

Supplementary Information for Halberda, J., Mazocco, M., & Feigenson, L. (2008). Individual differences in nonverbal number acuity correlate with maths achievement. *Nature*.

Supplementary Methods

Subjects

Subjects were drawn from an ongoing longitudinal study of mathematics achievement¹⁵. The initial sample (n=249) was recruited in Kindergarten from a large suburban public school district. Within this district, seven target schools were selected on the basis of having relatively low indices of student mobility and low indices of free or reduced price lunch enrolment (as a filter for socioeconomic status). Thus participating schools were representative of a diverse range of socioeconomic areas within the district with the exception of the lowest. This deliberate omission served to diminish the likelihood of poverty-associated poor maths achievement in the longitudinal study of mathematics ability²⁸.

All Kindergartners attending the participating schools were invited to enroll, except for children with mental retardation or limited English proficiency. A total of 57% of eligible subjects enrolled, resulting in 249 students (120 boys) in the initial sample. Subjects were tested annually, with decreasing enrolment over time due to attrition. Eighty students from the original cohort who were still being tracked in the 9th Grade agreed to participate in the present study. Of these 80, 7 subjects did not have complete data from Years 1 to 7, and so were omitted from our analyses. For 9 subjects, performance in the numerical discrimination task was too variable and the psychophysics model did not settle on a least squares fit for the parameter w . Data from these subjects were excluded from the analyses. The final sample included 64 children (32 boys), with a mean age of 14 years 10 months (range 14 years 3 months to 15 years 9 months), who were enrolled in 8th (n=5) or 9th Grade (n=59) at the time of testing. Most of the subjects were right handed (89%), and most were Caucasian (89%). Preliminary analyses revealed that the 64 subjects in the present study were representative of the larger sample of 249²⁹.

Procedure

Each subject was tested individually during each year of the longitudinal study by one or two female examiners. During Kindergarten, all testing was completed in the subject's school, away from the classroom in a room occupied by only the child and the examiner(s). During Years 1 to 7 of the longitudinal study the testing battery was divided among two or three testing sessions ranging from 45 to 90 minutes each, with shorter sessions used in primary versus middle school. The numerical discrimination task was administered during a school or lab visit as a portion of a single 60 to 75 minute session in Year 10 only (i.e., 8th-9th Grade). During all years of the study, individual tests were presented in a fixed order except under circumstances beyond the examiner's control (e.g., school fire drill, illness).

Relevant Measures administered during Years 1 to 7

Not all measures were administered each year as determined by developmental appropriateness of a given test (e.g., the *Test of Early Mathematics Ability*) or time constraints for the year in question. The major objective of the longitudinal study was to examine potential cognitive correlates of mathematics achievement, so the primary variables of interest included general measures of mathematics ability, mathematics achievement, reading achievement, phonological retrieval, working memory, and spatial ability. These tasks, described below, included a combination of published standardized tests and experimental measures. Unless otherwise noted, performance on the standardized tests is converted to an age-referenced score based on a mean of 100, SD=15.

Standardized Measures of Mathematics

The *Test of Early Mathematical Ability – Second Edition* (TEMA-2) is a standardized test normed for use with children from 4 to 8 years of age¹⁷. We administered the TEMA-2 during the first four years of the study. Depending on grade level at testing, the TEMA-2 requires counting aloud,

