Explicit and Implicit Learning of Verb Bias using Reversal Learning

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INTRODUCTION

Verb bias is a tendency for a verb to occur in a particular sentence structure, rather than other structures. Verb bias can influence the speaker’s choice in language production, and in the lab context, verb bias can be changed (learned) by associating a verb with only one of its possible structures. In our study, we are interested to see whether people learn a new verb bias implicitly or explicitly when the training process involves learning to categorize sentences as grammatical or not grammatical, and feedback is given. Furthermore, our current study is using the concept of reversal learning to determine whether the learning is explicit or implicit. If the learning is implicit, learning the reversed rule should be slow; on the other hand, if learning is explicit, learning the reversed rule should be fast. By using reversal learning in the study, we can validate the idea that implicit learning depicts a slow-reversal, whereas explicit learning indicates a fast-reversal.

PROJECT HYPOTHESES

Explicit Learning or Implicit Learning – Learning Behavior after the Rules of the Language Reversed

Verb Bias
Reversal Learning
Slow-reversal
Fast-reversal
Implicit Learning
Explicit Learning

EXPERIMENTAL METHODS & DESIGN

Dependent measure:
% Accuracy (measures performances)

Independent measure:
The rules of the language

GIVE HAND HAND GIVE
SEND SHOW SHOW SEND

Block 1: Training phase, learning behavior should occur ~ 80 trials
Block 2: Reversal Learning phase~ 80 trials

RESULTS

A criterion of 60% correct answer in block 1 was set to ensure participants learned the rules of the language. Most participants did not show learning significant, and only 16 participants out of 68 participants fulfilled this requirement.

Learning trends in Block 1 & Block 2

Participants’ performance was better towards the latter half of block 1 instead of the first half. These participants learned the rules of the language, but only learned it towards the end of block 1. Learning in block 2 appeared to be gradual, performance was also better in the latter half.

Slow-reversal Learners & Fast-reversal Learners

The difference of percent correct answer in the first 40 trials between block 1 and block 2 was calculated to determine slow-reversal learner and fast-reversal learner.

Two-step-rule

Difference of the first/last 40 trials of both blocks ≥0.15 → Fast-reversal
Difference of the first/last 40 trials of both blocks < 0.15 → Slow-reversal
Neither → cannot tell => proceed to analyzing the last 40 trials

DISCUSSION

Out of 16 subjects, some learned the rules explicitly, some learned the rules implicitly. With the explicit procedure with given feedback after each trial, the results matched our expectation that some subjects learned the rules explicitly. With some subjects who learned the rules implicitly, the number of verbs we used in the experiment might have made the task more difficult to learn explicitly with regards to working memory capacity. We hypothesize that subjects would have learned the rules explicitly if there were only two verbs instead of four verbs.

Reducing the number of verbs to two instead of four verbs to lessen the difficulty of the task; Doubling or tripling the number of trials in each block can also help subjects have more practice.

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REFERENCES