Available online at www.sciencedirect.com
SCIENCE DIRECT®
Pergamon
Research in Developmental Disabilities
24 (2003) 183–194
Research in Developmental Disabilities

Computer-based sorting-to-matching in identity matching for young children with developmental disabilities

Hirofumi Shimizu[a,*,1], Janet S. Twyman[b], Jun-ichi Yamamoto[c]

[a]*Meisei University, Tokyo, Japan*
[b]*Headsprout, Inc., Seattle, WA, USA*
[c]*Keio University, Tokyo, Japan*

Received 18 October 2002; received in revised form 17 December 2002; accepted 7 January 2003

Abstract

We evaluated a computer-based sorting-to-matching procedure to teach matching-to-sample skills to seven young children with developmental disabilities who had failed to demonstrate identity matching-to-sample under the typical training procedure (such as observing a sample then selecting a comparison stimulus). In the sorting-to-matching procedure, rather than clicking on a comparison stimulus, the children moved the sample stimulus under the identical comparison stimulus. For all the children, identity matching-to-sample accuracy rapidly increased when the sorting-to-matching procedure was introduced, while it remained at chance levels in the typical training procedure. One of seven children showed collateral gains in accuracy with the typical training procedure after the exposure to the sorting-to-matching procedure.

Keywords: identity matching-to-sample; sorting-to-matching; computer-based instruction; young children; developmental disabilities

* Corresponding author. Present address: Hawthorne Country Day School, 5 Bradhurst Avenue, Hawthorne, NY 10532, USA. Tel.: +1-914-592-8526x166; fax: +1-914-345-9189.
E-mail address: hshimizu@hawthornecountryday.org (H. Shimizu).
[1] Served as a Research Fellow of the Japan Society for the Promotion of Science when this research was conducted.

0891-4222/03/$ – see front matter
doi:10.1016/S0891-4222(03)00028-3

1. Introduction

Recent technology has allowed us to develop effective computer-based instruction for special education populations (e.g., Merzenich et al., 1996; Tallal et al., 1996). Computers have been used to teach a wide variety of skills, including spelling (Dube, McDonald, McIlvane, & Mackay, 1991), arithmetic (Leung, 1994), problem-solving (Mastropieri, Scruggs, & Shiah, 1997), and drawing (Lancioni & Boelens, 1996). Attempts to establish identity matching-to-sample (MTS) for individuals with developmental disabilities using a computer has been widely reported in the behavior analytic literature with positive outcomes (e.g., Dube, Iennaco, & McIlvane, 1993; Dube, Iennaco, Rocco, Kledaras, & McIlvane, 1992; McIlvane, Dube, Kledaras, Iennaco, & Stoddard, 1990; Saunders, Johnston, Tompkins, Dutcher, & Williams, 1997; Saunders, Williams, & Spradlin, 1995).

Due to it's function in helping build concept classes (identifying similarities and differences among and between stimuli) identity MTS is one of the most important tools in the acquisition of language and other academic skills and is often used in special education settings. The typical training procedure of identity MTS consists of three stimuli presented on each trial. One stimulus is called a sample stimulus and the other two stimuli are called comparison stimuli. One comparison stimulus is identical to the sample stimulus, while the other is not. The participant is required to identify (point to or touch) the comparison stimulus identical to the sample stimulus. The selection of a correct comparison stimulus is reinforced and the selection of an incorrect comparison stimulus is extinguished or punished. Two different sample stimuli (and two corresponding comparison stimuli) are usually taught simultaneously. The location of the two comparison stimuli and the presentation order of the two sample stimuli are counterbalanced across trials.

When establishing computer-based identity MTS, two procedures are usually used. One, called ''programmed instruction,'' is designed to teach two requirements for identity MTS: (1) a sample stimulus control over the response on every trial, and (2) rapid and flexible discrimination reversal between two sample-comparison relations (Dube et al., 1992; Dube & Serna, 1998; McIlvane et al., 1990). Dube and Serna (1998) taught identity MTS to six individuals with severe mental retardation using the instruction. Four participants completed the instruction and demonstrated the generalized identity MTS. The one other is a component training procedure (Saunders et al., 1995). This procedure contains three teaching components: (1) the simultaneous discrimination between the comparison stimuli, (2) the successive discrimination between the sample stimuli, and (3) a blocked trial procedure used to teach sample control of comparison selection. Saunders et al. (1995) reported that two individuals with mental retardation demonstrated identity MTS with the component training.

For individuals who have difficulty to demonstrate identity MTS with training procedures above, a procedure, called ''sorting-to-matching,'' would be effective (Serna, Dube, & McIlvane, 1997). This sorting-to-matching procedure is a variant of a sorting task. The task has been used to study conceptual behavior (e.g.,