Comprehension and a Complex Task: A construction-integration study of individual performance in a non-routine task situation

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Abstract: Comprehension is the ability to relate background knowledge to incoming information to build a "situation model" (Kintsch, 1998). The ConstructionIntegration (C/I) architecture of comprehension has been shown to predict individual performance on complex but routine tasks (e.g., Doane & Sohn, 2000). This study tests the ability of the architecture to explain and predict nonroutine (unexpected) instrument flight performance in aviation piloting. The behavioral results indicate significant differences in individual pilot ability to detect and recover from unexpected instrument failures as a function of piloting expertise. However, expertise is not the sole predictor of performance. The computational experiments indicate that the C/I architecture explains and predicts a significant amount of individual pilot performance. Overall the findings suggest that comprehensionbased processes play a significant role in understanding human performance in unexpected situations.