We present a new empirical test of the Linguistic Transmission Hypothesis (LTH), which posits that language is a conduit in the cultural transfer of cognitive practices. We studied the use of spatial reference frames in discourse and recall memory among speakers of English, Isthmus Zapotec, Yucatec Maya, Vietnamese, monolingual and bilingual speakers of Mandarin and Taiwanese Southern Min, and rural vs. urban Japanese speakers from Honshu vs. Okinawa - the largest and most diverse study of the use of reference frames in language to date. Preliminary analyses confirm the findings of earlier studies focusing on languages of Mexico and Central America (Bohnemeyer et al 2014, in press, ms.), according to which the participants’ first and second-language, the local topography, and the population density all made irreducible significant contributions to predicting frame. These findings support the LTH, but also provide the first quantitative evidence of environmental factors influencing language use.