

# The Role of Short-Term Memory and Task Experience for Overconfidence

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We have developed a *Naïve Sampling Model* (Juslin, Winman, & Hansson, in press) that accounts for some of the more intriguing and unresolved issues in research on confidence judgment: the extreme overconfidence with intuitive confidence intervals and the format dependence effect. According to the NSM, a confidence judgment elicits retrieval of a small sample of similar observations from long-term memory. The sample size is constrained by short-term memory limiting the amount of information that is available at the time of judgment. People are *naïve*, directly taking sample properties as proxies for population properties producing contradictory results depending on the assessment format (Winman, Hansson, & Juslin, 2004).

## Experiment

The experiment investigates the role of short term memory capacity ( $n$  by STM), the total number of observations stored in long term memory ( $n$  by LTM), and the role of several additional cognitive abilities (problem solving and episodic memory) for overconfidence in a laboratory learning task. Nominally the task involved estimates of the revenue of companies, which they had to learn from “scratch” in the laboratory. We manipulated the assessment format (interval production vs. probability judgment), and varied the extent of training in conditions with immediate, complete and accurate outcome feedback from very modest (68 trials), over intermediate (272 trials) to extensive (544 trials).

## Results and Discussion

The proportions of correctly recalled target values (and thus  $n$  by LTM) increased significantly with training, from less than 10% of all 136 target values in each training block after 68 training trials to more than 30% after 544 training trials. The left panel in Figure 1 summarizes the overconfidence with interval production across training block and interval evaluation (probability judgment) with .5 training blocks. There is persistent extreme overconfidence with interval production even after 544 trials with feedback. Consistently with the research on experts and as predicted by the NSM, however, experience appears to have a minimal effect on the overconfidence with interval production. To test the interaction between assessment format and  $n$  by STM, the participants were divided into low or high short term memory capacity based on a median split separately within

each condition. The interaction in Figure 1, right panel, confirms the prediction by the NSM. In the interval evaluation condition (probability judgment) there is no significant difference between the participants with low and high short term memory capacity, but in the interval production condition there is significantly more overconfidence bias for participants with low short term memory capacity. Entering RAPM and episodic memory as covariates in the analysis had no significant effects on the significant interaction.

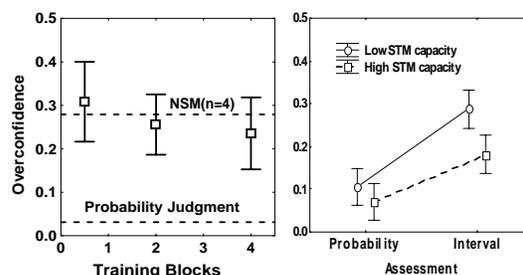


Figure 1: Left Panel: Overconfidence in interval production as a function of the number of training blocks. The dotted line denoted “NSM( $n=4$ )” represents the prediction by NSM assuming sample size 4. The lower dotted line denoted “probability judgment” refers to the observed overconfidence in the interval evaluation task after .5 training blocks. Right Panel: Overconfidence and the statistically significant interaction effect between short term memory capacity and assessment format (2 training blocks).

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