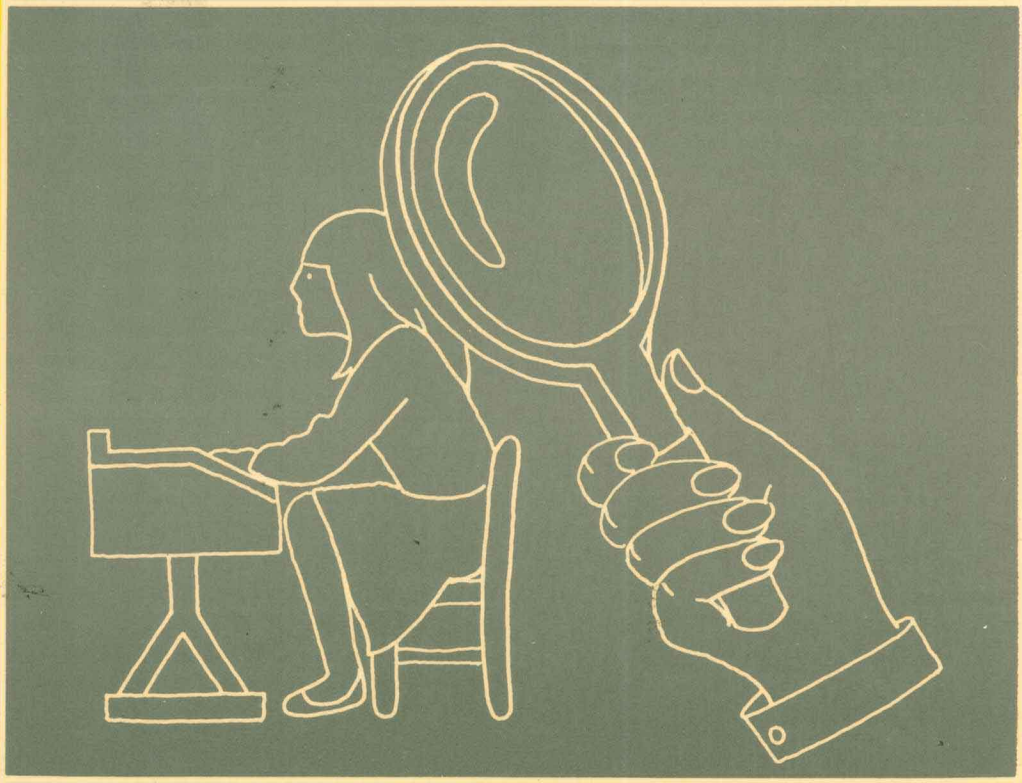
BEHAVIOUR ANALYSIS IN EDUCATIONAL PSYCHOLOGY

IN ASSOCIATION WITH POSITIVE PRODUCTS



Edited by Kevin Wheldall, Frank Merrett and Ted Glynn

BEHAVIOUR ANALYSIS IN EDUCATIONAL PSYCHOLOGY

Edited by KEVIN WHELDALL, FRANK MERRETT and TED GLYNN

All articles were originally published in the journal 'Educational Psychology' 1981—1985, published by Carfax Publishing Company and are copyright Journals Oxford Ltd.

Published by
CROOM HELM
London • Sydney • Wolfeboro, New Hampshire
in association with POSITIVE PRODUCTS.

Croom Helm Ltd, Provident House, Burrell Row,
Beckenham, Kent BR3 1AT

Croom Helm Australia Pty Ltd, Suite 4, 6th Floor,
64-76 Kippax Street, Surry Hills, NSW 2010, Australia

British Library Cataloguing in Publication Data

Behaviour analysis in educational psychology.
1. Educational psychology 2. Behavioral assessment
I. Wheldall, Kevin II. Merrett, Frank
III. Glynn, Ted
370.15'3 LB 1051

ISBN 0-7099-3689-3

Croom Helm, 27 South Main Street,
Wolfeboro, New Hampshire 03894-2069, USA

Library of Congress Cataloging in Publication Data applied for

Printed and bound in Great Britain by Mackays of Chatham Ltd, Kent

Behaviour Analysis in Educational Psychology

ABOUT THE EDITORS ...

Dr Kevin Wheldall is Director of the Centre for Child Study in the Department of Educational Psychology at the University of Birmingham where **Dr Frank Merrett** is Honorary Research Fellow. **Professor Ted Glynn** is Head of the Department of Education at Otago University, Dunedin, New Zealand. All three have been actively involved in behavioural research in education for a number of years and have published numerous articles and books in this area. Half of the papers in this collection report work carried out by the editors in collaboration with their students and colleagues.

OTHER CONTRIBUTORS INCLUDE ...

Mary Baker, Department of Education, Auckland University, New Zealand.
Keith Ballard, Department of Education, University of Otago, Dunedin, New Zealand.
Diane Berryman, School of Education, Macquarie University, Australia.
Dorothy Blundell, Sandwell Education Authority.
Helen Charles, New Zealand Psychological Service.
Bryce Cooper, School of Education, Macquarie University, Australia.
Mary Foley, Department of Education, Auckland University, New Zealand.
Yin Yuk Lam (nee Ng), Cumbria.
Elizabeth Limbrick, Department of Education, Auckland University, New Zealand.
Sue McCullough, University of Oregon.
Eddie McNamara, Lancashire Schools Psychological Service.
Stuart McNaughton, Department of Education, Auckland University, New Zealand.
Reg Marsh, Department of Education, Victoria University of Wellington, New Zealand.
Paul Mettem, Wolverhampton Education Authority.
Michael Miller, Department of Special Education, Ball State University, U.S.A.
Dennis Moore, Department of Education, Auckland University, New Zealand.
Marion Morris, Birmingham Education Authority.
Walt Musgrove (deceased).
Brian Pickthorne, Bromsgrove College of Higher Education.
Ingrid Rumsey, New Zealand Psychological Service.
Josh Schweiso, Bulmershe College of Higher Education, Reading.
Jeanette Scott, Department of Education, University of Otago, Dunedin, New Zealand.
Jerome Ulman, Department of Special Education, Ball State University, U.S.A.
Pamela Vaughan, Solihull Education Authority.
Sam Winter, Department of Education, University of Hong Kong.

Introductory Preface

Over the first five years of its existence, the journal *Educational Psychology* has been proud to publish many articles on behaviour analysis in education. There is, indeed, evidence to support the claim that *Educational Psychology* is becoming a major forum for publications in this area and is thereby achieving one of its founding aims.

As members of the editorial board of the journal (with particular interests in the behavioural research papers) we thought that many of these papers deserved a wider audience, not least among educational psychology students both undergraduate and post-graduate. Indeed many lecturers already refer their students to the journal regularly as a major source of relevant research. Consequently, with the agreement of the journal's publishers, Carfax Publishing Company, we have edited this book of selected behavioural papers from *Educational Psychology*.

This edited collection of twenty papers is structured in five sections. In some respects this is almost arbitrary since many of the papers could equally well be included under more than one section heading. But we chose this structure deliberately, and the consequent distribution of papers, in order to create the emphases we intended.

First, since we wanted this book to be accessible to students, teachers, educational psychology practitioners and other educationalists, as well as to behavioural researchers, we have included a preliminary preparatory section on the methodology of behaviour analysis. In its short history, *Educational Psychology* has, from time to time, published articles highlighting basic behavioural methodology. This has been deliberate policy with the aim of encouraging educational researchers to consider employing behaviour analysis methodology in future investigations. The papers included review basic considerations, introduce the essential procedures, provide an example of a behavioural observation schedule and show how traditional statistical analyses may be incorporated into behaviour analysis.

Another important consideration in selecting papers for this book was the need to stress antecedent control of behaviour. In order to do justice to our conviction that the manipulation of setting events and other antecedent stimuli has been relatively neglected in behaviour analysis in education, we have included a section specifically on this topic. Following a review paper spelling out the importance of antecedent control, several illustrative studies are presented.

The following section, on the control of social behaviour by its consequences, is more traditional in that this type of research is most commonly associated with a behavioural approach. Examples are provided of the effective use of consequence management strategies to control various classroom social behaviours. The two papers featuring studies in secondary school classrooms are particularly important given the relative dearth of such studies with older pupils.

The fourth section again stresses a commonly neglected area, control of academic behaviour. It is now generally accepted that the behavioural approach has something to offer classroom management, but the contribution behaviour analysis can make to academic instruction is frequently not appreciated. Language, reading, writing and even tertiary level physics are included as examples of academic areas in which the behavioural approach has been shown to be effective.

Finally, we conclude with two papers on training teachers and parents to use

behavioural methods. The behavioural approach is too important, too powerful and too useful for its use to be restricted to behaviour analysts. Real change can come about only by passing on behavioural skills and methods to those in most frequent contact with the various client groups within education.

We have selected papers to fit the structure we have set for ourselves and to meet best the needs of our prospective readers. This policy has sometimes meant the exclusion of otherwise excellent papers on behavioural topics and their non-inclusion here should certainly not be taken as any slight on their quality.

A further editorial policy has been to include as many papers as possible featuring the research of education students (almost always conducted and written up jointly with their supervisors) to serve as encouragement and to show that effective, relevant behavioural research is well within their capabilities. Many of these studies were carried out from three centres of behavioural research in education: the Centre for Child Study in the Department of Educational Psychology, University of Birmingham, England; the Department of Education, University of Auckland, New Zealand; and the Department of Education, University of Otago, Dunedin, New Zealand. Many of these papers also reflect the cross-fertilization of ideas (through correspondence and exchange of visits) between these centres which we, the editors, have enjoyed over the last six years.

It remains only to express our sincere thanks to the editorial board and panel of referees of *Educational Psychology* for all their work on the papers collected here and to Roger Osborn-King of Carfax Publishing Company for his generous help and encouragement. Readers who enjoy reading this collection of articles would be well advised to consider subscribing to *Educational Psychology* in order to keep up to date with current developments in behaviour analysis in education in the future.

Kevin Wheldall, Frank Merrett and Ted Glynn, 1986.

Contents

Section A.
Methodology of Behaviour Analysis

Why Measure Behaviour?

SAM WINTER

ABSTRACT *The upsurge in the use of behavioural* change *techniques with children in education and residential settings has not always involved an equally strong commitment to behavioural* measurement *(by which is meant quantitative data collection relating to latency, duration or, most often, frequency of the target behaviour in question). This paper outlines several advantages, other than effectiveness evaluation, which accrue from behavioural measurement; in relation to (a) deciding whether to change behaviour, (b) deciding the type of intervention required, (c) assessment of caregiver skills and commitment, (d) therapeutic effects, (e) reinforcement, (f) analysis of critical variables and (g) analysis of caregiver attitudes and behaviour. Case examples are included throughout.*

The social learning approach to children with adjustment problems will be familiar to most readers. There is a growing appreciation that behavioural techniques, wisely used, are both effective and efficient ways of helping children with various problems of learning. The recent formation of the Association for Behavioural Approaches with Children testifies to this development in Great Britain.

Writers such as Bandura (1969), Gelfand & Hartmann (1975) and Sulzer-Azaroff & Mayer (1977) have all emphasised the important role played by behavioural measurement (quantitative data collection) in the process of applied behaviour analysis. They argue that measurements should be made of the frequency of the target behaviour (or occasionally its duration or latency) before, during and after the intervention programme in question. They maintain: (1) that adults should focus their attempts at change upon patterns of overt behaviour between children and those around them, but (2) that adults are often very poor observers of their own and children's behaviour, and (3) that they consequently fail to obtain the reliable and objective information they need as change agents. Despite this generally agreed good practice, however, none of us need look far for cases in which teachers, care staff, social workers and psychologists profess to use a behavioural approach and yet fail to measure target behaviours to which change techniques are being applied.

Much of this work remains 'invisible'; for obvious reasons it does not find its way

into the journals. Instead we have to look around us at the work of our colleagues. In the north-east of England we know of a special school and special unit which both actually enjoy a local reputation for employing a behavioural approach, and yet do not commonly engage in behavioural measurement. How many individual teachers in special and mainstream education, and how many social workers, profess the use of 'behaviour modification' techniques, and yet neglect measurement? We suspect the number is very large indeed. One reason may be that psychologists, advisers and trainers advocating the behavioural approach have themselves minimised the importance of measurement, despite the undeniable fact that it underpins the empirical method which has traditionally characterised the approach.

The importance of behavioural measurement in single case therapy effectiveness evaluation (especially in the absence of independent advocacy groups visiting schools, psychological services and social services departments on a daily basis) is widely accepted in the literature. It provides the child with protection against the possibility of being subjected to prolonged but ineffective change programmes. Texts such as Sulzer-Azaroff & Mayer (1977) investigate the question of accountability in some depth, and hence it will not be dwelt on in any greater detail here. Instead, in this article we will attempt to list a few other benefits of behavioural measurement, some of which are paid little attention in the existing literature. The order of presentation is as follows—

Benefits of Pre-intervention Measurement

(1) Information on the need for behaviour change, and, where there is a need, which behaviour.
(2) Information on the type of intervention required.
(3) Information on caregiver skills and commitment, and existing environmental demands.
(4) The therapeutic effect of baselining.

Benefits of Within-intervention Measurement

(1) Reinforcement value.
(2) Information on critical variables.
(3) Information on caregiver attitudes and behaviour.

Attention throughout this paper will be focused upon the measurement of target behaviour *frequency* (rather than latency or duration) *by caregivers themselves* (rather than consultants or the child himself); this is because of the substantial predominance of this type of data collection in clinical work. Other important issues relating to measurement reliability, validity and obtrusiveness lie beyond the scope of this paper. For a fuller discussion see texts such as Sulzer-Azaroff & Mayer (1977) and Gelfand & Hartmann (1975). But 'caregivers' is meant those in direct daily contact with the child. Here the term is synonymous with 'caregivers' (Gelfand & Hartmann, 1975), 'mediators' (Tharp & Wetzel, 1969), 'contingency managers' (Sulzer-Azaroff & Mayer, 1977), 'change agents' (Bandura, 1969) and 'direct contact personnel' (Westmacott & Cameron, 1981). Parents, residential care workers, teachers and school auxiliaries are all caregivers.

By distinction, the term 'consultant' will be used to denote any person called in to give advice on child management and training. It is synonymous with 'behaviour analyst' (Sulzer-Azaroff & Mayer, 1977; Tharp & Wetzel, 1969) or 'therapist' (as used by McAuley & McAuley, 1977).

Psychologists and social workers act as consultants, although caregivers may occasionally adopt the role of consultant for others.

(a) Pre-intervention Measurement (Baselining)

In most cases caregivers will co-operate in collecting data (at least for a week or two), *after* the target behaviour has been identified and *before* any discussion regarding change techniques. The major exceptions are cases in which the target behaviour: (a) constitutes a danger to the child or those who surround him or, (b) shows a frequency which all caregivers concerned agree upon (e.g. 'We are both absolutely sure he wets the bed each night. We change the sheets each morning'). Caregivers who are reluctant to baseline may be persuaded by the effectiveness evaluation argument or by reference to some of the other benefits listed below.

(1) *Information on the Need for Behaviour Change and, Where There is a Need, Which Behaviour*

The decision to institute behavioural change necessarily depends upon a large number of factors (including the age and developmental level of the child, the effects which the target behaviour has upon his life quality, and that of his peers and caregivers, etc.) and often demands careful consideration. Decision-making is rendered even more difficult where reliable frequency information is absent, as in cases where: (a) caregivers give poor or conflicting verbal reports, or (b) the frequency apparently fluctuates. In each case measurements can provide a basis for more informed choice when combined with other types of assessment data.

Similarly, in situations in which caregivers are concerned about a wide variety of problem behaviours, only one of which can realistically be dealt with at a time, behavioural measurement can once again provide a basis for informed joint decision-making, regarding the specific behaviour to be changed.

(2) *Information on the Type of Intervention Required*

Objective frequency data are often helpful in making decisions regarding the type of change techniques required.

> Derek was a 4-year-old in a reception class. His aggressive behaviour caused concern to peers and adults alike. We decided to use DRO procedures as a component in an intervention package which also included modelling, time-out and self-control training. DRO (Differential Reinforcement of Other Behaviour) involved positive reinforcement at the end of each time interval during which problem behaviour (in this case, aggression) was absent. (For a fuller discussion of the technique see Sulzer-Azaroff & Mayer, 1977, Repp & Dietz, 1974 and Gelfand & Hartmann, 1975.)
>
> Wherever this type of technique is used it is essential to select a time period which will ensure high levels of positive reinforcement for the child throughout the day. Baseline data collected by Derek's teacher over a period of one week revealed that violently aggressive behaviour (appropriately defined) ran at a daily frequency of 6.2 (with a range from 4 to 9). The clear implication was that on 'bad days' Derek was refraining from aggressive behaviour for periods averaging only 30 to 35 minutes. On the basis of this information, and allowing for random fluctuations within a day, a DRO interval of 10 minutes was chosen; that is, from the outset of the change programme Derek's teacher and peers praised him whenever he succeeded in refraining from aggressive behaviour for

the whole of a 10 minute period. For further details of this intervention see Winter (1980).

Baseline data can be used in a similar way where DRH and DRL techniques (Differential Reinforcement of High or Low frequency behaviour) are under consideration.

A rather different example concerns those cases in which the target behaviour apparently fluctuates with time. Behavioural measurement may reveal that the fluctuations are related to (for example) the teachers or tasks involved at school or the father's working hours at home. Information such as this may prove invaluable in decisions regarding intervention techniques themselves, as well as the caregivers by whom, and the settings within which, they should be implemented.

(3) *Information on Caregivers Skills and Commitment, and Existing Environmental Demands*

Failure of a caregiver to collect data as agreed may be an indication of the absence of skills or of the commitment necessary for later implementation of change techniques. Further discussion may reveal the precise cause of failure. Alternatively, it may be due to genuine forgetfulness in which case some signalling device such as a kitchen timer or pre-recorded tape may be used as a reminder during the period of baseline, and during intervention itself.

Stephen was 4-years old and had been described as 'hyperactive'. Of all the problem behaviours he engaged in the most worrying to his teacher was that of non-attending behaviour during group sessions such as storytime, newstime, etc. The teacher was asked to collect baseline data for a week.

As specific moments during these sessions she was to observe Stephen's behaviour and write a tick on her hand if he was standing up, shuffling, walking around, interfering or talking with other children, staring elsewhere or making disruptive noises (all of which were considered to indicate non-attending behaviour). She was to write a cross if he was refraining from these behaviours (and thereby possibly attending to what was going on).

An immediate problem presented itself. The teacher found that she was too concerned with the content of these group sessions to remember to observe Stephen's behaviour using the 'interval' method described above. The solution was to provide a pre-recorded tape which played signals at one minute intervals. The teacher switched on the tape before each group session began and observed and recorded Stephen's behaviour quite successfully each time the taped signal reminded her to do so. Throughout the actual intervention, which involved DRO (as well as training and modelling sessions and extinction), it was necessary to continue to use the pre-recorded tape as a way of reminding the teacher to reinforce intervals of attentive behaviour.

Several possibilities exist where failure to collect baseline data seems to be due to a lack of commitment. The target behaviour which has been chosen may be low priority for the caregiver, despite the care previously taken when defining the problem behaviour. The solution to this particular situation is obvious.

More commonly the lack of commitment may stem from reservations about a 'symptom' approach (best dealt with through further discussion) from general pessimism about the possibilities for change (dealt with by further discussion and in increased consultant reinforcement of caregiver behaviour once intervention begins)

or from a desire (expressed or otherwise) to have the child removed rather than engage in *in situ* intervention. This last possibility (perhaps encountered more often in schools and largely the result of an abundance of special schools and units) may be the most difficult to deal with. Three possible solutions involve: (a) the enlistment of support from colleagues within the school, (b) the use of measurement and change techniques involving minimal caregiver effort (extreme forms of which are strategies which involve the child in self-reinforcement or involve reinforcement by other caregivers) and (c) choosing and training target behaviours which will result in the child quickly becoming more reinforcing to the caregiver (Hutchings & Jones, 1979).

(4) *The Therapeutic Effect of Baselining*

A certain proportion of target behaviours appear to improve under baseline. Lindsley (in Duncan, 1969) reports a figure of 5% in his review of 2000 cases, whilst Tharp & Wetzel (1969) report 7% in a rather smaller sample of 83. A review of 36 of our own cases yielded a rather higher 14% (unpublished).

Sometimes this baseline effect is a result of the discussions which precede it. In particular the consultant will typically 'prepare' the caregivers for targeting and then baselining a behaviour by telling them that the child's behaviour is a problem of learning, the solution to which lies in a teaching approach which they themselves will be required to adopt as the major participants of therapy. In certain cases all this is bound to change long-held attitudes and result in changes in caregiver behaviour *via-à-vis* the child.

Alternatively the acts of targeting (i.e. defining the child's 'problem' in observable behavioural terms) may make possible (and indeed result in) more consistent management by caregivers than has been possible hitherto. This in turn may lead to improvements under baselining. Finally, there are cases in which the child observes or is told that the consultant is visiting the home or school in connection with his or her problems. This may lead to behavioural improvement by way of a sort of 'bogeyman' effect. Strictly, speaking, however, these are examples in which behavioural improvements are made visible by, rather than actually resulting from, baselining. It is this second phenomenon to which we now turn.

Where the child is told or observes that his or her behaviour is under scrutiny he/she may exert a self-control that has hitherto been absent, with a consequent improvement in target behaviour. Unfortunately, the former pattern of behaviour may reappear when baselining stops. One solution involves asking the caregivers to withdraw the offending record card or graph paper on one in every 5 days, then in every 4 and so on, until the baselining has eventually been phased out, hopefully with no return of problem behaviour. Another solution may lie in transferring record keeping to the child itself.

(b) Within Intervention Measurement

The benefits which accrue from collecting quantitative data throughout the duration of an intervention programme are numerous.

(1) *Reinforcement Value*

Behavioural measurements provide a powerful source of reinforcement for the child,

for caregivers and for the consultant especially when improvements in target behaviour are shown visually (Gelfand & Hartmann, 1975). This is particularly important in two special cases.

(a) Where behavioural change is expected to be (or actually turns out to be) gradual. Indeed changes of this sort may pass unnoticed altogether if measurements are not kept. In this connection it may be worth listing some of the conditions under which behavioural change may be expected to proceed gradually, if at all:
   (i) Where one or more caregivers deviate from the agreed techniques, either through 'behavioural inertia' or 'sabotage'. All these possibilities are more likely to occur not only where a large number of caregivers are involved in the task of behavioural change (as in a residential school or a comprehensive) but also where important caregivers have not been co-opted into the programme (as where a grandmother has been left uninvolved in a programme which involves the use of pocket money as a reward).
   (ii) Where the target behaviour is difficult to distinguish from non-target behaviour; has been poorly defined (i.e. 'naughty' or 'difficult' behaviour) or (as in Stephen's case earlier) itself consists of a particularly wide variety of constituent targets. All these are likely to reduce the consistency with which caregivers apply the programme.
   (iii) Where the problem behaviour has been established for a particularly long time.
   (iv) Where the intervention is planned for a limited setting (for example where withdrawn behaviour in home and school is being modified at school only).
(b) Where caregivers perceive that response cost is high. By this is meant that they ask themselves 'Is what we are being asked to do worth it?', and conclude that it is not.

In answering the second question caregivers will weigh the physical effort and time involved or anticipated (in attending review meetings with the consultants as well as in implementing the behavioural techniques themselves) against the reinforcement received or expected (for themselves, their colleagues and superiors, the consultants and the child himself). Sometimes the physical effort and time expended in the early stages of intervention is very high indeed. For example an intervention package involving DRO, modelling, time-out and self-control training obviously involves quite a lot of effort during class hours as well as several hours discussion outside (Winter, 1980). Similarly reinforcement available to caregivers may be quite limited. They may fail to reinforce their own adherence to the programme because they feel uncomfortable using the techniques, are sceptical about their effectiveness or feel they are acting under duress. Superiors and colleagues may show scepticism about and even ridicule the techniques the caregivers are being asked to use. Most importantly the child himself may, through his or her continuing aversive presence in a classroom, punish a teacher for adhering to techniques which at best, 'only put off the day that the child goes to the unit'.

In a minority of cases the perceived response cost may be so high as to prevent behavioural techniques being used at all. For example, in a review of 36 of our own cases, 14% of the interventions terminated after unsuccessful attempts to negotiate a set of behavioural techniques acceptable to the caregiver(s). However, there are many methods by which apparently high response cost can be reduced. For example,