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Revisiting the influence of numerical language characteristics on mathematics achievement: comparison among China, Romania, and U.S.

Summary: Eastern Asian students repeatedly outperform U.S. students in mathematics. Some suggest that number-naming languages consistent with the base-10 number system found in many Eastern Asian countries presumably contribute to their students’ better understanding of the base-10 system and consequent performance. Such language features do not exist in English or other Western languages. The current study tests this assumption by comparing base-10 knowledge of students in kindergarten and first-grade from China, Romania, and U.S. who have developed number-naming language abilities but received relatively little formal school instruction. It is expected that since Chinese number-naming is linguistically more transparent and consistent with the base-10 system, Chinese students should outperform both their Romanian and U.S. peers. Romanians should show intermediate performance between Chinese and U.S. students since Romanian language is somewhat transparent and consistent with a base-10 system while English number-naming language is least consistent. However, the analysis of this study revealed that although Chinese children outperformed both Romanian and U.S. counterparts in accomplishing base-10 tasks, there were no significant differences between Romanian and U.S. children. This finding suggests that the extent to which number-naming language is linguistically transparent and consistent with the base-10 system may not necessarily align with the level of children’s understanding of the base-10 system and relevant mathematics performances.

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