



From grammatical number to exact numbers: Early meanings of ‘one’, ‘two’, and ‘three’ in English, Russian, and Japanese

Barbara W. Sarnecka^{a,*}, Valentina G. Kamenskaya^b,
Yuko Yamana^c, Tamiko Ogura^d, Yulia. B. Yudovina^e

^a Department of Cognitive Sciences, 3151 Social Sciences Plaza, University of California,
Irvine, CA 92697-5100, USA

^b Institute of Childhood, Herzen State Pedagogical University of Russia

^c Faculty of Education and Human Studies, Akita University, Japan

^d Faculty of Letters, Kobe University, Japan

^e Faculty of Humanities, University of Amsterdam, The Netherlands

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Abstract

This study examined whether singular/plural marking in a language helps children learn the meanings of the words ‘one,’ ‘two,’ and ‘three.’ First, CHILDES data in English, Russian (which marks singular/plural), and Japanese (which does not) were compared for frequency, variability, and contexts of number-word use. Then young children in the USA, Russia, and Japan were tested on Counting and Give-N tasks. More English and Russian learners knew the meaning of each number word than Japanese learners, regardless of whether singular/plural cues appeared in the task itself (e.g., “Give two apples” vs. “Give two”). These results suggest that the learning of “one,” “two” and “three” is supported by the conceptual framework of grammatical number, rather than that of integers.

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* Corresponding author. Fax: +1 949 824 2307.

E-mail address: sarnecka@uci.edu (B.W. Sarnecka).

1. Introduction

Young children use number words in intriguing ways. Consider Ben, age 2-1/2. “He pointed to a picture of two airplanes and said “two,” his mother recalls. “But then he pointed to a picture of five airplanes and said ‘two.’ So much for knowing his numbers.”

Ben’s error was to treat “two”¹ as a marker of plurality. In other words, he used it to mean any set size greater than one, rather than using it to mean exactly two. Ben was not alone in this error—it is common for young children not only to say “two” to describe set sizes larger than two, but also to give two items when they are asked for any higher number word (Le Corre, Li, & Jia, 2003; Le Corre & Carey, submitted for publication; see also Mix, Sandhofer, & Baroody, 2005; pp. 330–331). But English-speaking adults do not use “two” as a general marker of plurality; we would not call five planes “two,” nor would we give two items when asked for “five.” So why do children?

This paper explores the possibility that children first assign quantitative meanings to number words by treating them as words for grammatical number categories such as *singular* and *plural*, rather than as words for positive integers (i.e., members of the indefinitely long series of exact, whole numbers related by the successor function). We examine the number-word knowledge of English, Russian and Japanese preschoolers, to see whether children learning a singular/plural-marking language (i.e., English or Russian) assign set-size meanings to ‘one,’ ‘two,’ and ‘three’ earlier than children learning a language without singular/plural marking (i.e., Japanese). We also compare children’s counting skill, and we analyze CHILDES data from all three languages to ask (A) how often children in each language hear the words “one,” “two,” and “three,” (B) how variable the forms of “one,” “two,” and “three” are in each language, and (C) *how* (i.e., in what contexts) the words “one,” “two,” and “three” are used in each language.

1.1. Learning number-word meanings

Children hear number words used in various ways. For example, the word “two” sometimes occurs in a list, among other number words (“one, two, three,” etc.); at other times it occurs in sentences, where it may be the only number word (e.g., “you can have two cookies”). It has been suggested that children initially treat these contexts as separate—almost as if the words were homonyms (Fuson, 1988, 1992). Children learn to recite the number list up to “five” or higher (Baroody & Price, 1983; Fuson, 1988; Miller, Smith, Zhu, & Zhang, 1995; Miller & Stigler, 1987), and to point to one object with each word, without understanding how counting reveals the number of objects in the set (Baroody, 1992, 1993; Baroody & Ginsburg, 1986; Briars & Siegler, 1984; Fuson, 1988, 1992; Le Corre, Van de Walle, Brannon, & Carey, 2006; Rittle-Johnson & Siegler, 1998; Schaeffer, Eggleston, & Scott, 1974; Siegler, 1991; Sophian, 1987; Wagner & Walters, 1982; Wynn, 1990, 1992).

¹ Throughout this paper, double quotation marks are used to enclose actual English words; single quotation marks indicate the English word as well as its equivalents in other languages (‘two’ means the English word “two,” the Russian words *dva*, *dve*, *dvumia*, etc., the Japanese words *futa-* and *ni*, etc.). Arabic numerals (e.g., 2) are used to indicate numerosities when the spelled-out word might be ambiguous.

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