Summary: We draw a distinction between syntactic and semantic aspects of algebraic thinking. We examine the hypothesis that these two aspects can be distinguished empirically using test items. We present exploratory analysis of a test of algebra based on a large sample of students aged 11–14 in England and contrast this to a previous analysis of older German students. This analysis indicates that there are considerable difficulties in operationalizing the distinction using test items, but suggests a potentially fruitful line of analysis may be to treat the semantic aspect as consisting of two sub-dimensions, based on whether one or many meanings or interpretations appear to be required.

Classification: H23 H33 D63