

Abstract

It is well documented that attention and visual working memory share similarities in terms of capacity, and at least part of their mechanisms have something in common; however, there is no consensus in terms of whether the shared resources of them can be occupied in a fixed-slot way or a load-based way. The present study tried to answer this question. In the study, two dual-task experiments were conducted, with an attentional tracking task and a visual working memory task. In experiment 1, the overall load of attentional tracking task was different in two ways – either by varying the number of the targets to be tracked (number of slots), or by varying the speed of the moving items (information load). And in experiment 2, the load of visual working memory task was different also by varying the number of targets to be remembered (number of slots), or the distance among their locations (information load). The dual-task cost for both the tasks was calculated. It turned out that information load did play a role in experiment 1, but not in experiment 2. The results supported the notion that attention and visual working memory may share a resource pool that is at least partly determined by overall information load. But the absence of a bidirectional effect between the two processes may indicate some distinct mechanisms, which is in line with some previous findings (e.g., Fougnie & Marois, 2006). To advance the research on this topic, more precise definitions of visual working memory and attention should be provided in the effort of finding the overlap of some potential sub-pool of resources; moreover, better manipulation is needed to control the spatial interference of the two processes, and to focus on the interference of their mechanisms.

摘 要

許多研究發現，注意與視覺工作記憶的機制和容量都具有不少相似性，並共享一部分共同的資源。但它們佔用的資源是否以固定物體數量的方式進行組織，還是基於單個物體的負荷決定可加工物體數量，目前尚無定論。本研究試圖通過兩個實驗來回答這一問題。兩個實驗均採用雙任務範式，任務之一為需要注意的多物體追蹤，之二為視覺工作記憶任務。在實驗一中，注意追蹤任務的總體負荷將通過增加目標個數或物體移動速度（即增加信息負荷）的方式增加，在實驗二中，記憶任務的總體負荷將通過增加目標個數或縮短目標間距離（即增加信息負荷）的方式增加。兩個實驗中，另一任務的負荷均保持不變。結果發現，注意與視覺工作記憶共享的資源池，至少在一定程度上由目標物體的整體信息負荷決定，而不僅僅是目標物體的個數。但是，沒有在實驗一和二中發現兩個任務間相互對等的影響關係。這可能同時說明，注意與視覺工作記憶之間，依然存在不同的工作機制，這也與先前的研究發現相符 (如 Fougne & Marois, 2006)。未來的研究可以對注意與視覺工作記憶的細分定義進行探討，更好地匹配兩個任務中相關特征的屬性，從而更為精準地發現兩個過程可能重合的部分資源。此外，追蹤任務中的物體運動軌跡應當被更好地控制，以減小兩個任務在視覺空間信息層面的影響干擾，進而更好地研究他們在機制層面的影響。