

UC Merced

Proceedings of the Annual Meeting of the Cognitive Science Society

Title

Children's Semantic Representations of a Science Term

Permalink

<https://escholarship.org/uc/item/5r17v4nm>

Journal

Proceedings of the Annual Meeting of the Cognitive Science Society, 26(26)

ISSN

1069-7977

Authors

Best, Rachel
Dockrell, Julie E.
McNamara, Danielle S.

Publication Date

2004

Peer reviewed

Children's Semantic Representations of a Science Term

Rachel Best (r.best@mail.psyc.memphis.edu)

202 Psychology Building, University of Memphis, Memphis, TN 38152

Julie E. Dockrell (j.dockrell@ioe.ac.uk)

Institute of Education, University of London, 20 Bedford Way, London, WC1H 0AL

Danielle S. McNamara (d.mcnamara@mail.psyc.memphis.edu)

202 Psychology Building, University of Memphis, Memphis, TN 38152

Background

School-age children acquire hundreds of new words each year, many of which are acquired incidentally, from uses in discourse contexts. Although children are adept word learners, lexical acquisition from oral language is not necessarily inevitable. Children have particular difficulties in the acquisition of terms that involve complex semantic representations, such as science terms (Braisby, Dockrell, & Best, 1999). Learning science terms poses particular challenges for acquisition because they are 'conceptually complex' and can be understood at various levels of abstraction (Meyerson et al, 1991). Our study investigated the kinds of knowledge children acquire about a science term during the process of lexical acquisition.

Understanding the process of lexical acquisition requires a thorough assessment of the nature of children's word-related knowledge (Beck & McKeown, 1991). While previous studies of word learning have focused on what drives children's acquisition of word meanings, less is known about the nature of children's lexical representations, particularly those relating to complex vocabulary. When children acquire a new word, they must identify the sound in the speech stream to encode a phonological representation and then establish a mapping between the word and concept. Ultimately a detailed semantic representation is developed for the new term.

Because of this multifaceted representation, ascertaining the nature of vocabulary knowledge requires multiple measures (Beck & McKeown, 1991). These measures should include both production and comprehension, moving beyond the conventional multiple-choice comprehension task. Indeed, recent research has indicated that tapping into children's knowledge of conceptually difficult concepts may necessitate creative methods, such as drawing-based assessments (Gross & Teubal, 2001).

Assessing knowledge across a range of tasks does not, on its own, provide information about the maturity of children's lexical representations. Although seldom used in lexical acquisition research, comparison with adults' performance allows us to identify knowledge gaps.

The Study

The present study examined children's representations of a science term following a fortuitous exposure to the term.

Thirty children's (mean age = 6.7 years) knowledge of the term eclipse was examined before and after a partial solar eclipse that was visible throughout Europe in the summer of 1999. There was considerable media interest at the time, but no general formal educational instruction occurred because children were on summer break.

Our study assessed the nature of understandings that children acquired about the term eclipse and a control term, comet (which was not related to an eclipse) at three points in time (baseline test, two-week post-test, and five-month post-test), using a range of assessment tasks (multiple-choice comprehension, picture-naming, drawing, and eclipse 'making' task). Also, children's knowledge was compared to 15 adult controls during the baseline test and two-week post-test. According to the two-week post-test and five-month post-test, children acquired extensive knowledge about eclipses, but not comets. The majority of children successfully named and drew eclipses and 'made' an eclipse using models of the sun, moon, and earth. Also, children's eclipse knowledge more closely approximated adult-level understandings at the two-week post-test than at the baseline test. Overall, the study offered an important insight into the nature of children's lexical knowledge when words are acquired. The study also identified effective methods for tapping into children's lexical knowledge.

References

- Braisby, N. R., Dockrell, J. E., & Best, R. M. (1999). Children's acquisition of Science Terms: Does Fast Mapping Work? *Proceedings for the 8th Conference of the International Association for the Study of Child Language*, 1066-1087. Somerville, MA: Cascadilla Press.
- Beck, I. L., & McKeown, M. (1991). Conditions of vocabulary acquisition. In R. Barr, M. L. Karmil, P. Mosenthal, & D. D. Pearson (eds.), *Handbook of Reading Research* (Vol. 1), Longman Publishing Group.
- Gross, J., & Teubal, E. (2001). *Microscope use in scientific problem solving by kindergarteners*. Paper presented at the IXth European Conference for Research and Learning, Fribourg-Switzerland, 28th August – 1st September.
- Meyerson, M. J., Ford, M. S., Jones, W. P., & Ward, A. W. (1991). Science vocabulary knowledge of third and fifth grade students. *Science Education*, 75, 419-428.