



Today is tomorrow's yesterday: Children's acquisition of deictic time words



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ABSTRACT

Deictic time words like “yesterday” and “tomorrow” pose a challenge to children not only because they are abstract, and label periods in time, but also because their denotations vary according to the time at which they are uttered: Monday’s “tomorrow” is different than Thursday’s. Although children produce these words as early as age 2 or 3, they do not use them in adult-like ways for several subsequent years. Here, we explored whether children have partial but systematic meanings for these words during the long delay before adult-like usage. We asked 3- to 8-year-olds to represent these words on a bidirectional, left-to-right timeline that extended from the past (infancy) to the future (adulthood). This method allowed us to independently probe knowledge of these words’ deictic status (e.g., “yesterday” is in the past), relative ordering (e.g., “last week” was before “yesterday”), and remoteness from the present (e.g., “last week” was about 7 times longer ago than “yesterday”). We found that adult-like knowledge of deictic status and order emerge in synchrony, between ages 4 and 6, but that knowledge of remoteness emerges later, after age 7. Our findings suggest that children’s early use of deictic time words is not random, but instead reflects the gradual construction of a structured lexical domain.

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K, age 4: “Yesterday ... that’s last night’s morning.”

1. Introduction

To learn their first words, children must rely primarily on the extra-linguistic context in which those words are used, since they are not yet able to understand the sentences in which the words are embedded. Consequently, children’s first words often label concrete referents that can be ostensively identified, like “mama,” “doggie,” and “cup.” Other words, however, are more difficult to learn through observation of the world and may require children to recruit their knowledge of the linguistic context in which those words are embedded (e.g., Gillette, Gleitman, Gleitman, & Lederer, 1999; Gleitman, 1990; Gleitman, Cassidy, Nappa, Papafragou, & Trueswell, 2005; Snedeker & Gleitman, 2004). For example, the meanings of *deictic*

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time words, such as “yesterday” and “tomorrow,” cannot be gleaned solely from extra-linguistic situations. These words are abstract and describe periods in time, which are difficult to reference ostensively. Further, due to their deictic functions, these words do not have fixed denotations and cannot be understood without information about the time at which they are uttered (Fillmore, 1997/1977): Tuesday’s “tomorrow” is different from Wednesday’s “tomorrow.” Acquiring words like these is one of the greatest challenges that English-learning children face, as evidenced by the massive gap between their first use of deictic time words around age 3 and their eventual mastery of adult-like meanings in elementary school (Ames, 1946; Busby Grant & Suddendorf, 2011; Harner, 1975; Harner, 1981). However, the process through which these words are ultimately acquired—and thus the roles of linguistic and referential context—remains mysterious. Here, as a case study of abstract word learning, we explore children’s gradual construction of deictic time word meanings between ages 3 and 8.

While many children produce words like “yesterday” and “tomorrow” as early as age 2 or 3 (Ames, 1946; Busby Grant & Suddendorf, 2011; Dale & Fenson, 1996), they do not use them as adults do for several subsequent years (Ames, 1946; Busby Grant & Suddendorf, 2011; Harner, 1975; Harner, 1981; Nelson, 1998; Weist, 1989; Weist, Wysocka, & Lyytinen, 1991). According to parental report, two thirds of 3-year-olds produce the word “yesterday,” but fewer than 20% use the word in adult-like ways; by age 5, more than 80% of children produce “yesterday,” but, still, fewer than 60% use it like adults (Busby Grant & Suddendorf, 2011). Children struggle not just with production but also with comprehension: When asked to name an event that occurred “yesterday” or one that will occur “tomorrow,” only about a quarter of 3-year-olds can provide reasonable answers (Busby & Suddendorf, 2005; Suddendorf, 2010). These difficulties persist even later in acquisition, as 5-year-olds can correctly generate an event from “yesterday” only 66% of the time, and an event that will occur “tomorrow” only 63% of the time (Busby & Suddendorf, 2005).

Although children differ from adults in how they use time words, it remains possible that they nevertheless use them systematically, and that they construct their meanings gradually and in stages over the first 6 or 7 years of life. Consider an anecdote: When 21-month-old Franny tried to remove dirty dishes from the dishwasher, her mother stopped her and said, “We can empty it *tomorrow*.” Upon hearing this, Franny ran to her bedroom, climbed under her blanket, closed her eyes, and after a brief delay returned to the kitchen to begin the chore. For Franny, “tomorrow” seemed to mean something like “after waking up.” Just a few months later, Franny began producing the word “yesterday,” but used it to refer not only to events that happened the previous day, but also to events that happened two days ago, five minutes ago, and even several months earlier. Productions like Franny’s are thought to be quite common (Ames, 1946; Friedman, 1990; Harner, 1981, 1982; Nelson, 1998; Weist, 1989) and suggest that although young children do not use deictic time words in adult-like ways, they may have partial knowledge of their meanings.

Critically, knowledge of partial word meanings may not have been detectable by the comprehension measures used in previous studies (i.e., parental report and event naming). For example, although adult English speakers may judge that Franny fails to use “yesterday” correctly, Franny may nonetheless know that “yesterday” refers to a period of time, and that it refers to periods prior to the time at which it is uttered. Further, even if Franny were to develop an adult-like meaning of “yesterday” and understand that it refers to a specific period exactly one day ago, she might not be able to name an event that occurred “yesterday.” The ability to associate time words with life events depends not only on knowledge of these words’ meanings, but also on the ability to recall, order, and anticipate events (e.g., a capacity for “mental time travel”; Suddendorf & Corballis, 2007). These abilities develop slowly (Busby & Suddendorf, 2005; Suddendorf, Nielsen, & Von Gehlen, 2011; Schacter, Addis, & Buckner, 2007). These considerations suggest that other methods are required to probe children’s knowledge—or partial knowledge—of deictic time word meanings.

Understanding the nature of children’s early uses of deictic time words—and the partial word meanings they may implicate—could provide critical insight into the inductive hypotheses children make about these words’ meanings. While there has not been systematic study of children’s partial knowledge of deictic time words during the long delay between initial production and adult-like usage, there are hints that children may acquire information about different facets of their meanings independently, with some acquired before others. These facets include a word’s *deictic status* (e.g., “yesterday” is in the past; “tomorrow” is in the future), its sequential *order* relative to other time words (e.g., “next week” is a time after “tomorrow”), and its *remoteness* from the present (e.g., “yesterday” is exactly one day from today). For instance, 3-year-olds appear to understand that “yesterday” and “tomorrow” refer to a non-present time, without knowing that they refer specifically to the past and future, respectively (Harner, 1975). Further, children struggle to grasp the differing causal implications of events from “yesterday” vs. “tomorrow” on the present until at least age 5, also suggesting that their understanding of the distinction between past and future is incomplete (Busby & Suddendorf, 2010). Together, these results suggest that children may first learn that deictic time words label periods in time, without understanding much about their deictic past/future status, order, or remoteness. Furthermore, children’s over-extension errors *within* the past or future, like Franny’s use of “yesterday,” suggest that at some stage, children may understand a word’s deictic status without understanding its remoteness (e.g., Harner, 1981; Nelson, 1998).

One reason to think that children may acquire information about a word’s deictic status, order, and remoteness separately is that there is substantial variation in how these facets of time are expressed across languages. In English, for instance, all time words refer to either the past, present, or future. By contrast, in Urdu, “kal” refers to a period exactly one day from the present—whether in the future or the past—and thus does *not* encode deictic status but *does* encode temporal remoteness. Other languages include terms that encode degrees of temporal remoteness that are not lexicalized in English. For example, German’s “übermorgen” and Georgian’s “zeg” label a period that is in the *future*, much like English “tomorrow,” except that

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