

Exploiting Nonverbal Context to Promote the Acquisition of Word-Referent Relations in a Second Language

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Different amounts and ordering of pictorial content were compared to determine their effect on learning word-referent relations in a second language. Subjects were presented with 20 event-related sentences composed of an agent, an object, and an instrument (the arguments) plus an activity (the predicate). Subjects heard these components before and after the sentence; then, translations were requested. The number of pictures shown with each sentence varied. The predicate was placed after the arguments in half of the component presentations and before the arguments in the rest. Results indicate that the smaller the number of unknown referents at the time subjects are exposed to a sentence in its referential context, the higher the probability of correctly inferring the meaning of the unknown word or words from the context: $F(4, 96) = 21.58, p < .001$. Also, context is used more effectively when the predicate illustration was presented *after* the argument illustrations: $F(1, 24) = 84.26, p < .001$. These findings indicate that there is an optimal level at which nonverbal context facilitates the process of inferring word meanings in a foreign language. Implications for immersion methods of teaching a second language are discussed.

While it is now widely accepted that the use of nonverbal context is basic to first-language acquisition, little is known about how to systematically exploit its use in promoting second-language acquisition. The present study addresses this issue experimentally by comparing different amounts and ordering of

This study was presented at the Second Annual Los Angeles Second-Language Research Forum, Los Angeles, October 7, 1978.

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pictorial context with respect to their effect on learning word-referent relations in a second language.

According to Stalnaker (1974), communication normally takes place when speaker and audience share a background of beliefs or assumptions. He calls this concept "pragmatic presupposition." Foreign-language learners who find themselves in the total immersion situation must rely on presuppositions as well. For second-language learners, even the most basic level of presuppositions, word-referent relations, cannot be taken for granted. Before learners can have command of the language, they must find out what each foreign word means or presupposes by itself. Using de Saussure's (1959) terminology, learners must make a connection between a linguistic sign and a concept. To explore the circumstances under which this connection might be facilitated by manipulating the actual referential context in which a second language was presented, pictorial context was used to expose English monolingual high school students to Spanish.

In a natural situation, foreign-language learners will often be exposed to a complete sentence referring to an ongoing event. If none of the words in the sentence are already known, learners have little means for inferring which word refers to which element of the event. The ideal conditions, then, for learning new vocabulary from a sentence uttered in its nonverbal referential context would seem to be when the referents of all words but one are already known to the language learners at the time they hear the complete sentence. Under these conditions, learners can infer that the one unknown word goes with the one situational element not otherwise being referred to. At this point, there are enough word-referent relations that can be taken for granted so that the meaning of a new word can be successfully communicated. It was therefore hypothesized that the smaller the number of unknown referents at the time when subjects are exposed to a sentence in its referential context, the higher the probability of correctly inferring the meaning of the unknown word or words from a pictorial context.

In the basic experimental task, subjects were exposed to 20 Spanish sentences and a picture of the event to which the sentence refers. The subjects' task was to determine the meaning of each Spanish word in the sentence. Both the sentence and the picture were broken down into four components: three entities and a relation. Greenfield and Smith (1976) state that entities are things that can be pointed at. Relations, however, are actions or

states that can be predicated of entities but cannot be pointed at. In these sentences, the entities were composed of the following arguments: an agent, an object, and an instrument. The relation is a predicate which takes the form of an activity.

The ideal condition to acquire word-referent relations is in the one-unknown condition when the predicate is presented last. As an example, using the sentence "*La niña pinta la cerca con la brocha*" ("the girl paints the fence with the paintbrush"), the experimenter said *la niña* and showed the subject a line drawing of a girl. *La cerca* was uttered next while a drawing of a fence was shown. A drawing of a brush accompanied *la brocha*. *Pinta* was the last word presented and no picture was shown; the absence of pictorial illustration makes *pinta* the single unknown. Lastly, the full sentence was presented together with an illustration of the girl painting with a brush. The subject then translated each word as it was presented. In this example, the order was as follows: *la niña, pinta, la cerca, la brocha*.

This basic idea yielded a design in which sentences were presented to each subject in a total of 10 different conditions. There were five different levels of pictorial context. All of the individual arguments and the predicate were presented verbally before being combined into a sentence; what varied from condition to condition was the number of verbal elements that were introduced with a pictorial illustration. For example, in the four-unknown-referents case, all the components were presented without any illustrations. Only when the sentence was uttered was a picture shown. In the three-unknowns case, a picture was shown with one of the components and the sentence only. There were four sentences in each of the five context conditions. It was assumed that where a word was stated without a pictorial illustration, it would be an unknown word at the time when the complete sentence was presented. Thus, we had the variable "number of unknowns" which we also refer to as "amount of context."

The second variable was whether the subject was presented the predicate before the arguments or after the arguments. Each subject was given 10 sentences in the former condition and 10 in the latter. As mentioned earlier, all sentences used in the experiment referred to events composed of an agent, an object, and an instrument (the arguments) plus an activity (the predicate). Because a predicate exists only in relation to some argument, it is impossible to use a picture or any visual image to convey the

meaning of a verb without including an entity undergoing or performing the verb's activity. Consequently, a language learner hearing a verb accompanied by an illustrative picture may be led to the incorrect conclusion that the word refers to some more concrete, pointable entity pictured as involved with the activity instead of the activity itself.

For this reason, it was predicated that subjects would be able to use context more effectively when the predicate illustration was presented *after* the argument illustrations. This prediction was based on the assumption that, in the predicate-last condition, the initial pairings of noun arguments with entity pictures would eliminate the possibility that the final word could be an argument; therefore, the learner would infer its meaning as a predicate by a process of elimination.

Method

Subjects

A total of 25 high school students participated in the experiment. All were monolingual English speakers who had never studied a foreign language.

Materials

The basic materials were 20 sentences in Spanish that referred to 20 sets of pictures described earlier. The latter were taken from Laine's (Note 1) language assessment test that was developed at UCLA. They were composed of an agent, an object, and an instrument (the argument) plus an activity (the predicate).

Procedure

Each subject was interviewed periodically. The following instructions were given:

There will be 20 trials. In each one, I will be saying four words in Spanish. I will then repeat these words within the structure of a sentence. Sometimes I will show you a picture at the same time that I say the word. I will *always* show you a picture with the sentence. After each of these presentations, I will ask you to translate each of the four Spanish words into English.

The subjects were given two practice trials to make sure that they understood the task. Their translations were written down and scored later.

Results

A repeated-measures analysis of variance showed that there are main effects of the position of the predicate, $F(1, 24) = 84.26, p < .001$, and the amount of context, $F(4, 96) = 21.58, p < .001$. The interaction between these two variables is also significant: $F(4, 96) = 4.57, p < .01$.

As it can be seen in Figure 1, subjects translate more Spanish words correctly when the predicate is presented last than when it

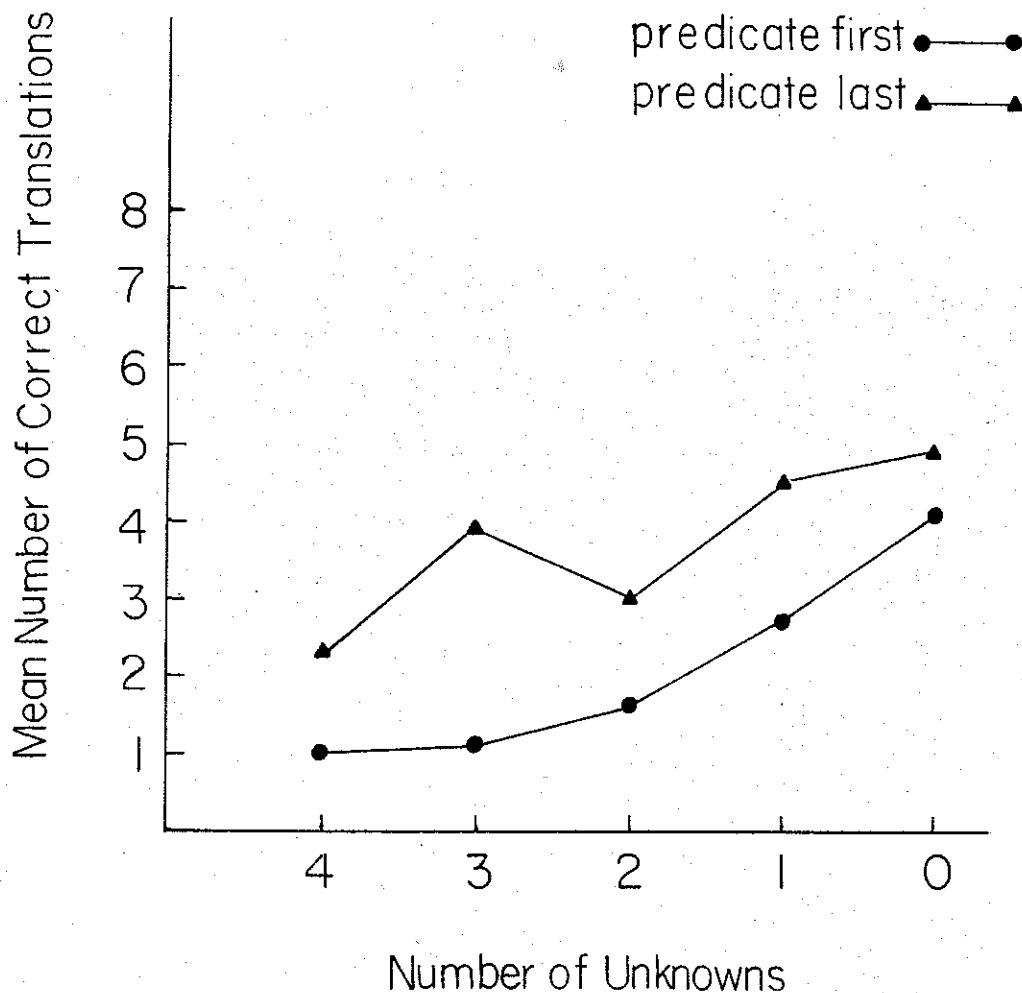


Figure 1. Mean number of correct translations as a function of amount of context and predicate position.

is presented first. Also, as the number of unknown referents decreases, performance improves in both conditions. Thus, both of the hypotheses were confirmed by the data.

Aside from overall performance, a key issue is whether the subjects were able to infer the correct translations of the unknown Spanish words (words which were not initially introduced with a picture) When the predicate was presented first, the probability of correctly translating unknown Spanish words ranged from 12.5% in the four-unknowns condition to 26% in the one-unknown condition. When it was presented last, the probability ranged from 29.5% in the four-unknowns condition to 68% in the one-unknown condition. In both orders of presentation, inferences occurred in the one-unknown-referent condition, as predicted. However, within the one-unknown condition, the greatest number of correct inferences were made when the predicate was presented last, also just as predicted.

Thus, the results strongly confirm our hypothesis that the ideal condition for using nonverbal context to infer the meaning of an unknown word in a language-learning situation is where the word in question is the only verbal element in the sentence whose meaning is unknown. The results also confirm that using nonverbal context to present the meaning of a verb is most effective when the meanings of the relevant noun arguments have already been made known.

Discussion

The results from this study indicate some variables that control the effectiveness of nonverbal context in the second-language-learning process. Nonverbal context can be used to establish the presuppositions that are likely to be lacking when people try to communicate while speaking different languages.

In establishing these presuppositions, this study points to the inherent differences between entities, expressed as nouns, and relations, expressed as verbs. A noun can acquire meaning for the learner on its own merit. It represents a "thing" and, as such, its referent can be pointed at, touched, and made obvious. A relation, expressed by a verb, does not have these characteristics. The referent of a verb can be observed only when entities are interacting in such a way that the relation emerges. We cannot touch the activity of painting. We must see a person (the agent) holding a brush (the instrument) and doing "something" to a fence (the object).

Because relations depend on entities in this way, the referent of an unknown verb cannot be pictured in isolation and can easily be confounded with one of the entities of which it is predicated. For this reason, saying an unknown verb in a relevant pictorial context leaves its meaning indeterminate if the learner cannot eliminate, through previous knowledge, pictured entities as possible referents for the new word. The predicate-first condition was designed to maximize this indeterminacy, and this order did, indeed, reduce the learning of Spanish vocabulary in our experiment.

Our findings have implications for immersion methods of teaching a second language, in which no translation to the first language is provided by the teacher. Insofar as immersion consists of the teacher producing sentences in their nonverbal referential contexts for the learner to comprehend, our study points to some principles for making such exposure fruitful for second-language acquisition. The first is that exposure to a sentence in a foreign language will lead to greater learning of new word-referent relations if the component word-referent relations have first been presented separately. The second principle is that sentences uttered in their nonverbal referential contexts are more likely to lead to correct inferences about the referents of totally unknown words if there is but one unknown word in a given sentence.

Finally, verb meanings can be more effectively taught through nonverbal context if the learner is already familiar with the linguistic expression of the arguments to which the verb is related in that situation. Our findings indicate that, no matter how rich the nonverbal context, little vocabulary learning can be expected if second-language learners are simply immersed in sentences without first building up component word-referent relations in a systematic manner.

Resumen

Se compararon diferentes cantidades y ordenación de contextos pictóricos para determinar sus efectos en el aprendizaje de relaciones palabra-referente en un segundo idioma. Se les presentó a los sujetos 20 frases relacionadas con un evento que incluían un agente, un objeto y un instrumento (los argumentos) mas una actividad (el predicado). Los sujetos escucharon estos componentes antes y después de la frase y luego se les pidió que

los tradujeran. El número de gráficas que se mostró con cada frase varió. El predicado se colocó después del argumento en la mitad de las presentaciones de los componentes y antes de los argumentos en la otra mitad. Los resultados indican que cuando menor es el número de referentes desconocidos que se le presentan a los sujetos cuando se les expone a una frase en su contexto referencial, mayor es la probabilidad de que infieran correctamente el significado de la palabra desconocida o de las palabras del contexto: $F(4, 96) = 21.58, p < .001$. También se encontró que el contexto se utiliza más efectivamente cuando la ilustración del predicado se presentó *después* de las ilustraciones del argumento: $F(1, 24) = 84.26, p < .001$. Estos resultados indican que existe un nivel óptimo al cual el contexto no-verbal facilita el proceso de inferencia del significado de las palabras en un idioma extranjero. Se discuten las implicaciones de estos resultados para los métodos de inmersión para la enseñanza de un segundo idioma.

Reference Note

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Received April 9, 1979

Revision received November 15, 1979