

FACILITATION AND INTERFERENCE COMPONENTS IN THE SIMON EFFECT

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INTRODUCTION

The Simon effect arises when subjects are required to make a rapid left or right motor response on the basis of a stimulus dimension other than position (e.g., form), and the stimulus appears in one of two lateralized positions, that is, on the left or on the right (16, for reviews see 10, 17). For example, in a typical Simon task, subjects respond with the left-side key to one stimulus (e.g., a square) and with the right-side key to a different stimulus (e.g., a circle). Although the task requires shape discrimination, and stimulus position is task irrelevant, responses are faster when the position of the stimulus and the position of the response correspond (i.e., corresponding stimulus-response pairings; i.e., the stimulus and the response are both on the right or the left side) than when they do not correspond (non-corresponding stimulus-response pairings; i.e., the stimulus is on one side and the response is on the other side).

Most authors agree that the Simon effect occurs because in the Simon task a spatial code is generated for the irrelevant stimulus location attribute in relation to one of several possible reference axes (see, e.g., reviews in 10, 17).

Another widely shared assumption is that the Simon effect is a response selection phenomenon (e.g., 10). The idea is that the stimulus position code automatically activates its spatially corresponding response code. On trials in which the automatically activated response code corresponds to the code signalled by the relevant stimulus feature, there is no competition at the response selection stage, but rather a facilitation originates from the redundant response codes. Hence, reaction times (RTs) are faster on corresponding trials. On trials in which the automatically activated response code does not correspond to the one signalled by the relevant stimulus feature (i.e., on non-corresponding trials), a competition must be resolved before the correct response is executed. This competition is considered to cause interference. Hence, RTs are slower on non-corresponding trials.

The activation of the corresponding response code by the spatial stimulus code, for which there is behavioural and psychophysiological converging evidence, is often incorporated in a dual-route model (2-4, 8, 9, 11). According to this model,

