

Information theory and variance estimation
techniques in testing the reliability and sensitivity
of category rating and paired comparisons

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Measurement reliability in tests of receptive speech ability has a critical role in the evaluation and treatment of hearing and neurosensory disorders. This study compared the reliability and sensitivity of category rating and paired comparison tests in the evaluation of subjective speech clarity (five bandpass-filtered conditions) by five age groups (four groups of children and one group of adults). The test results were compared using a signal detection model, in which an objective speech quality measure (bandwidth) is corrupted by a noise component (caused, for example, by inattention) which depends on the test paradigm and the age of the subject. In category rating, there was a difference between 4-6 year olds, who did not perform the task well, and 7-8 year olds, who were much closer to adult performance. In the task of paired comparison, the rate of sensitivity in distinguishing two bands increased gradually and consistently with every increase in age. When the two methods were compared by calculating the perceptual distance between band in the paired comparison test, all groups showed more a reliable response style in the paired comparison method than in category rating; however, the difference was small for the group of 4 year olds.