

Language influences number processing: the case of bilingual Luxembourg

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In a series of studies we investigated how language affects basic number processing tasks in a German-French bilingual setting. The Luxembourg school system indeed progressively educates pupils to become German-French bilingual adults, thanks to extensive language courses in both German and French, as well as a progressive transition of teaching language from German (dominant in primary school) to French (dominant in secondary school). Studying numerical cognition in children and adults successfully going through the Luxembourg school system thus provides an excellent opportunity to investigate how progressively developing bilingualism impacts numerical representations and computations. Studying this question in Luxembourg's German-French bilingual setting is all the more interesting, since the decades and units of two-digit number words follow opposite structures in German (i.e. unit-decade) and French (decade-unit). In a series of experiments pupils from grades 7, 8, 10, 11, and adults made magnitude comparisons and additions that were presented in different formats: Arabic digits and number words. Both tasks were performed in separate German and French testing sessions and we recorded correct responses rates and response times. The results obtained during magnitude comparison show that orally presented comparisons are performed differently by the same participants according to task language (i.e. different compatibility effects in German vs. French). For additions it appears that the level of language proficiency is crucial for the computation of complex additions, even in adults. In contrast, adults tend to retrieve simple additions equally well in both languages. Taken together, these results support the view of a strong language influence on numerical representations and computations.