

EFFECTS OF MAND-TACT VERSUS TACT-ONLY TRAINING ON THE ACQUISITION OF TACTS

ERIK ARNTZEN AND INGER KARIN ALMÅS

AKERSHUS UNIVERSITY COLLEGE AND
BLEIKER TREATMENT CENTER, NORWAY

We sought to replicate and extend Carroll and Hesse's (1987) study of the acquisition of tacts by including participants with and without developmental disabilities. As in Carroll and Hesse, the present results showed that mand-tact training, rather than tact-only training, led to more rapid acquisition of tacts. Tacting on follow-up tests did not differ. In addition, our results show that mand-tact training established both verbal operants involved about as rapidly as tact-only training established only one verbal operant.

DESCRIPTORS: verbal behavior, tact acquisition, mand-tact training, tact-only training, follow-up

As Skinner (1957) pointed out, when an utterance is established as a verbal operant (e.g., an echoic), it does not automatically mean the utterance emerges as another verbal operant (e.g., a tact). However, relations between verbal operants may arise from direct training that seeks to integrate the verbal repertoires (e.g., Hall & Sundberg, 1987). Such training may also facilitate learning. For example, Carroll and Hesse (1987) examined the effects of mand-tact and tact-only training procedures on the acquisition of tact performance. The results showed that, on average, children with typical development required fewer trials to learn tacts in the mand-tact condition than in the tact-only condition.

We wanted to extend the generality of the Carroll and Hesse (1987) study by including children and youths with autism and other developmental disabilities. The purposes of this study were (a) to explore whether the mand-tact condition was more effective in the acquisition of tact responses than the tact-only condition, and (b) to determine whether the mand-tact and the tact-only

conditions yielded different tact performances on follow-up tests.

METHOD

Participants and Setting

The participants were 2 typically functioning 3-year-old girls (Eli and Siv) and 3 boys with developmental disabilities and autistic characteristics: Per (aged 17 years), Jon (aged 15 years), and Are (aged 3 years). Per, Jon, and Are could follow simple and a few complex instructions; each displayed little spontaneous vocal verbal behavior. Sessions occurred at a treatment center for Per and Jon and at home for Eli, Are, and Siv.

Materials

For Per, the training materials were objects and pictures of the objects in an album; for Eli, Jon, Are, and Siv, a letter puzzle was used. The target behaviors were tacting the 12 objects or letters. In Phase 1, Per learned to tact the objects yeast, CD, bottle opener, newspaper, video, and film; in Phase 2, the objects were baler, tape, thread, ruler, thermos, and glue. In Phase 1, Eli, Jon, and Siv learned to tact letters A, Ø (a Norwegian letter), B, L, and X; in Phase 2, the letters were E, G, H, F, Y, and V. Are's letters in

We thank Robert Stromer and four anonymous reviewers for helpful comments to an earlier version of the manuscript.

Correspondence should be sent to Erik Arntzen, Akershus University College, P.O. Box 372, 1301 Sandvika, Norway (e-mail: erik.arntzen@equivalence.net).

Phase 1 were A, Ø, C, B, L, and Y; and in Phase 2 letters were O, T, M, E, G, and S. The items were trained successively and were followed by discrimination training among sets of three items. The materials were chosen because the teachers and parents involved thought it was important for the participants to learn to tact these items.

Procedure

As in Carroll and Hesse (1987), the participants were randomly divided in two groups. In Phase 1, Group 1 (Per, Eli, and Jon) received the tact-only procedure with the first three objects or letters and then the mand-tact procedure with the next three objects or letters (A-B design). Group 2 (Are and Siv) received the mand-tact procedure with the first three stimulus items followed by the tact-only procedure with the next three items (B-A design). To avoid sequence effects in training, we included Phase 2 in which the mand-tact and tact-only procedures occurred in the same session (a multielement design). Neither the names of the objects nor the letters used in training were currently in the participants' verbal repertoire when they were exposed to a baseline condition in which no programmed consequences followed responses. Session lasted 30 min with a short break after each 12-trial block. Mastery criteria during training for each condition consisted of two blocks in which there were 10 consecutive correct trials.

Tact-only training. The experimenter placed the object or letter in the front of the participant and said, "This is a —" or "What is this?" If the participant did not respond, the experimenter said the name of the object or letter and asked, "What is this?" If the participant's tact response was incorrect (e.g., said "yeast" when the correct response was "CD"), an echoic prompt was provided and the original question was re-presented. Correct responses were praised (e.g., "Yes, that is correct. Good girl."), and tokens were given. Furthermore, after a cou-

ple of responses when the response was stable, other tasks (imitation skills, rule following, intraverbals) were presented to ensure a delay between the presentation of the object and the question "What is this?" and to match the rate of reinforcement to the slower tempo of the mand-tact training.

Mand-tact training. Mand and tact trials alternated, and the first trial for each part was a mand training trial. The experimenter hid the object or letter and used the instructions "find the object" for Per or "finish the puzzle" for Eli, Jon, Are, and Siv. Per was to find all objects pictured in the album; when the participant couldn't find the object, he was supposed to ask for (mand) the object. Eli, Jon, Are, and Siv had to ask for the missing letter. Errors or nonresponding were corrected in such a way that the participant had to imitate (echoic prompt) and then ask for the object or letter once more without the echoic prompt. The next training trial for this condition was tact training. These trials continued to alternate until the participants correctly manded and tacted the object or letter on 10 consecutive trials. During mand training, the participants were given the object or letters manded. For tact training, the reinforcement and correction procedures were the same as in the tact-only procedure.

Follow-Up Testing

The period from the end of training until the follow-up tests varied across participants for Tests 1 and 2, respectively: for Per, 10 and 125 days; for Eli, 65 and 95 days; for Jon, 10 and 109 days; for Are, 7 and 137 days; and for Siv, 18 and 119 days. The retention interval varied because of practical considerations. The same 12 objects or letters as used in training were presented to the participant in a random order, and the trainer asked, "What is this?" During the follow-up test, no programmed consequences followed correct or incorrect tact responses. Other types of requests (e.g., put hands on table, look at the trainer, etc.) were presented

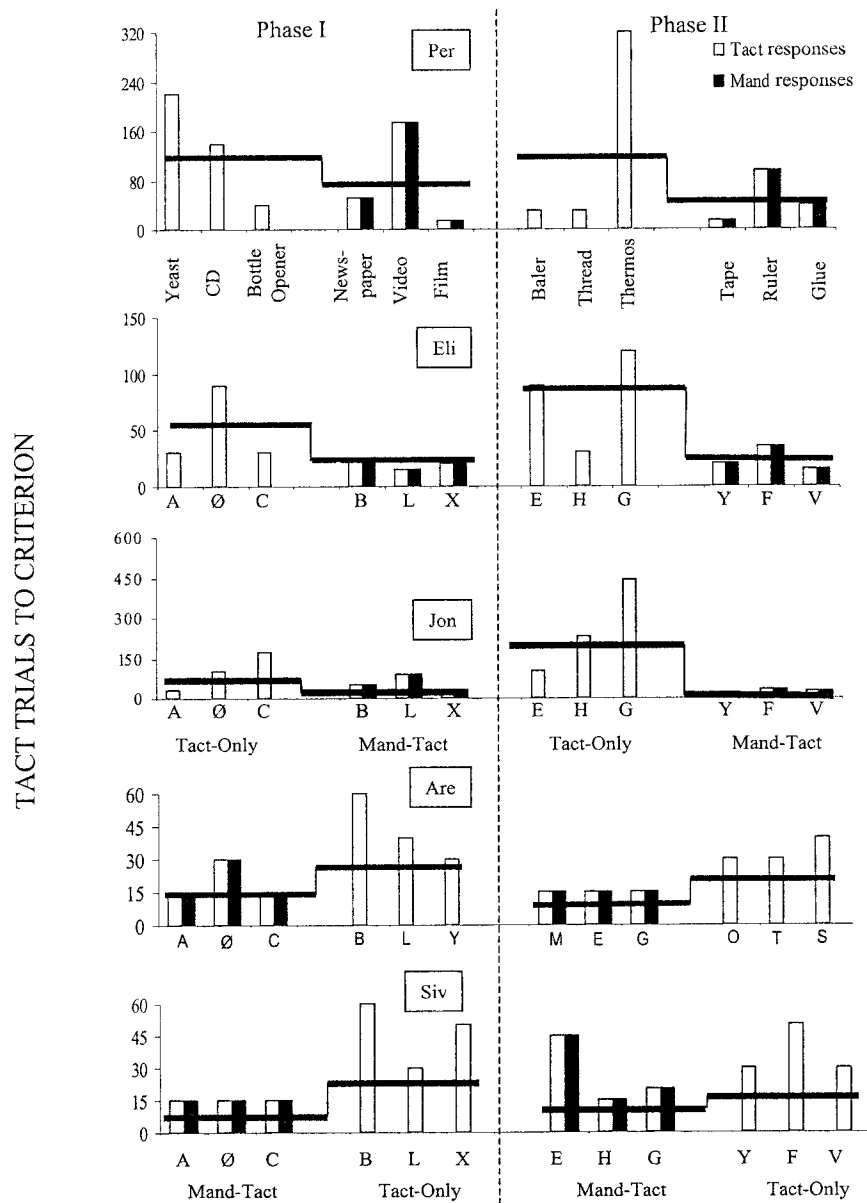


Figure 1. Panels show the number of trials to criterion in Phases 1 and 2 for each participant and with their particular letters or objects used in training (denoted below bars). Group 1 (Per, Eli, and Jon) received tact-only and then mand-tact training in each phase; Group 2 (Are and Siv) received mand-tact and then tact-only training.

on an average of every fifth trial, and compliance with these instructions was praised.

Reliability

Interobserver agreement was determined by having two trainers independently score

approximately 10% of all trials for each participant. Overall interobserver agreement was calculated as total agreements divided by agreements plus disagreements multiplied by 100%. The mean score was 99% (range, 90% to 100%).

RESULTS AND DISCUSSION

All participants scored 0% correct tacts of items under baseline conditions (not shown in Figure 1). In contrast, the mand-tact condition, on average, was superior to the tact-only procedure in training the participants to tact objects or letters (see Figure 1); this was so, independent of the sequence of training. The results are consistent with those of Carroll and Hesse (1987) and support the argument that mand contingencies involve stronger controlling variables and, therefore, could facilitate the acquisition of tact responses. The results also coincide with other research showing that changes in one verbal repertoire may result in collateral changes in a second verbal repertoire (Lee & Pegler, 1982). In contrast to Carroll and Hesse, we have presented results with numbers of both mand and tact trials in the mand-tact condition, because a mand trial preceded each tact trial in the mand-tact condition. Thus, the difference in number of trials to criterion following the two procedures holds only when the number of tact trials is considered. On the other hand, the mand-tact condition provides the opportunity to train two verbal operants as fast as one verbal operant in the tact-only condition.

During follow-up testing, there was very little difference between the retention outcomes of the two procedures. Are and Siv scored 100% correct (six of six) tact responses on objects trained by both conditions in Phase 1; Are scored 83% correct and Siv scored 100% in Phase 2. Per had a slightly higher score on the mand-tact condition than on the tact-only condition in Phase 1 and an equal yield in Phase 2. Eli had a similar score on objects or letters trained according to both procedures in Phase 1 and a higher score on objects following the mand-tact condition than the tact-only condition in Phase 2. Jon had a low score on both conditions in both phases. The results showing no difference between the two pro-

cedures during the follow-up tests differ from Carroll and Hesse (1987), and there may be two reasons why: First, the test in the Carroll and Hesse study was given immediately after the completion of training, whereas in the current study several days had passed before the participants received the test. Second, the different results could be due to the fact that in their study only half of the trained objects were tested rather than all objects as in the present study.

In sum, the present mand-tact procedure was superior to the tact-only procedure in the acquisition of tacts in both children with typical development and in children and youths with developmental disabilities. Further research will be needed to identify procedures that encourage better long-term retention of the newly established performances (Mueller, Olmi, & Saunders, 2000; Winborn, Wacker, Richman, Asmus, & Geier, 2002). In addition, the extent to which the mand-tact intervention results in outcomes that generalize to other functional communication settings also deserves systematic study.

REFERENCES

- Carroll, R. J., & Hesse, B. E. (1987). The effect of alternating mand and tact training on the acquisition of tacts. *The Analysis of Verbal Behavior*, 5, 55–65.
- Hall, G., & Sundberg, M. L. (1987). Teaching mands by manipulating conditioned establishing operations. *The Analysis of Verbal Behavior*, 5, 41–30.
- Lee, V. L., & Pegler, A. M. (1982). Effects on spelling of training children to learn. *Journal of the Experimental Analysis of Behavior*, 37, 311–322.
- Mueller, M. M., Olmi, D. J., & Saunders, K. J. (2000). Recombinative generalization of within-syllable units in prereading for children. *Journal of Applied Behavior Analysis*, 33, 515–531.
- Skinner, B. F. (1957). *Verbal behavior*. Englewood Cliffs, NJ: Prentice Hall.
- Winborn, L., Wacker, D. P., Richman, D. M., Asmus, J., & Geier, D. (2002). Assessment of mand selection for functional communication training packages. *Journal of Applied Behavior Analysis*, 35, 295–298.

Received February 11, 2002

Final acceptance August 14, 2002

Action Editor, Robert Stromer