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# **Verbal Insight Revisited: fMRI evidence for subliminal processing in bilateral insulae for solutions with AHA! experience shortly after trial onset**

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## **Abstract**

In insight problem solving solutions with AHA! experience have been assumed to be the consequence of restructuring of a problem which usually takes place shortly before the solution. However, evidence from priming studies suggests that solutions with AHA! are not spontaneously generated during the solution process but already relate to prior subliminal processing. We test this hypothesis by conducting an fMRI study using a modified compound remote associates paradigm which incorporates semantic priming. We observe stronger brain activity in bilateral anterior insulae already shortly after trial onset in problems that were later solved with than without AHA!. This early activity was independent of semantic priming but may be related to other lexical properties of attended words helping to reduce the amount of solutions to look for. In contrast, there was more brain activity in bilateral anterior insulae during solutions that were solved without than with AHA!. This timing (after trial start / during solution) x solution experience (with / without AHA!) interaction was significant. The results suggest that a) solutions accompanied with AHA! relate to early solution-relevant processing and b) both solution experiences differ in timing when solution-relevant processing takes place. In this context, we discuss the potential role of the anterior insula as part of the salience network involved in problem-solving by allocating attentional resources.