

# Is Accurate Metacognitive Monitoring Important for Effective Collaboration?

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## Abstract

This study investigated the effect of individuals' metacognitive accuracy on collaborative problem-solving competence. The research was conducted in two stages. 551 university students (404 female; 147 male) were tested for metacognitive accuracy using the Paper Folding Test. Metacognitive accuracy was measured by students' confidence in answering each question. The absolute difference between judgment and performance was used to calculate the accuracy for each item. The average metacognitive accuracy score was calculated for each student. Students were grouped into four categories using SPSS's visual binning procedure. Nine students from the highest group and nine from the lowest group were randomly selected. Six groups, each with three students, were formed for the second stage. The groups were asked to work collaboratively to complete a target shape using Tangram pieces. The collaborative problem-solving competence was coded over video recordings. The Non-Verbal Indexes of Students' Physical Interactivity (NISPI) framework was used to evaluate their collaboration by analyzing bodily cues. Each student's bodily cues were coded every second. We calculated four scores: synchrony (the degree of students' physically actively working on the task), individual accountability (the degree of support by the other participant(s) in situations where at least one person in the group takes the initiative individually), equality (the degree of equality observable in students' workload contribution), and intra-individual variability (the amount of change in the individual student's behavior). High-accuracy groups completed the task faster and had higher synchrony but similar accountability, equality, and intra-individual variability than low-accuracy groups. Low-accuracy groups worked cooperatively rather than collaboratively.

**Keywords:** Collaborative problem solving, metacognition, metacognitive monitoring accuracy, university students