EXERCISE: READING AND UNDERSTANDING PAPERS

Question	Vickery (2005	Kaiser (2015)	Conci (2021)	Konkle (2012)
What was the rationale for conducting the study?		• Visual working memory (VWM) capacity extremely limited, can be partly overcome by exploiting regularities in sensory input (chunking, better performance) • Focus of traditional visual working memory research: geometric shapes, colored disks • Unclear how findings transfer to naturalistic real-world stimuli • Characteristic of real-world scenes: contain high degree of spatial regularity • Only few studies investigated visual memory for naturalistic objects in real-world context (memory for spatial relations better when embedded in meaningful scene, objects stored in memory in relation to environment) • Focus of research more on visual perception and the effect of object regularities • Object grouping based on real-world regularities may not only facilitate visual perception but could also represent a powerful mechanism to overcome capacity limitations of VWM		
What is/are the research question/s and hypotheses?		• how do real-world spatial regularities affect working memory capacity for individual objects • Hypothesis: enhanced VWM performance for regularly positioned objects due to grouping of objects based on typical real-world configurations • H1: higher sensitivity for regularly configured objects than irregularly configured objects • H2: decreased sensitivity for inverted condition • H3: similar sensitivity for both encoding time		

What was the design? (independent & dependent variables)		• Dependent variable: VWM performance • Independent variables: configuration (regular vs irregular) • 12 object pairs of everyday objects with typical spatial configuration • Pairs either placed in typical configuration or vertically reversed • 2 different exemplars for each single object, leading to 4 possible pairs per category • H1: configuration + number of pairs (2 vs 3) • H2: configuration + orientation (upright vs inverted) • H3: configuration + encoding time (2s vs 4s) • 2x2 within-subject design		
How was the dependent variable measured?		• Delayed change detection task: participants had to memorize multiple objects that presented in pairs • Procedure: verbal suppression task, display of 2 / 3 object pairs, retention interval, display again all objects at different locations, Change in objects? • Measure: d' for change-detection sensitivity • E1: delayed change detection task, comparison of performance between object pairs presented in regular configuration vs interchanged positions • E2: delayed change detection task, comparison of performance between object pairs manipulated by configuration & orientation • E3: delayed change detection task, comparison of performance between object pairs manipulated by configuration & encoding time		
What were the most important results?		• Visual working memory enhanced for objects positioned according to real world regularities (vs. irregularly positioned) • Effect specific to upright stimuli • E1: main effect of pair configuration, higher sensitivity for regularly configured pairs • E2: interaction effect Configuration & Orientation, no main effects (For original pairs, sensitivity		

		significantly higher for the regular than for the irregular configuration, benefit for regular pairs abolished by inversion • E3: main effect for configuration (higher sensitivity for regular than irregular configuration), non-significant interaction of encoding time & configuration		
How do the results integrate into existing literature?		• Objects can be held in visual working memory more efficiently when positioned according to frequently experienced real-world regularities -> grouping of single objects into larger representational units • VWM performance was enhanced when pairs of objects were positioned according to such regularities, in comparison to an irregular positioning of the same objects • Crucially, this effect of regularity was significantly reduced when the object pairs were inverted • Because the VWM effect was statistically independent of encoding time, our results are unlikely to solely reflect improved perception of regularly positioned objects. Rather, they indicate that real-world regularities are additionally associated with more efficient storage of objects in VWM • lifelong experience with specific spatial configurations of real-world objects similarly facilitates VWM performance		

What are open questions?		• results could in principle reflect either a VWM benefit for regularly positioned objects or a VWM cost for irregularly positioned objects • at which stage of the memory process the benefit for object regularities arises		