

Expertise-dependent perceptual performance In chess tasks with varying complexity

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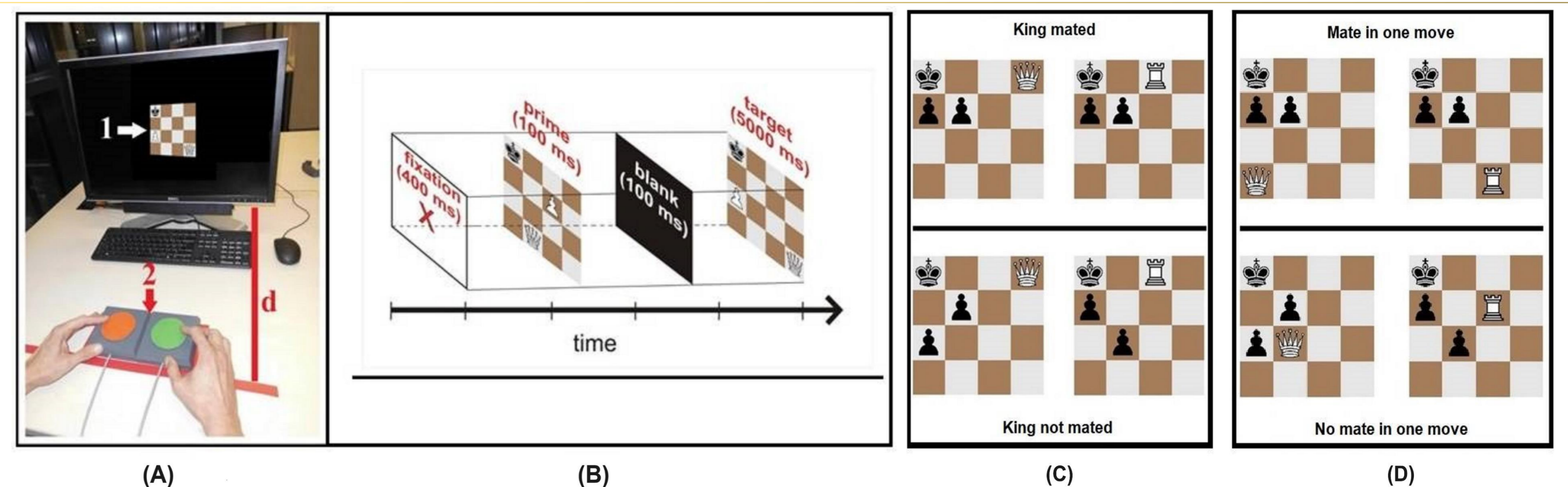
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Introduction

Chess expertise is determined by visuocognitive performance and judging chess positions especially in subliminal processing, i.e., the perception of subconscious stimuli (so-called *primes*) which precede conscious stimuli (*targets*). Herein, screen-based subliminal presentations of checking and nonchecking constellations offer insights into how far experts and novices can be influenced (*priming effect*) under consideration of their expertise level (Kiesel et al., 2009). In order to extend knowledge about potential visuocognitive limitations of chess players we conducted two priming experiments. Our main hypothesis is that priming effects only occur for the experts (Kiesel et al., 2009) and vanish with increasing prime-target complexity.

Method

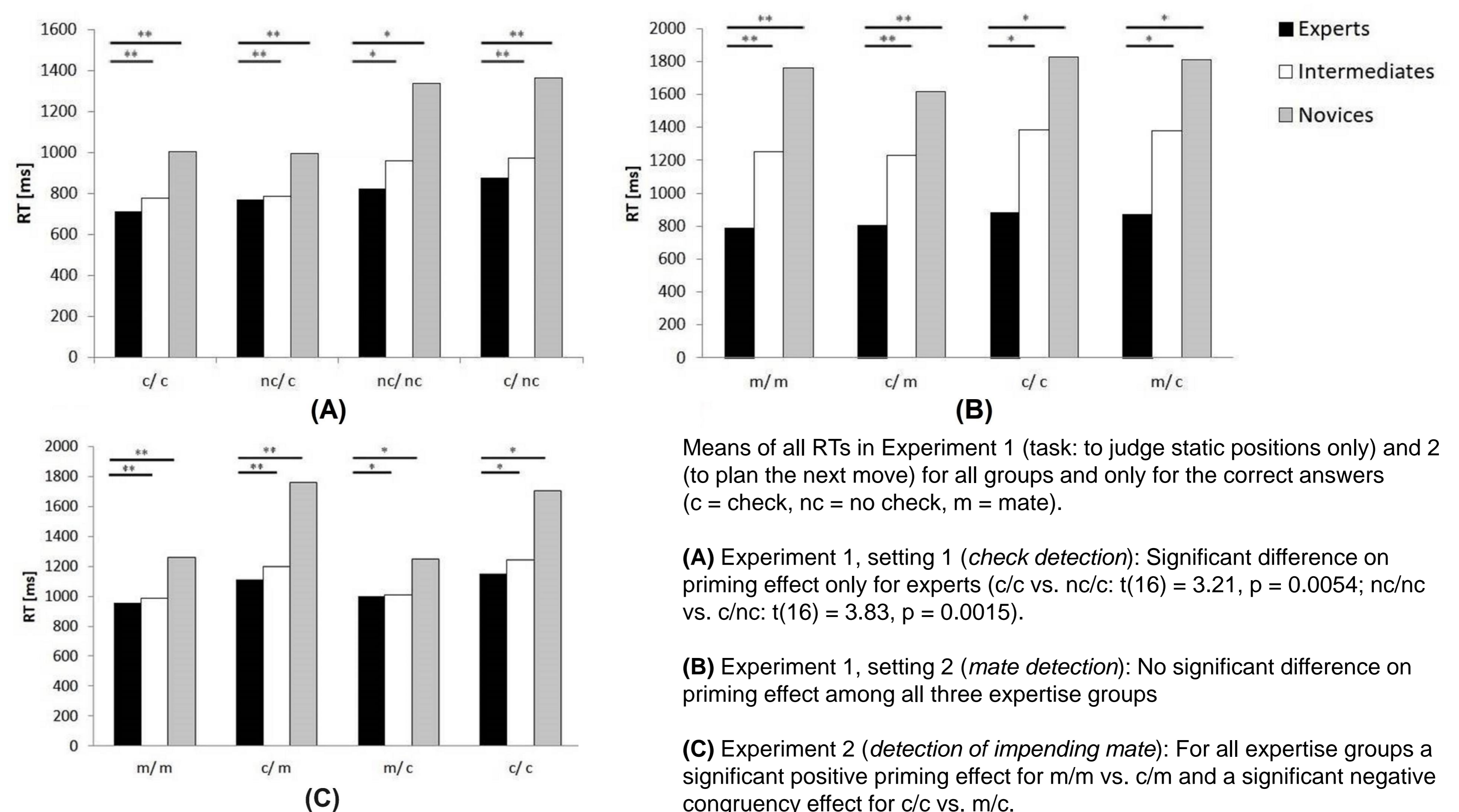
We varied the prime duration and gradually increased the complexity of targets (check versus no check but also mate versus no mate) and of the tasks (to judge static situations versus to plan the next move) in a screen-based experiment (N = 17 experts, N = 15 intermediates and N = 15 novices - due to ELO criteria).



(A) Experimental setup: (1) stimulus presented in the center of the screen; (2) external button box with two buttons; (d) is the distance between the button box and the screen;
(B) A trial in Experiment 1, Setting 1 (check detection setting): prime (no check) and target (check) are incongruent;
(C) Examples for stimuli in Experiment 2, *Prime* stimuli: a present mate and only a check;
(D) Examples for stimuli in Experiment 2, *Target* stimuli: mate and check. For each target stimulus, the participant has to answer the question: "Can the king be mated within the next move?".

Results

The results reveal experts' perceptual superiority manifested by their faster reaction times in settings with increased stimulus and task complexity. Further, experts' priming effects seem to be affected by the target content and/ or priming duration. For short prime duration, experts show priming effects only for the check versus no check prime-target content. Interestingly, for longer prime duration and more complex task (planning the next move) and prime-target content (mate versus no mate), all participants reveal priming effects.



Discussion

The results of the present study are partially consistent with previous studies and partially support our hypotheses. We argue that experts' anticipation of potential threats to the king is rooted in a more efficient visuocognition due to stored chunks (checking and mating constellations). We suggest that visuocognitive limitations are related to the prime-target complexity as well as to the task and suggest further investigations about chess players' performance.

Literature