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Incidental learning of item orientation

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Several studies have failed to find evidence for incidental learning of regularities in everyday life (e.g. Morton, 1967, Jones & Martin, 1992). However, as Kelly et al (2001) noted, those laboratory tasks that successfully demonstrated incidental acquisition of stimulus regularities used a 2-alternative forced choice (2-AFC) test. This type of test is considerably more sensitive than recall tasks used in earlier 'real world' experiments. It is therefore more likely to be able to tap into knowledge which is not readily accessible to conscious, strategic processes. Using a 2-AFC procedure, Kelly et al demonstrated that the orientation of stimulus items commonly encountered in British and Japanese cultures was indeed learned by individuals through everyday exposure to these items.

While this result was important in establishing that such learning can occur in a 'real world' setting, further studies are needed to determine which parameters are necessary and sufficient for learning to occur. Hence, the orientation-learning experiments reported here use 'clip art' stimuli which are asymmetrical but which were found during piloting to have no preferential left- or right-facing orientation. Participants were required to search for a specific item (e.g. an anchor) on pages of clip art images containing the to-be-found item, four each of the 12 oriented, critical stimuli (e.g. a dolphin, a key, a cup), and four each of the 17 non-oriented filler items. A different search item was used on each page. This procedure was designed to allow participants to acquire the orientation knowledge of the stimuli incidentally. In all experiments, participants were then tested for their orientation knowledge of the 12 critical items via a 2-AFC procedure.

Experiment 1 examined whether the number of times a stimulus was presented was critical to incidental learning. Accuracy and confidence were measured for the following two conditions: low exposure (12 pages, or 48 critical exemplars seen) or high exposure (24 pages, or 96 critical exemplars seen). Above chance performance on the 2-AFC task was evident only for the high exposure group; however overall confidence was virtually identical in the two groups.

Although this appears to indicate that number of exposures is the critical factor, it could be argued that the high exposure group performed better because they had spent longer looking at the critical items. Experiment 2 manipulated number of presentations with time presented.

As with Experiment 1, only those in a high exposure group learned the invariant orientations. Equivalent time spent examining a low exposure task did not afford learning and twice the time spent examining the items in a high exposure condition did not convey any further advantage.

These results suggest a 'conspiracy of exemplars' is necessary for learning and provides converging evidence for a prototype extraction mechanism being involved in incidental invariance learning (Kelly & Wilkin, in press). Kelly and Wilkin found that the 'prototype' exerted more of an influence over a time delay and Experiment 3 examined this using the clip art stimuli. A 35-minute delay between study and test using these stimuli also showed greater learning of the invariant orientation than an immediate test but only with high exposure to the stimuli. The low exposure group did not show learning even after the delay. In line with Kelly and Wilkin the delay group also exhibited higher confidence than the immediate group. These studies provide evidence that there may be an invariance detection mechanism which relies on the formation of a prototypical representation after sufficient exposure to individual exemplars and which gains in strength over time. An increase in confidence could be interpreted as an increase in fluency caused by increased influence of the prototype.

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