

https://dspace.org/

The stimulus-response situation in language learning with special reference to the language laboratory

Proctor, Leslie

1966
Johannesburg College of Education
https://hdl.handle.net/10539/27425
Proctor, L. (1966). The stimulus-response situation in language learning with special reference to the language laboratory. Symposium: A Journal of Education for Southern Africa, pp. 25-30.

Downloaded from a DSpace repository. https://dspace.org/

The Stimulus-Response Situation in Language Learning with special reference to the Language Laboratory

by
L. PROCTOR
Johannesburg College of Education

ANY LANGUAGE EVENT, however great or however small, however trivial or however important, no matter how many people are involved, is basically a stimulus-response situation. If I ask you to come and have a beer, or if I put my thumb to my nose, or if a tsotsi sidles up to you in your parked car to offer an illegally gained watch, you will feel constrained to give a response, and more likely than not that response will be a verbal one, and most likely an oral one. Although the verbal stimulus or verbal response, or both, will be largely automatic — one that we do not think about consciously (for example 'Stop Thief'), the situation is a highly complex one, and one in which it is impossible to distinguish or delineate one single or simple stimulus or response.

Let us make a brief analysis of one of the millions of possible language events. Nelson Brooks* describes it thus: Mr. Smith is sitting working at his desk in his office. There is a knock at the door. Smith calls out loudly 'Just a minute!' and shortly afterwards goes to the door, where he perceives Mr. Jones, who says rather apologetically 'I'm sorry to disturb you'. Smith interrupts him by saying 'Not at all — come in'.

As Smith was sitting at his desk, "the kaleidoscope of consciousness in his head was given a sudden new configuration by the sound of Jones' knock. Out of a composite of emotional reactions reorientations and intentions, one finally comes to dominate the rest: Smith's wish to signify his presence on the other side of the door and to ask Jones to wait until he opens it. This intention is almost simultaneously transformed into certain English words which Smith pulls out of the memory store that he has built up over many years. These words — sound waves set up by certain physiological changes convey this intention." Smith's vocal apparatus perform a highly complicated sequence of movements that produce the vibrations that carry the meaning. A non-English speaker, receiving these vibrations, would not be able to decode them. Jones, however, is English-speaking; his ear-drums are struck by the sound-waves; an almost imperceptible movement sends to Jones' brain a sequence of neural impulses that are decoded into meaning, and Jones 'understands'. The process of communication has passed through a series of definable stages: a mental state (Smith's reaction to the knock and his desire to have Jones wait), an encoding process, a physiological reaction within Smith's vocal apparatus, a purely physical event of vibrations or sound waves going out concentrically through the air, another mental state.

The complexity of this situation, which is only momentary, is further heightened, if we think of the possible reactions that could have taken place when Smith heard the knock. He could have asked Jones in immediately; he could have been annoyed, excited — any one of a dozen possible states of mind. The actual sounds that he made in response to the knock could have covered an enormous range: 'Wait a moment', 'Wait a minute', 'Just a moment', 'Hang on', Attendez un peu', 'Attendez un moment', 'Wag 'n bietjie', 'Warten Sie bitte' etc.

It is interesting to note that this situation is unique. Although someone else may come and knock again, the precise details of this situation will never be repeated psychologically or linguistically. Although Smith and Jones may use the same utterances again in a similar situation, the phonic details — volume, stress, pitch, intonation will never be repeated. (Have you ever tried repeating the same utterance when recording a tape from script — it is difficult to employ identical intonation and pitch a second time?)

What I wish to suggest by using this rather lengthy example of a typical language situation is that the stimulus-response situation in real life, whatever the situation, and whatever the kind of stimulus-response, is enormously complex — a computer would be necessary to work out all the possibilities.

*Nelson Brooks: *Language and language Learning* (Harcourt, Brace & World — 1960).

On the other hand the number of possibilities in a language-learning situation is strictly limited. The limitations are brought about by the limited number of sounds, structures or vocabulary items that are at the disposal of the learner or by the framework of the teaching-learning situation. The linguistic range of the language learner handling a situation similar to the one I described would naturally be smaller than that of Mr. Smith. If you like, it would be the difference between making a journey by car and doing the same journey by trolley-bus, or even by tram. Mr. Smith goes by car: the route he travels, the speed at which he travels, the number of times he stops and where he stops is almost entirely his own affair. The advanced learner — one with several years of L2 experience, is the trolley-bus. He has more manoeuvrability than the tram, but he must stick to a definite, well-defined route. The beginner is the tram-car: he must adhere to the tram-lines. If he deviates at all from the linguistic tram-lines, he will be in trouble.

Language-learning situations, then, (and I am referring specifically to second and third languages, but this also applies occasionally to first language learning, even in high school and beyond) are to a large extent artificial. They can not be otherwise. Progress in language-learning means simply extending the possibilities and increasing manoeuvrability. What the ultimate is I do not know — is there such a thing as complete bilingualism?

Language-learning is artificial also because as teachers we have to oversimplify the stimulus-response, especially for beginners, otherwise the teaching-learning situation would become unmanageable. The reduction of the stimulus-response to manageable proportions is the very essence of programmed learning and language laboratory techniques.

I wish, at this point to hazard one definition (and there are many) of learning. Learning may be defined as an identifiable change in behaviour on the part of the student. These new habits of behaviour are brought about when the mechanism of stimulus-response is involved. A comprehensive discussion of the terms stimulus and response, which I can not elaborate in an article of this length, may be found in *The Learning Process and Programmed Instruction* by E. Green (Holt, Rinehart & Winston — 1962). This stimulus-response mechanism can be brought into play in one of two ways. Politzer* describes them thus: "The first type of learning is known as classical conditioning and involves an associational shift: a stimulus (S) is associated with a reaction or response (R). Then another factor (A) is added to the stimulus. (S) and (A) together still produce (R) (S plus A equals R). Eventually the original stimulus (S) is dropped, and (A) by itself causes the reaction originally produced by (S). In first language learning (S) corresponds to the stimuli created by a situation, and (A) to the linguistic symbols with which the stimuli are associated."

This symbolisation often causes trouble to teachers, because they overlook the fact that the concept or the thing for which the symbol stands is more important than the word or utterance that we use to give expression to the concept or thing. I am reminded of the story of an African student teacher who wrote in his English essay "Last night I took my girl-friend out and proposed to her, but she garbaged me." The lecturer was non-plussed and asked the student to explain. "I looked in the dictionary," was the student's reply, "and found that garbage meant *Refuse*."

Politzer continues: "In second language learning this associational shift can not be repeated in this simple form unless learning is started in early childhood. The linguistic symbol (A^1), learned in a given situation, becomes inevitably associated with the linguistic symbols of the first language: S plus A^1 plus A equals R. The "meaning" of A^1 is thus not simply the one derived from the situational association. It is also identified with the meaning of the symbols of L1, thus we get what are commonly known as 'areas of interference'."

"The second type of learning is that known as instrumental conditioning", (which is in fact the basis of the linear programme in programmed learning, and the kind of learning that we attempt to produce in the language laboratory.) "In addition to an association of stimulus-response, it involves the idea of 'reinforcement'." As a result of some kind of inner satisfaction or 'reward' (I do not like the word), be it praise from the teacher, or a sweet, or the mere satisfaction of knowing that he is right, the student is urged to tackle the next S-R situation, and so on. Here again, this situation, however well it may work in the teaching-learning process (and I think it does), is that the real-life situation will be a random or open-ended situation, as contrasted with the closed situation of the classroom, or even more so, of the language laboratory. This is, in fact, the main thesis of this article — to show some of the discrepancies between the language learning situation and the practical application of language in real life situations.

Some psychologists feel that all learning results mechanically and automatically from stimuli and responses which are associated in the learning organism, and that all learning is basically of this mechanical habit-formation type. Others feel that the perception of patterns and configurations is of the utmost importance. This seems to be the basis,

*POLITZER: *Teaching French — An Introduction to Applied Linguistics* (Blaisdell 1960).

for example, of the modern approach to the teaching of mathematics: that the perception of pattern is more important than rote learning or mechanical ability in computation. According to the second type of learning theory, the learner is more than just a mechanism shaped through stimuli or impressions received from the outside: he brings to the learning process his own creative ability to perceive relationships: a kind of gestalt theory.

The psychology of L2 learning must take into account three facts which determine much of the learning process:

(*a*) L1 tends to interfere with the acquisition of L2

(*b*) Language is habit.

(*c*) Language is an elaborate system.

(*b*) implies that the second language must be taught by producing the appropriate responses to the appropriate stimuli, and if this is to take place, three conditions have to be fulfilled:

(i) a response can be learned only if it is performed.

(ii) a response is learned only if it is rewarded.

(iii) the reward must be immediate.

It will be seen that these are in fact some of the bases for programmed learning, and that the language laboratory is eminently suitable for the realisation of these conditions. The Skinnerian system of programming — which I consider to be especially applicable to language laboratory techniques in the various stimulus-response situations — means that a student must be provided with a situation where wrong responses are impossible — or, if you like, where there is an error rate of only five per cent, without the challenging nature of the work being removed. In order to achieve this, the stimulus-response situation must be closed-ended: the tram-lines from which the student must not deviate.

We can communicate in our native tongue without having the slightest idea of what the structure of our native tongue is like. We manipulate the structures mechanically, unconsciously and automatically, as a result of long and meaningful practice. The goal of all second and third language learning is to achieve precisely the same kind of automatic control or automaticity in the second or third language, but within a shorter time and in a more artificial environment than is the case with first language learning. (I am not thinking here of a student who is absorbed fully into the L2 environment — e.g. a person who goes to France and lives with a non-English-speaking family.

In most second or third language learning situations the stimulus-response situations should be so arranged that they make the patterns of language clearly apparent to the student. This does not mean that he should be able to talk about these patterns, although many students like to do this, but rather that he should be able to use the patterns, first of all by repeating them, in a kind of vacuum, and then by putting them to use in meaningful situations. He also needs a perception of the analogies involved, of the structural differences and similarities between sentences and other units of speech. If he does not perceive these, then he will have difficulty in carrying over or applying the closed system of pattern drill and substitution table to the open-ended system of spoken or written communication. The degree and kind of perception will depend on the age of the learner. One thinks here of Whitehead's theory of the three stages of development: romance, precision and generalisation and his suggestion that the age of precision heralds the "mass attack upon grammar — the grammar of language and of science", which takes place (or ought to) between the ages of 12 and 16.

It is at this point that language learning becomes a gestalt business, where without necessarily mastering grammatical terminology, the student must see that certain utterances follow definite patterns — for example the /s/, /z/ and /əz/ forms of the English plural, or the /t/, /d/ and/əd/ of the English preterite. The ability to perceive such patterns and relations is possibly a function of intelligence. It may well be that there is inevitably a high correlation between general intelligence and the student's ability to control the pattern mechanisms of the target language. While transformation drill and substitution exercises operate on a stimulus-response basis, the fact that we arrange them according to patterns indicates an appeal to the student's ability to perceive these patterns. Thus the pattern practice caused by stimulus-response conditions is an attempt to establish responses while at the same time showing the student the pattern involved in the responses. It combines a purely mechanical stimulus-response approach (which many students find rather boring in itself) with a utilization of the student's intelligence.

There is a potential conflict here between pattern perception and habit formation, in the temptation to substitute the perception of the existence of a pattern for its actual acquisition as part of automatic habit. This conflict can, I think, be eliminated, or at least reduced by utilising stimulus-response situations which, instead of involving a complete pattern, utilise the minimal step approach, where each small step is rewarded and reinforced. May I give a French example? This is an instance of the so-called refinement technique.

Taped voice: "Repeat:

Voici ma mère .....

Voici ma chambre ..

Voici ma maison ....

"Now make sentences acording to this pattern with:

ma mère .....voici ma mère .....
ma chambre .....voici ma chambre ....
ma maison.....voici ma maison.....

"Now make sentences according to this pattern with:

mère.....voici ma mère .....
chambre .....voici ma chambre ....
maison .....voici ma maison.....

"Repeat:

voici mon livre.....
voici mon cahier.....
voici mon roman.....

"Now make sentences according to this pattern with:

mon livre .....voici mon livre .....
mon cahier .....voici mon cahier.....
mon roman .....voici mon roman.....

"Now make sentences according to this pattern with:

livre .....voici mon livre .....
cahier.....voici mon cahier.....
roman .....voici mon roman.....

"Now make sentences according to this pattern with:

livre .....voici mon livre.....
chambre .....voici ma chambre.....
maison .....voici ma maison.....
cahier.....voici mon cahier.....
roman .....voici mon roman.....
mère.....voici ma mère.....

Notice here, inter alia, the four-phase technique, the minimal step, the problem at the end arising naturally out of the repetitions.

The perception of the pattern can be taught or tested in this way: (the student has already learned the nouns and their genders).

Taped voice "What do you notice about the difference between mon and ma in French? . . . Yes, that mon is used for a masculine noun, and ma for a feminine noun."

In this presentation the possibility of error is eliminated — at this stage. We hope that the carry-over will be successful enough for the student not to make a mistake when he is in the open-ended situation of every-day communication, where the possibilities are infinite. In other words we hope that the transfer from closed to open system will be complete. In ordinary life plurals are not usually produced in response to singulars, or feminines to masculines. The transfer of the response to a different situation, making it independent of the original stimulus, involves precisely the awareness of the total pattern and of those intellectual processes which the method was designed to avoid in the first place. This, I believe, is an important aspect of our language programming, either for classroom use or for laboratory use. The minimal step must lead eventually to the total pattern. The structures which the student has learned by the refinement principle must be put to use as soon as possible in audio-comprehension, controlled conversation, or even in composition.

The student recognises the pattern — that for example *gehen* is a *sein* verb, but until he can reproduce automatically *Das Mädchen ist um halb zwei zur Schule gegangen* he can not be said to 'know' the structure. It would be the same in Afrikaans in this example.

Overcoming points of interference from the home language can be achieved only if regular and special attention is paid to those points of interference, either in phonology, grammar or lexis. The mental set of the student must be keyed to the use of stimuli in the target language. This is done as a matter of course in the second language, but in the third language we still have far too much use of the home language. This, to me is one of the exciting possibilities of language laboratory techniques. We are being forced by the medium to reduce translation and linguistic one-to-one correspondence to a minimum, or even to abolish it altogether, as in *Crédif* and *Tavor* courses. It may be necessary, in the early stages of a course to give instructions in the home language, but the stimulus-response situations must be in the target language. One can, of course, use pictorial stimuli, such as Stack suggests*. The grammar-translation method is still with us, where the stimulus consists of translation from or into the target language, in far too many classrooms.

Another more startling way of overcoming points of interference is to eliminate meaning entirely from the initial phases. Give the pattern drill without the student's knowing the meaning. For example the following refinement drill could be used; the student knows that *kommen* etc are verbs, and that *ist gekommen* is the perfect tense, but he does not know the lexis.

Johann **ist gekommen**

Johann	ist	gekommen gefahren geflogen geglitten
	hat	vergessen gesprochen geholfen befehlen

I would now like to examine briefly some of the stimulus-response situations that we use in the language laboratory and that can be applied, although less efficiently, in the class-room. I would emphasise the classical four-phase technique master stimulus — student response —

*E. M. Stack: *The Language Laboratory and Modern Language Teaching*. O.U.P. 1960.

master confirmation — student reinforcement:

master stimulus		master confirmation	
	student response		student reinforcement

I am going to use the term 'written', although this does not necessarily mean writing — it can refer to graphic material: drawings, pictures, etc.

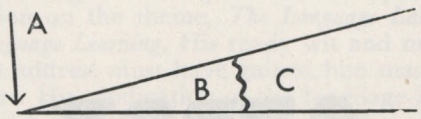
STIMULUS	RESPONSE
1. Oral	Oral
2. Oral	Written
3. Written	Oral
4. Written	Written

I am presuming that some writing and reading skills are involved in the course, especially where (3) and (4) are concerned, although, as I have suggested before, you may have a written response which is neither in the home nor the target language, for example the cross-tick exercise.

Fernand Marty in his *Linguistics Applied to the Beginning French Course* (Audio Visual Publications, 1963) gives 71 examples of stimulus-response situations (this for French) and puts them under 3 headings: Constructed Responses, Memory Responses and Multiple Choice Responses. Stack in his *The Language Laboratory and Modern Language Teaching* (O.U.P.—1960) analyses these according to analogy drills, mutation drills, fixed increment drills, paired sentence drills, narration drills and exploded drills. Some of these overlap, and one could add many others of one's own.

It is not necessary to mention all these individually. There is however, one type of SR mode, not mentioned by Marty or Stack, one which I regard as being very useful, especially for revision, but more particularly for what I call consolidation — putting language to use in a completely closed system after the various drills have been practised by the student. This is what is called conversational chaining, or fixed increment response. The student is given a sentence, and then another item. That new item must be incorporated into the sentence, possibly by replacing an existing item, so as to form a new sentence. I find it particularly effective in French and German, and one which my language laboratory groups find quite difficult. Let's have an example in English. "Peter likes chocolate — Mary: Mary likes chocolate — sweets:Mary likes sweets — prefers:Mary prefers sweets — eats:Mary eats sweets — always:Mary always eats sweets — is eating:Mary is always eating sweets — too many: Mary is always eating too many sweets — Harry: Harry is always eating too many sweets — do you think?:do you think Harry is always eating too many sweets? — my mother:do you think my mother is always eating too many sweets? — peaches:" etc. This is in fact the substitution table run riot. Notice that it is not necessary in this exercise to confirm the response. Whether one does so or not will depend on the age and level of achievement of the students. If one does not confirm the response, the students are apt to get lost quickly in this verbal maze — a good audio-memory is essential. Try the exercise without confirmation: "Peter likes chocolate — Mary — sweets — prefers — eats — always — is eating — too many — Harry — do you think?—my mother — peaches."

May I give my own matrix of SR situations? This is taken from Halliday (*The Linguistic Sciences and Language Teaching* — Longmans, 1964), and is worth looking at. (Those of you who are acquainted with the works of Brooks, Politzer, Marty, Stack and Halliday will recognise their influence in this paper: I hereby acknowledge my debt to them). The authors discuss the difference between grammar and lexis. "What causes us to draw a distinction between grammar and lexis is the variable range of possibilities that arise at different places in the language." They suggest a gradient or *cline*, like this:



In the corner, at the end of the line, we have no choice of items at all. A particular structure demands that we use such and such a unit of speech or utterance and no other — "His mother has just died and he has come . . . . money. The only unit that will make sense here is 'into'. We can not use 'over', 'up', 'through', 'in', 'down' or 'out'. That is the first section of the cline (A).

The second section (B) (and there is much overlap here) is where we can have a choice of two possible answers: 'He is (in/out of) love, 'this, that', singular, plural. The further up the cline you go, the greater the number of possibilities — past, present, future, imperfect, perfect, aorist, pluperfect, and so on. There are some points in every language (and the possible choices are not the same from language to language) where we have to make such a choice. We can not avoid it or remain neutral. But there is a limited number of possibilities to choose from. Moreover the range of choice is not exhaustive: where positive can be chosen, negative is the only possible alternative, for example. Further along the cline we choose from a

*See article by present author *Materials for the Language Laboratory*—Symposium 1965.

lareg number of possibilities — we cannot say what is possible and what is not. "He was sitting on the . . ." Certain items are likely to follow — chair, stool, settee, bench. But a large range of other answers is possible — film star's knee, top of Hertzog Tower, rotting kipper. This is section (C).

This is the basis of the difference between grammar and lexis. Grammar is concerned with choices of the first kind (A or B), where there is a small fixed number of possibilities and a clear line between what is possible and what is not. The second kind of choice is the domain of lexis. As I suggested earlier, these two types of choice are known as *open* and *closed*. The range of possibilities in a closed choice is known as a *system*, that in an open choice a *set*. The closed system is therefore characteristic of grammar, and the open set of lexis.

In the SR situation, these two systems are handled differently. At this point we must redefine somewhat the term stimulus. Initially we may regard the stimulus as the utterance or utterances given by the master voice on the tape or by the teacher in the classroom. But the UR-stimulus, if I may use the phrase, is not sufficient on its own to arouse any response at all, let alone the right one. There must be a cutting edge, or fuse, or whatever metaphor you like to use, that elicits the desired response from the UR-stimulus, a bridge, if you like, between S and R, so that the student knows what he must do with the stimulus. In other words, the instructions to the student which will indicate what is desired of him. The simplest example is repetition. "I'm going home now" is the UR-stimulus. That on its own is not sufficient. Nothing will happen if you merely say that (unless you all decide to go home). *Repeat* is the bridge that will lead to the response 'I'm going home now'. Another bridge in the closed system of SR might be *say* or *repeat in the plural:* I'm going home now' —R: 'We're going home now'. This requires careful handling in the laboratory. Again everything depends on the type of student. What happens if the student does not know what 'plural' means, or possibly does not understand the English term? You have to back-pedal, and introduce a sub-programme involving singular-plural concepts and terms.

When we come to the open set, it is somewhat easier. S — 'I'm going home now.' Bridge — 'and Peter?' R — 'Yes, he's going home now'. Confirmation — 'Yes, he's going home now'. Student reinforcement — 'Yes, he's going home now'. 'And Anne . . . the policeman . . . the clown . . . my grandmother's chauffeur. . . the new baby penguin, . . . and this takes us right back to one of the most powerful weapons in the language teacher's armoury — the substitution table.

AFROX

AFRICAN OXYGEN LIMITED is the principal supplier of industrial and medical gases in Southern Africa. The company also leads the field in the supply of welding and cutting equipment and machinery, Handigas (Liquified petroleum gas) and anesthetic and breathing apparatus. In meeting the specialised needs of a busy nation, African Oxygen Limited has forged close links of service, including training and education, with all sectors of South Africa's economy. Afrox is at your service.

AFRICAN OXYGEN LIMITED, P.O. Box 5404, JOHANNESBURG