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Two experiments investigated infants' ability to localize tactile sensations in peripersonal space. Ten- (Experiment 1) and 6.5-month-olds (Experiment 2) were presented with vibrotactile stimuli unpredictably to either hand while they adopted either a crossed or uncrossed-hands posture. At 6.5 months, infants' responses were predominantly manual. Visual orienting behavior was more evident at 10 months. Analyses of the direction of the responses indicated that: i) Both age-groups were able to locate tactile stimuli. ii) The ability to remap visual and manual responses to tactile stimuli across postural changes develops between 6.5 and 10 months. iii) The 6.5-month-olds were biased to respond manually in the direction appropriate to the more familiar uncrossed-hands posture across both postures, demonstrating their use of a visual frame of reference despite the adequacy of a body-centred framework. We conclude that there is an early visual influence on tactile spatial perception, and suggest that the ability to remap visual and manual directional responses across changes in posture develops between 6.5 and 10 months, most likely due to the experience of crossing the midline gained during this period.

PS2:29

The influence of auditory action effects on bimanual coordination stability

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The influence of auditory action effects on bimanual coordination stability was investigated in a task that required participants to tap in antiphase with metronomic tone sequences while alternating between the two hands. The maximum rate at which musicians could perform this task was measured under conditions in which taps did or did not trigger tones. The pitches produced by the two hands (very low, low, medium, high, very high) could be the same as, or different from, one another and the (medium-pitched) metronome tones. Faster movement rates were achieved with than without action-effect tones. This benefit was greatest when action effects were close in pitch to metronome tones and the left hand triggered low tones while the right hand triggered high tones. Thus, coordination was facilitated by action effects that were perceptually distinct from, but easy to integrate with, the metronome, and by compatibility of movements and action effects (left-low, right-high).

PS2:30

Perceived tactile localization shifts as a function of head orientation

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We report a series of experiments designed to examine whether the orientation of the head relative to the body influences the perceived position of tactile stimuli presented on the torso. Participants rated the perceived position of vibrotactile stimuli presented to one of eight different positions (40 mm centre-to-centre) along the front of their waist on a visual scale. They performed the task while maintaining one of three different head positions: looking straight ahead, head turning to their left, or head turning to their right. The results revealed a systematic bias of tactile localization as a function of the position of the head relative to the body, with the perceived location shifting away from the actual position (i.e., in the direction opposite to the direction of the participant's head turn). The results also revealed better tactile localization accuracy for tactile stimuli closer to the navel than for stimuli presented from more eccentric locations. These results have important implications for the design of directional tactile displays in real-world applications for active operators.

PS2:31

Transient short term representations of tactile stimuli contain more information than can be reported explicitly: Evidence from the partial report paradigm

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We report a series of experiments designed to investigate whether explicitly unreported information regarding the actual number of tactile stimuli presented in parallel across the body surface can be accessed using partial report procedures (Sperling, 1960). In Experiment 1, the participants had to report the total number of stimuli in a display composed of up to 6 tactile stimuli presented across the body surface in one block (numerosity task). In a second block (partial report task), the participants had to detect whether or not a tactile stimulus had been presented in the position indicated by a visual probe presented at a variable delay after the offset of a tactile display (again composed of up to 6 stimuli). While participants were only able to correctly report up to 3 stimuli in the numerosity task, they performed significantly better than chance for up to 5 stimuli when responding in the partial report task. These results suggests that short-lasting representations of tactile stimuli can be accessed using the partial report procedure. Experiment 2 further showed that the accessibility of these tactile representations depends on the amount of information stored in them (the more information stored, the shorter the availability of such information for subsequent recall).

Sperling, G. (1960). The information available in brief visual presentations. Psychological Monographs, 74, 1-29.

PS2:32

Location as a feature in binding in visual working memory

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The Feature Integration Theory (Treisman and Gelade, 1980) ascribes a special role to location in feature binding. Treisman and Zhang (in press) showed that initial encoding of bindings (at 100ms) is dependent on location, but memory for bindings (at 900 ms) is comparatively less dependent on location. Our initial experiment explored the effect of random change vs. no change in location across retention intervals ranging from 0 ms to 4100 ms. Randomly changing the location of all the stimuli rendered location non-informative and participants found it more difficult to remember the conjunction of shape and colour. But as the duration of the retention interval increased from 0 to 2800 ms, they could ignore the randomly changing locations, and their memory for the shape-colour bindings became better (except that performance decreased at 4100ms). Another experiment replicated this consolidation effect with a different set of participants for durations ranging from 0 to 2500 ms. Two subsequent experiments explored whether a similar enhancement of memory would be found if colour and shape were made irrelevant. Taken together, results suggest that not being tied to a specific location augments the emergence of a bound object in visual working memory over a period of time.

Treisman, A., and Gelade, G. (1980). A feature integration theory of attention. Cognitive Psychology, 12, 97-136.

Treisman, A., and Zhang, W. (in press). Location and Binding in Visual Working Memory. Memory and Cognition.

PS2:33

On the reality of illusory conjunctions

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From the work of Treisman and Gelade (1980) illusory conjunctions is the term used for percepts in which features from stimuli are correctly identified but incorrectly combined. Although many studies have been done concluding that illusory conjunctions are real, Donk (1999) challenged this conclusion arguing artefacts related with the method for data analysis. Specifically, that not all reports of incorrect combinations of the presented features are in fact illusory conjunctions, given that observers can misidentify the features presented or even guess in some proportions of the trials. Multinomial Tree models have been proposed as a mean to disentangle the several sources of the several types of errors in typical tasks. We have employed RSVPs of several streams to investigate the reality of illusory conjunctions in the space domain (between streams) and in the time domain (within the stream containing the target). Employing the Multinomial Tree models methodology we have found that whereas illusory conjunctions in the space domain can be explained as just feature errors, illusory conjunctions in the time domain are genuine. Several experiments show how the results are sensitive to experimental manipulations (such as cognitive load) while the conclusion about the very nature of illusory conjunctions remains the same.

Donk, M. (1999). Illusory Conjunctions are an illusion: The effects of target-nontarget similarity on conjunction and feature errors. Journal of Experimental Psychology: Human Perception and Performance, 25, 1207-1253.

Treisman, A. & Gelade, G. (1980). A feature-integration theory of attention. Cognitive Psychology, 12, 97-136.

PS2:34

Age effects on memory binding

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Several studies have investigated the binding of different features in perception, which is known to be affected by age. Less is known about binding in memory. The aim of the present study is to investigate age effects on memory binding. A newly devised battery of tasks was given to young controls and older participants. These tasks examined perception and memory for information presented as single features (e.g. colours) or as a combined features (e.g. shapes with colours). The results support the view that older people, compared to younger controls, have difficulties in remembering combined features. Results differed depending on what type of information had to be remembered (e.g. colours with colours vs. shapes with colours) and at which level this information was assessed (perception or memory). Remembering the same type of bound stimuli (e.g. two colours into one pattern) was more difficult for older adults as compared with younger adults, although no differences were found in perception. Older adults were also worse than younger adults at the binding of different types of information in memory and perception. This evidence suggests that ageing may impair binding in perception and memory differentially depending on the nature of the information to be processed.

PS2:35

Exploring the determinants of the binding asymmetry in visuo-spatial memory

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