

THE EFFECTS OF PUNISHMENT ON THE ACQUISITION AND MAINTENANCE OF READING BEHAVIOR IN RETARDED CHILDREN

Emilio Ribes,¹ Salvador A. Galesso-Coaracy and Lilia Duran

University of Veracruz
México

ABSTRACT. The use of punishment for incorrect responding in reading by three retarded children is described. The results show positive effects of punishment in the acquisition and maintenance of reading behavior. The outcome is discussed in relation to discrimination training and a more extensive evaluation of punishment effects in academic behaviors with retarded children is suggested.

RESUMEN. En este artículo se describe el uso del castigo después de la emisión de respuestas incorrectas durante la lectura, con tres niños retardados. Los resultados indican que se obtuvieron resultados positivos al emplear el castigo, tanto en la adquisición como en el mantenimiento de la conducta de lectura. Se comentan los resultados en relación con el aprendizaje discriminativo y, al mismo tiempo, se sugiere una evaluación más extensa de los efectos del castigo en la conducta académica de los niños retardados.

Punishment is assumed to have disruptive effects on behavior maintained by positive reinforcement, presumably because of the elicitation of emotional and respondent incompatible behaviors as well as because of the negative reinforcement of behavior instrumental in avoiding the aversive stimulation source (Skinner, 1953; Azrin and Holz, 1966). Nonetheless, many of these negative side-effects of punishment — emotional predisposition aroused by the punished response emission, the elicitation of fear, anxiety and conflict — have not been confirmed in studies in which punishment has been used with human subjects (Risley, 1968; Birnbrauer, 1968; Ribes and Guzmán, in press; Sajwaj and Hedges, 1970). In the present study, punishment was used to improve the reading accuracy of retarded children after a token and social reinforcement procedure had proved to be relatively ineffective. The present study intends to show that some positive effects may be obtained by punishment of "incorrect" responding, even when the same agent provides both punishment and reinforcement.

METHOD

Subjects

Three subjects were used, all them retarded children attending the Center for Training and Special Education of the University of Veracruz

(C.T.S.E.). Subject (1), B. P., was a 12-year-old retarded boy diagnosed as educable, with speech and hyperactivity problems. Subject (2), L. R., was a 9-year-old retarded girl, with profound retardation produced by a meningitic syndrome when she was a young infant. Subject (3), J. C. S., was an 8-year-old retarded boy, with body-shivering, behavior problems at home, and attentional and verbal deficits. They were being trained under a reading program developed at the C.T.S.E., but their progress was very slow and erratic according to the usual criteria. Since the slow pace was attributed to deficient discrimination, punishment by slapping was used in order to improve performance in reading. Punishment should be more functional in motivating and sharpening the discriminative behavior of reading, after reinforcement and time-out procedures previously used had failed in this regard. Punishment by slapping was selected for two different reasons. First, different reinforcement and stimuli sequencing procedures relative to the reading program were tried out unsuccessfully. Second, not very intense slapping had previously proved to be effective in suppressing undesirable behaviors, compared to time-out or verbal punishment (Ribes *et al*, 1970).

Reading Program

The reading program at the C.T.S.E. consists of several sections, which will be very briefly described. The first section of the reading program involves learning to read seventeen words. Each word is separately taught under a matching-to-sample situation. The word is presented as a sample stimulus and three more words are presented below as comparison stimuli (Cumming and Berryman, 1965). The subject is first read the sample word and he has to imitate the trainer: "Here it says papa" . . . "What does it say here?" pointing to the sample word. The child then has to respond "papa." Then he is presented the comparison stimuli, being asked to identify where "papa" is written. He points to the correct comparison word and then is asked: "What does it say here?" and he has to respond again "papa." When he does so, he is reinforced with token and social reinforcement. If he makes an error, the experimenter puts him under a partial time-out, turning his face away from S for 10 seconds. Each word is acquired through a successive presentation of an average of 27 steps. In the first steps the sample stimulus and the correct comparison words are printed in the same color (usually yellow, green, or red) and the other comparison stimuli are printed in black. Through the course of succeeding steps, color is faded out and finally the subject has to choose the correct comparison word just on the form of the stimulus, since color has been omitted and the four

words are printed in black. The number of errors is recorded during the complete program as well as the number of words identified and read in successive days when the child is presented an individual card with a word printed (individual test) and a page with the 17 words printed (mixed test), involving the words previously learned in recent days.

Recording

Recording was done only by the experimenter since he had been previously trained to record with a 100% of reliability.

Punishment Procedure

Two different punishment procedures were used, since with subjects (1) and (2) the procedure was administered without reversals as was the case with subject (3).

In the case of subjects (1) and (2) a non-experimental procedure was used. Both were showing a poor performance in their reading programs, where they were being reinforced with tokens and social reinforcement. For subject (1), punishment by slapping on one hand was introduced after 17 sessions using reinforcement and time-out. Punishment was administered during 26 additional sessions and then it was discontinued during 19 sessions used as follow-up period to evaluate the performance of the reading repertoire just acquired. For subject (2) punishment by slapping on one hand was introduced after 25 sessions in which the subject was performing only at a 10% level of accuracy in her reading. That is, she only responded correctly in 2 or 3 of the 27 steps of the word program. The procedure was maintained during 65 sessions, after which it was discontinued. In both cases, punishment was administered together with the token and social reinforcement procedures normally included. Punishment was provided for any error made during the course of the reading program in every daily session of twenty minutes in length.

For subject (3) an experimental procedure was used in order to evaluate the differential effects of punishment and social reinforcement plus time-out procedures. The procedure involved four stages. In the first stage, a brief time-out (10 seconds) and social reinforcement were used. Time-out consisting of the experimenter turning his face away from the subject was applied contingent on every error. Social reinforcement consisted in praising and fondling the boy every time he responded correctly. In the second stage, the time-out procedure was substituted by slapping with moderate intensity on the external lateral face-neck region. In the third stage, conditions were reversed to those prevailing in the first stage. And finally, in the fourth stage, token reinforcement and time-out were with-

drawn and just punishment was administered for every mistake the subject made. Every stage lasted 5 days, two words per day being presented to the subject in sessions of twenty minutes. Baseline measurement with this subject involved the percentage of incorrect responses in the 27 steps of each one of ten words that were being taught. This is what Sidman (1960) calls a manipulative base-line, and was used to evaluate punishment against the normal procedure used in the reading program (token and social reinforcement plus time-out). It seemed irrelevant to measure reading behavior without token and social reinforcement plus time-out, since none of these children could read before the study was carried out and the low percentage of correct reading behavior shown was obviously produced by the reinforcement and time-out procedures previously administered.

RESULTS

Different data are shown to illustrate the effects of punishment in the acquisition and maintenance of reading behavior.

For subject (1), the number of words learned per session and their maintenance after ending the first section of the reading program is shown. Figure 1 depicts the performance both before and after introducing punishment for every error. The figure only includes data from the individual test (reading a card with an individual word previously learned — the subject is shown as many cards as words learned in that and previous sessions). The mixed test yielded almost identical data. Before the punishment procedure, after seventeen sessions, subject (1) was able only to read one of the seventeen words learned during those sessions. His peak performance was in the seventh session in which he read four out of seven words. After punishment was introduced, the subject was able to read in the individual test the seventeen words learned in the 26 previous sessions. Figure 1 shows that after session number seventeen, he read one more word per day without any serious decrease in performance. The follow-up data shows that the subject maintained the seventeen-word repertoire during 19 additional days in which the individual test was presented to him. Improvement seems to be quite independent of time elapsing, since in his performance prior to punishment administration, he did not make any error during the 27 steps of each word in the program, but failed to recognize and read them in the mixed and individual tests. Time per se could not account for the cumulative increase in maintenance of reading of words learned in the current and prior sessions.

For subject (2) the graph depicts the percentage of correct responses

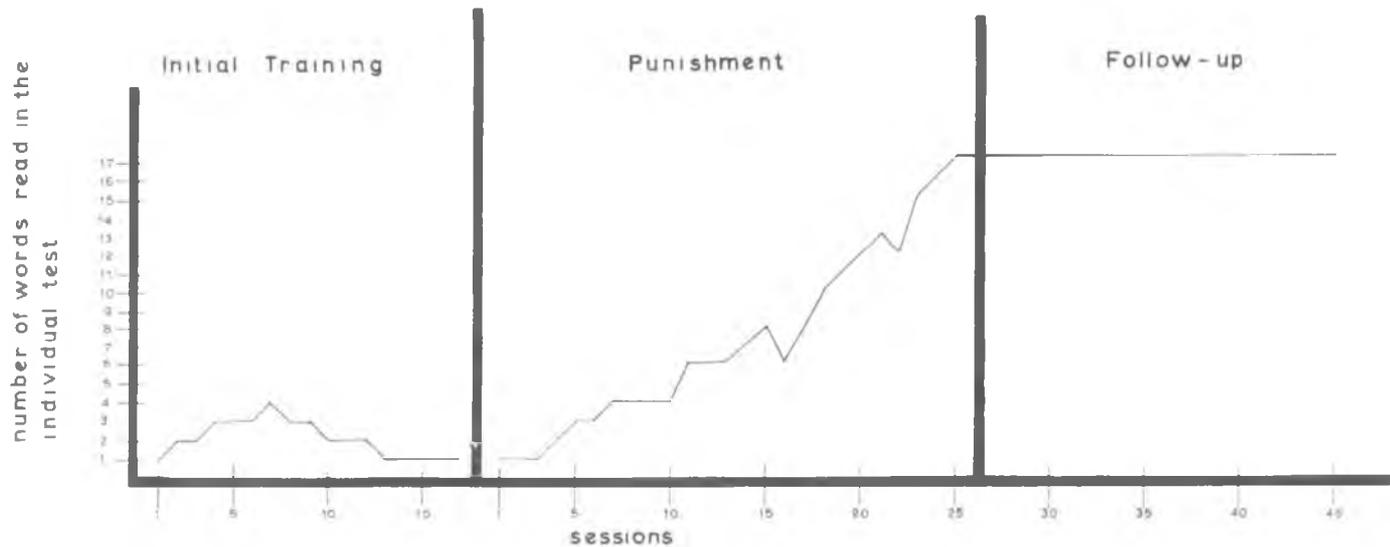


Figure 1 - Performance of subject (1) with a punishment procedure for reading previously acquired words.

during the administration of the 27 steps of the reading program for 9 of the 17 words comprising the first section after punishment application. Figure 2 shows how a 100% performance is achieved successively in less and less sessions for different words, in such a way that the first word was read with complete accuracy after 29 sessions. The second word presented unusual difficulty and took 50 sessions, but from there on fewer sessions were required until the five last words were learned in an average of seven sessions each. As was previously mentioned, subject (2) had not performed above 10% accuracy in learning to read the first word in the reading program. He was only able to read correctly three out of the 27 steps of the word program. The change observed after punishment introduction is too large to be ascribed to a mere learning effect due to passage of time and increased practice. From Figure 2 it is evident that some words were more difficult than others, and that the saving criterion was not a straight linear function as a time effect would suggest.

Figure 3 shows the results obtained with the punishment procedure compared to the time-out and reinforcement procedures for subject (3). The data depicts the number of errors in reading the 27 steps involved in the units of ten of the seventeen words of the first section. Every session involved the presentation of two different words of the program, that is, 54 stimulus presentations. During the first stage, using brief time-out and social reinforcement, the mean frequency of errors was 20%. In the second stage, in which time-out was substituted by punishment, errors increased to 24.5%, mainly because of a peak produced in the first session using punishment in which errors reached 50%. In the third stage errors increased even more, reaching an average 28%, with a peak at 53.6%, also in the first session where punishment was substituted again by time-out. In the fourth stage, errors sharply decreased to only 10%, with the highest point at 15%. In this stage only punishment was used. The tendency in the last sessions to an increase in the percentage of errors in the various treatments may be produced by the increasing difficulty of successive words (formed by different letters) and by the increased difficulty in having to discriminate among a larger number of words previously learned.

DISCUSSION

The results, although presenting different kinds of data for each subject, show a common effect: punishment seems to facilitate the acquisition and maintenance of reading behavior when reinforcement procedures prove to be inefficient. In the three cases described above, every available correc-

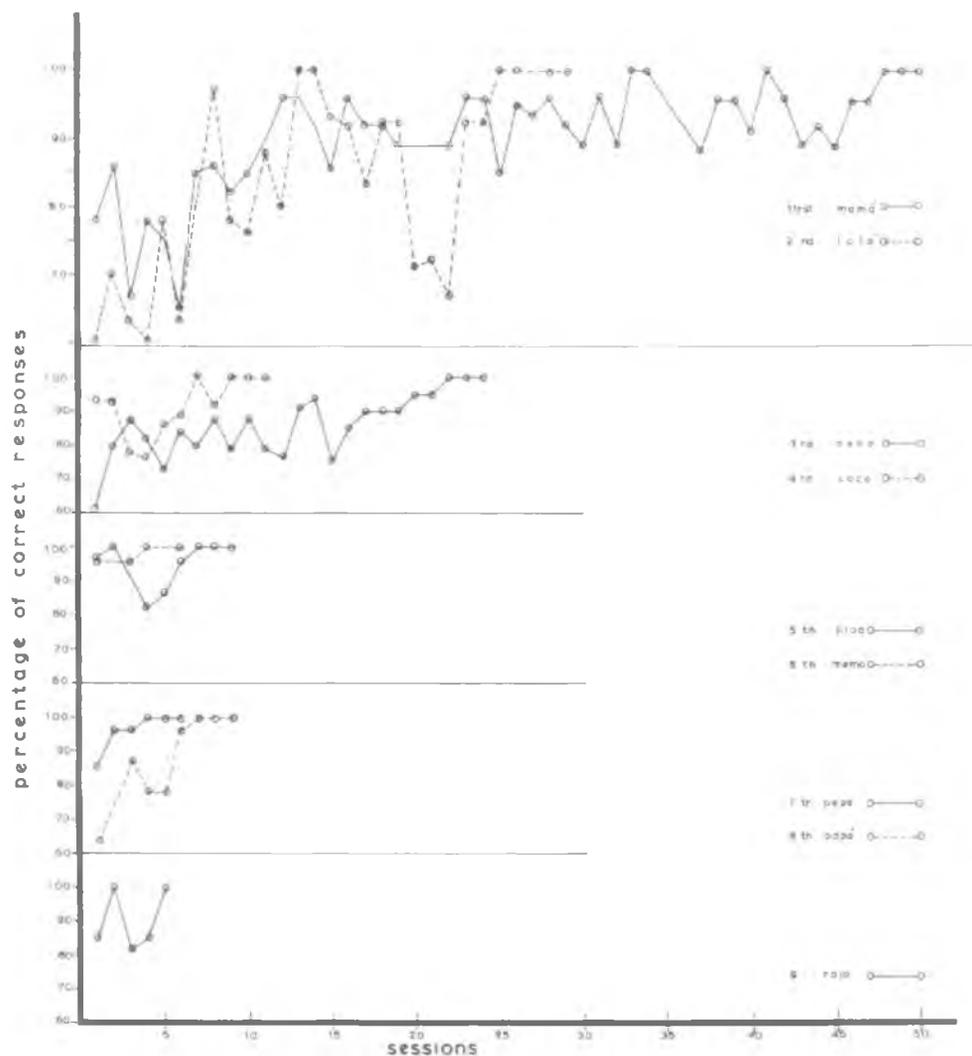


Figure 2 - Percentage of correct reading in the acquisition of successive words under punishment (subject 2) after sessions (25) showing a 10% accuracy

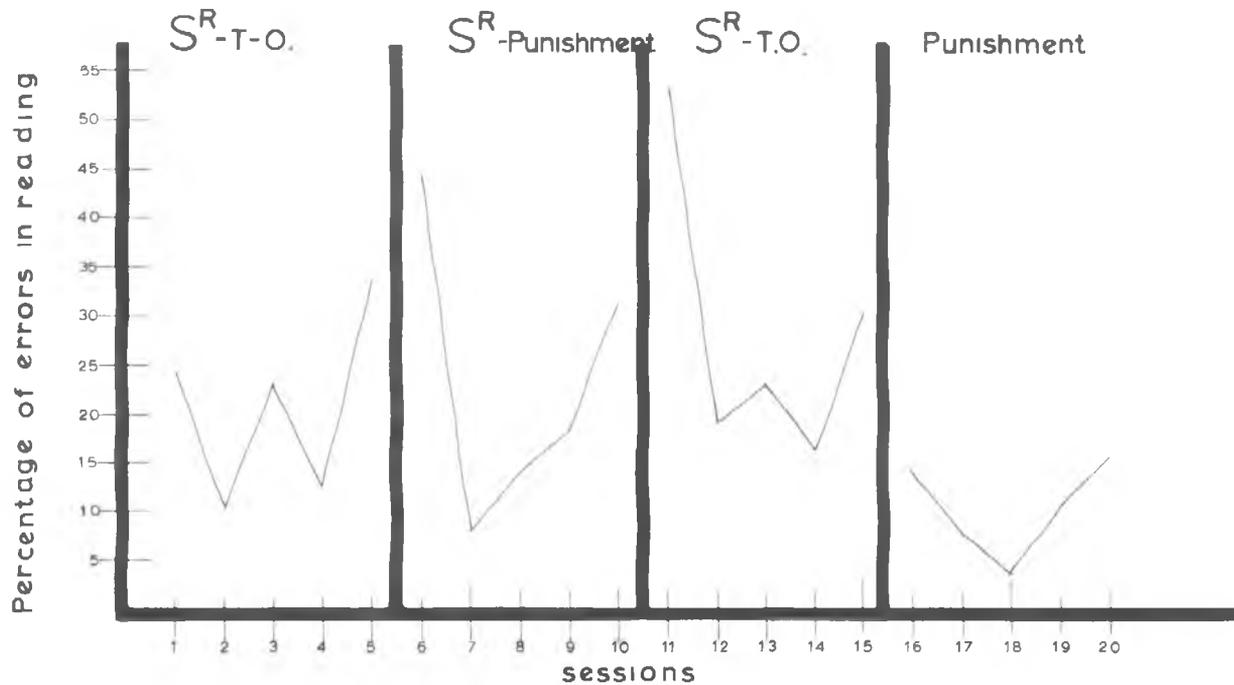


Figure 3- The differential effects of punishment, social reinforcement and time-out in the acquisition of reading behavior (subject 3).

tive procedure was used before trying out punishment, but all proved to be ineffective. Sequencing the material and fading out color were prolonged, the matching to sample situation was simplified, and different reinforcement procedures were tried out, all with little success.

Data from subjects (1) and (2) show how punishment accelerated the maintenance and acquisition, respectively, of a basic reading repertoire. This finding contradicts the common assumption that punishment by eliciting emotional responding could interfere with the performance of a complex discrimination as is involved in reading, where reinforcement and punishment are provided by the *same* source. Furthermore, the results contradict the frequent suggestion that punishment effects are at best transient (Skinner, 1953). Follow-up with subject (1) showed the repertoire to be functional during 19 additional days, after punishment was discontinued. In subject (3), punishment associated to reinforcement slightly increased the percentage of errors compared with time-out and reinforcement, but punishment alone produced a marked decrease in incorrect responding -- to an average of only 10%. This effect of punishment, increasing correct responding in a discrimination situation, seems to conform with findings by Terrace (1966) and Rilling *et al* (1969) which indicate that differential responding in discrimination training depends in some degree on the aversive properties acquired by S-delta. If S-delta, in this case, is directly associated with punishment, it is assumed that it will acquire aversive properties faster and therefore it will facilitate setting up the required discrimination. Differential consequences seem to provide the basis for differential stimulus control.

Even if the results are not too dramatic, they demonstrate that punishment did not produce any negative side-effects or disturbance in reading behavior. On the contrary, it increased accuracy of responding and facilitated a correct discrimination where more traditional procedures failed. Although no objective measures were taken in this regard, subject (3) showed a remarkable increase in responsiveness to social stimuli and reinforcers, an effect already pointed out by Bucher and Lovaas (1967) and Sajwaj and Hedges (1970). It seems that the neglect of punishment in the area of academic behavior is unjustified, and that it deserves a more thorough investigation in the future as a potential tool for developing complex repertoires, at least in retarded children.

FOOTNOTE

¹ Now at the Department of Psychology of the National University of Mexico.

REFERENCES

- Azrin, N. H. and Holz, W. Punishment. In W. H. Honig (Ed.), *Operant Behavior: Areas of Research and Application*. New York: Appleton-Century-Crofts, 1966.
- Birnbrauer, J. S. Generalization of punishment effects — a case study. *Journal of Applied Behavior Analysis*, 1968, 1, 3, 201-211.
- Bucher, B. and Lovaas, I. Use of aversive stimulation in behavior modification. In M. R. Jones (Ed.), *Miami Symposium on the Prediction of Behavior 1967: Aversive Stimulation*. Miami University Press, 1967.
- Cumming, W. W. and Berryman, R. N. The complex discriminated operant: Studies of matching-to-sample and related problems. In D. Mostofsky (Ed.), *Stimulus Generalization*. Palo Alto, California: Stanford University Press, 1965.
- Ribes, E., Nunes, H., Souza, S., Felix, G., Durán, L., Evans, B., Sánchez, S., and Rivera, G. El uso de castigo en la modificación de conducta de niños retardados. *Revista Latinoamericana de Psicología*, 1970, 2, 2, 137-160.
- Ribes, E. and Guzman, E. Effectiveness of several suppression procedures in eliminating a high-probability response in a severely brain-damaged child. In press.
- Rilling, M., Askew, H. R., Ahlskog, J. E. and Kramer, T. J. Aversive properties of the negative stimulus in a successive discrimination. *Journal of the Experimental Analysis of Behavior*, 1969, 12, 6, 917-932.
- Risley, Todd R. The effects and side effects of punishing the autistic behaviors of a deviant child. *Journal of Applied Behavior Analysis*, 1968, 1, 1, 21-34.
- Sajwaj, T. and Hedges, D. *Functions of Parental Attention in an Oppositional, Retarded Boy*. University of Illinois, 1970.
- Sidman, M. *Tactics of Scientific Research*. New York: Basic Books, 1960.
- Skinner, B. F. *Science and Human Behavior*. New York: MacMillan, 1953.
- Terrace, H. S. Stimulus Control. In W. H. Honig (Ed.), *Operant Behavior: Areas of Research and Application*. New York: Appleton-Century-Crofts, 1966.