal countless others. In each case the gesture can be studied with respect to its semantical, syntactical, and pragmatical rules. Because gestures (at least non-vocal gestures) do not appear to possess syntactical rules concerning their relations to vocal speech, some have urged that gestures do not belong to language. We may accord with this point of view only if language is very narrowly defined. While it is true that gestures are in many ways not on a par with vocal utterances, we are compelled to accept them as linguistic response-types on the basis of our definitions. The analysis of the rules pertaining to gesture is really the task of formal linguistics, but the study of the behavioral properties of gestures belongs to linguistic psychology. We must be able to study the total linguistic behavior of, say, a public speaker, or better still, an actor playing a Shakespearian role. Acting on the stage involves the use, and even the exaggeration, of conventionalized gestures. We may even go so far as to study the conventionalized choreographic movements of the modern dance. These movements may be regarded as conventionalized response-types with fairly definite semantical and pragmatical rules expressed in terms of the situations in which the responses are appropriate and the feelings they are intended to express. Learning to appreciate the modern dance necessitates (at least in part) the apprehension of these response-types and some dim awareness of their intended ‘meanings.’

It may be asked whether the expressive movements described by Allport and Vernon (1) are to be taken as conventionalized linguistic response-types. Allport and Vernon define expressive movements as "those aspects of movement which are distinctive enough to differentiate one individual from another." Further, "most movements have both non-expressive and expressive features." As an illustration, the eye-blink reflex is cited. According to these writers, this is on the one hand an adaptive reflex common to all men; on the other hand, it can be regarded as an expressive movement because of the individual variations in the performance of the reflex. We may find people with fast blinks and people with slow Winks, roughly according to whether the individual is constitutionally alert and energetic or languid and listless. We must note that in expressive movement the sign-vehicle is not the movement itself but a distinctive manner of performance. The semantical rule for an expressive movement, if it could be stated, would be in terms of the personality variables associated with a given manner of performance. But before a given expressive movement could be accepted as a linguistic response-type it must have certain characteristics. It must be a manner of performance capable of voluntary and deliberate control, and it
must be socially recognized as having a fairly definite meaning. Furthermore, it must actually be used in linguistic sign-situations. As an example of an expressive movement which has become a linguistic response-type we may cite the deliberate wearing of one's hat at a rakish angle to suggest, say, the journalistic nonchalance of the city desk. Another case is the actor's affectation of a certain gait in order to suggest a personality trait in the character he is portraying. It may be argued that having acquired the status of linguistic response-types these movements cease to be true expressive movements, in that they no longer represent individual differences. True expressive movements, for the most part, appear to be symptomatic (of personality traits) rather than semantic. Moreover, they are non-deliberate, and the fact that research in expressive movement has been chiefly concerned with the determination of personality correlates shows that expressive movements possess a minimum of conventionalization and social recognition.10

10 The elements of speech style studied by F. H. Sanford (15) are strictly speaking expressive movements rather than conventional linguistic response-types. Except by some sort of artificial transfer, as where a writer deliberately affects a certain style, these elements of style as such do not resemble the uniformities of a language system. The remarks made above with regard to Allport and Vernon's expressive movements apply equally well here. In many cases, however, these elements of speech style (e.g., the use of the 'word' uh) function at two levels—at the level of the linguistic response-type ('uh' used voluntarily to mean "Just a moment—I've got some more to say"), and at the level of the expressive movement ('uh' as associated with, perhaps, the timid, hesitant personality). The study of expressive movements in speech can thus be extremely important in linguistic psychology, for idiosyncrasies in speech may generally be regarded as manifestations of unusual strengths of response-types. Thus, in the case of the individual who uses 'uh' frequently, the 'uh,' which may have been learned originally as a

In turning to the enormous range of responses which occur in spoken and written language as commonly conceived, we may expect without much hesitation that virtually all of these responses are patterned in what we have called linguistic response-types. It cannot be said, however, that we can as yet specify all the kinds of linguistic response-types which are inherent in spoken and written language. Only by determining what segments of speech behavior follow both conventional rules and psychological laws can we ascertain the range of linguistic response-types. It is safe to say that the lexicon of a language provides a partial list of the linguistic response-types of that language. That is to say, words are among the chief sorts of linguistic response-types. We can also be confident in stating that at least some of the units of language analyzed in formal linguistics11 constitute linguistic response-types. But the mere fact that these units are convenient units in formal linguistics does not insure in advance that they are units in the psychological sense. As an example of the sort of qualification which might be imposed on linguistic units, we may say that morphemes such as de-, inter-, and -ess, etc., are not to be regarded as response-types unless the speakers of the language are generally aware of these forms as such and can use them in relatively novel contexts according to appropriate syntactical and semantical rules. Another kind of linguistic response-type, which is not usually con-linguistic response-type, for some reason has attained an unusually high response-type strength and hence has become fixated to such an extent that its symbolic function has practically disappeared.

11 Here we mean synchronic linguistics—the formal analysis of a language at a particular moment in its history—as opposed to diachronic linguistics—the study of a language from a historical point of view.
sidered a part of the lexicon of a language, is the idiom or conventionalized phrase. A phrase such as *the warp and the woof* (in its metaphorical sense), though it can be analyzed into smaller units by formal linguistics, nevertheless functions as a unit in speech behavior. From a historical standpoint these phrases become crystallized—perhaps almost by accident—from frequently used series of words, but from a synchronic point of view they appear to have all the characteristics of other linguistic response-types. Conventionalized idiomatic phrases are known to occur even in well disseminated artificial languages such as Esperanto. A less obvious form of conventionalized phrase is seen in the author's Phrase Completion Test (5). In this test, scored by a community of response technique, the subject must give his first response to incomplete phrases like 'Hounds and --------'; 'And as for -----------.' When a distribution is made of the responses to these items, it is found that two or three different responses constitute the majority of all the running responses, while a relatively large number of infrequent responses constitute the remainder of the responses. The phrases as completed by the frequently occurring responses may possibly be regarded as conventional response-types. Support is lent to this conclusion by the finding that knowledge of these phrases is related to vocabulary knowledge by a common factor which can be described as involving general knowledge of linguistic response-types (5).

There is a surface similarity between these phrase responses and the responses in free association tests. But free association responses are not conventional, linguistic responses. In the first place, the free association test is an artificial situation not found in normal verbal intercourse. Secondly, the associations are often made on the basis of similarities (rhyme, concrete relationship, etc.) which do not function directly in linguistic patterning. It should also be observed that the community of response score in free association tests has not as yet been found to be significantly correlated with verbal intelligence, although the possible relationships have never been fully investigated. Nevertheless, the responses in the free association test can often be studied as somehow stemming from certain linguistic response-types. This is particularly true of responses made on what seems to be a thematic basis. The responses *butter* and *milk* made to the stimulus word *bread* may be taken as derived from the conventionalized phrases *bread and milk, bread and butter.* Similar responses which cannot be traced directly to such phrases may nevertheless be regarded as reflecting the organization of verbal habits underlying speech. Certain properties of linguistic responses, therefore, may profitably be studied by means of the free association situation. Indeed, association tests afford a convenient means of measuring certain strengths of response-types, as we shall suggest later.

In formal linguistics, it has always been difficult to draw the line between morphology (the study of forms) and syntax (the study of word order) since the rules of form and word order are generally interwoven. It is possible that this difficulty can be avoided if we try to find the basic psychological units involved. Let us consider some of the problems raised by morphology. As a hypothesis we suggest that the knowledge of a conjugation or a declension in inflected languages such as, for example, Latin, Greek, and Russian, be regarded as a knowledge of a number of...
separate response-types. For example, each of the Latin forms sum, es, est, sumus, estis, sunt (="I am," "you are," etc.) must certainly be taken as a separate response-type. Similarly with dabo, dabas, dabat (="I, you, etc., shall give"), amabo, amabas, ama-bat (="I, you, etc., shall love"), despite the fact that the endings involved here are said to be 'regular.' Latin students will remember, however, that these endings are regular only for a particular conjugation (the first). It is probable that the similarity between dabo and amabo as contrasted with dicam (="I shall say") was hardly noticed by the native Latin speaker of ancient Rome. Likewise, the native English speaker does not often notice the difference between regular and irregular verbs in English; e.g., the forms kitted, occurred, and intended as contrasted with found, went, and brought have no special status as regular verbs. We have already spoken of the possibility that phonemes should be regarded as conventional response-types. Linguistic analysis defines the phoneme as the smallest sound unit of a linguistic structure. Certain rules can be stated concerning the occurrence of phonemes; for example, in English the phoneme cluster [fI] does not occur initially in free forms. But such a rule is of a purely linguistic and conventional nature and obviously has no fundamental psychological significance. It is of psychological interest, however, to study the force and cogency of such a rule in various individuals and at various stages of individual socialization. In so doing, we may say that we are studying the strength of a syntactical rule (itself a linguistic response-type) concerning phonemes (segmental response-types). Such an analysis could be carried out by the phonemic study of neologisms and brand names such as thrub, Snerd, Spam, and the like.

It is likewise possible that certain syllables of words, qua syllables (non-morphemic), may be found to have interesting behavioral properties. Some types of verbal slips may perhaps be studied as representing interferences between syllables.

Tagmemes (2, p. 166) and other syntactic units of linguistic structure are also to be regarded, tentatively at least, as linguistic response-types. Extremely little is known of either their linguistic or their psychological properties, however. An understanding of the taxemes and tagmemes which constitute the larger patterning of speech behavior in phrases, clauses, and sentences will undoubtedly lead to a better comprehension of the nature of verbal thinking.

Since writing is a special 'language,' bound by certain conventions, we may perhaps regard as linguistic response-types the letters of the alphabet, conventional symbols (e.g., $, &, %, #, etc.), numeral figures, and abbreviations, insofar as they function in behavior. It is further suggested that the spellings of words may be considered as response-types distinct from the corresponding spoken words.

Any characterization of linguistic response-types as Gestalten is at present gratuitous, in the opinion of the writer. The term 'pattern' is not intended to suggest such a description. The patterning of linguistic response-types may consist merely of habitual sequences of movements.13

IV. PSYCHOLOGICAL PROPERTIES OF LINGUISTIC RESPONSE-TYPES

The concept of strength of a linguistic response-type may now be described.

13 It should be noted that the experiments on words as Gestalten by Hollingworth (9) and others have been equivocal with regard to the problem studied, since they have dealt with words as spelled and printed, not with words as spoken and heard.
We shall use the term strength much as Skinner does in speaking of the strength of the reflex (18, p. 15). Strength refers in a general way to the likelihood or probability of the occurrence of the given response-type in a given individual. It refers not to the magnitude or intensity of a particular response but to the state or condition of a response-type in an organism. Strength is defined operationally in terms of several criteria or measures of strength. Since several criteria are used it is evident that the strength of a response-type is not unitary: a given response-type may have several strengths corresponding to different criteria. It is the task of research to determine how various criteria are related; experimental, mathematical, and rational procedures may be utilized for this purpose. A case could be made for the point of view that different criteria for a supposedly unitary response-type yield essentially different response-types. In nominal aphasia it is sometimes found that while green appears in spontaneous speech as a description of green objects, the patient is unable to respond with the word green when asked the color of an object. It is conceivable that the two responses belong to essentially different response-types. In practice, however, it is not of immediate importance to make any assumptions regarding the unitary nature of given response-types having different strengths according to different criteria, and no such assumptions are made here. Only if serious difficulties should arise in lawfully relating various criteria of strength would it be necessary to take a stand on this matter.

In selecting measures of response-type strength in an individual, we may have at our disposal any situation or set of conditions in which the response-type plays some role. Criteria may be conveniently classified as follows:

A. Recognition situations.—The individual is asked whether he recognizes a given response-type. This criterion may be used to measure the strength of pure sign-vehicle response-types; e.g., S is asked to check all words in a given list which he knows to exist in the English language, regardless of whether he knows their 'meanings.' This type of criterion is also used in the usual recognition vocabulary test, which can be regarded as a measure of the knowledge of semantical response-types. Recognition tests of grammatical knowledge are from our standpoint measures of knowledge of syntactical response-types (in most cases). It is probable, in fact, that the strengths of virtually all response-types can be measured in recognition situations. Measurements of this type suffer, however, from the fact that only two values of strength are obtainable, viz., presence and absence.

B. Stimulus-response situations.—Under this classification may be listed those situations where there is an attempt to elicit a given linguistic response-type by means of definite stimulus conditions, or where the investigator seeks to determine a correlation between stimulus and response. Even imitative situations—where S is asked to imitate, repeat, or reproduce a given response-type—should not be ruled out of consideration. The traditional verbal completion test affords an example of a stimulus-response situation. It is extremely easy to set up stimulus conditions for the eliciting of some response-types (e.g., words denoting common concrete objects) since the semantical rules connected with these response-types are best defined by correlations with definite stimuli; on the other hand, difficulties would often arise in connection with certain other response-types such as abstract terms, syntactical connectors, and certain grammatical constructions. What stimuli, for example,
could be specified for the eliciting of a so-called 'nominative absolute' construction?

An important variable which must be studied in connection with this type of criterion is the speed of response.

C. Frequency criteria.—The strength of a response-type can be measured by the frequency with which it occurs in a sample of behavior. The sample may be either a sample taken over a certain period of time, or a sample consisting of a specified number of words, sounds, etc., and it may be a sample taken under either controlled or uncontrolled conditions. The responses may be studied as operant responses. The measurement of response-type strength by frequency criteria is illustrated by studies of word frequency by Thorndike (19), Zipf (22), and Skinner (17), and by time-sampling studies of children's speech (4).

The classification of criteria outlined here is made purely for convenience; future inquiry may reveal a more valid or useful classification. There is a suggestion of such an outcome in recent factorial studies of verbal ability, which show that verbal tests can be grouped according to whether they measure primarily range and breadth of response-type knowledge or primarily speed and fluency of response.14

The study of the criteria of response-type strength corresponds roughly to the investigation of what Skinner terms the "static laws of reflex strength" (18, p. 12). The criteria of strength are to be studied first by determining their reliabilities and then by discovering consistent relationships among them. It

would be of interest to know, for example, whether response-types are observed to be present on the basis of one criterion more often than on the basis of another, and whether line-relationships can be found between criteria. The relations between speed of response and other criteria would be of particular importance.

The study of the strengths of response-types, nevertheless, is merely preliminary to the investigation of the dynamic properties of verbal response-types; that is to say, the study of lawful changes in response-type strength. The strength of a response-type is variable, being affected by positive and negative reinforcement from various sources. The effects of such reinforcement must be given precise expression if worthwhile data are to be obtained. The relationship between the frequency of occurrence of a response-type in a speech-community and its strength in a particular individual is of interest and can be studied in terms of the dynamic properties of response-types. Several tentative postulates concerning this and other relationships can be stated:

1. The strength of a response-type according to a given criterion is affected by positive and negative reinforcement. (It should be determined whether strengths according to different criteria vary concomitantly under similar conditions of reinforcement.)

2. From a developmental point of view, the strength of a response characteristically increases from zero and attains a certain value in the adult individual which is relatively constant despite ephemeral changes due to reinforcements.

3. There may be individual differences in the capacity or the disposition to learn linguistic response-types.

4. Within the individual, there may be differential capacities or dispositions

14 For example, note the distinction between factor C and factors A and E in Carroll's study of verbal tests (5). It may be added that the separation of factor A, a word fluency factor, and factor E, apparently a sentence fluency factor, suggests that response-types themselves may be grouped by factorial methods.
to learn different classes of response-types.

5. In a given individual, the average strength of response-type, taken over a wide range of similar response-types, has fluctuations mainly due to sampling errors, but also due to temporary changes in the strengths of the separate response-types. (The average strength of response-type is for practical purposes a constant in the individual, and can be measured, for example, by certain vocabulary tests, spelling tests, etc.)

6. Through reinforcement, there is a substantial relationship, in any individual, between the strength of a response-type and its frequency of occurrence in the speech-community.

7. The frequency of occurrence of a response-type is an indication of its average strength among the members of the speech-community. The average strength of a response-type in a speech-community is usually relatively constant but is subject to relatively large changes under certain conditions of a sociological nature.

8. When the total range of linguistic response-types are ranked or scaled in order of frequency of occurrence or average strength in the speech-community, it will be found that for any individual there exists a point on this scale on one side of which most of his response-types are present and on the other side of which most response-types are not present. There are individual differences in the position of this critical point.

9. Individual differences in the average strength of response-type will be found with the use of any criterion of strength. (The most convenient method of studying relationships between criteria is to correlate average strengths of response-type by different criteria. In this way it may be shown that different groups of criteria are linearly independent from the standpoint of factor analysis.)

The reader will undoubtedly notice that the type of analysis outlined here bears similarities to many of the traditional procedures of psychology. For example, except for a change of emphasis there is little difference between our criteria of response-type strength and some of the accepted measures of the retention of verbal material (recognition, reproduction, and recall). Some of the various tests of verbal intelligence need only a moderate amount of sifting and rearrangement in order to be turned to our purposes. Finally, the study of dynamic laws of verbal response-types must obviously be built on the known laws of learning and conditioning. In the main, the study of verbal behavior is a branch of the applied psychology of learning. The psychological laws of linguistic behavior may turn out to be nothing more than the accepted laws of learning in a new guise; but even if this should be the case, we should find ourselves in possession of a newer and deeper understanding of the application of these general laws. The theory of verbal behavior outlined here is intended to be capable of translation into a program of research. Nevertheless, it does not pretend to cover all the problems which may be raised in the field of linguistic psychology.

V. SUMMARY

This paper has attempted to present a theory of linguistic behavior which can be integrated with general psychological theory and which at the same time does justice to the complexities of linguistic structure.

Speech behavior is seen as fundamentally a series of movements in which certain uniformities can be found. Some of these uniformities are the linguistic norms studied in formal linguistics;
others are of a more psychological nature and relate to the conditions under which speech responses occur. An attempt is made to define the linguistic response-type as any uniformity in speech behavior which exhibits a certain behavioral structure. This common behavioral structure may be characterized as follows:

A linguistic response subsumed under a linguistic response-type must first of all play a role in a sign-situation such that "something takes account of something else mediatelty." Secondly, the sign-situation must be such that an organism deliberately intends another organism to respond to the sign as a sign. Consequently, the response must be one which can be produced either directly or indirectly by mechanisms which are under the voluntary control of the organism. Thirdly, the linguistic response must either itself be a sign, or it must form a segment of a sign. Fourthly, there must be some social agreement among the members of a speech-community with regard to the sign. Finally, the linguistic response-type must exhibit certain static and dynamic properties as a recurrent uniformity in the speech behavior of a number of individuals.

A wide range of behavior is examined in order to find what types of behavior may on occasion become linguistic response-types. It is found that it is possible to separate linguistic from non-linguistic behavior on the basis of the qualifications listed above. Linguistic behavior is found to include all speech behavior in the ordinary sense of the term, as well as many non-vocal gestures. In the case of linguistic behavior, it is suggested that the units of formal linguistic analysis be tentatively regarded as linguistic response-types until the psychological properties of these units can be fully investigated. Certain other patterns of speech behavior, such as inflected forms and conventionalized idiomatic phrases, are also to be regarded as response-types which function as units in behavior.

The psychological properties of linguistic response-types are to be studied in terms of their strengths. The strength of a linguistic response-type can be measured in any identifiable situation in which it plays a role. Since different measurements may yield different strengths, the 'strength' of a linguistic response-type is not unitary. It is the task of research to discover relationships among various measures of strength. These relationships will constitute the static laws of linguistic response-types. The dynamic laws of response-types are the statements of the conditions under which response-type strength may change.

Verbal behavior is thus seen as a series of movements patterned in overlapping units. The uniformities underlying these movements exist as behavioral habits, or response-types, the strengths of which are subject to continual change.

REFERENCES


