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RECEPTIVE TRAINING OF ADJECTIVAL INFLECTIONS IN MENTAL RETARDATES[1]

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A generalized discrimination of /er/ and /est/ suffixes as labels for stimuli exemplifying comparative or superlative relationships was established in three institutionalized retardates through differential reinforcement. The subjects were first taught correct pointing in response to opposite adjectives (*e.g.*, "big—small") presented as labels for simple visual stimuli, and then taught each of the comparatives, or each of the superlatives possible for those opposites (*e.g.*, "big—bigger" and "small—smaller", or "big—biggest" and "small—smallest"). As training proceeded, novel combinations of the training stimuli were presented as unreinforced probes to display any developing generalization of the training. As training of comparative discrimination proceeded, correct pointing response to comparative probes was high, but correct response to superlative probes was low. When training of superlative discriminations replaced training of comparatives, correct response to superlative probes increased, and correct response to comparative probes remained high.

This study was designed to extend the experimental analysis of grammatical language development to the case of adjectival inflections, which can be defined as a generalized response class. In morphological grammar, many adjectives can indicate relative degrees of quantity or quality simply by standardized comparative and superlative suffixes: the comparative suffix, /er/ (*e.g.*, slow*er*), expresses a quantitative degree of difference between a pair of referents, and /est/ (*e.g.*, slow*est*), indicates the maximum quantitative degree holding between three or more referents. These suffixes can be correctly generalized to a very large number of adjectives; thus, those adjectives potentially constitute a response class conditionable by teaching correct suffix usage with a relatively small number of representatives. This study explored that possibility at the receptive or "understanding" level of language.

This particular area of grammar was chosen for analysis because it represents one of the more sophisticated areas of morphology, constitutes a large response class, can be objectively defined, and is modestly difficult. Presumably, difficulty occurs because these adjectival inflections represent relationships between referents rather than fixed or absolute entities. Thus, while one ball may be the bigger of one pair, it may also be the smaller of another pair, or the smallest of three, *etc.*

Furthermore, an absence of this grammatical organization is not uncommon in the productive speech of young or retarded children. Berko (1961) found that only one of eighty 4- to 7-yr-old children formed both comparatives and superlatives with a novel (nonsense) adjective. (Each child was shown three dogs that were increasingly "quirky", and was expected to say the second was "quirkier" than the first, and that the third was "quirkiest". The children either said they did not know, or simply repeated the experimenter's label.) Lovell and Bradbury (1967) used the same stimulus cards and nonsense adjective ("quirky") in a study of 160 educationally subnormal 8- to 15-yr-old children (mean IQ 70). No child provided the comparative inflection; only 13 gave the superlative ("quirkiest") after being told the correct comparative.

A previous study in the area of morphological grammar (Guess, Sailor, Rutherford, and

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Baer, 1968) used operant conditioning procedures to establish a generative productive (spoken) use of the plural morpheme in a severely retarded girl. During training trials, reinforcement was presented contingent upon correct imitation of singular and plural verbalizations by the experimenter in response to objects presented singly and in pairs. A plural response class resulted, the girl correctly labelling new objects in the singular or plural without further direct training in their plurals.

The present study followed the same pattern but with receptive language (*i.e.*, acting on what is heard). It, too, used the response class concept to describe a significant fact of response development: that there often emerges from the organism more behavior exemplifying the dimensions of his experience than that experience has taught directly to him. In this conceptual approach, language and speech may be conceived to be a large number of highly generalized response classes, at both the receptive and productive levels, exemplifying the same dimensions or rules that characterized the person's training or experience. Thus, teaching a child to identify correctly the quantitative relationships between stimuli, as indexed by comparative and superlative adjectives, could result in an organized set of responses that the child then can apply correctly to new stimuli, thereby generating response to new words, within his old grammar, without further training.

METHOD

Selection of Subjects

Subjects were screened by a test of correct receptive use of adjectival inflections. In this test, the subject was shown pictures, and then objects, that could be labelled with the comparative and superlative inflections. The subject was first shown pictures of two distinct sizes of balls and asked to point to the "bigger" one. The pictures were withdrawn, then presented again with a request to point to the "biggest" ball. The same procedure was followed for other pictures representing "longer" and "longest" (pencils), and "higher" and "highest" (houses). Each comparative and superlative was tested three times, in consecutive trials. In the second part of the test, objects were presented in the same way. The three types of objects included boxes ("smaller" and "smallest"); sticks ("shorter" and "shortest"); and books ("thicker" and "thickest"). Again, three trials were given for each comparative or superlative tested. A total percentage of correct responses was computed for all trials with both pictures and objects. The three subjects ultimately selected for the study performed either near or below chance level (50%) when pointing to the comparatives or superlatives included in the screening test.

These three subjects, residents of a state institution for the mentally retarded, were considered to be severely retarded according to the A.A.M.D. classification system.

Subject 1, Jim, was 13 yr old, and diagnosed as mongoloid. His productive speech was characterized by the use of single words or short phrases, poorly articulated. In the screening test, Jim pointed correctly to six of the 12 comparatives and two of the 12 superlatives requested.

Subject 2, Gene, was 12 yr old, had fairly good articulation, and used short simple phrases when speaking. He pointed correctly for three of the 12 comparatives requested on the screening test, but did not point correctly for any of the 12 superlatives.

Subject 3, Barb, was 7.5 yr old, spastic, and confined to a wheelchair. She was talkative and could use sentences, but pointed correctly for only one of the 12 comparatives and four of the 12 superlatives requested in the screening test.

Setting

The study was conducted in a 10 by 12 ft soundproof room connected by one-way mirror and intercom system to an adjoining observation room. Subjects sat across a table from the experimenter. (An exception was made for Barb, who was in a wheelchair: a board was placed across the arms of the wheelchair to serve as a table.) A small store containing numerous commodities, located across the hall from the experimental room, provided back-up reinforcers, which could be purchased with tokens earned in the sessions.

Stimulus Cards

The training materials used in the study consisted of 19 sets of pictures. Each set contained four cards 5 by 8 in. (12.7 by 20.3 cm), each card of a set displaying a quantitatively different picture of the same basic stimulus.

Table 1

The 19 Sets of Four Stimulus Cards Used to Exemplify Adjectives

Set Number	*Descriptions of the 4 Cards in the Set*	*Adjectives*
1	Circles differing in diameter (0.5, 1, 2, 4 in.)	small-big
2	Faces differing in degree of up- or down-curved mouth (0.25 or 0.5 in. deep)	happy-sad
3	Flowers differing in size, esp. height (2, 4, 6, 8 in.)	tiny-huge
4	Squares differing in shading (clear, lined, cross-hatched, black)	light-dark
5	Beetles differing in width (0.25, 0.5, 1, 2 in.)	skinny-fat
6	Triangles differing at apex (60° angle or half-circle of 0.125, 0.25, or 0.5 in. radius)	sharp-blunt
7	Glasses differing in fullness (2%, 10%, 70%, 100%)	empty-full
8	Rings differing in tightness around rod (tight or 33%, 67%, 100% larger in diameter)	tight-loose
9	Rectangles differing in length (0.125 by 0.5 in. by 1.25 by 2.5 by 4 in.)	short-long
10	Striped poles differing in width (0.125, 0.25, 0.75, 1 in.)	narrow-wide
11	Houses differing in height (0.75, 1.5, 4.5, 6.5 in.)	little-tall
12	Birds differing in distance from point (1, 2, 4, 6 in.)	near-far
13	Angles (10°, 45°, 120°, 150°)	acute-obtuse
14	Diamonds differing in one axis (3 by 0.5 by 1, by 2, by 3 in.)	thin-thick
15	Squares differing in density of dots (1, 4, 20, 40 dots/sq. in.)	sparse-dense
16	Running men differing in perspective "distance" from viewer (12°, 9°, 6°, 3° retinal angle)	slow-fast
17	Grids differing in lines per inch (1, 2, 8, 16 lines/inch)	coarse-fine
18	Sine waves differing in amplitude (0.25, 0.5, 1, 2 in. crest-to-trough)	steady-shaky
19	U's differing in depth (0.25, 0.75, 1.5, 3 in. deep)	shallow-deep

(For example, the first set consisted of four cards each displaying a circle; the four circles differed clearly and regularly in size.) Thus, each set of cards could be used to exemplify opposites ("big" and "small"), comparatives ("big, bigger" and "small, smaller"), and superlatives ("big, bigger, biggest" and "small, smaller, smallest"). Table 1 describes the 19 sets of stimulus cards and lists the adjectives exemplified by each set.

Experimental Design

Control and evaluation of the training procedures were accomplished by a multiple baseline technique that incorporated probes of the subject's ability to transpose from trained combinations of stimuli to untrained combinations. The multiple baseline design was built on two baselines of such probes: a Comparative and a Superlative baseline. First, however, there was a preliminary teaching of opposites (*e.g.*, "big" and "small"). Next, training established the receptive identification of comparatives, teaching the child to point correctly to members of successive pairs of stimuli showing a quantitative difference (*e.g.*, "big, bigger" and "small, smaller"). This training, called the Comparative Phase, was probed repeatedly for generalization to novel combinations (*i.e.*, transpositions) of stimuli. Response to these probes constituted the Comparative baseline of the design. Periodically during Comparative Phase training and probing, the subject was probed further for correct response to the superlative. Data from these probes comprised the Superlative baseline of the design. After training in comparatives had produced a satisfactory level of correct response on comparative probes, training was shifted to the development of superlatives and discontinued for the still ongoing comparative presentations. This was called the Superlative Phase. Ongoing probes continued to measure response to untrained transpositions of comparatives and superlatives.

Procedure

Overview. Three sequential training conditions were used within each set of stimuli. (1) Using two cards of the set, training established the receptive identification of two opposite adjectives (*e.g.*, "big" and "small"). (2) Using three cards from the set, one of these opposites (*e.g.*, "big") underwent comparative training ("big", "bigger") if this was the Comparative Phase of the multiple baseline

design, or superlative training ("big", "biggest") if this was the Superlative Phase of the design. (3) Again with three cards (but including one not previously used), the other opposite ("small") underwent comparative training ("small", "smaller") if this was the Comparative Phase of the design, or superlative training ("small", "smallest") if this was the Superlative Phase.

As many as three types of probes were interspersed within these training conditions, to display any effects of training on as yet untrained responses or stimulus combinations. In the Comparative Phase of the design, (1) superlative probes, always involving the three stimuli used so far, were applied after the first comparative of each set had been trained, and again after the second comparative had been trained, to see if that training had evoked any pre-existing discrimination of the superlative. (2) Late in the Comparative Phase, transpositional superlative probes (*i.e.*, probes involving stimulus trios not used previously) were added to the superlative probes previously used, to see if any combination of stimuli, familiar or novel, would evoke correct superlative discrimination, and to provide a baseline for the upcoming Superlative Phase. (3) Transpositional comparative probes (*i.e.*, probes involving stimulus pairs not used previously) were applied during the Comparative Phase after the second comparative of each set had been trained, to see if the comparative training (now complete for that stimulus set) had established any generalized skill in identifying comparative relationships.

In the Superlative Phase of the design, nontranspositional superlative probes, supplemented by transpositional superlative probes, were applied after the first superlative of each set had been trained, and again after the second superlative of each set has been trained (to display the generalized effects of superlative training); and transpositional comparative probes were applied after the second superlative of each set had been trained (to display any maintenance of the previously trained comparative skills with new stimuli, now that such training had stopped).

A detailed account of the reinforcement technique, of each type of training condition, and of each type of probe, follows.

Reinforcement. Subjects were reinforced for correct responses on a variable-ratio 3 (VR 3) schedule with small plastic chips, which they redeemed at the end of the session for a variety of sweets, games, toys, clothing, books, and cosmetics. The cost of these items ranged from 1 to 100 tokens. The VR 3 schedule of token reinforcement was established gradually with the first set of opposites taught to the subject; thereafter, it was quickly put into effect for each training condition that followed. This schedule was selected to accommodate the various unreinforced probes interspersed in the training conditions.

Comparative phase overview. The overall plan of training and probes during the Comparative Phase is exemplified in Table 2, for the first stimulus set used in that phase.

Training the opposites. The subject was trained to point correctly to one of the two pictures labelled by the experimenter as opposites (*e.g.*, "big" and "small", as exemplified in Table 2). The two pictures (5 by 7 in.; 12.7 by 17.8 cm stimulus cards) were placed in front of the subject; the experimenter then said, "Point to _____." If an incorrect response was given, the experimenter said "No", pointed to the correct card, removed the cards, and presented them again after a 10-sec timeout. The positions of the training cards were changed unsystematically, to control for position biases. The order of requesting the two opposites (*e.g.*, "big" or "small") was random. Criterion for successful performance in this condition, as well as all subsequent training conditions, was 10 consecutive correct responses. Opposite training always used the "middle" two stimuli of each four-stimulus set, as Table 2 implies.

Training the two comparatives. In the Comparative Phase of the design, after training of the opposites, the subject was taught to identify the comparative of one of the opposites. Three stimulus cards were shown to the subject; they included those originally trained as opposites (*e.g.*, "big" and "small") plus a new stimulus card which, quantitatively, represented the comparative of one of the opposites (*e.g.*, "smaller") as exemplified in Table 2. The subject was given a reinforcer for pointing to the picture previously taught as one of the opposites when requested (*e.g.*, "small"), and to the new stimulus card when the experimenter asked for its comparative (*e.g.*, "smaller"). These requests were made in a random order. No requests were made for

Table 2

Example of the sequence of training and probe conditions used during the comparative phase.

TRAIN (*reinforced*)	*Request* ("*Point to* ___")	*Stimuli Presented:* • *Correct Response:* (•)				*No. of Trials*	*PROBE* (*unreinforced*)
	small		(•)	•		to	
Opposites	big		•	(•)		criterion	
First	small	•	(•)	•		to	
Comparative	smaller	(•)	•	•		criterion	
	smallest	(•)	•	•		4	Superlative[a]
Second	big		•	(•)	•	to	
Comparative	bigger		•	•	(•)	criterion	
	biggest		•	•	(•)	4	Superlative[a]
	smaller	(•)			•	1	
	bigger	•			(•)	1	
	smaller		(•)	•		1	
	bigger		•	(•)		1	Transpositional
	smaller		(•)		•	1	Comparative
	bigger		•		(•)	1	
	smaller			(•)	•	1	
	bigger			•	(•)		

[a]These superlative probes were modified, three stimulus sets before the Comparative Phase ended, to include transpositional superlatives as well. Table 3 describes the modified transpositional superlative probes.

the remaining stimulus card, originally trained as the second opposite (*e.g.*, "big"). This card remained in the three-card series as a neutral stimulus, both to reduce the probability of chance correct responses and perhaps to facilitate the discrimination between the first opposite and its comparative. As before, the positions of the cards were changed unsystematically; and the subject was required to meet a criterion of 10 successive correct responses.

Procedures for training the second comparative were identical to those used for the first comparative. However, the subject was now shown the two cards originally taught as opposites, plus the stimulus card depicting the comparative for the second opposite (*e.g.*, "bigger"). The first opposite ("small") was presented as the third stimulus card but was not requested by the experimenter.

Superlative phase overview. The overall plan of training and probes during the Superlative Phase is exemplified in Table 3, for the first stimulus set used in that phase.

Training the opposites. Training of superlatives in the Superlative Phase of the design was always preceded by the establishment of two opposites (*e.g.*, the "shallow" and "deep" of Table 3) just as was training of comparatives in the prior phase.

Training the two superlatives. The subject was then shown the two stimulus cards originally trained as opposites, plus an additional card, which represented the superlative of one of the opposites (as shown in the example of Table 3). This logically converted the stimulus trained previously as the other opposite to the anchor item of the superlative series to be trained. For example, "deep" now became "shallow", "shallow" implicitly became "shallower", and the additional third stimulus represented the explicitly trained superlative, "shallowest" (see Table 3, first Superlative). On the first trial only, the experimenter therefore re-labelled the "deep" card as "shallow" ("This is shallow") and then began a random series of requests to point to either "shallow" or "shallowest". The middle card (originally trained as "shallow" and now implicitly "shallower") remained in the training series but was not requested by the experimenter. Again, the positions of the cards were changed unsystematically during the training trials; and the subject was required to meet a criterion of 10 consecutive correct responses. The second superlative was trained by the same proce-

Table 3

Example of the sequence of training and probe conditions used during the comparative phase.

TRAIN (*reinforced*)	*Request* ("*Point to* ___")	*Stimuli Presented:* • *Correct Response:* (•) ⌴	⌴	⌴	⌴	*No. of Trials*	*PROBE* (*unreinforced*)
Opposites	shallow deep		(•) •	• (•)		to criterion	
First Superlative	shallow shallowest	• (•)	• •	(•) •		to criterion	
	shallowest	(•)		•	•	2	
	shallowest	(•)	•		•	2	Transpositional
	shallowest		(•)	•	•	2	Superlative
	shallowest[a]	(•)	•	•		2	
Second Superlative	deep deepest		(•) •	• •	• (•)	to criterion	
	deepest	•	•		(•)	2	
	deepest	•		•	(•)	2	Transpositional
	deepest	•	•	(•)		2	Superlative
	deepest[a]		•	•	(•)	2	
	shallower	(•)			•	1	
	deeper	•			(•)	1	
	shallower		(•)	•		1	
	deeper		•	(•)		1	Transpositional
	shallower		(•)		•	1	Comparative
	deeper		•		(•)	1	
	shallower			(•)	•	1	
	deeper			•	(•)	1	

[a]These probes were not transpositional; they were identical to the training stimuli of the Superlative Phase and analogous in form to the Superlative probes of the Comparative Phase (Table 2).

dures. As indicated in the example of Table 3, the combination of stimulus cards was changed for this training (the "shallowest" card was removed, the card originally trained as "shallow: now became "deep", and the newly added stimulus was labelled "deepest").

General Probe Conditions

One or another of the three types of probes described in this section was given to the subject interspersed within the training trials, following that point at which the subject had reached criterion in the particular training condition to be probed. The subject was then being given reinforcers on a VR 3 schedule, thus allowing insertion of the probes within the established level of reinforcer density. Responses to all probes, correct or not, were never reinforced.

Transpositional comparative probes. These probes measured the extent to which the subject applied the comparative rule to stimulus combinations that had not been taught directly in the comparative training conditions. The subject was requested to point to one of two different stimuli, now labelled as a comparative. In the example of Table 2, the subject was asked to point to either the "smaller" or "bigger" pattern. Eight transpositional comparative probes were given for each stimuli series, covering pairs of stimulus cards not trained directly *as comparatives* in the preceding conditions. Table 2 and 3 both exemplify the eight combinations of paired stimuli used for these probes.

Superlative probes. Nontranspositional superlative probes were taken (as a second baseline) during the early comparative training conditions (see Table 2): the subject was presented with the same three stimulus cards used in training, and he was then requested to point to the stimulus card which, quantitatively, would be the superlative. For example, the subject was shown the three stimulus cards

originally labelled as "big", "small", and "smaller" in the first comparative training condition, and was asked to point to the "smallest" of the three stimuli. After the second comparative training condition, the subject was asked to point to the "biggest" of the three stimuli (see Table 2). The nontranspositional superlative probes were presented four times following training of the first comparative, and four times again following training of the second comparative.

Transpositional superlative probes. The transpositional superlative probes were administered in a manner identical to the nontranspositional superlative probes. The only difference between them was in the trios of stimulus cards shown to the subject. Whereas the nontranspositional superlative probes used the same three stimulus cards presented in the training condition, the transpositional superlative probes included every other possible trio of stimuli contained in each four-card series (as exemplified in Table 3). Each of the three possible transpositional superlative probes was presented twice, and the nontranspositional superlative probes now were presented twice. Transpositional superlative probes were introduced to each subject three stimulus sets before the beginning of superlative training.

Summary of training sequences. Training of first and second comparatives was continued, with new sets of stimuli, until the subject required only a minimal number of trials to reach each criterion. This was followed by the training of superlatives, which, to that time, had been measured as a second baseline, first as nontranspositional superlative probes and later as transpositional superlative probes. The transpositional superlative probes were added to the nontranspositional superlative probes near the end of the training con-

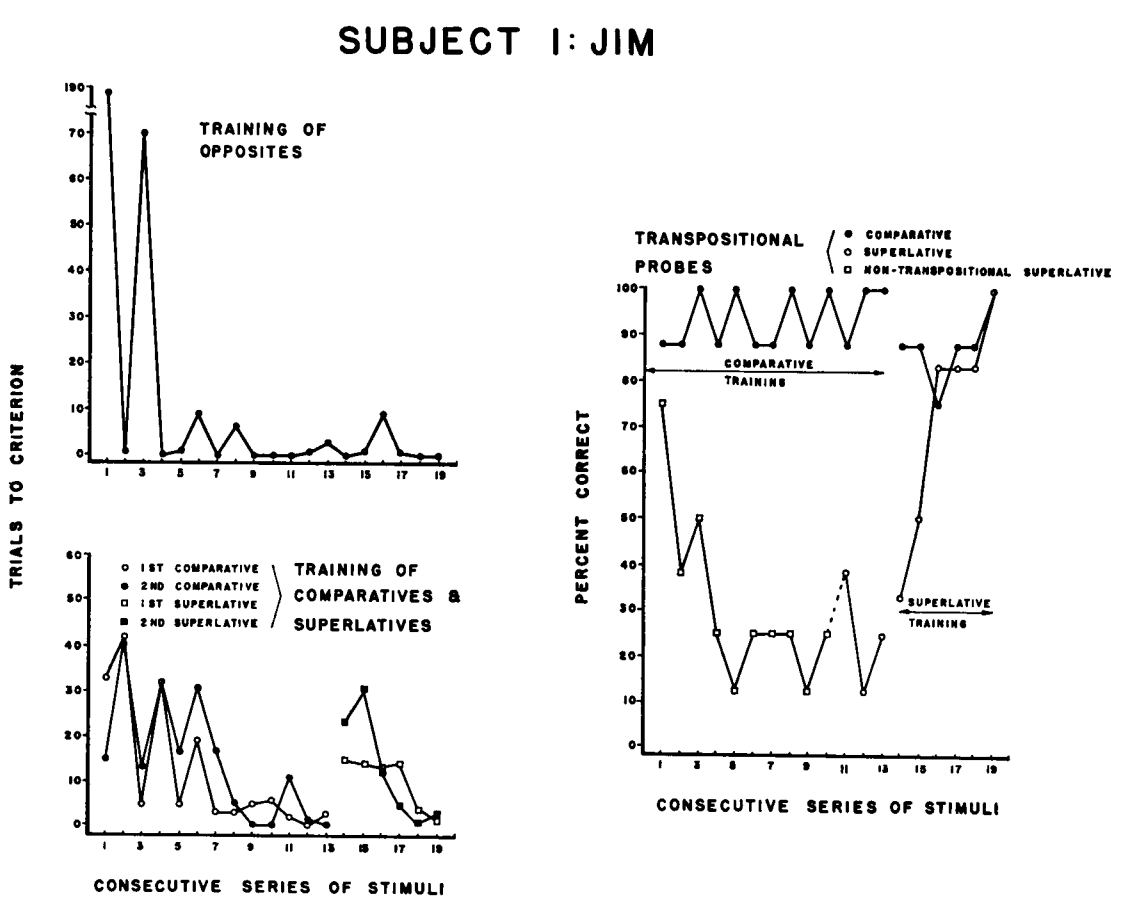

Fig. 1. Trials to criterion for the training of opposites, comparatives, and superlatives, and percentage of correct response to comparative and superlative probes, for Subject 1.

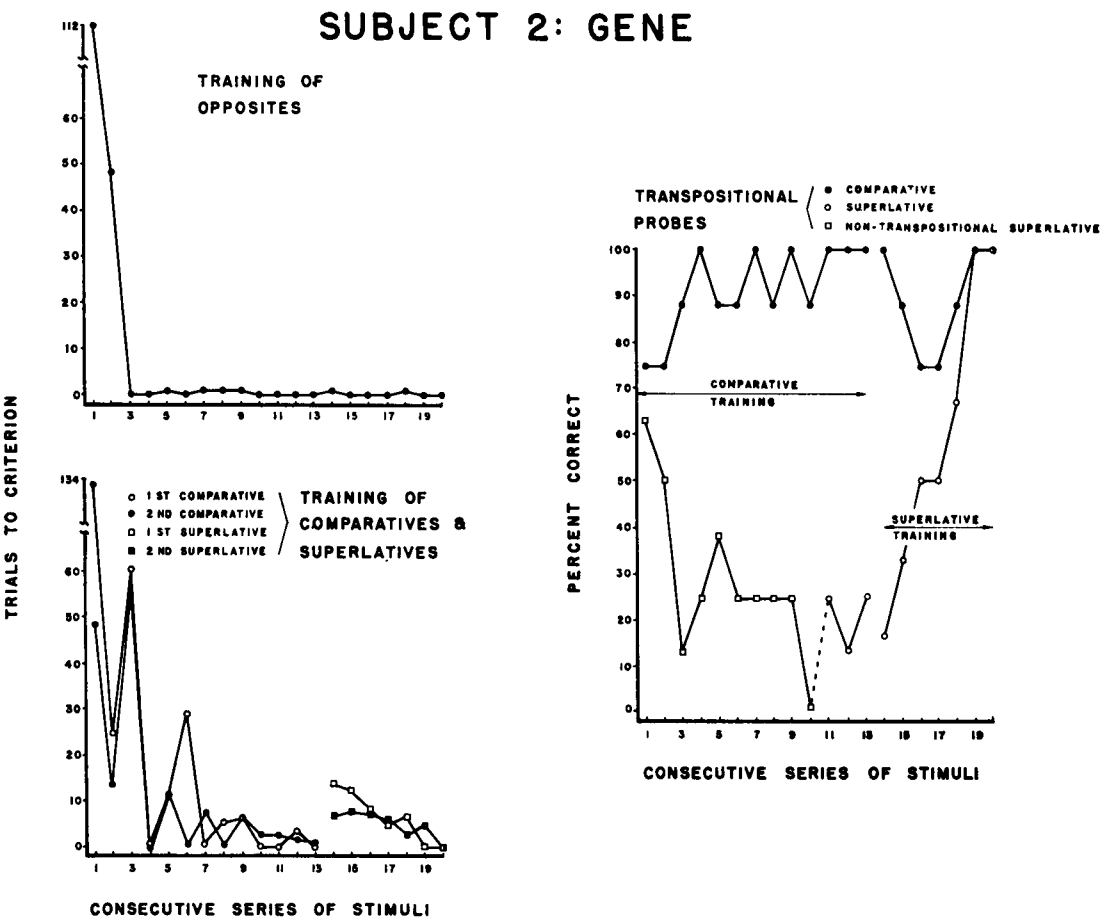

Fig. 2. Trials to criterion for the training of opposites, comparatives, and superlatives, and percentage of correct response to comparative and superlative probes, for Subject 2.

ditions for comparatives, *i.e.*, when the subject required only a minimum number of trials to reach criterion on each new series of stimuli. Introduction of the transpositional probes was made in preparation for the superlative training conditions; these probes were subsequently used to measure the subject's ability to generalize to stimulus patterns not taught directly. Superlative training also continued, with new sets of stimuli, until only a minimal number of trials was required to reach criterion.

RESULTS

Reliability

The percentages of agreement between the experimenter and the reliability observer were assessed three times during the training and probing of each subject (once each during the opposite, comparative, and superlative training phases). These percentages varied between 97% and 100%, reflecting the ease of objective recording of the pointing responses defining receptive discrimination. Each subject's reliability percentages were based on a minimum of 100 trials.

Training

The number of trials required by each subject to reach criterion performance during the training of successive sets of opposites, first and second comparatives, and first and second superlatives, is shown in Fig. 1, 2, and 3, each figure displaying the results for a single subject. In general, fewer and fewer trials were required to reach each successive criterion, the minimum number being achieved repeatedly

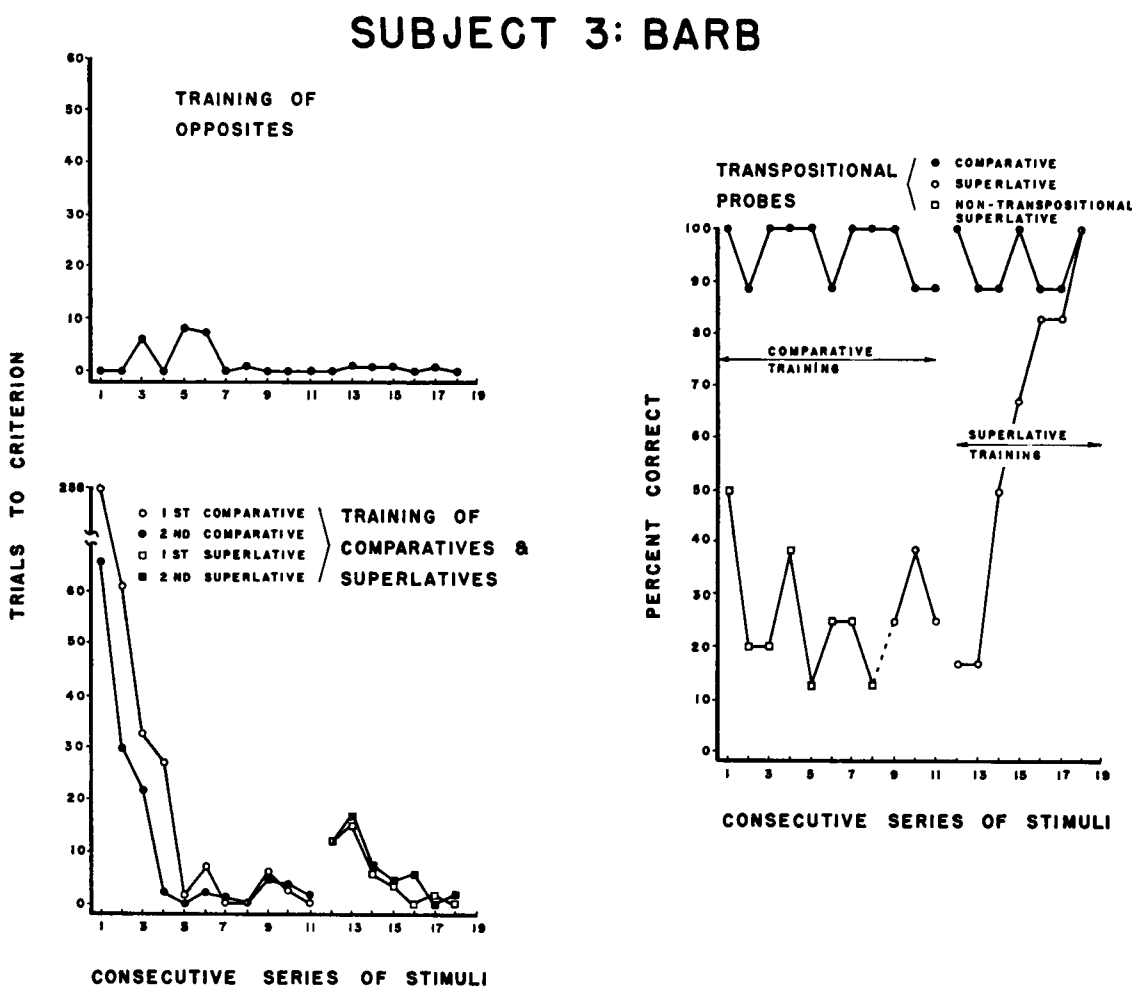

Fig. 3. Trials to criterion for the training of opposites, comparatives, and superlatives, and percentage of correct response to comparative and superlative probes, for Subject 3.

by the end of training.[3] However, Subject 3, Barb, required little or no training in opposites; and Subject 1, Jim, was not quite at the minimum level of trials required for learning new superlatives by the end of training.

[3]The minimum number of trials to reach criterion during comparative and superlative training was 0, if the first 10 trials were correct, as they might well be in a generative subject. During the training of opposites, the minimum number was either 0 or 1: if the subject by chance pointed correctly on the first trial, 1 if he made an error on that trial. In either case, the trial had enough cue function to allow a generative subject to be correct on all further trials. Nevertheless, in the latter case the subject was scored as making an error (even though he could not be expected to know the opposite labels exemplified by the first presentation of a new stimulus set).

Probes

The percentage of comparative and superlative probe trials responded to correctly is shown in Fig. 1, 2, and 3, each figure displaying the results for a single subject. The comparative probes were always transpositional; the superlative probes were nontranspositional during most of the comparative training condition, but became transpositional three stimulus sets before superlative training began. In general, the three subjects responded accurately to the comparative probes from the outset, generally scoring 87.5% or 100% correct (*i.e.*, seven or eight correct of eight trials). However, Subject 2, Gene, showed some evi-

dence of a more gradually acquired generalization, his initial two points being 75% correct and his subsequent scores then showing the usual 87.5% to 100% level.

When comparative training gave way to superlative training, response to comparative probes remained relatively accurate, although Subjects 1 and 2 declined briefly to the 75% level (Subject 1 for only one stimulus set, Subject 2 for two stimulus sets). And, as superlative training progressed, accuracy of response to the transpositional superlative probes steadily increased to the 100% level in all three subjects. (As indicated in Table 3, two of eight of these trials were actually *non*transpositional; however, as response reached 100% levels this distinction became trivial.) During comparative training, the superlative probes had shown only chance (33%) or lower accuracy levels, except for relatively high scores on the first (or first few) stimulus sets shown uniformly by the three subjects.

DISCUSSION

In this study, severely retarded children were taught to identify comparative and superlative adjectives, through differential reinforcement. The acquisition of comparative and superlative usage, at the receptive level, was accomplished with relatively few training sequences in each subject (although a prior acquisition of opposites required relatively many training trials over the initial two or three sequences for two of the subjects). Significantly, this learning generalized to stimulus combinations, or transpositions, which had not been trained directly, but which exemplified the same dimensions that characterized the original training experiences (*cf.* Spence, 1937). Thus, when subjects were taught to identify the "comparative" stimuli of certain stimulus combinations, they also responded correctly to new combinations of those same stimuli, rather than simply choosing the specific stimulus that had been "comparative" during training. Superlatives generally were not identified correctly by the subjects until they were taught directly in the second condition of the study (as measured by both nontranspositional and transpositional superlative probes). Concurrent with superlative training, there appeared a rapid increase in correct "superlative" response to untrained transpositions of the same stimuli. Meanwhile, the subjects continued to point accurately to comparatives.

These results parallel the findings of a previous study (Guess *et al.*, 1968), in which training in the *productive* pluralization of nouns generalized to objects not taught directly. In this study, *receptive* behavior was measured, and found to display a similar susceptibility to generalization. In both studies, the concept of response class can describe the emergence of the new and highly generalized behaviors, productive or receptive, to many more instances than were included in the training experiences.

It will be noted that all three subjects pointed significantly above chance level during the first nontranspositional superlative probes given during the comparative training condition. This was especially evident in Subjects 1 and 2. It is possible that the subjects overgeneralized during the early phases of comparative training, *i.e.*, they had not yet made a clear discrimination between the /er/ and /est/ endings. The correct response to the nontranspositional superlative probes was also the same stimulus pattern trained as the comparative (refer to Table 2). However, as training on comparatives continued, another pattern emerged in which all subjects pointed below chance level (below 33%) on the nontranspositional superlative probes. An analysis of the relative frequency of the possible kinds of error showed that all three subjects pointed most frequently to the choice previously reinforced when the adjective had been trained against its opposite (56%, 44%, and 53% for Subjects 1, 2, and 3, respectively). The next most frequent choice was of the card labelled as a comparative during comparative training, *i.e.*, the correct responses during the comparative probe (31%, 29%, and 27%, respectively). The least chosen cards on the nontranspositional superlative probes were those representing the opposite adjective, *i.e.*, those cards that were never labelled in the comparative training condition (13%, 27%, and 20% respectively).

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