# Role of Selective Attention in Artificial Grammar Learning

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## Introduction

What role does attention play in implicit learning? Dienes, Broadbent, and Berry (1991) investigated the relationship between attention and the artificial grammar (AG) learning using the dual-task procedure. However, there have been no studies that have manipulated attention as a selective process rather than as mental effort. This study investigated the relationship between AG learning and selective attention as a mechanism of information selection using a new GLOCAL procedure.

## Methods

### Participants

Twenty-seven undergraduates from the University of Tokyo participated in this study.

### Stimuli and Procedures

Two AGs were created such that they shared neither letters nor bigrams even if participants could translate one letter into another. For the learning phase, 18 GLOCAL strings were constructed from two strings generated from two different AGs (Figure 1). Moreover, 40 pairs of strings, with one string following and one deviating from each AG, were used in the test phase.

At first, the participants were asked to write down the strings presented on the sheet in the learning phase. To manipulate attention, the participants assigned to the global attention condition were required to write down the global features of GLOCAL strings whereas the participants in the local attention condition were required to write down the local feature. Each string was presented on the display for 6 s, 6 times per string.

In the test phase, the participants were informed about the existence of rules used to construct the strings in the learning phase and were required to select a grammatical string from a pair presented on the display. The 40 pairs were presented in a random order to each participant. A pair of stimuli was presented for as long as it took a participant to make a decision. This procedure was repeated twice.

## Results and Discussion

First, the selection rates of grammatical strings were submitted to a 2 × 2 analysis of variance (ANOVA) with attention (global or local attention to GLOCAL strings; between participants) and grammar (global grammar or local grammar; within participants) as the variables. The interaction effect of attention and grammar was found to be significant, indicating that the selection rates of grammatical strings of the attended grammar were higher than those of the unattended one ($F(1,25) = 22.15$, $p < .01$, $MSE = 0.012$). The main effects of attention and grammar were not significant ($Fs < 1$). These results suggest that attention accelerates AG learning.

Second, *t*-tests were conducted to compare the rate of correct responses to the grammatical strings of the unattended AG with the chance rate; the results suggested that participants could not learn the AG from the unattended feature of GLOCAL strings.

In conclusion, selective attention that can be subjectively manipulated for visual stimuli seems to play a critical role in AG learning.

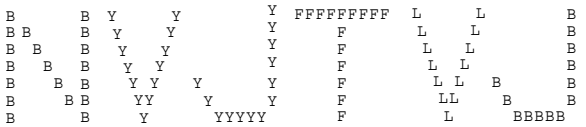

Figure 1: An example of a GLOCAL string.

## References

Dienes, Z., Broadbent, D., & Berry, D. (1991). Implicit and explicit knowledge bases in artificial grammar learning. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 17*, 875-887.