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ABSTRACT

B. F. Skinner's influence on various applications of psychology in education has been greater than J. R. Kantor's, the founder of interbehaviorism. However, the field of education might benefit from a greater input of Kantorian, as opposed to Skinnerian, theory. Policymakers, administrators, and teachers have failed to totally adopt Skinner's educational proposals, which focus heavily on programmed instruction and do not consider how teaching is actually practiced or how educators discuss educational goals. Two examples of interbehavioral educational approaches are presented. One, based on "The Psychology of Learning and Techniques of Teaching" by J. M. Thyne, explains learning as the adoption of a new response to a situation. The second example, the EXRIB System of Analyzing Teaching, was developed as an indisciplinary endeavor and as part of the Classroom Interaction Project (CIP) at Jordanhill College. Project participants analyzed statements about teaching and observations of actual teaching situations and devised a model based on teaching as a goal-oriented activity. Appendices include an explanation of the EXRIB system and a report entitled "An Interbehavioral Perspective on Applied Behavior Analysis." Figures and tables are included. (JHP)

WHAT BEHAVIOURAL PSYCHOLOGY HAS TO OFFER EDUCATION - NOW

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This paper deals with the application of behaviorism in education. It is argued that whereas in the past the radical behaviorism of B.F. Skinner has been fairly fully applied to educational problems, there is a need to take account too of the interbehaviorism advocated by J.R. Kantor. The EXRIB system referred to in the main text is described more fully in Appendix I. The relationship between radical behaviorist approaches to human problems and the approach of interbehaviorism is explored further in Appendix II.

The main text which follows was delivered as a paper by Sandy Hobbs and David Cornwell at the Annual Conference of the Experimental Analysis of Behaviour Group held at the University of St Andrews, 1986. The text of Appendix II was delivered as a paper by David Cornwell and Sandy Hobbs at the same conference. Appendix I derives from a teaching aid developed by David Cornwell at Jordanhill College of Education.

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Those who are familiar with the festschrift for Skinner's sixty-fifth birthday (Dews, 1970) will perhap realise that in effect the title of this paper has been stolen from a contribution to that volume (Bijou, 1970). The title of that paper was "What psychology has to offer education - now" and given the circumstances in which it was then published, it might seem impertinent to insert the word "interbehavioral". However, not only has Bijou on many occasions identified himself with an interbehavioral approach in psychology, but in the very paper dedicated to Skinner to which our title alludes Bijou cited two authors who had enunciated the principles underlying the behavioral analysis he was expounding. One, naturally, was Skinner himself and the other was the founder of interbehaviorism, J. R. Kantor.

It was presumably apparent to Bijou, even at the time of writing, that in practice Skinner's influence on the various applications of psychology to education were much more substantial than Kantor's. Yet however great Skinner's influence on education may be, it is evident that he himself considers his impact has still been far too small (Skinner, 1984). If this is so, and given that Skinner and Kantor are exponents of related forms of behaviorism, it seems reasonable to raise the question of whether the eventual success of behaviorism in education might benefit from a greater impute from the Kantorian, as opposed to the Skinnerian, tradition.

Whilst agreeing with Skinner's goal of transforming educational practice through the application of behaviorism, we would argue with him both on his diagnosis of the specific reasons for behaviorism's relative failure so far and on his proposal for how behaviorism may hope to win through in education in the future. Before explaining further where we differ with Skinner, there is one feature of his paper to which we wish draw attention. Skinner (1984) differs from Bijou (1970) not only in its much less optimistic tone but also in the fact that whereas Bijou

dealt with both programmed instruction and behaviour modification, Skinner's focus is on programmed instruction alone. The shame of American education to which his paper refers is its failure to adopt programmed learning. We take this emphasis on teaching machines at the expense of behaviour modification techniques to arise from Skinner's desire to concern himself with influencing instructional procedures directed towards substantive educational goals rather than the broadly managerial problems which have so far been tackled by behaviour modification techniques.

Skinner's discussion of the failure of programmed learning to gain wide acceptance touches briefly on "rank commercialism", the rush to write "bad programs" and the opposition of "humanistic psychologists" (p 948). However, by far the greatest emphasis is put on cognitive psychologists, who speak to educationists in more palatable terms than those of behaviorists, and who thereby exert an influence on education despite their failure to provide anything as substantial as teaching machines. However correct Skinner may be in his criticisms of cognitive psychologists it is rather surprising to find so much attention devoted to them in a paper whose main focus is supposed to be on a national education system. Although it is policy makers, administrators and teachers who have failed to adopt Skinner's educational proposals, it is cognitive psychologists who are cast in the role of principal villains. Skinner compares cognitive psychology to "Old Home Week"

> "We are back among friends speaking the language we spoke when we were growing up. We can talk about love and will and ideas and memories and feelings and states of mind, and no one will ask us what we mean; no one will raise an eyebrow". (p950)

This may be an appropriate attack on the cognitivists but how much light does it throw on the world of education and how to change it. There seems to be an implicit assumption made by Skinner, in devoting so much

attention to cognitive psychology, that teachers are "naturally" cognitive psychologists in word and deed. This seems to us a dubious assumption, at best an over-simplification. Even if it were true, it would still beg the question of whether the most effective way to influence a "cognitivist" teacher is necessarily the same way as one would argue with a cognitive psychologist.

Neither in the paper under discussion (Skinner, 1984) nor in his earlier, seminal book The Technology of Teaching (Skinner, 1968) does Skinner show much interest in looking systematically at how teaching is actually practised or at how educators discuss educational goals. We would argue that to overlook these matters is to attempt to modify the behaviour of teachers and educational administrators without having first established an adequate representation of the "base rates". Given this significant omission, it does not come as a surprise to find that Skinner has little to suggest concerning ways in which behaviorists might go about achieving the implementation of their policies in any specific circumstances. The alternatives he considers are of a very high level of generality and he concludes by proposing only that we seek to perfect programmed instruction. Behavioural scientists "can develop instructional practices so effective and so attractive in other ways that no one ... will need to be coerced into using them". (p953) Thus Skinner seems to envisage that successful manipulation will in itself lead to the adoption of behaviorist methods. No suggestions are made as to the parallel development of persuasive verbalizations.

In contrast, a more interbehavioral approach to education would involve a greater emphasis on looking at teaching as currently practiced in its natural setting and a greater emphasis on developing a conceptual framework and terminology appropriate to the tasks behaviorists face in education. Little has been written so far about education from an explicitly interbehaviourist standpoint (although see Kantor, 1975) but there is some behaviorist work on education which seems to us to exhibit certain interbehaviorist characteristics. We shall discuss two examples.

Both of our examples are Scottish, which should surprise no one, given Scotland's honorable role in the history of behaviorism stretching back at least as far as Alexander Bain, who took the crucial step of introducing behaviour into Associationism (see Greenway, 1973, Hobbs and Cornwell, 1979). Our examples also share a common origin in that they grew out of their authors' involvement with teacher training. They represent different attempts to approach teaching from a behaviorist point of view. Both see the advance of behaviorism in education coming about not simply through successful experimental manipulation but through effective persuasive verbalizations.

The earlier of the two examples is J.M. Thyne's book The Psychology of Learning and Techniques of Teaching (Thyne, 1966). We have cited the second edition, which appeared only three years after the first, because it incorporates some helpful changes in terminology. Thyne's preface (pp x-xi) repays careful reading. He takes as his starting point the assumption that "the primary purpose of teaching is the promotion of learning" and hence "teaching has the peculiar function of satisfying the various conditions learning requires". He writes:

> "I believe ... that between teaching-techniques and the necessarily limited psychological knowledge the student-teacher can be expected to acquire it is possible to establish a relationship which is both systematic and profitable".

Foreseeing the criticism that this shows undue optimism, he puts forward the view that "the paucity of the literature on the teaching-learning relationship is due, in large measure, to our giving insufficient thought to it".

Faced with the need to simplify problems for the student by applying systematically a limited set of principles, the need to deal with a variety of different forms of teaching, and given his own

behaviorism, Thyne found it necessary to develop his own theory of learning. The theory of learning makes up part one of the book, the second part applies the theory to various techniques of teaching such as explaining, skill training and teaching for recall. Thyne does not announce himself as a behaviorist but his continual efforts to relate his concepts directly to obervation means that his behaviorism becomes clear to the careful reader (as it was to an early favorable reviewer of this first American edition, Birnbrauer, 1865, for example).

It is not the aim of the present paper to offer either a full exposition of Thyne's theory or an extensive evaluation of the book. Figure 1 summarizes its basic features. Thyne treats learning as a single phenomenon and his model may accommodate both respondent and operant conditioning. His conception of reinforcement is a broad one which includes, but it not limited to, reward. Reinforcement, prompting and the force of a cue are defined in terms of types of stimulus function rather than in terms of types of stimulus objects. Whether or not a given stimulus successfully prompts or reinforces a response in a situation, and whether or not a cue has force, are determined by sets of observations.

One feature which distinguishes Thyne's book from much previous writing on learning theory is that, since he is preoccupied with learning in natural settings rather than with laboratory experiments, it deals much more with the unplanned and unexpected circumstances which may interfere with plans to initiate learning and can confuse our interpretations of whether or not learning has actually taken place. Thus Thyne shows himself sensitive to a variety of aspects of the interbehavioral field. It is difficult to make a brief assessment of Thyne's relative success or failure. By the standards that we have seen Skinner setting for programmed instruction, of course, Thyne too has "failed", but that is an exceedingly high standard. If one looks for reasons why Thyne has not had a wider impact one might note two features. One is that, have excluded from consideration much of the

FIGURE 1: THYNE'S MODEL OF LEARNING

(derived from Thyne 1966)

DEFINITION To learn is to adopt a new response to a situation

REQUIREMENTS of any instance of learning:

1. Cue: a series of situations, sharing, and sharing only, the cue of that instance
2. Force: the cue must have force
3. Prompt: a prompt must appear in one or more of the successive situations
4. Reinforcement: the specified form of response must be tied to the cue

EXAMPLE Tom learns to say 'Thank you' when given a present

Item	Some relevant evidence	Interpretation
1.	Tom is given present; Tom does not say 'Thank you'.	The learning specified is possible since the response does not already occur in the situation.
2.	Tom is given present; Mother says "Say 'thank you'"; Tom says 'Thank you'.	Mother saying "Say 'Thank you'" acts as a prompt for the response in this situation.
3.	Tom says 'Thank you'; Mother says 'Good boy'.	'Good boy' may reinforce the occurence of the response in the situation, but this sequence in itself does not demonstrate the fact.
4.	Tom is given present; Tom says 'Thank you' without his mother having said "Say 'Thank you'".	The learning specified may have taken place since the response occurs in the situation without the prompt, but see item 5.
5.	Tom is given present in the absence of Mother; Tom does not say 'Thank you'.	This suggests the learning specified has not taken place; what has been learned is the response to the cue "given present when Mother is looking"; "given present" itself has not been shown to acquire the force.

typical laboratory research of the sort usually cited in works on learning, he deals almost entirely with hypothetical examples of learning in natural settings. The lack of any attempt to examine evidence of how teaching is actually practiced seems regrettable. It leaves him relatively vulnerable to those who might wish to question the relevance of his theory. A second weakness is that Thyne opened up no systematic means of feedback from those who might wish to apply his principles and find themselves facing practical problems. Despite his stress on the need differentiate clearly between merely "thinking" about teaching and teaching itself, i.e. "acting" (p18), there is no sign of Thyne anticipating any influence of the fruits of his students' "acting" on the further development of his own thinking and writing about teaching.

Our second example is the EXRIB system of analysing teaching which was developed as part of the Classroom Interaction Project (CIP). CIP was started at Jordanhill College in the mid-1970s as an interdisciplinary enterprise. One of the two psychologists initiating the project is a joint author of the present paper (S.H.). When CIP began, there was a flurry of interest in the systematic observation of teaching and the CIP team envisaged doing so, but despite the broad range of observation schedules already in use, none seemed suitable. On the one hand, there was a lack of schedules which linked the teaching observed to the stated goals; on the other hand, few schedules bore a close relationship to any view of behaviour acceptable to the psychologists planning the work of CIP. Accordingly, a new behavioural system was developed which had the dual purpose of being applicable to analysing <u>statements</u> about teaching and analysing <u>observations</u> of teaching in practice.

The EXRIB system can be found summarized in Appendix I, which is an instructional aid used by one of the present authors (D.C.) in under-graduate teaching. It will be seen to involve the division of teaching into three mutually dependent component groups of elements. First, there are <u>pupil behaviours</u>, secondly, there are <u>conditions</u>

initiating pupil behaviour, and thirdly, there are teacher evaluations of pupil behaviour. It is argued that an adequate statement of educational goals requires entries in the first two categories, and it is further argued that teaching as practiced may be meaningfully interpreted by dividing observations into the three component categories. The system was developed under the influence of existing radical behaviorist work on education, which nevertheless seemed too narrow in perspective for the tasks faced by CIP. It was envisaged that the project would produce materials useful for both the analysis of the practice of teaching and the planning of curricula. As the CIP team tried to elaborate on existing behaviorist concepts, we became aware that it was taking on features which brought its conceptual scheme closer to the interbehaviorist position.

The emergence of elements in the EXRIB framework may be summarized thus. For teacher evaluation, EXRIB has two categories, Teacher Approval and Disapproval, which are taken from existing work in the field of applied behaviour analysis (White, 1975). In dealing with initiating conditions of pupil behaviour, existing work in applied behavior analysis was found to be less helpful. Clearly such conditions could be classed as discriminative stimuli but this concept seemed too broad for the issues CIP sought to handle. Hence a distinction was proposed between two subclasses of discriminative stimuli which teachers employ to initiate pupil behaviour. The one, Rule Indicator, are discriminative stimuli intended to control pupil behaviour towards discriminative stimuli which fall into the other subclass, Examples. Discriminative stimuli which are "Examples" may give rise to many different responses by the pupil, the presence of the Rule Indicators direct the pupil towards certain responses rather than others (see Appendix I for illustrations). After the model was devised, we became aware of the possibility of re-conceptualizing it in interbehavioral terms, whereby the Rule Indicator elicits a particular stimulus function from the stimulus object. The EXRIB system also includes a category "Contextual Stimuli" and a category "Contextual Responses" to allow for

the treatment of other significant stimulus and response features. Here too, it can be argued that the models incorporated feature which were aimed at the more effective handling of certain practical issues, but which nevertheless also had the additional effect of moving it in the direction of an interbehavioral field model.

The application of the EXRIB framework may be found in a number of CIP publications (e.g. Hobbs and Kleinberg, 1978, Hobbs and Kleinberg, 1981, Hobbs and Kleinberg, 1982, Hobbs, Kleinberg and Crozier, 1980). In the main these papers have been written for audiences of educationists rather than for psychologists. The approach to teaching problems had been to stress the descriptive rather than the prescriptive, in the belief that the reader is more likely to find the conceptual system more acceptable if it is not presented in the context of a critique of current methods which some practitioners might find threatening. The reaction of educationists had been mixed, of course; quick conversions had never been expected. Galton (1979) has correctly noted that EXRIB was the only one of over forty British classroom observation schedules he surveyed which was aimed specifically at comparing classroom behaviour with stated objectives, despite the fact that this is clearly one of the most obvious reasons for undertaking obsevational studies. Critical comments on EXRIB range from the uncomprehending (e.g. Elder, Johnstone and Wills, 1982) to the cautious acceptance (e.g. Roberts, 1984).

Neither Thyne's model of learning nor the EXRIB model of teaching has been presented as the definitive interbehaviorist corrective to radical behaviorism's supposed "failure" in education. However, if we are correct in suggesting that there is a need for behaviorists to devote more attention to developing persuasive verbalizations about education then the experience of Thyne and, more particularly, of those who developed EXRIB throws a favorable light on interbehaviorism. If they found themselves moving towards an interbehavioral perspective, that augurs well for any fullblooded attempt at developing an interbehaviorist analysis of education.

ILLUSTRATION reproduced from teaching aid on which this Appendix is based.

(photo-reduced)

1

ERIB SYMBOLS

NAME	SHORT SYMBOL	FULL SYMBOL
Response (Behaviour aimed for)		
Discriminative stimulus (Rule Indicator)		
Discriminative stimulus (Example)		
Stimulus content		
Response content		

2

ERIB CODE SUMMARY

All modality codes may be used for both stimulus and response categories.

MODALITY

Spoken	S
Written	W
Drawn	D
Presentation of object	P
Manipulate	M
Indicate	I
Unspecified modality	U

OBSERVABLE STEPS

Specific number	1 ... n
>1 but unspecified	N

ANALYSIS OF STATEMENTS

Question	A
Vagueness	V

3

SEQUENCE	STIMULUS: SITUATION IN WHICH RESPONSE IS TO OCCUR				RESPONSE: HOW LEARNER IS TO ACT IN SITUATION				COMMENTS ON THE RELATIONSHIP
	CONTEXT	EXAMPLE (EX)		RULE INDICATOR (RI)		BEHAVIOUR (B)			CONTEXT	
No. / Verbatim	Same	Specification of stimulus class	Modality	Specification of kind of activity	Modality	Specification of learner's behaviour	Modality	Steps	Same	e.g., sense of unreasonable difficulties, omissions, problems, incomplete, other possible interpretations, etc.

4

STIMULUS: SITUATION IN WHICH RESPONSE IS TO OCCUR				RESPONSE: HOW LEARNER IS TO ACT IN SITUATION			
CONTEXT	EXAMPLE (EX)		RULE INDICATOR (RI)		BEHAVIOUR (B)			CONTEXT
Same	Specification of stimulus class	Modality	Specification of kind of activity	Modality	Specification of learner's behaviour	Modality	Steps	Same

5

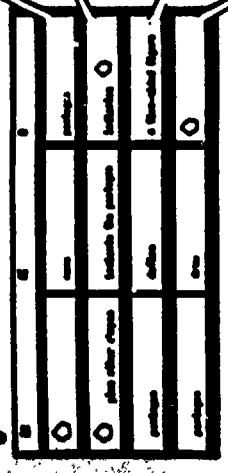
MINIMAL SPECIFICATION OF OBJECTIVES

STIMULI				RESPONSES		
EX		RI		B		
specific	modality	specific	modality	specific	modality	steps

6

All the material on this page has been adapted from documents produced by the Classroom Interaction Project. Readers who seek further details will find them in the references listed overleaf.
This handout was designed by the PRAXICS UNIT at Jordanhill College.
1986

7



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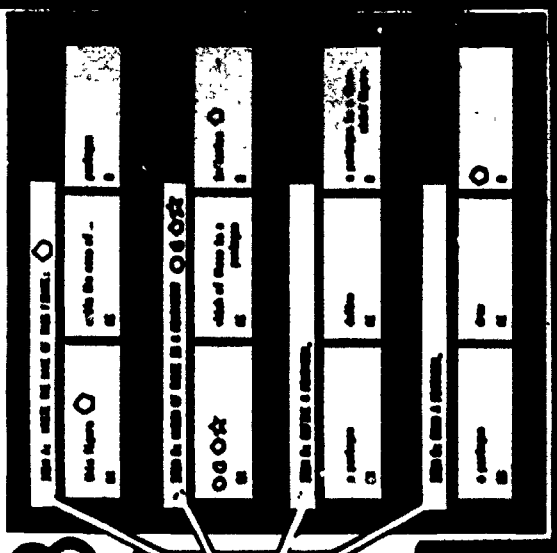

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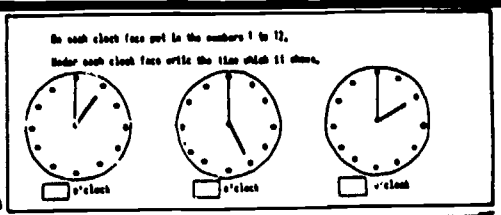

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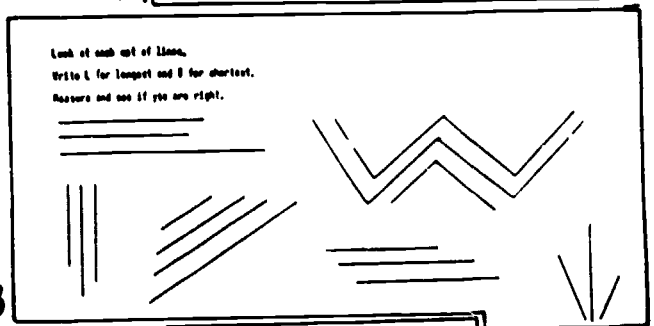

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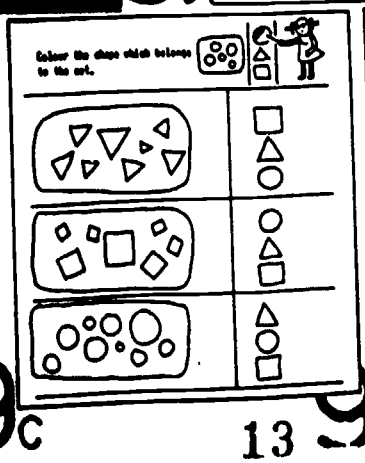

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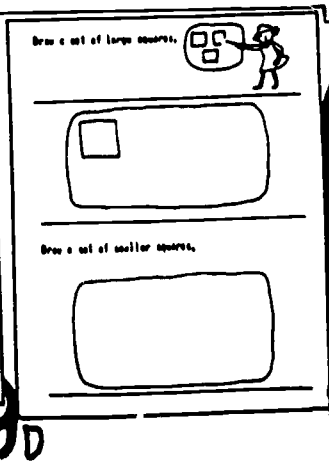


13

APPENDIX I: THE EXRIB SYSTEM

1. PRINCIPLES

1.1 The EXRIB system is a conceptual framework devised for the interpretation of classroom events. In this framework teaching is regarded as a goal-oriented activity with the fundamental aim of bringing about pupil learning. In the 1970's the EXRIB framework was used extensively in the Classroom Interaction Project, a research project located at Jordanhill College and directed by Sue Kleinberg. The material in this outline draws heavily upon the work of that project (see Hobbs and Kleinberg, 1978, for details).

1.2 When the EXRIB team looked at schemes of work (and other documents) with particular regard to the question of what should they expect to see going on in primary classrooms, they were struck by the VAGUENESS AND AMBIGUITY of much of what they read. The team believed that the vagueness hid the fact that there are unresolved problems and unsettled debates. These ambiguities made it difficult to interpret the intentions of the writers. The EXRIB team believed they needed some way to make sense of the language of curriculum documents. They need to find a way of "translating" that language into language useful for describing what happens in classrooms.

1.3 The EXRIB team decided to focus upon the question of "objectives". The initial problem to be tackled was how to compare different objectives, drawn from different schemes of work, written by a range of professionals, and couched in a variety of terms. How could they compare such objectives? How could they tell whether any two objectives, stated in quite different terms, were in fact the SAME or DIFFERENT, COMPATIBLE or INCOMPATIBLE? The problem facing the team was rather like that confronting a primary teacher who attempts to compare his/her objectives with those of colleague, or with other objectives which (s)he has already formulated.

1.4 The EXRIB team believed that some kind of general framework for the consideration of different, specific objectives would aid discussion and help avoid ambiguities. The team began by considering the question of how a teacher, or any observer of teaching, knows whether or not a learner has achieved an objective. The answer is that the observer must look at the learner's behaviour for evidence. The meaningful discussion of objectives hinges on the specification of what the learner does. Thus, if the behavior implied by one stated objective is the same as the behaviour implied by another, than to that extent the objectives are the same. If the behaviour implied differs, then to that extent the objectives differ.

1.5 This idea of behaviour needs to be examined more closely. Strictly speaking it is not very helpful to look at responses on their own, because all behaviours involve stimuli. It is not possible to compare objectives satisfactorily if the circumstances connected with the response are not made clear in each case. Both stimuli and response are necessary in specifying an objective.

1.6 The EXRIB team suggested that at least two basic kinds of stimuli must always be refered to in a satisfactory objective. First, there must be some indication of materials upon which the learner is to act. Second, there must be some indication of how the learner must act with regard to these materials if the objective is to be achieved.

2. DERIVING OBJECTIVES

2.0 The EXRIB team produced a manual for deriving objectives (Crozier, 1976). It contained procedures for preparing EXRIB objectives. A modified version of those procedures is presented here. Seven stages are involved.

1. PRELIMINARIES
2. SPECIFYING THE BEHAVIOUR
3. SPECIFYING THE STIMULUS
4. SPECIFYING THE STEPS
5. SPECIFYING THE MODALITIES
6. REVIEW THE EXRIB
7. SPECIFYING THE CONTEXTS

STAGE ONE. PRELIMINARIES:

2.1.1 Write the unclear objective as a single statement.
2.1.2 Prepare an EXRIB-sheet for writing the EXRIB Objective.

STAGE TWO. BEHAVIOUR SPECIFICATION:

2.2.1 Refer to the B column of the EXRIB-sheet and indicate there what kind of observable behaviour must be displayed by the leaner in order to meet with the teacher's approval.

STAGE THREE. STIMULUS SPECIFICATION:

2.3.1 Identify in what kind of observable situation the learner is to display the behaviour in order to meet with teacher's approval.

2.3.2 For that situation identify (a) the example which identifies the kind of material upon which the action is to be taken, and (b) the rule indicator which identifies the kind of action which is to be taken with regard to that material.

2.3.3 Specify the example in the EX column of the EXRIB-sheet.

2.3.4 Specify the rule indicator in the RI column of the EXRIB sheet.

STAGE FOUR. STEPS SPECIFICATION:

2.4.1 Refer again to the B column of the EXRIB-sheet and indicate the number of intervening behaviours (steps) the learner is permitted to display before engaging in this behaviour.

STAGE FIVE. STEPS SPECIFICATION:

2.5.1 Refer to the B column of the EXRIB-sheet and indicate the modality/modalities in which the behaviour must be displayed in order to meet with the teacher's approval.

2.5.2 Refer to the EX column of the EXRIB-sheet and indicate the modality/modalities in which the example must be displayed in the situation.

2.5.3 Refer to the RI column of the EXRIB-sheet and indicate the modality/modalities in which the rule indicator must be displayed in the sicuation.

STAGE SIX. REVISION:

2.6.1 Scrutinise the EXRIB-sheet for ambiguities and modify entries if necessary.

STAGE SEVEN. CONTEXT SPECIFICATIONS:

2.7.1 Refer to the Scon column of the EXRIB-sheet and indicate there any ADDITIONAL feature of the situation (EX or RI) which MUST be either present or absent in the situation.

2.7.2 Refer to the Rcon column of the EXRIB-sheet and indicate there any ADDITIONAL feature of the behaviour which MUST be either present or absent in order to meet with the teacher's approval.

3. ANALYSING TEACHING

3.0 The EXRIB team also produced a manual for analysing teaching (Hobbs, 1976). It contained procedures for analysing classroom lessons using the EXRIB framework. Six stages are involved.

3.1 Scan the teacher's behaviour and identify cases of teacher approval and disapproval, i.e. T+ and T-.

3.2 Scan the learner's behaviour and identify what behaviour was in wach case being approved of or disapproved of, i.e. B+ and B-.

3.3 Scan the teacher's behaviour and identify, for each B+, what EX and RI had been presented.

3.4 State, in EXRIB form, the objective of which each observed EXRI:B+ is an example.

3.5 Scan the teacher's behaviour and identify for each B-, what EX and RI had been presented.

3.6 State, in EXRIB form, the objective of which each observed EXRI:B- is an example. Note that in stage 4 it was necessary to decide on a category B, into which the observed behaviour (B+) fell; in Stage 6 you must decide on a category, B into which observed behaviour (B-) does not fall.

APPENDIX II

AN INTERBEHAVIORAL PERSPECTIVE ON APPLIED BEHAVIOR ANALYSIS

In 1970, the Journal of the Experimental Analysis of Behavior (JEAB) published the text of an invited address which J. R. Kantor had given to Division 25 of the American Psychological Association (Kantor, 1970). Since the division and the journal share common goals and a common debt to B.F. Skinner, the invitation to Kantor seems to have been a recognition of what might be termed the "fraternal" relationship between Kantor's interbehaviorism and the radical behaviorism which dominated the division and the journal.

Kantor showed his respect for the movement (which he calls TEAB rather than the more usual EAB) by offering both praise and friendly criticism.

> "I admire TEAB because its policy is to turn away completely from every form of animistic entity or process whether called 'mind', 'consciousness', 'drive', 'sensation', 'emotion' or the like." (p 101)

Yet he also saw weaknesses in the movement: "... there still lurks the danger of a constrained scientific horizon." (p 101, our emphasis). Thus he hoped for some modification in attitude and operation.

As our title indicates, it is with applied behavior analysis (ABA) rather than EAB that the present paper is concerned. It is not our intention either to simply repeat Kantor's views on EAB or to apply them mechanically to ABA. However, it may be useful to summarize some of Kantor's main points in that paper, because they allow us to highlight both the similarities and differences between interbehaviorism and radical behaviorism.

Kantor argued that since EAB tended both to oversimplify behavior and to engage in specialized patterns of research, it was in danger of remaining merely a "specialized science of animal psychology" (p 103). He further complained that complex human behavior "is only superficially analysed" (p 104) and that "in situ observation is underrated" (p 104). EAB sometimes gives the "suggestion of a mechanistic type of operation" (p 104), in contrast to which Kantor proposes (pp 105-107) five sets of alternative approaches, which amount to a restatement of Kantor's own interbehavioral psychology (see, for example, Kantor and Smith, 1975). Marr (1984) has discussed the fairness of Kantor's criticisms of EAB at the time they were made and the extent to which they continue to hold true. Therefore, we shall not pursue this issue further, except to stress the extent to which Kantor's complaints against EAB refer to sins of omission rather than of commission, i.e. Kantor hoped to persuade EAB to expand its scientific horizons beyond current boundaries.

If we look at ABA, with Kantor's EAB critique in mind, it is quite obvious that in some respects at least ABA might escape his strictures. ABA clearly is not concerned with animal behaviour and it does often concern itself with observing behaviour in natural settings, even though, generally speaking, observation is simply a preliminary to manipulation. Given the similarities in underlying concepts between EAB and ABA, however, it is possible that some of Kantor's other criticisms may indeed apply.

In reviewing the work of ABA, as it appears in the Journal of Applied Behavior Analysis (JABA), we have noted a few occasions on which papers drawing on Kantor's concepts, or having some similarities to Kantor's concepts, have appeared. These are infrequent, however, and it would appear that they have not been met with much enthusiasm by other ABA practitioners. By way of illustrating our thesis, we shall concentrate on the question of the setting within which behavior takes place. We have scanned the various cumulative indexes of JABA for evidence of the settings being given substantive treatment in papers. Four groups of subject were noted, involving the key words "ecology", "environment", "institution" and "setting". The occurrence of one or other of these words, or a word or phrase derived from these words, in the indexes indicates that paper dealt with it as a matter of explicit concern. Obviously, similar issues may sometimes have been discussed under different names. In a sense all ABA papers deal with some aspect of the subjects' environment. The appearance of the word "environment" in a subject index simply means that the level of generality of the discussion gave that concept a relatively prominent place in the article. Similarly, many ABA studies take place in "institutions" but in only some of them is the concept of an "institution" as such specified. Thus, when considering the subject indexes, we are dealing with the concepts used to discuss variables rather than with the variables themselves.

Table 1 summarizes the appearance of these subjects in volumes 1 to 18 of JABA (i.e. 1968-1985). It is meant to give only a general impression of the frequency of occurrence and no attempt has been made to allow for variation in the number of articles per volume. Since our argument is that ABA has been fairly unresponsive to interbehavioral ideas, we have erred on the side of over-inclusion. These subjects do appear somewhat more frequently in volumes 7 to 18, than they did in the first six volumes, but the overall frequency is low and there is no substantial evidence of growth in the use of these concepts of the last twelve years of JABA.

We have included those terms which appear to deal with broad or overall aspects of the conditions in which behavior occurs, whether the terminology is Kantor's or not. One explicitly Kantorian phrase does appear in Table 1, namely "setting events". A theoretical paper advocating its usefulness appeared in 1981 (Wahler and Fox, 1981). These authors pointed out that an attempt to integrate the concept into the operant model had been made as long ago as the early 1960s (Bijou and Baer, 1961). They might also have mentioned that the same authors pursued the same goal in their contribution (Bijou and Baer, 1966) to a

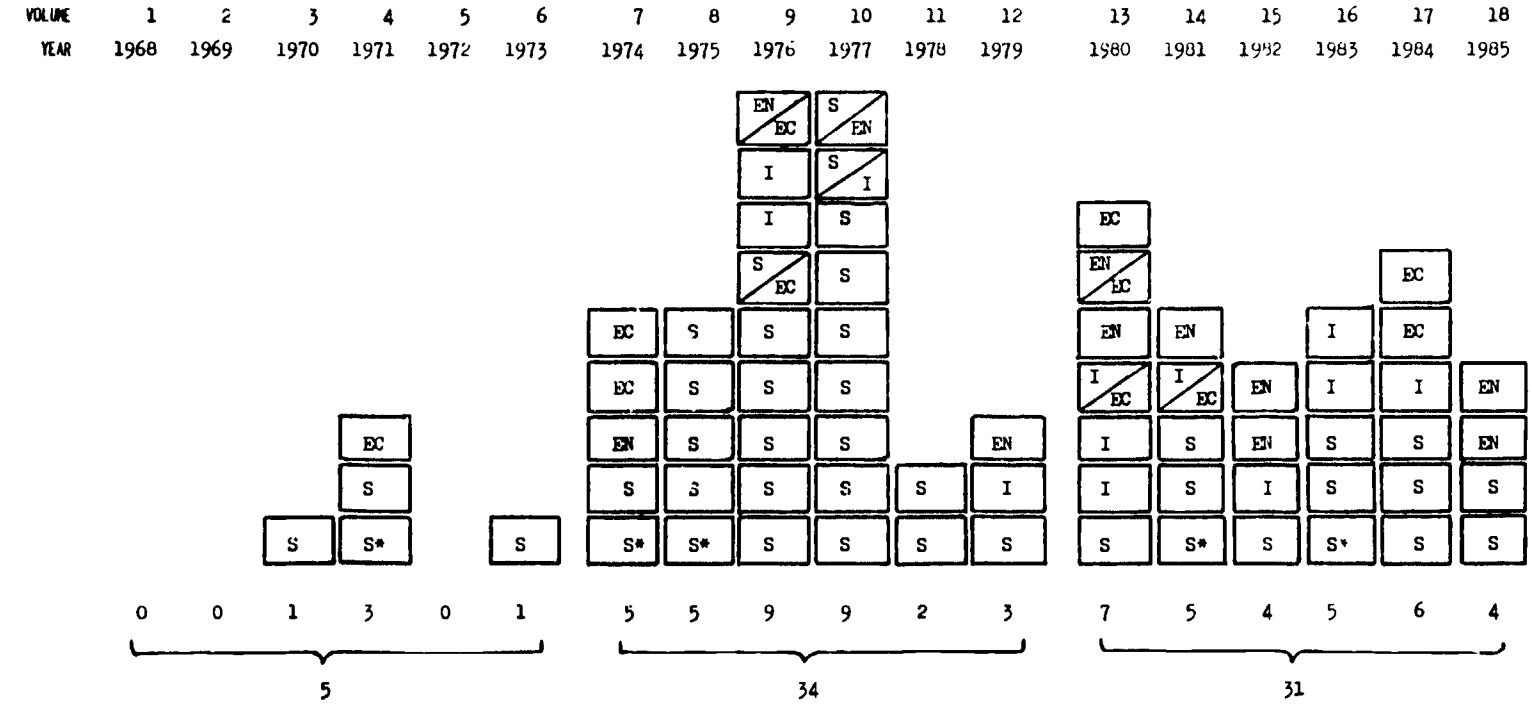
TABLE I

JABA : ARTICLES DEALING WITH SPECIFIED SUBJECTS

KEY

EC	behavioral ecology ecological ecological control ecological research ecobehavioral ecosystems ecology	EN	environment environmental problems environmental protection environmental research environmentally relevant psychology least restrictive environment	I	institution for offenders institutions organization organizational behavior management	S	community setting residential setting residential trestment setting setting events* setting generality setting generalization

* Setting events are indicated by an asterisk, thus: S*



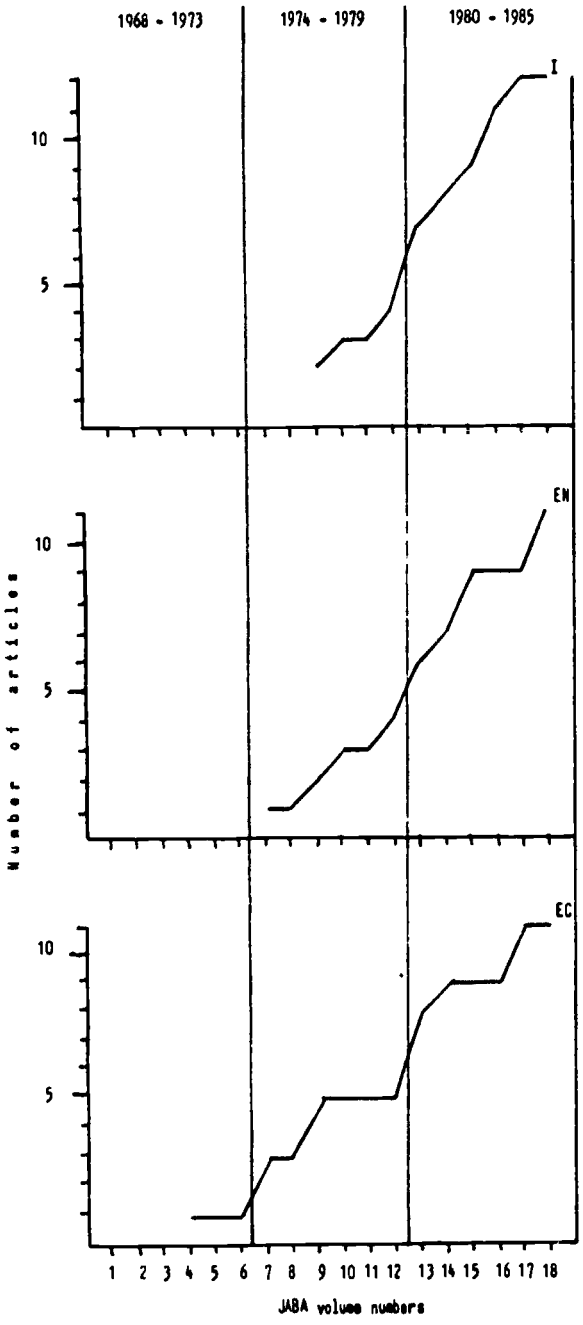


FIGURE 1. Cumulative records of the number of articles dealing with specified subjects per volume of JABA from 1968 to 1985.

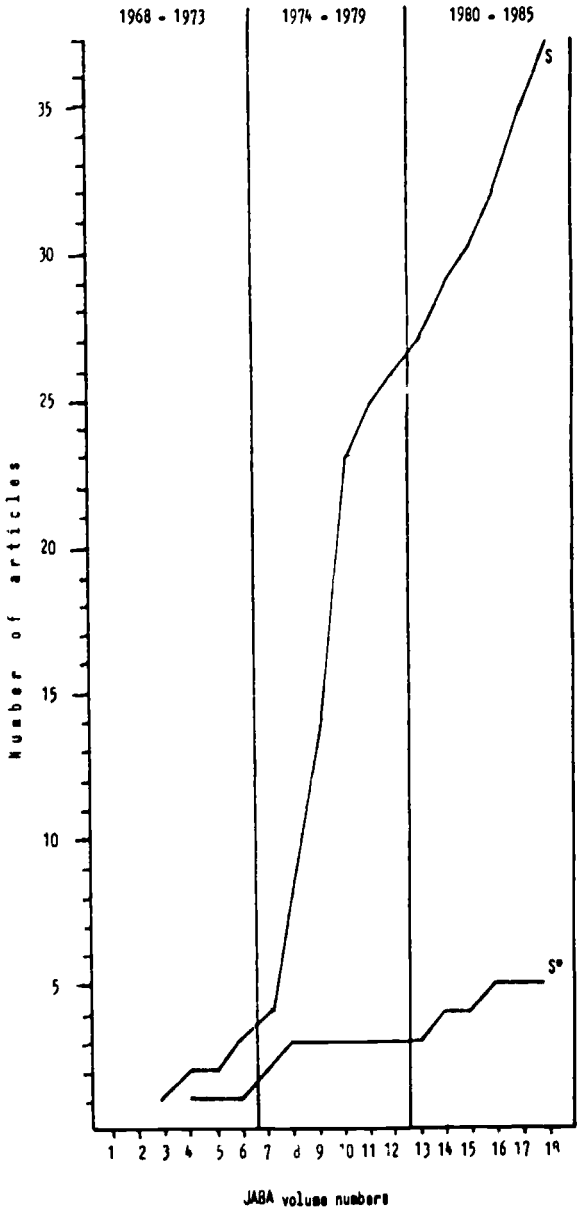


FIGURE 2. Cumulative records of the number of articles dealing with specified subjects per volume of JABA from 1968 to 1985.

KEY TO FIGURE 1		
EC	EN	I
behavioral ecology	environment	institution for offenders
ecological	environmental problems	institutions
ecological control	environmental protection	organization
ecological research	environmental research	organizational behavior management
ecobehavioral	environmentally relevant psychology	
ecosystems	least restrictive environment	
ecology		

KEY TO FIGURE 2	
S	S*
community setting	setting events
residential setting	
residential treatment setting	
setting generality	
setting generalization	

well known text of operant psychology (Honig, 1966). Despite that, Wahler and Fox could find only three articles in JABA using the concept prior to their own; we have noted only one further article to do so since Wahler and Fox. Thus although some ABA writers have apparently found the concept useful, it remains a marginal one in JABA articles. Why should this be? It does not seem to have been subject to any sustained criticism and without explicit criticism it is difficult to draw any firm conclusions as to why the concept has not proved more acceptable. It might be that the circumstances which lead a minority of JABA contributors to use the concept "setting events" are not frequently met by other ABA researchers. However, there is one other explanation which we would like to explore, namely a bias in JABA in favour of a "technology" perspective and against open discussion. (See Hayes, Rincover and Solnick, 1980, for a discussion of the "technical drift" in ABA).

When Willems's paper on behavioral technology and behavioral ecology was published in JABA (Willems, 1974), one of the accompanying critical reviewer's comments said:

> "One of the foremost characteristics of applied behavior analysis ... is its emphasis upon demonstration rather than discussion. The absence of any applied behavioral problems from the examples ... suggests that the author needs to get busy with his research activities ..." (Reviewer D, 1974).

This review contained no substantive criticism of the paper in question other than it was "discussion" rather than "research" which seems to have been regarded by that particular reviewer as sufficient comment. One quotation does not demonstrate a bias, and after all the paper thus damned was published in JABA. However, we do regard it as symptomatic of a strong trend within ABA, a trend which underlies what seems to be the history of a failure to debate.

In 1974, the American Psychologist published an article called "The social psychology of behavior modification: Problems encountered in the implementation of behavior modification programs in natural settings" (Reppucci and Saunders, 1974). This article attempted to draw lessons from the experience of attempting to develop a token economy programme in an institution for teenage male delinquents. Eight classes of problem were identified, each illustrated by events in that institution and several also related to reports of similar events in the publisned literature. The problems were given names such as "institutional constraints", "external pressures", "two populations", and "limited resources" which clearly link them to the general issue of the "setting" within which behavior is observed and modified. Aided, perhaps, by the fact of publication in such a prominent journal, the Reppucci and Saunders article has been frequently cited. We have traced around eighty citations in journals though checking is by no means straightforward because of the extraordinary high frequency of misspelling of the first author's surname as "Repucci". One might have anticipated that this potentially "classic" paper on the token economy

TABLE II

Journal articles citing Reppucci and Saunders (1974)

Date	"Reppucci & Saunders"	"Repucci & Saunders"	Total
1975	5	1	6
1976	9	3	12*
1977	10	3	13
1978	5	3	8
1979	3	3	6
1980	3	5	8*
1981	4	3	7
1982	1	2	3*
1983	3	1	4
1984	3	3	6
1985	2	3	5
1986**	3	0	3
Total	51	30	81

* including one in JABA

** so far

would give rise to a considerable reaction amongst contributors to JABA, but as is clear from Table II, only three JABA articles appear to have cited Reppucci (or Repucci) and Saunders (1974) which puts JABA behind several other journals for frequency of citation, including naturally enough American Psychologist itself but also the American Journal of Community Psychology, Behavior Therapy, Criminal Justice and Behavior, the Journal of School Psychology and Professional Psychology. Perhaps the fact that the paper provides "discussion of problems" rather than "researched solutions" leads JABA contributors to give it a low rating.

Our criticisms of the practices of exponents of ABA arise from our conception of the nature of psychology. Psychology deals with the prediction and manipulation of behavior. However, manipulation as such is not enough to make someone a psychologist and prediction of its very nature involves some verbal behaviour. Psychology as a science is a communal activity. It includes experimentation but an experiment becomes part of the corpus of psychological knowledge through reporting (verbalizations arising out of the experimental manipulation). Different psychologists may accept a given psychological datum but seek to promote rival verbal systems to describe that datum. It is one of the claims that can be made for behaviorism that it reduces unnecessary or unproductive debate by reducing verbiage and seeking to exclude unhelpful and undiscriminating verbalizations. But to say that is not in any sense to eliminate the role of verbalization in psychology. It seems to us verbal behavior is inevitable in a social activity such as science is. The balance between time to be spent manipulating and time to be spent verbalizing is not self-evident. The careers of Skinner and Kantor exemplify different emphases, but one need only refer to Verbal Behavior (Skinner 1957) to dispose of any notion that they represent rival polarities of manipulating and verbalizing. The dangers arising from extreme positions are fairly clear: too much emphasis on verbalization may lead one to lose touch with the substantive psychological events one is supposed to be discussing. Too much experimental practice with negligible verbalization may restrict the subject matter one is capable of successfully handling to the contents of one's own experiments. (Note that we have not been able to conceive of a psychologist who does not verbalize at all about psychological events, which suggests to us that verbalizing has the more central role in psychology).

Our friendly criticism of ABA from an interbehavioral perspective is that its practitioners have tended to show themselves more aware of the dangers of too much verbalizing than they have shown themselves aware of the dangers of too little.

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