Can approximate number system acuity improve with arithmetic training?

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Abstract: The relationship between approximate number system (ANS) acuity and math performance has recently received a lot of attention. It is still unclear, however, whether the ANS is a prerequisite for math performance or whether training in mathematics could improve ANS acuity. The present study investigated the extent to which mathematics training influences ANS acuity. Participants' ANS acuity was measured before and after six 45-minute sessions of solving arithmetic problems. Participants improved substantially in both the speed and accuracy (i.e., in arithmetic fluency) with which they solved the problems. There was, however, no accompanying change in ANS acuity, suggesting that mathematics training may not affect ANS acuity. Further, in line with previous research we found that arithmetic fluency was strongly related to working memory capacity. With improved arithmetic fluency the relationship, however, became weaker, indicating that practice with arithmetic problems may give rise to strategies that can circumvent working memory constraints.