12 Psycholinguistic Experiment and Linguistic Intuition[1]

Virginia Valian
Columbia University

The methodological questions discussed in this chapter are directed toward psycholinguistics but hold more generally for all dependent areas within psychology. By a dependent or derivative science I mean one that relies on and is constrained by concepts from another science in stating its theories and hypotheses. Biology, in this sense, is dependent on physics. The central claim here is that formal psycholinguistic experiments (including formal observational studies) test performance models directly, competence models only very indirectly. Intuitive judgments, which may be thought of as informal experiments, test competence models more directly, even though intuitive judgments are fallible.

First it is necessary to characterize and distinguish competence and performance. Two characterizations are possible, what may be called the *general distinction,* which is a priori, and what may be called the *particular distinction,* which is a posteriori (Valian, 1979). The general distinction is the one that will be important for present purposes.

The general distinction is between knowledge and use. It is a priori because it does not depend on data. It is applicable whenever one assumes that there is knowledge *of* or *that* something. The distinction is logical because there is a conceptual difference between, on the one hand, knowing of or that something and, on the other hand, making use of that knowledge. The distinction is at least implicitly presupposed by all branches of cognitive psychology. For example, all programs have knowledge stores.

The particular distinction, in contrast, is an empirical matter. It represents a particular claim about what the content of knowledge is, such that it is distin-

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[1]My thanks to J. J. Katz for endless discussion of the issues touched on in this chapter.

psycholinguist often ends up making claims about competence. Two questions may still be raised. Why does such a practice exist? Does the practice make

guished from features of the use system in which it is embedded. Chomsky early proposed one claim about the particular distinction, namely that there exists a syntactic level called deep structure. That claim could be incorrect: It is subject to data; it is empirical.

To summarize, the general distinction is imprevious to data and asserts the non-identity of knowledge and use; the particular distinction depends on corroborating evidence about how to draw it, about, for example, what the content of knowledge is. Disagreements about how to draw the particular distinction have no bearing on the existence of the general distinction. Here we will neither make nor defend any claims about how to draw the particular distinction; we simply note the definitional necessary of the general distinction. (See Valian, 1979, for further discussion.)

Having noted that there is a difference between knowing something and making use of knowledge, we now turn to the question of what the subject matter of psycholinguistics is. Given the preceding discussion, the subject matter could be the nature of the knowledge, the use of the knowledge, or both. Since we are talking about language, we can rephrase the choice as follows: Psycholinguistics is about the knowledge necessary for any and all linguistic behavior to take place; it is about how that knowledge is represented, accessed, and used; it is about both. (It will not always be easy to tell which behaviors are "linguistic," and which "non-linguistic," but there are enough clear cases to allow the discussion to proceed: Making a pun is clearly linguistic behavior while tieing shoelaces is clearly not.)

There are two different routes we can follow to answer the above question, corresponding to two different conceptions of grammar. (There are other routes as well, but only two will be followed here.) One conception is that first put forward by Chomsky, which claims that linguistics is theoretical psychology, having as its subject matter the ideal speaker-hearer's knowledge of the language plus the structure of the language itself. A constraint is placed on theories in linguistics that they be psychologically realizable (though whether practicing linguists typically make decisions on such a basis is unclear). On that conception, psycholinguistics is the study of performance. That is, the goal of psycholinguistics is to develop an explanatory model of performance.

Another conception is that put forward by Katz (1981), which claims that linguistics is solely linguistics, having as its subject matter only the structure of the language. Theories in linguistics are neither about psychological representations nor constrained by psychological facts. On this Platonic conception it is not ruled out that speakers have knowledge of their language and its structure, but the existence of such knowledge is a matter of independent and contingent fact, and the nature of that knowledge is within the domain of psychology.

Thus, the two conceptions make different assignments of the subject matter of psycholinguistics: On a Chomskyan view it is limited to performance, on a Platonic view it includes competence and performance. Further, in practice, the

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psycholinguist often ends up making claims about competence. Two questions may still be raised. Why does such a practice exist? Does the practice make sense? The following discussion attempts to answer both questions.

Let us first assume that we are interested in finding out whether someone has knowledge of some hypothesized linguistic rule or entity K_g. Even though the question of whether a person *has* K_g is logically distinct from the question of whether or how that person *uses* K_g in some task T_i, the only access to K_g is through one or another T_i. For example, if we want to know whether people have knowledge of basic grammatical relations like "subject of the sentence," we can only find out by having them do various tasks: We could ask them to identify the subject of various sentences, or to sort sentences with or without a subject into two different piles, or to make judgments about sentences that require discrimina-. tion of subjecthood, and so on.

If, for all T, there is no evidence of K_g, our confidence in the existence of K_g will decrease as a function of how many T's are tried. If only T_1 and T_2 are tried, and no evidence for K_g is found, we ought to keep an open mind about K_g's existence. To return to the example of subjecthood, if none of the above-described "experiments" demonstrated people's knowledge of subjecthood, we should be just as inclined to worry about experimental error as about the nonexistence of knowledge of subjecthood.

An open mind would not be necessary if it could be proven that T_1 or T_2 had some special status with respect to K_g, for example, if it could be demonstrated that performance on T_1 or T_2 could not fail to disclose K_g if K_g existed. We assume for the moment, however, that all T's are equal. If $T_1, T_2, \ldots, T_{1000}$ are tried, and no evidence for K_g is found, we will be fairly certain K_g does not exist. Thus, experimental evidence for the absence of K_g requires many negative cases from a large and representative sample of T's.

If, in contrast, for T_1 or T_2 there *is* evidence of K_g, then we have reason to believe in the existence of K_g, even if other T's fail to disclose the existence of K_g. Only if T_1 or T_2 had some especially suspect status with respect to K_g would we distrust the evidence. Thus, all other things being equal, less evidence is needed to confirm the existence of K_g than to confirm the non-existence of K_g. A similar point is made by Kiparsky (1975, p. 203), thus:

> When we find a certain pattern of blips with the radio-telescope aimed at some point in the sky, we may have evidence for a pulsar, but when we fail to find such a pattern, there might be either no pulsar or the signals we are looking for are so weak that they are buried in all kinds of other stellar and terrestrial noise.

Our temporary assumption that all T's were equal can now be examined. That assumption must be false, since in all sciences some T's are better sources of data than others. There are at least two determinants of how much confidence we place in a given T_i. The first is how successful a theory one can build by making use of

data from a particular T_1; the second is how explicable it is that a particular T_i should yield superior data. To justify using T_i it is sufficient to show that by doing so one can construct a fine-grained comprehensive consistent theory. A good theory testifies to the adequacy of its associated data-collection procedures, simply by virtue of its existence. What solidifies confidence is an explanation for why T_i works so well. Such an explanation is not required for confidence, since a technique may work without anyone's knowing why, but it solidifies confidence.

The conclusion of this section of the argument is that, to find out if K_i exists, one should use the T that yields "good" data. You know if you have good data by whether you have a good theory. Thus, at one level, a theory justifies the data, just as, at another level, the data justify the theory.

The linguists' technique of choice is having intuitions. That "task" has made possible the construction of a comprehensive finely-grained theory of, on a Chomskyan view, people's (more accurately, of ideal speaker-hearers') knowledge about language (more specifically, knowledge about the structural properties of language). The theory is not about intuitions, any more than physics is about meter readings. It is about linguistic knowledge; having intuitions is a tool, an informal experimental procedure, allowing one to find out what one knows about a language. Grammar-constructing systematizes that knowledge and also projects claims about the object of the knowledge, namely the language in question.

If intuitions are "good" data for the construction of powerful theories about linguistic knowledge and language itself, why don't psycholinguists take for granted the linguists' claims about the nature of knowledge, and concentrate on determining access and use? Why, instead, do psycholinguists commonly make competing claims about the nature of linguistic knowledge? It is not because psycholinguists have a Platonic conception of grammar; none have espoused Platonism. But, even if psycholinguists did subscribe to a Platonist view, they would still be in error to rely on psychological experiment rather than linguistic intuition as a basis for information about a speaker-hearer's knowlege, or competence. To demonstrate that, however, it will first be necessary to go through psycholinguists' actual reasons for making claims about competence. There are three reasons.

The first is that linguists disagree about what the nature of linguistic knowledge is. The second is that many psycholinguists distrust the linguists' method as one that yields artifactual results. The third is that psycholinguists have erroneously concluded from failure to find evidence of aspects of K (e.g., transformations) in a few T's, that success via the T of having intuitions is only apparent, not true, success. There are several discussions of this third mistake. (See, for example, Fromkin, 1975; Kiparsky, 1975; Wirth, 1975; Valian, 1979. See also Foss & Fay, 1975, and Gough & Diehl, 1977, for a discussion of the limitations of experiments and the lack of strong evidence against the use of transforma-

tions.) Here the discussion will center on the first two reasons psycholinguists make competing claims about competence.

The first is that linguists disagree among themselves at any particular time about the contents of linguistic knowledge, and they change their minds over time (see McCawley, this volume). As a result, the psycholinguist is usually in a quandary about which theory to incorporate into a performance model. That quandary, however, is integral to any dependent science. There are always disagreements in basic science, often about very fundamental issues, such as how many basic particles compose matter. But no dependent science can afford to wait until the ultimate truth is arrived at in its allied basic science(s). Choices must be made with no guarantee of having made the right choice, and, in any event, advances can be made in the dependent science with an incomplete or even incorrect basic science. Newtonian physics, for example, is useful over a very large range.

It is tempting, however, to think that where linguistics has failed, psycholinguistics may succeed, especially if the experimental procedure of linguistics is intrinsically flawed. We now arrive at the second reason psycholinguists concern themselves with questions of knowledge as well as use. In most dependent sciences there is more agreement that the methods their allied basic sciences use are appropriate; seldom do dependent scientists criticize the main techniques used by basic scientists as being inherently flawed.

What are the properties of having intuitions that make it seem so suspect a technique? They should be quite serious in order to justify relinquishing a technique that allows for the construction of fine-grained theory and substituting techniques that, thus far, have explored only fairly gross aspects of linguistic knowledge and had difficulty establishing them.[2]

The major criticisms that have been made against using intuitions as data are: They are fallible; they are unstable; they are often in apparent conflict with each other and with data gathered in other ways; they are biased by one's theoretical orientation and by context. There are many discussions of the nature of intuitions and their role in the linguist's enterprise. See, for example, Bever (1970); Greenbaum (1976); Spencer (1973); Householder (1965, 1966); Derwing (1973); Ringen (1977); Labov (1972); Carroll, Bever, and Pollack (1979). By and large, intuitions are seen as necessary data, though the linguist's dependence on intuitions is often seen as unfortunate, because of the problematic character of intuitions.

The list of problems seems formidable until one realizes that the same criticisms hold, and to the same extent, for formal experimental results. All experimental procedures are fallible. They all yield data which are subject to more than one interpretation. There is always some datum in conflict with other data. The

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[2]I will not take up the possible difficulty of fitting theories to intuitive data since there is no a priori reason to suppose that that task is more difficult for intuitions than for other data.

same procedure may yield one result in the hands of a scientist with one theoretical orientation and another in the hands of a scientist with a different orientation. Some experimenters get results when others do not. To begin with, then, there seems to be parity between having intuitions and doing formal experiments in terms of the likelihood of each to error.

Perhaps what makes having intuitions seem more likely to error is that it is subjective. There are no pieces of apparatus either in producing the stimuli or measuring the responses. The factor of human error, because there are no other error sources and because nothing is available to hide the human factor, looms large. But many subjective judgments are both reliable and valid. To buttress this claim I will compare making judgments about language with making judgments about wine, or tea, or cheese. There is an important disanalogy in the comparison that I mention first. In making judgments about food and drink one is making judgments about physical objects; neither linguistic knowledge nor language is a physical object. For present purposes the disanalogy is unimportant. It may seem that there is another disanalogy, in that tasters lack a theoretical bias, but that is not true. A Bordeaux lover, for example, will accept defects in a Bordeaux, like excessive tannin, that a Burgundy lover will not.

Tea companies have tea-tasters; champagne and sherry houses have taste specialists; wine shippers rely on their tongue. Tea- and wine-tasters taste in order to make quality judgments between different examples of the same tea or grape type, and in order to make analytical judgments that a blended tea or wine needs more or less of one or another component. Only people can produce a blend that will taste the same from year to year. In other words, companies hire tasters and smellers because their skills are needed, not because of ritual. Tasters are not infallible, but their errors are within acceptable limits, in part because they know what steps to take to keep their errors at a minimum. Interestingly, many of the procedures tasters deliberately use to reduce errors of judgment are similar to procedures linguists use.

Here are some examples of the similarities between tasters and linguists. Tasters arrange the order in which they will taste samples. Wines or teas expected to be light-bodied will precede those expected to be heavy-bodied. Tasting in the other order would dull or coarsen the palate. The fact that order of presentation of samples affects judgment is not taken as an indication that the judgment-making process is so flawed as to be useless, but as a fact to be exploited so as to reduce errors of judgment. Linguists support their analyses by presenting examples in a particular order, a practice that is similarly reasonable.

Tasters also make better judgments if they do not taste completely "blind." By visual inspection and smell they are able to narrow the range of possibilities as to the identity and quality of the wine. Further, knowing in advance that a wine is, say, a French wine, will enable a taster to make a more accurate judgment about the exact geographical origin of the wine than if she had been given no prior information. Prior information can also be misleading, but that

will be discovered in the long run. As mentioned earlier, tasters' preferences for wine of a certain type may also lead to erroneous judgments, but it should be noticed that although a Bordeaux lover will be too forgiving of excess tannin, she will simultaneously be more likely than a Burgundy lover to detect a critical absence of tannin in a young wine.

Linguists armed with a theory similarly have a greater possibility of making finer judgments, and a greater possibility of making certain kinds of errors. Theories, depending on their content, make it more likely that some distinctions will be missed and more likely that others will be noticed. In the long run, the competing theoretical claims and their attendant intuitions will be adjudicated. One easy method both tasters and linguists employ in the short run is to check their judgments with others who hold the same, different, or neutral theory and then re-judge.

The erroneous expectation that is operative here is that it is preferable to approach samples with a completely open mind. The only completely open mind is an ignorant, inexperienced one. Only someone who knows nothing about wine can approach samples of it with no preconceptions. Common reports of beginning tasters include: They all taste the same; they taste different but it's all a jumble; I can't remember anything about the ones I tasted last week, and so on. The untrained palate pays a heavy price for its "open-mindedness," namely, lack of ability to make fine discriminations. Again, the fact that training and experience are necessary is not a sign that the technique is suspect. Similarly, intuition-having is a skill at which all are capable at some level, but which training and experience can cultivate.

Another characteristic of tasters is that some tasters are better than others at detecting certain flavor components. For example, some people are very sensitive to bitterness and can detect it at lower concentrations than other people can. That is, not only do some people have better palates than others—since talent is unequally distributed—but some people excel in making certain kinds of judgments. Again there is a parallel with linguistics: Some people have better ears in general than other people, and some people excel at syntactic judgments, while others excel at semantic judgments. Again, the fact that people with talent, training and experience will have intuitions that people lacking them will not have is not an argument against using intuitions as data.

This is not to claim that intuition-having is such a privileged activity that only professionals should engage in it. We all have intuitions, because we all possess one necessary property, knowledge of our language. But having good intuitions requires more than knowing a language, and the other requirements will be met to various degrees from person to person. Therefore it should be recognized that while everyone is capable of having intuitions, there is also a talent and skill involved that are presumably more highly cultivated in professional linguists than in the person on the street.

To summarize this section of the argument, having intuitions is on a methodo-

logical par with using other experimental procedures except for its more apparent subjective character. The subjectivity is not a disqualification, however, since subjective judgments can be both reliable and valid. Further, we know something about how to improve our ability to produce good intuitions, such as via training, checking with others, and so forth.

Now we can return to the issue of the domain of psycholinguists from a Platonic viewpoint. Were psycholinguists to adopt a Platonist view of linguistics they would be free to make claims about the nature of competence but, I will argue, should give greater weight to intuitions than to psychological experiment, continuing to reserve the latter principally for claims about performance.

Intuitions have two aspects. The Platonic linguist is only concerned with what intuitions are about, namely, language. But the psychologist is also interested in what can be inferred about the intuiter's knowledge from the intuitions. The intuitions are not hallucinations. By virtue of the fact that linguists can construct good grammars by using intuitions as a starting point, there is evidence that the intuitions do reflect, on the intuiter's part, linguistic knowledge.

Thus, the role that intuitions play in the construction of grammars testifies to the existence of linguistic knowledge, independent of whether that knowledge is considered to be in the domain of linguistics or psychology. On a Platonist view it is necessary for the psychologist to integrate the information about speakers' linguistic knowledge obtainable from linguistic intuition with that from psychological experiment. The psychologist cannot ignore the implications about knowledge offered by intuitions (unless intuitions are somehow suspect, which the preceding discussion claimed was not true).

If anything, then, the psycholinguist who adopts a Plantonist framework must give more weight to intuitions than one who adopts a Chomskyan framework. If intuitions yield information about linguistic knowledge (as well as information about the structure of the language), and if linguistic knowledge is the province of the psychologist, then the psycholinguist must make full use of that information. Further, since the picture of competence that we get from intuitions is richer and more detailed that the picture we get from psycholinguistic experiments alone, and since in general we are ill-advised to throw data away, we are better off taking the richer offering (again, supposing there is nothing suspect about intuitions).

Any lingering unease about the method of having intuitions is probably due to how little we understand about why the method works, what makes for a good intuiter, what is responsible for faulty intuitions, what makes some intuitions clear and certain while others feel questionable, and so on (see Bever, 1974; Carroll et al., 1979). We earlier stated that a good theory testifies to the adequacy of its data-collection procedures, but that an explanation of why the procedures worked so well would solidify confidence in the procedures. That explanation is missing. Answers to the just-posed questions are needed to explain *why* the task

of having intuitions yields better data than other tasks, even though they are not needed to prove that the task of having intuitions is superior to other tasks.

I have suggested elsewhere (Valian, 1979) that one possible reason intuitions are a better source of information about competence is that intuitions have as their focus and object the structural properties of the language. In contrast, most psycholinguistic experiments are designed to keep subjects from explicit awareness of the linguistic structure of the materials. The effects are intended to operate unconsciously. Further, subjects' responses are frequently nonlinguistic (e.g., pressing a button), so that inferences must be drawn about the interaction between the nonlinguistic and linguistic aspects of the task. The suggestion does not prove that intuitions are by their nature more informative about competence, but makes somewhat more reasonable the fact that they are.

There is, then, no a priori claim being made here that intuitions are the only source of knowledge about knowledge, nor that intuitions are always correct. Their use is not being justified on the basis of the claim that they have an a priori privileged status. Rather, their use is being justified on the basis of the fact that they work. It is as a matter of fact that we make the claim that having intuitions produces more direct information about the contents of knowledge, or competence, than psycholinguistic experiments do, and the further claim that psycholinguists should be more hesitant in making statements about the competence component than the performance component, if their statements are only based on psycholinguistic experiment.

REFERENCES

Bever, T. G. 1970. The cognitive basis for linguistic structures. In *Cognition and the development of language*, ed. J. R. Hayes. New York: Wiley.

Bever, T. G. 1974. The ascent of the specious or, there's a lot we don't know about mirrors. In *Explaining linguistic phenomena*, ed. D. Cohen. Washington, D.C.: Hemisphere.

Carroll, J. M., Bever, T. G., & Pollack, C. 1979. *The nonuniqueness of linguistic intuitions*. Unpublished manuscript, Columbia University.

Derwing, B. L. 1973. *Transformational grammar as a theory of language acquisition*. Cambridge: Cambridge University Press.

Foss, D. J., & Fay, D. 1975. Linguistic theory and performance models. In *Testing linguistic hypotheses*, ed. D. Cohen & J. R. Wirth. Washington, D.C.: Hemisphere.

Fromkin, V. A. 1975. When does a test test a hypothesis, or, what counts as evidence? In *Testing linguistic hypotheses*, ed. D. Cohen & J. R. Wirth. Washington, D.C.: Hemisphere.

Gough, P. B., & Diehl, R. L. 1977. Experimental psycholinguistics. In *A survey of linguistic science*, ed. W. O. Dingwall. 2d ed. Stamford, Conn.: Greylock.

Greenbaum, S. 1976. Contextual influence on acceptability judgments. *International Journal of Psycholinguistic Research*, pp. 5–11.

Householder, F. W. 1965. On some recent claims in phonological theory. *Journal of Linguistics* 1:13–34.

Householder, F. W. 1966. Phonological theory: A brief comment. *Journal of Linguistics* 2:99–100.

Katz, J. J. 1981. *Language and other abstract objects*. Totowa, N.J.: Rowman & Littlefield.

Kiparsky, P. 1975. What are phonological theories about? In *Testing linguistic hypotheses,* ed. D. Cohen & J. R. Wirth. Washington, D.C.: Hemisphere.

Labov, W. 1972. *Sociolinguistic patterns*. Philadelphia: University of Pennsylvania Press.

Ringen, J. 1977. *Linguistic data: Intuitions and grammar testing*. Paper presented at the 12th International Congress of Linguists, Austria.

Spencer, N. J. 1973. Differences between linguists and nonlinguists in intuitions of grammaticality-acceptability. *Journal of Psycholinguistic Research* 2:83–98.

Valian, V. 1979. The wherefores and therefores of the competence-performance distinction. In *Sentence processing: Psycholinguistic studies presented to Merrill Garrett,* ed. W. Cooper & E. Walker. Hillsdale, N.J.: Lawrence Erlbaum Associates.

Wirth, J. R. 1975. Logical considerations in the testing of linguistic hypotheses. In *Testing linguistic hypotheses,* ed. D. Cohen & J. R. Wirth. Washington, D.C.: Hemisphere.