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Inhibitory and Facilitatory Effects in the Perception of Repeated Items

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Introduction

One recent interest in the study of visual cognition is on the issue of how people process and recognize repeatedly presented stimuli. This interest was largely stimulated by the work of Kanwisher (1987) on repetition blindness (RB), which refers to the failure to detect/recall repetitions of stimuli in rapid serial visual presentation (RSVP).

The purposes of the present study are to investigate (1) whether display rate and task demand can affect the perception and processing of repeated stimuli and (2) if RB is an all-or-none phenomenon. Unlike most prior studies on the topic, we focus especially on the latency of successful responses to repeated items as opposed to unrepeated ones, though we also measure the accuracy of overall responses in the related conditions.

Method and Results

In the first experiment, we varied the display rate of two sequentially presented Chinese characters. Subjects were asked to judge if a given category appeared once or twice in a trial. When the display rate was fixed at 70 ms per item, an RB effect was found: The stimuli with two repeated targets were responded to more slowly compared to the unrepeated targets. Under a slower display rate (i.e., 200 ms per item), however, a repetition priming effect was shown: The repeated targets were actually responded to faster than the unrepeated ones.

In the second experiment, subjects were required to perform category judgment only to the second item in two sequentially presented stimuli. The experimental materials and other aspects of procedure were basically the same as those in Experiment 1, except that the display rate was fixed at 70 ms per item. The reaction time analysis actually revealed a repetition priming pattern, instead of showing an RB effect as in those conditions in Experiment 1 with a comparable display rate.

Discussion

The present study showed that an RB effect occurred under a relatively fast display rate, whereas a repetition priming effect appeared under a relatively slow rate. Similar findings have also been found in a different set of experiments using the RSVP procedure (Chen & Wong, this volume). These results clearly indicate that the

display rate plays an important role in determining the pattern of results. But does this mean that the encoding effectiveness of a repeated item is responsible for (or is the sole determinant of) whether the item can produce a priming or blindness effect? We do not think so. This is because our findings also reveal both blindness and priming effects under the same fast rate of stimulus presentation. These results, in conjunction with those of our previous research (Chen & Wong, this volume), seem to suggest that RB only occurs when subjects are required to process the first occurrence of a repeated item to the level of recognition under a severe time constraint.

Furthermore, in the present study, the error data could not readily distinguish various conditions, while the response times were very sensitive to different sorts of manipulations and were able to produce meaningful information. In fact, the RT results provide clear evidence for the notion that the RB effect is not an all-or-none phenomenon (Chen & Wong, this volume); the successful responses to repeated stimuli are distinctively different from those to unrepeated ones in various conditions.

Finally, it is worthwhile to note that the methodology adopted in the present study not only enables us to directly explore the on-line processing of repeated items with minimum memory load, it also allows us to measure both errors and latencies in responding to these stimuli. Hence, the present methodology is a valid and useful research tool in the study of the perception of repeated items.

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