

AN EVALUATION OF GENTLE TEACHING
AND VISUAL SCREENING
IN THE REDUCTION OF STEREOTYPY
IN MENTALLY RETARDED PERSONS

A thesis
submitted in partial fulfilment,
of the requirements for the Degree
of
Master of Arts in Psychology
in the
University of Canterbury
by
Jennifer Jordan

University of Canterbury.

February 1987

ACKNOWLEDGEMENTS

I am deeply indebted to my supervisor Dr Nirbhay N. Singh for his encouragement and valued guidance throughout the year. I also thank the nursing staff of Templeton Hospital and Training School for their interest and participation and acknowledge with gratitude the support of Dr Marshall, Eric Lundin and Charge Nurse Chris Autridge. A special thank you to Jane Penney, Timea Kincs, Shane Ball, Nigel Wilson and Richard Tan for their enthusiasm as therapists in the data collection phase. Thanks also to the University of Canterbury Psychology Department technicians and to Karilyn for their help in the preparation of this thesis. To my friends and colleagues who encouraged me, I would like to express my appreciation and I especially thank Jeff for his indispensable support throughout. Finally, I thank my subjects David, Kevin and Paul for their participation and contribution to making this research enjoyable.

CONTENTS

	PAGE
ACKNOWLEDGEMENTS	i.
CONTENTS	ii.
ABSTRACT	iii.
INTRODUCTION	1
METHOD	37
RESULTS	49
DISCUSSION	76
REFERENCES	91

ABSTRACT

An alternating treatments design was used to compare Gentle Teaching and Visual Screening with a no-treatment control in the reduction of high rate stereotypy in three mentally retarded persons. A Task-training condition using standard behavioural techniques followed Baseline to establish the effects of training the subjects on the task. While all procedures were superior to the control condition, for all subjects, Visual Screening was more effective in suppressing stereotypic behaviour than Gentle Teaching. In two subjects, Gentle Teaching was more effective than the Task-training condition but for the third subject, stereotypy increased under the Gentle Teaching condition. Implementing Visual Screening across two and then in all three daily sessions reduced the rate of stereotypy further to near zero levels. For one subject, an additional phase introducing new therapists demonstrated that the treatment effects were easily replicated across therapists. Mixed changes in collateral behaviours were observed and subject responses were idiosyncratic. There were no specific treatment effects noted for bonding (pro-social behaviours) or the other collateral behaviours that were monitored. This result was unexpected in view of bonding being the expressed goal of Gentle Teaching. These results are discussed in terms of future research in the evaluation of Gentle Teaching in mentally retarded persons.

INTRODUCTION

Stereotypy is a prevalent and well studied problem in mentally retarded and autistic populations. This behaviour has been defined as highly consistent, repetitive motor behaviour, excessive in or pathological in rate, frequency and/or amplitude, with no apparent adaptive significance (Baumeister, 1978) and common examples include body rocking, complex finger and hand movements and object twirling.

There is an area of overlap with the self-injury literature as these behaviours frequently co-exist in some individuals and the topography of a particular behaviour such as finger sucking may indicate that the behaviour is both stereotypic and self-injurious (Barron & Sandman, 1984). In this thesis, studies reporting the behaviour as self-injury may be included if the target response is highly stereotyped and in agreement with the above definition. Despite an extensive literature on this problematic behaviour, the origins and functional significance of stereotyped responding are not yet fully understood and while numerous treatments have been developed, a panacea still awaits discovery.

Stereotypy is a significant problem which warrants intervention primarily because it reduces the person's responsiveness to his or her environment thereby interfering with the acquisition of new adaptive behaviours (Chock & Glahn, 1983; Kaufman & Levitt, 1965; Koegel & Covert, 1972; Koegel, Firestone, Kramme & Dunlap, 1974; McGonigle, Duncan, Cordisco & Barrett, 1982; Scibak, 1983; Thompson & Berkson, 1985). Recent research suggests that this factor may be more critical the greater the level of retardation (Klier & Harris,

1977). Failure to learn essential adaptive skills may hinder or prevent the person from moving into a less restricted environment. A further justification for treatment is that stereotypic behaviour lends the person a bizarre, unsocialised appearance (Baumeister & Forehand, 1973) which makes integration and acceptance into the wider community more problematic.

As Baumeister and Forehand (1973) have pointed out, stereotypy is not some fixed symptom but it occurs and should be judged, on a relative basis, as occurring on a series of continua from mild to severe, typical to atypical, adaptive to maladaptive and desirable to undesirable. There are numerous forms of stereotypy then, ranging from everyday repetitive behaviours that most people indulge in such as pencil tapping, to the frequent and bizarre manifestations seen to varying extents in populations such as blind, mentally retarded, autistic and schizophrenic persons (Strongman, 1984).

This behaviour is also widely observed in normal infant development (Berkson, McQuiston, Jacobson, Eyman & Borthwick, 1985; Schwartz, Gallagher & Berkson, 1973; Werry, Carlielle & Fitzpatrick, 1973) but persists in persons with severe abnormalities of mental, emotional and physical development and in unusual rearing conditions such as isolation and institutionalisation (Werry et al., 1973). Several early studies estimated that the prevalence of stereotypy among institutionalised mentally retarded persons was around two thirds of this population (Berkson & Mason, 1964; Kaufman & Levitt, 1965). However recent studies have found somewhat lower incidence figures. Corbett (1977, 1979) estimated that

for under-16-year-olds, the incidence of stereotypy in severely retarded persons was up to 40% while for mentally retarded adults the rate was only around 18%. Repp and Barton (1980) found that 47% of those living in institutions displayed stereotypic behaviour while a comparative group in the community averaged only 13% (Repp, Barton & Gottlieb, 1983).

The relationship between age and abnormal stereotyped behaviour was recently investigated by Berkson and his colleagues (Berkson et al., 1985). Using comprehensive records from various state mental retardation agencies in several areas of the United States, these authors found that the prevalence of stereotypy increased with chronological age peaking in late childhood for the moderately and severely retarded, and in the early teenage years for profoundly retarded persons.

Some of the other factors affecting the rate of stereotypy include the opportunity for and type of alternative activities and social interaction (Berkson & Mason, 1964; Kaufman & Levitt, 1965; MacLean & Baumeister, 1981; Thompson & Berkson, 1985), the familiarity or novelty of the therapist (Runco, Charlop & Schrieblman, 1986) as well as the complexity of the environment (Hutt & Hutt, 1965). The type of lighting in the therapy room has also been identified as influencing this behaviour with stereotypy being higher under fluorescent than under incandescent lighting (Fenton & Penney, 1985). The interaction between the situation and the person's ability seems to be a factor as well, with higher functioning individuals showing more variability in responding across settings (Baumeister, MacLean, Kelly & Kasari, 1980). The type of

stereotypy engaged in also appears to affect the degree to which the behaviour is influenced by external variables as several studies have found that subjects who body-rock are more responsive to the environment than those who do hand-posturing (Berkson & Mason, 1964; Kaufman & Levitt, 1965) possibly as a result of the hand-regard, which often accompanies hand-posturing, being incompatible with visual attention to the environment while body-rocking still allows the person to watch what is happening around him or her.

Another factor which has important implications for scheduling treatment and indeed judgment of treatment efficacy are the findings by several researchers of the cyclical nature of the performance of this behaviour. Pohl (1976) noted that stereotypy tends to occur in bouts rather than continuously. Brusca (1985) proposed that this was due to endogenous factors such as a basic rest-activity cycle of between 1½ to 2 hours as well as to ultradian (less than 24 hour) cycles, longer cycles lasting 6 to 8 weeks, and finally circannual rhythms related to the subjects' metabolic functions. Exogenous factors may modify and interact with these rhythms as, for example, the rate of stereotypy increases prior to meals and staff shift changes.

Etiological Theories

There have been a number of recent papers reviewing possible etiological explanations of stereotyped behaviour (Baumeister, 1978; Baumeister & Forehand, 1973; Berkson, 1968; Mitchell & Etches, 1977; O'Brien, 1981; Strongman, 1984; Werry et al., 1983).

All of the theories have some support and so none are able to be discounted at this stage. Baumeister (1978)

considers that there are a number of questions that need to be addressed by these theories including the origin of these behaviours, how they are inserted in the repertoire, factors maintaining the behaviour, whether the behaviour serves any adaptive function and indeed whether an individual's various stereotypies are functionally related. A final question which should follow on from each theory is how the behaviours can be controlled. There have been a number of categorizations but Baumeister (1978) considers that there are five broad theoretical categories: the homeostatic, developmental, organic, dynamic and learning theories. These theories all have some overlap and utilise similar constructs but they differ in their emphasis on the role of environmental stimuli and learning, and on the functional or developmental significance of stereotypy (Baumeister, 1978).

Among the oldest theories is that of the psychodynamic viewpoint. One such theory holds that stereotypes have an autoerotic basis, with sexual undertones being indicated in infant body rolling (von Hug-Hellmuth, 1919), while another viewpoint holds that stereotypic behaviour is a manifestation of poor ego boundaries and a lack of a well developed sense of self interpretation (see Baumeister (1978) and O'Brien (1981) for reviews of this area). Other dynamic theorists have implicated severe disruptions of normal mother-infant interactions such as deprivation and child abuse as causal factors. While there is some support for the maternal deprivation hypothesis from non-human primate studies there is little empirical support for other theories and as they do not provide clear effective treatments, they are currently given little credence (O'Brien, 1981).

The second viewpoint implicates pathology of the structure or chemistry of the brain. This theory is based on a number of findings including the negative correlation between IQ and stereotypy and the high levels of central nervous system pathology such as phenylketonuria with symptoms of stereotypy more prevalent among more retarded populations. Other evidence to support this viewpoint comes from animal experiments which show that producing lesions or injecting certain chemicals such as caffeine or amphetamines into the brain can lead to the appearance of stereotypy (Lewis & Baumeister, 1982). Further suggestive evidence comes from the measured physiological alterations in the individual with, for example, variability in cardiac activity being associated with bursts of stereotypy (Lewis, MacLean, Bryson-Brockmann, Arenolt, Beck, Fidler & Baumeister, 1984) and clinical observations that some individuals appear to undergo behavioural changes similar to those preceding seizures prior to stereotypic activity (Baumeister, 1978). Others have suggested that stereotyped self-injury may arise from disturbances in the endogenous opiate system (Barron & Sandman, 1983). While there is no formal neurological theory as yet, Baumeister (1978) considers that for some individuals, an organic basis for stereotypy cannot be ruled out.

One of the more influential theories is the developmental or maturational theory. This viewpoint holds that stereotypic behaviour is an exaggeration and extension of behaviours occurring during infancy (Gesell & Amatruda, 1965). The assumption is made that some forms of stereotypy are essential to the normal development of motor, social and learning skills, such as in Piaget's (1952) theory of the

ontogeny of circular reactions. According to this theory, disruption of the normal sequencing due to factors such as deprivation, disability and atypical development can cause the child to fixate at a particular stage such as at Piaget's primary or secondary circular reaction stages. In another theory emphasising maturational factors, Werry et al. (1983) contend that stereotypic behaviour is a spontaneous and inevitable manifestation of a certain stage of neuromuscular development, dictated by an intrinsic neural clock (Thelen, 1979). Several studies comparing infants of normal intellect with retarded infants have noted that the onset of common stereotypies such as rocking and sucking is delayed among the retarded children as are other milestones (Kravitz & Boehm, 1971; Thelen, 1979). In a recent observational study, Schwartz, Gallagher and Berkson (1986) noted that a group of mentally retarded infants performed stereotypic behaviours for considerably longer periods than did normal infants who displayed topographically similar behaviours. Although relatively little is known about the behavioural histories of mentally retarded persons, there is some evidence that among retarded children with the same diagnosis, the presence of high-rate stereotypy appears to have adverse effects on indices of infant development such as on the Bayley Scales (Brassell, 1977).

Another influential group of theories consider that stereotypic responding arises and operates to perform a homeostatic role, maintaining stimulation within an optimal range when environmental levels of stimulation are too low or too high (Leuba, 1955). Baumeister (1978) notes that many treatment studies accept this viewpoint rather

uncritically as evidenced by their use of the term self-stimulation in preference to stereotypy.

The particular stimulation that the organism seeks to adapt to has been variously called tension (Lourie, 1949), arousal (Berkson, 1967) and frustration (Baumeister & Forehand, 1973). The evidence for this viewpoint comes from observations that stereotypy occurs in deprived environments such as some institutional wards for the mentally retarded and that environmental enrichment generally reduces the level of stereotypy and other maladaptive behaviours (Horner, 1980; Murphy & Zahm, 1978). As Baumeister (1978) notes, there are some problems with this theory, such as the question of why all individuals in deprived environments do not exhibit stereotypy and the argument that stereotypy actually induces a state of stimulus deprivation by preventing more adaptive interactions with the environment. This theory remains popular however possibly because it has considerable intuitive appeal (Baumeister, 1978; Thompson & Berkson, 1985).

The learning theory explanation of stereotypy considers that these particular behaviours arise, are superstitiously reinforced, and are then maintained by social consequences (Spradlin & Girardeau, 1966) or sensory consequences (Foxx & Azrin, 1973; Rincover, 1978). Once established, these behaviours may occupy so much time that there is little opportunity for learning adaptive behaviours (Foxx & Azrin, 1973). Baumeister (1978) considers that these theories are growing in popularity mainly because the most effective treatments for stereotypy are behavioural, however this may be a backward validation and the demonstration that stereotypy can be controlled using operant principles does not necessarily mean

that this was how the behaviour originated. The possibility that different factors may be implicated in its origin and the maintenance of stereotyped behaviour has been widely acknowledged (Baumeister, 1978).

Werry et al. (1983) combined aspects of several theories to provide an integrated theory of etiology, modulation, persistence and extinction. Werry and his colleagues consider that there is considerable data from the developmental literature in favour of maturational factors as the primary etiology. Thelen's work has shown that rhythmic behaviours are ubiquitous in normal children of both sexes and they appear in a predictable developmental profile with the age of onset, peak performance and decline occurring earlier in advanced children and later in retarded infants (Thelen, 1979, 1981a, 1981b). Once these behaviours are established in the behavioural repertoire their frequency, severity and persistence may be influenced by a wide range of organismic and environmental variables. These include caretaker variables, motor restriction, vestibular stimulation, arousal level, the ability and opportunity to engage in more complex behaviours and social learning factors (Werry et al., 1983). These factors may act alone or interact with other variables at different stages of development. As Werry and his colleagues note, while stereotypies are essentially primitive behaviours, they can assume the complexities of other human behaviour explaining the persistence and frequency of these behaviours in mentally, physically, emotionally or socially handicapped children.

Review of Treatment Literature

A wide range of behavioural interventions have been

used to treat stereotypy in severely and profoundly mentally retarded and autistic children and adults (for full reviews see Baumeister, 1978; Baumeister & Forehand, 1973; Bornstein, Bach & Anton, 1982; Gorman-Smith & Matson, 1985, La Grow & Repp, 1984). Attempts to reduce stereotypy can be categorized as those manipulating antecedent setting conditions, those using aversive techniques, positive reinforcement procedures or those manipulating sensory stimulation.

Antecedent Manipulations

Some of the antecedent variables which have been investigated include the use of various psychoactive medications, environmental enrichment and variation of the task or toys provided on the rate of stereotypy.

In a recent review of the use of anti-psychotic medication for behavioural disturbance, Aman and Singh (1983, 1986) noted that a number of studies reported that stereotypic responding was often affected by these drugs (Breuning, 1982; Davis, Sprague & Werry, 1969; Heistad, Zimmerman & Doebler, 1973; Hollis, 1968; Singh & Aman, 1981). The few studies directly investigating medication on the rate of stereotypy have produced equivocal results, partially due no doubt to the confusion caused by several studies where the subjects were taught a stereotypic response, such as rocking (Davis, 1971; Hollis & St Omer, 1972). Aman, White and Field (1984) sought to clarify the picture by looking at the effects of chlorpromazine in four profoundly mentally retarded subjects with high rate stereotypy. Using a placebo controlled crossover design, Aman et al. (1984) found that while stereotypy was reduced by an average of 36%, the medication interfered with the performance of a previously learned task. Impaired task performance has also been found

with thioridazine (Mellaril) (Wysocki, Fuqua, Davis & Breuning, 1981). Breuning (1982) investigating thioridazine suggested that learning may be impeded by interference with memory and attention processes and, in particular, by interfering with the subject's response to external reinforcement. This point was also made by Repp, Deitz & Deitz (1976) who considered that as well as the problems caused by medication making subjects too stuporous to learn, more importantly, medication does not teach any more adaptive behaviours to replace the stereotypy once the medication is stopped. In addition, Barron and Sandman (1983) suggest that many retarded persons with stereotypic and self-injurious behaviours appear to demonstrate paradoxical reactions to some of the commonly used anti-psychotic medications. The use of medication at this stage then, does not seem warranted as the treatment of choice with this problem behaviour.

Interventions which have manipulated or enriched environmental conditions to provide greater opportunity for social interaction have also reported reductions in the rate of stereotypy. Several studies have found that the provision of toys or equipment is insufficient in itself to produce significant positive behaviour change unless the subjects are prompted and positively reinforced for manipulating the objects (Berkson & Mason, 1964; Flavell, 1973; Hutt & Hutt, 1965). Horner (1980) found however that moderate reductions in maladaptive behaviours including stereotypy and moderate increases in appropriate object play were achieved by placing numerous objects in a barren dayroom for five profoundly retarded females. When the environmental enrichment condition was supplemented by a differential reinforcement of other

(DRO) procedure, there were further significant reductions in stereotypy of an additional 20-30%, with 30-40% increases in adaptive object manipulations.

Another interesting study investigated the effects of making major improvements in the living conditions of 22 institutionalised severe and profoundly retarded males on self-help skills and rate of maladaptive behaviours (Murphy & Zahm, 1978). These authors found that when three groups of residents were moved into small living units with low staff-to-resident ratios, rates of all maladaptive behaviours dropped with or without specific behaviour modification techniques being applied.

Other studies have investigated the effects of varying stimulus conditions. One such study found that the presence of a therapist reinforcing desirable responses reduced the rate of stereotypy although this effect was more apparent if the therapist was familiar to the client (Runco et al., 1986). These authors found though that among their six autistic subjects, that the familiarity of the task or setting had no effect on the level of stereotypic responding. In a study of several self-injurious children, Weeks and Gaylord-Ross (1981) found that making the task requirements easier led to a decrease in self-injury. Koegel and Egel (1979) found that autistic children were more motivated to respond on easier tasks than more difficult ones. Finally, in a novel approach, Baumeister and McLean (1984) successfully reduced the rate of stereotypy and self-injury in several subjects by instituting a regular, intensive exercise programme.

While environmental and other antecedent manipulations alone produce reductions in the rate of stereotypy, unless

this approach is supplemented with other more active procedures such as DRO, the results achieved generally fall short of those obtained by the more effective methods outlined below (Horner, 1980).

Aversive Procedures

On the whole, aversive procedures have been very effective in reducing stereotypic responding, either alone or in combination with positive reinforcement techniques. A wide range of aversive procedures have been used in this area. See Gorman-Smith and Matson (1985) and La Grow and Repp (1984) for recent reviews.

Undoubtedly, one of the most controversial procedures for reducing stereotypy is that of electric shock which enjoyed fleeting popularity in the late 1960's and early 1970's. Because of the severely aversive nature of shock, it has usually been limited to use with self-injurious stereotypy. Shock has been used in a response contingent fashion where it is very effective in reducing aberrant behaviours (Baumeister & Forehand, 1972; Lovaas & Simmons, 1969; Tate & Baroff, 1966). The procedure has also achieved reductions in stereotypy indirectly when it was used to encourage social interaction (Lovaas, Schaeffer & Simmons, 1965). In this study, two five-year-old autistic twins with high-rate stereotypy were shocked if they did not respond to experimenter commands to "come here", within five seconds. It was found that response latencies were rapidly reduced as well as the unpunished stereotypic responding. In addition they noted an immediate increase in pro-social interaction which was informally noted to have generalised outside the experimental setting and these effects were reportedly maintained

for up to nine months before extinguishing. Lovaas and his colleagues explained the increase in social behaviour as being due to the therapists acquiring reinforcing powers through being paired with shock avoidance. These immediate dramatic increases in pro-social interaction have been noted in other studies where shock was used to reduce stereotypy or stereotyped self-injury (Lovaas & Newsom, 1976; Tate & Baroff, 1966). One of the problems noted with the therapeutic use of shock, however, was that the effects tended to be situation-specific and often short-lived (Lovaas et al., 1965) and there can be problems in fading the shock.

Another aversive consequence which has received some attention is the use of a sharp slap paired with a verbal punisher "No!", contingent upon the target response occurring (Koegel & Covert, 1972; Koegel et al., 1974; Romanczyk, 1977). In these three studies, the slap procedure was found to be very effective in suppressing stereotypy in autistic children with high rate stereotypy and low rates of on-task behaviour, toy-play or social interaction. Koegel et al. (1974) found that as self-stimulation was suppressed in two autistic children of six and eight years, the level of appropriate play rose significantly. They noted, however, that for one child, there still remained a high percentage of time (on average 43% ranging from 10 to 70%) where neither self-stimulation nor appropriate toy-play was observed. However, this category decreased somewhat by the end of treatment. Romanczyk (1977) successfully reduced high-rate stereotypic responding in a 7-year-old autistic boy and an 8-year-old girl with cerebral palsy using a slap and "No!" delivered on either a continuous or intermittent schedule of punishment. He found

that an intermittent schedule was just as effective as continuous punishment and it had the advantage of providing greater resistance to extinction. Punishment effects were again found to be situation-specific. Other non-punished stereotypic behaviours were reported to co-vary with the punished behaviour. Positive side-effects were also noted with the subjects demonstrating learning of the task only after stereotypy had been reduced. In addition, an increase in pro-social behaviours was noted in the punishment condition, particularly for subject 1.

In a recent study investigating the use of less restrictive aversive techniques, Reilich, Spooner and Rose (1984) used water-mist to reduce stereotypy in a 15-year-old deaf-blind girl who placed paper or other objects over her face for prolonged periods of time. In this study, a fine mist of room-temperature water was sprayed at the subject's face contingent upon stereotypy while existing reinforcement contingencies for correct on-task responding within the classroom were continued. In a multiple baseline across settings design, the behaviour was reduced to near-zero levels within several days of sequential introduction of treatment into the sheltered workshop, lunchroom and classroom settings. Furthermore, the suppression was successfully maintained at three and six months and formal follow-up at 17 months found the behaviour to be non-existent. These promising results suggest that further research with this method of suppression is warranted.

A number of recent studies have investigated the use of physical restraint in the reduction of stereotypic responding (Azrin & Wesolowski, 1980; Barkley & Zupnick, 1976; Barton, Repp & Brulle, 1985; Bitgood, Crowe, Suarez & Peters,

1980; Ollendick, Shapiro & Barrett, 1981; Shapiro, Barrett & Ollendick, 1980; Wesolowski & Zawlocki, 1982). The rationale for the use of response contingent restraint is that it stops the response and prevents it from occurring for a specified period of time (Bitgood et al., 1980). The durations of restraint used have varied a good deal from an indefinite "until the response stopped" in Barkley and Zupnick's successful treatment of violent body-whipping contortions in a 9-year-old moderately retarded girl to more recent studies where the durations used were 30 seconds (Ollendick et al., 1981), 15 seconds (Bitgood et al., 1980), and 3, 5 and 10 seconds (Barton et al., 1985). An interesting demonstration of fading the restraint procedure has been reported by Azrin and Wesolowski (1980). A group of seven profoundly mentally retarded adults with moderately high rates of stereotypy were individually treated with differential reinforcement of alternative behaviour (DRA) plus a 2-minute restraint package, which was gradually faded so that it was able to be maintained at near zero levels within a group learning situation with a verbal warning and only momentary restraint of approximately 1 second.

Comparative studies have found mixed results, with differential subject effects being reported in several studies where restraint was compared with auditory time-out (Wesolowski & Zawlocki, 1982) and with overcorrection (Ollendick et al., 1981). Bitgood et al. (1980) noted that the physical guidance and requirement that the subject held positions in the overcorrection procedure involves a form of restraint. Certainly in the Ollendick et al. (1981) and Shapiro et al. (1980) papers this seems to be the case with the overcorrection procedure here being 30 seconds of forced manipulation of the formboard task compared to 30

seconds of holding the subject's hand in lap or on the table in the restraint condition. Thus the findings of no differential effect between treatments in these studies may have been confounded by the similarity of the procedures used.

Generally though, brief duration restraint has been found to be a very effective treatment which is easy to implement and is therefore of practical use within regular teaching situations with retarded persons (Azrin & Wesolowski, 1980; Barton et al., 1985; Bitgood et al., 1980).

Another treatment approach has attempted to eliminate the consequences of stereotypy by the contingent removal of social and other reinforcers. A number of studies have used variations of extinction and time-out procedures including exclusionary time-out used either contingently (Pendergrass, 1972; Sachs, 1973) or non-contingently (Lovaas & Simmons, 1969), or non-exclusionary procedures where the therapist turns away from the subject and makes social and other reinforcers unavailable for a brief period contingent upon stereotypy being emitted (Harris & Wolchik, 1979; Laws, Brown, Epstein & Hocking, 1971; Sachs, 1973). A recent example of this type of procedure was reported by McKeegan, Estill and Campbell (1984) who used removal of a special ribbon contingent upon stereotypic behaviour to signal the withdrawal of access to reinforcers. This procedure was successful in reducing to near-zero levels stereotypic behaviour in a 28-year-old male in a regular classroom setting, however as this was only an AB design this result warrants further replication. Another variation was used by Wesolowski and Zawlocki (1982) who blocked out auditory stimulation using earmuffs in an auditory time-out procedure to

successfully reduce stereotyped eye-gouging in two blind profoundly retarded twins but unfortunately, the results were not maintained after treatment ceased. There have been a number of problems identified with the use of time-out and extinction with stereotypic behaviour such as the difficulties in identifying and controlling the reinforcement maintaining the behaviour (Homer & Peterson, 1980) and the appearance of negative side-effects such as aggression (Pendergrass, 1972) and disruptive behaviour (Sachs, 1973) and generalised suppression of appropriate behaviours as well as the target stereotypy (Pendergrass, 1972). In addition, the effectiveness of these procedures has been found to be compromised if the client has the opportunity to perform stereotypy in the time-out environment (Solnick, Rincover & Peterson, 1977) or if the "time-in" environment does not provide a high density of reinforcement. Many of these problems appear to have been overcome by the increasing use of brief non-exclusionary procedures paired with effective reinforcement contingencies for appropriate behaviours thereby increasing the value of the procedure in teaching situations (Harris & Wolchik, 1979; McKeegan et al., 1984).

Certainly the most popular procedure used with stereotypic behaviour has been the overcorrection treatment package. This procedure was developed by Foxx and Azrin (1972, 1973) as a response reductive and educative procedure which taught more adaptive alternatives to the particular stereotyped movement. In most cases of stereotypy, the first component of overcorrection, restitution, is not required as no damage or change is made to the environment by the behaviour, except perhaps with behaviours such as mouthing. Generally the

positive practice component where the subject is required to practice topographically relevant alternative behaviour, incompatible with the stereotypic behaviour, is the main therapeutic focus. There have been many variations on the original procedure in terms of duration and the type of positive practice used, with the trend being toward shorter durations in attempts to retain the effectiveness of overcorrection while making its implementation more economical and practical in applied situations. From the original 20 minute duration (Foxy & Azrin, 1972), recent studies have found that durations as short as 20 seconds (Maag, Rutherford, Wolchik & Parks, 1986) or 10 seconds (Harris & Wolchick, 1979) can be effective while others have investigated systematic fading of the procedure from, in one example, 15 minutes to momentary overcorrection and then to a verbal warning only (Wesolowski & Zawlocki, 1982). The type of alternative behaviour that is required to be practised and the question of the educative nature of the procedure has also been investigated. Several studies have used the procedure to teach positive behaviours. For example, Denny (1980) guided the hands of three non-ambulatory subjects in propelling their wheelchairs for 60 seconds contingent upon stereotypic hand movements and Ollendick et al. (1981) used 30 seconds of manual guidance in form-board manipulation contingent upon emittance of bizarre hand movements in three severely retarded, autistic children. In both of these studies however, there were no apparent educative effects due to the use of these particular positive practice procedures. In spite of stereotypic responding being significantly reduced in all subjects, none of Denny's subjects learned to propel their wheelchairs and

while Ollendick's subjects did show increased accurate task performance during the overcorrection treatment, the improvement was no different to that in the comparison restraint condition.

While the overcorrection procedure has demonstrated widespread success, there have been problems encountered in a few studies with negative side-effects, such as increases in untreated stereotypy or self-injury (Doke & Epstein, 1975; Harris & Wolchick, 1979; Rollings, Baumeister & Baumeister, 1977) although these may not be lasting and may be controlled by an extension of the treatment (Foxy & Azrin, 1973) or by the incorporation of positive reinforcement procedures to reduce the problematic side-effects. Several overcorrection studies have reported positive side-effects such as increases in prosocial interaction (Czyzewski, Barerra & Sulzer-Azaroff, 1972; Foxy & Azrin, 1973; Harris & Wolchik, 1979; Matson & Stephens, 1981). While most studies have reported that treatment effects were maintained in the short-term (Barrett & Linn, 1981; Foxy & Azrin, 1973; Luiselli, Pemberton & Helfen, 1978), in one of the few long-term follow-up studies, Matson, Ollendick and Martin (1979) found that only two of their eight profoundly retarded subjects successfully treated previously with overcorrection had maintained low rates of stereotypy one year later. It appears that unless specific programming for maintenance is incorporated into treatment, durability cannot necessarily be expected (Czyzewski et al., 1982; Matson et al., 1979; Matson & Stephens, 1981; Wesolowski & Zawlocki, 1982). Similar conclusions can be made about the generalization of treatment effects as, although several studies have reported generaliza-

tion of suppression either across settings or to other non-targeted behaviours (Czyzewski et al., 1982; Johnson, Baumeister, Penland & Inwald, 1982; Luiselli et al., 1978), the majority of studies have either not assessed generalization or have reported that this did not occur without specific training (Matson & Stephens, 1981; Rollings et al., 1977).

While the efficacy of aversive procedures such as electric shock is undeniable, an ongoing debate both within the professional literature and the public arena has forced a greater awareness of ethical considerations. This debate has been influenced by a number of factors including the human rights movement, a misunderstanding of the psychological meaning of the term 'punishment' among lay persons, as well as public and professional resistance alike to the use of painful modalities such as shock with those who are viewed as having no control over their behaviour (Harris & Ersner-Herschfield, 1978). A further factor which has generated considerable heated debate has been the few, well publicised misuses of treatment. A recent example involved the death of a young client at Matt Israel's Behaviour Research Institute in Rhode Island while undergoing an unprecedented barrage of punishment procedures for self-injurious behaviour (Schopler, 1986).

Schopp (1984) argues that the use of punishment as treatment is justified and in fact obligatory in some rare cases such as severe self-injury where less intrusive methods have failed. In these cases, Schopp argues that implementation of an aversive procedure is in line with the least restrictive alternative doctrine, the patient's right to effective treatment and current legal trends within the mental

health field. Similarly, Repp and Deitz (1978) state that blanket rejection of the use of aversive procedures is an inappropriate step. They illustrate this point with the results of a study with a self-injurious child who was prevented from moving into a less restrictive environment because the rate of self-injury was unable to be controlled by DRO or DRI. When the child was removed by his parents to another institution where punishment was permitted, with only two treatments of electric shock, the problem behaviour was suppressed, allowing the child to progress to a community facility. Foxx, Plaska & Bittle (1986) provide a comprehensive set of guidelines for the use of aversive techniques based on the least restrictive alternative model, principles of informed consent, the use of human rights committees and the commitment to the use of data-based decisions in selecting more intrusive procedures. Use of such guidelines gives protection to the client, and satisfies the legal and moral requirements that the client has the right to effective treatment.

Positive Reinforcement Procedures

This ethical debate has stimulated a good deal of research which has looked at the use of less restrictive alternatives in the treatment of maladaptive behaviours in mentally retarded persons (Brakman, 1985; Harris & Ersner-Herschfield, 1978; Homer & Peterson, 1980; Repp & Deitz, 1978). As part of this change in emphasis, there has been a trend toward the selection of positive procedures over aversive techniques where they are of equal efficacy and finally the combination of positive reinforcement with mildly aversive procedures where positive approaches alone prove ineffective (Rosen, O'Leary, Joyce, Conway & Pfiffer, 1984). Differential reinforcement of other (DRO)

behaviour has been widely and effectively used in combination with environmental enrichment (Horner, 1980), physical restraint (Azrin & Wesolowski, 1980; Barkley & Zupnick, 1976; Barton et al., 1986; Bitgood et al., 1980), with overcorrection (Azrin et al., 1973) and with variations of extinction and time-out (Laws et al., 1971; McKeegan et al., 1984; Sachs, 1973). The finding that the availability of reinforcement for alternative behaviours was necessary for the success of time-out (Solnick et al., 1977) emphasises the importance of incorporating reinforcement procedures in the treatment technology, aside from ethical considerations. An increasing number of studies have preferred to utilise the differential reinforcement of incompatible (DRI) and alternative or appropriate (DRA) strategies to teach specific desirable behaviours rather than reinforcing any response other than the problem behaviour. Some of these studies have focussed on teaching or increasing the frequency of behaviours such as toy-play (Azrin et al., 1973; Azrin & Wesolowski, 1980; Eason, White & Newsom, 1982; Flavell, 1973; Murphy, Calais & Carr, 1985), operant training tasks such as panel pressing (Johnson et al., 1982) or in classroom tasks (McKeegan et al., 1984).

Another approach underutilised as yet, has been the use of differential reinforcement of low rates of responding (DRL). Singh, Dawson and Manning (1981) effectively reduced stereotypy in three profoundly retarded institutionalised adolescent females by the use of spaced responding DRL. They noted that DRL is a relatively innocuous, effective and socially acceptable "least restrictive" treatment for stereotypy but conceded that on the whole aversive procedures

provide a more rapid and predictable response suppression. Furthermore, while these differential reinforcement strategies can be effective when used alone (Haring, Breen, Pitts-Conway & Gaylord-Ross, 1986; Repp, Deitz & Deitz, 1976; Singh et al., 1981), generally they are more effective if they are paired with other interventions where there is a stronger consequence for the undesirable stereotypic response (Azrin et al. 1973; Cavalier & Ferretti, 1980; Denny, 1980; Foxx & Azrin, 1973; Harris & Ersner-Herschfield, 1978; La Grow & Repp, 1984). However, as Homer and Peterson (1980) point out, there are problems with a number of the comparative studies in that the scheduling of the reinforcements used may have meant that differential reinforcement procedures may not have been used at optimal strength, prejudicing the result in favour of the more aversive technique.

An interesting offshoot from the sensory extinction literature discussed below (Rincover, 1978; Rincover & Koegel, 1977) has been the development and use of sensory consequences as reinforcement. Observation of a subject's stereotypic behaviour provides information about the sensory modality (visual, auditory, proprioceptive or kinesthetic) that is assumed to be providing the reinforcing consequence for the behaviour and the subject can then be provided with topographically similar sensory consequences on a DRI or DRO schedule (Ferrari & Harris, 1981; Murphy, Carr & Calais, 1986; Murphy, Nunes & Hutchings-Ruprecht, 1977; Rice & Lloyd, 1982; Smith, 1986; Wolery, Kirk & Gast, 1985). In some such studies the equipment needed to provide the sensory reinforcement is very complicated (Lancioni, Smeets, Ceccarani & Goossens, 1983). However Rotholz and Luce (1983) used readily

available, age-appropriate, socially acceptable equipment such as a gyroscope and taped music to successfully suppress high rate self-stimulatory behaviours in two autistic boys using a DRL schedule. As long as the sensory consequences can be easily and practically consequated as in this study, then sensory reinforcement may be a valuable addition to the range of potential motivators and it holds particular promise as it seems to be more resistant to satiation and at least as powerful as primary reinforcers for some children (Ferrari & Harris, 1981).

As an extension of this work, several studies have even used access to the subject's own stereotypic behaviour as the reinforcement for performing desired tasks. Hung (1978) successfully increased appropriate verbalisations and decreased stereotypy in two autistic children during certain daily activities by making the opportunity to stereotype contingent upon spending tokens earned by appropriate speech. In a related study, Wolery et al. (1985) allowed their two subjects to perform five seconds of stereotypy as reinforcement following correct responding on a discrimination task. Significantly there were no increases recorded in stereotypic behaviour in free operant settings and stereotypy acted as an effective reinforcer. As the research in this area is still limited to a few studies, the potential utility and ideal target groups for this approach merit further investigation.

Rincover, Newsom and Carr (1979) noted that although extinction procedures involving the removal of social consequences of attention, feedback and praise were commonly used and reportedly successful in some cases in reducing stereotypy,

many more were less successful, raising the possibility that environmental contingencies other than social attention might be involved such as that the behaviour might be self-reinforcing.

Sensory extinction procedures were developed by Rincover and his colleagues (Rincover, 1978; Rincover, Cook, Peoples & Packard, 1979; Rincover & Koegel, 1977; Rincover et al., 1979) to reduce stereotypic behaviours. The rationale for this procedure is that assuming that self-stimulatory behaviour is maintained by its sensory consequences then blocking or masking these proprioceptive, auditory and visual consequences should lead to the extinction of the behaviour. The procedure is said to act by preventing sensory feedback accompanying the self-stimulatory behaviour rather than by the contingent application of an aversive procedure designed to punish the behaviour. Using a reversal design, Rincover (1978) demonstrated the successful elimination of stereotypy in three autistic children using a particular sensory extinction procedure for each self-stimulatory behaviour. For example, a blindfold was applied, to prevent visual feedback being obtained from a particular behaviour where this modality was found to be the reinforcer. Rice and Lloyd (1982) used blackout to block visual feedback and successfully reduced stereotypic behaviours in a boy with high-rate stereotypy who had not responded to a DRA schedule of visual reinforcement for lever pressing. One of the potential difficulties with this procedure is that the procedures for blocking the sensory feedback can become very complex, requiring cumbersome, individualized apparatus which may restrict the subject's

participation in other activities. To illustrate this point, in one study the equipment used consisted of rubber springs between wrists to prevent clapping, a foam rubber collar to prevent headweaving, and elastic bands between the subject's leg and wrist to prevent arms being held up to gaze at hands (Maag, Wolchik, Rutherford & Parks, 1986). Although the proponents of this approach view its success in the reduction of stereotypy as being due to the extinction of the sensory reinforcement maintaining the behaviour, it seems likely that the procedures used, by restraining the subject in some way, or applying strange equipment, are likely to be at least mildly aversive to the subjects. The alternative formulation of sensory extinction being a mildly punitive procedure in addition to a sensory extinction paradigm, if indeed this is an effective component, cannot be discounted.

Visual and Facial Screening Procedures

Recently a range of screening procedures have been found to be very effective in treating a range of stereotyped and other maladaptive behaviours (Barrett, Matson, Shapiro & Ollendick, 1981; Barrett, Staub & Sisson, 1983; Dick & Jackson, 1983; Kohleis, 1986; Lutzker, 1978; Lutzker & Wesch, 1983; McGonigle, Duncan, Cordisco & Barrett, 1982; Singh & Winton, 1984; Singh, Winton & Dawson, 1982; Zlomke, Smith & Piersel, 1986). In these procedures, the subject's vision is interrupted according to the particular procedure contingent upon the occurrence of the target response.

The earliest of these procedures was facial screening, where typically a terry-towelling bib was used to cover the subject's face for a few seconds following the maladaptive response (see Lutzker & Wesch, 1983, for a review of the use of this technique). The parameters of facial screening have

been investigated in a number of studies. Facial screening has been found to be most effective if the screening is opaque rather than translucent or transparent (Demetral & Lutzker, 1980; Winton, Singh & Dawson, 1984), if it is used contingently (Demetral & Lutzker, 1980) and combined with positive reinforcement rather than used alone (Zegiob, Jenkins, Becker & Bristow, 1976). Watson, Singh and Winton (1986) in a study comparing facial with visual screening in two profoundly retarded institutionalised subjects found that visual screening produced more effective suppression of finger-sucking in both subjects when the duration of both procedures was five seconds. Furthermore, consumer satisfaction was greater for visual screening as it produced more rapid results and did not require the use of a bib. Interestingly, the presence of toys in this study was insufficient to either increase the rate of toy-play or to decrease the rate of finger-sucking and toy-play occurred only after it was specifically trained.

The visual screening studies in the area of stereotypy have been characterised generally by the use of sound methodology. Barrett et al. (1983) used a combined multiple baseline across settings and reversal design to demonstrate the rapid and effective reduction of compulsive rituals and other stereotypy in a 4-year-old boy, using visual screening of at least 30-seconds duration. Dick and Jackson (1983) were also successful in reducing highly repetitive screaming in a 4-year-old severely retarded boy in the school setting and eliminating it in the home. Treatment effects were clearly demonstrated using a combined

multiple baseline across settings and alternating treatments design and probes to determine that treatment effects had generalised across time and settings within the school setting without specific training but stereotypy did not reduce in the home until it was treated there. Anecdotal reports suggested that there was an increase in toy-play and a social validation measure indicated that the subject's family were impressed and satisfied with the procedure.

In another study utilising a multiple baseline design, McGonigle et al. (1982) successfully reduced a range of stereotypic behaviours in four retarded children with high-rate stereotypy using a 15 second minimum duration of visual screening and suppression was maintained for each child at followup checks ranging from 6 to 18 months. An increase in spontaneous play was noted for one subject as the rate of stereotypy decreased. Another of their subjects displayed an adverse reaction to the first screening, becoming very emotional and struggling to escape with the result that the duration was 2.5 minutes long. This single screening was sufficiently aversive to totally eliminate the stereotypic behaviour thereafter.

Finally, Barrett et al. (1981) used an alternating treatments design to compare DRO with a 10 second minimum duration of visual screening in reducing stereotyped finger-sucking in a 5-year-old moderately retarded girl. A no-treatment control condition was rapidly alternated with the two treatment conditions in a counterbalanced order and photographs of the procedures were used as discriminative cues for each treatment. The target behaviour was reduced to near zero levels within 7 sessions with the visual screening

procedure and this was maintained at a 6 month followup. Barrett et al. suggested that aversive procedures may be more effective with behaviours of long-standing duration compared to reinforcement alone procedures. The visual screening procedure then has the advantages of being an easily administered, relatively innocuous treatment of brief duration which involves no physical risk to the client and appears to be free from atypical side-effects (Barrett et al., 1981; McGonigle et al., 1982). Furthermore, it is highly effective, producing rapid and durable changes across a range of behaviours, and it appears to hold promise in terms of ease of generalisation (Dick & Jackson, 1983; McGonigle et al., 1982).

Zlömke et al. (1986) recently used a visual blocking procedure in which a large piece of cardboard was held between the subject and the therapist whenever the mildly retarded adult subject engaged in excessive verbalisations. This procedure was easy to implement and alleviated concerns of the therapist regarding a possible aggressive reaction from the subject if the subject were held or restrained in any way. This procedure holds promise then as a practical, less intrusive alternative procedure for use with certain clients.

Gentle Teaching

A philosophy of treatment which has received publicity in New Zealand recently is the Gentle Teaching approach put forward by John McGee (McGee, 1985a; 1985b; 1985c; 1985d; McGee, Menalascino & Menousek, in press; Menalascino & McGee, 1985). The goal of this approach is to teach the client the reinforcing value of social interaction. As this is taught, "bonding" takes place between the client and the therapist, enabling the therapist to gain interactional control over the

client's behaviour. McGee and his colleagues have combined a range of behavioural techniques in this treatment package which is based on differential reinforcement techniques and a non-punitive posture toward behaviour change. Maladaptive behaviours are ignored with the exception of self-injurious or aggressive behaviours where McGee allows interruption or minimal restraint as a last resort to avoid injury to the client or others.

McGee reports that this approach has been successfully applied to 650 clients at the Nebraska Psychiatric Institute over the last five years. The clients were admitted with severe behaviour problems ranging from self-injury and withdrawal to promiscuity and antisocial behaviour and were drawn from all levels of retardation. McGee (1985a) contends that of this treated population, only 13% required one further treatment at this facility and only 5% returned twice. As the average stay at the facility was only 28 days (McGee, 1985a) these results suggest that Gentle Teaching is a powerful treatment approach which warrants further investigation by independent researchers.

Specific Techniques of Gentle Teaching

Gentle Teaching (McGee, 1985; McGee, Menalascino & Menousek, in press; Menalascino & McGee, 1985) is a complex treatment package composed of nine well-validated behavioural techniques (Glynn, 1985). McGee contends that the unique character of the Gentle Teaching lies in its emphasis on a 'humanising and respectful posture' toward mentally retarded persons. The goals of Gentle Teaching are 'bonding' and 'interactional control' and these are achieved by eschewing punitive techniques and focussing on positive reinforcement

strategies to teach the rewarding nature of human interaction. Furthermore, this approach provides for the individualisation of treatment by providing a range of appropriate techniques and encouraging the therapist to select various combinations of techniques as the client and situation demand.

The nine component techniques of Gentle Teaching are:

Step 1). Ignore-redirect-reward (Berkson & Mason, 1964; Favell, McGimsey & Schell, 1982; Horner, 1980) aims to extinguish the maladaptive behaviour by refusing to attend to it while simultaneously directing the client toward a task for which he can be reinforced.

Step 2). Interrupt-ignore-redirect-reward (Azrin & Wesolowski, 1980) adds to Step 1 the option of interruption of a self-injurious or aggressive behaviour to prevent harm occurring to the client, therapist or others. McGee stipulates that this should only be used as a last resort and the interruption should be made in a calm and minimal manner to ensure that the behaviour does not escalate and that as little attention as possible is given to the behaviour.

Step 3). Environmental control (Boe, 1977; Hewitt, 1967; Murphy & Zahm, 1978; Rago, Parker & Cleland, 1978) involves organising resources such as seating arrangements or group composition to maximise the chances of the desired behaviours occurring and make it more difficult for maladaptive behaviours to occur.

Step 4). Stimulus Control (Gold 1972) involves maximising the client's chances of success by choosing appropriate tasks, controlling the materials and tailoring the teaching methods to the skill level or needs of the client at the time.

Step 5). Errorless learning (Crónin & Cuvo, 1979; Foxx & Azrin, 1973; Lambert, 1975; Weeks & Gaylord-Ross, 1981) involves breaking a task into a sequence of steps to make learning easier and giving as much assistance as necessary to ensure success without errors, so enabling the client to earn reinforcement.

Step 6). Shaping and fading (Stokes & Baer, 1977).

Initially the therapist provides intense levels of assistance and reinforcement to keep the client on task but this high level is faded as soon as the client is able to work more independently and still receive reward.

Step 7). Teaching quietly (Gold, 1972) involves limiting the therapist's use of speech to maximise the reinforcing power of the human voice. Initially, the client is directed to a task using gestures and physical prompts with verbal feedback being reserved, as much as possible, for reinforcement. In the early stages, instructions should be minimal with the quantity and complexity of the language used being increased as the client progresses.

Step 8). Assistance envelope (Kazdin, 1980). After the initially high levels of assistance are faded as in Step 6, there is provision for the reinstatement of higher levels of assistance when necessary to redirect the client or provide opportunities to earn reward.

Step 9). Reward envelope (Koegel & Williams, 1980; Williams, Koegel & Egel, 1981). Initially reward is given at a high level to give the client the opportunity to learn the power of verbal and tactile reinforcement. This high rate is systematically faded as in Step 6, with provision being made for reverting to a higher level of reward to keep the client

on task, redirect back to task or provide the opportunity to earn reward.

Significance

Gentle Teaching has received considerable publicity in New Zealand over the past year as the result of John McGee's recent visit and a series of articles which appeared in the journal Mental Handicap in New Zealand (McGee, 1985a; 1986; 1985c; 1985d; Menalascino & McGee, 1985). Apart from articles by Glynn (1985) and Mudford (1985) examining the conceptual bases of Gentle Teaching and relating these to other approaches used in educational and developmental or mainstream applied behaviour analysis respectively, there do not appear to have been other objective evaluations or independent replications of Gentle Teaching in the literature to date. While the component techniques of Gentle Teaching are individually well-validated, there are serious limitations in the research methodology used by McGee and his colleagues (Mudford, 1985). For example, while McGee gives an abundance of informal observations of clients' progress, none of the cases where data are presented include a baseline or control condition. Failure to take baseline data means that inferences of a causal relationship between the treatment and behaviour changes cannot be made as the possibility of extraneous variables influencing the results cannot be discounted (Kazdin, 1982). This major deficiency calls into question the validity of McGee's criteria for judging improvement and indeed the basis of his reported success rate.

A recent study by Mudford (1986) on the acceptability of the visual screening and Gentle Teaching procedures used here indicated that among staff working in psychopaedic

institutions such as the one in which this study was conducted, Gentle Teaching was viewed more favourably although visual screening was viewed as acceptable when combined with reinforcement procedures, as was done in this study.

The aim of this study has been to provide data on the clinical efficacy of Gentle Teaching from a methodologically tight study and to compare its effects with a well-established procedure such as visual screening in the treatment of a prevalent and significant maladaptive behaviour in the mentally retarded population.

As well as assessing the efficacy of each technique in decreasing the rate of stereotypy, a secondary aim was to measure any changes in collateral behaviours such as pro-social interaction with the therapist (evidence of bonding), increases in the rate of on-task behaviour, as well as any changes in a negative direction such as increases in aggression, disruptive behaviours or other forms of stereotypy.

It is hypothesised that while both techniques are likely to be successful in reducing stereotypy, Gentle Teaching is likely to take longer to achieve this reduction as previous research comparing similar (though admittedly less complex) DRO (Differential Reinforcement of Other (behaviour) techniques with screening procedures have found DRO procedures to be the weaker of these techniques (Barrett et al., 1981). It also predicted that an increase in the rate of pro-social behaviours, McGee's evidence of 'bonding', will occur in both treatment techniques although there may be a difference in the magnitude of these changes in favour of Gentle Teaching.

Until this promising but complex treatment package has been systematically evaluated and compared with other proven behavioural techniques across the range of problems treated by McGee using adequate research designs, informed judgements about the merit of Gentle Teaching cannot be made. It is intended in this research to address this issue with regard to the problem of stereotypy.

METHODSubjects

The subjects for this study were three mentally retarded long-term residents of a psychopaedic institution who were selected on the basis of stable high rate stereotypy. Informed consent was obtained from the subjects' parents and the research was approved by the Ethics Committee of the Canterbury Hospital Board.

David

David was a 21-year-old man who had been institutionalised for 12 years. The etiology of his retardation was thought to be perinatal complications and he had been diagnosed prior to his admission to the institution as a childhood psychotic with autistic features. He was profoundly retarded based on AAMD criteria (Grossman, 1983) and obtained an age-equivalent score of 21 months on the Vineland Adaptive Behavior Scales. David had no expressive language and his receptive understanding was limited to simple instructions. David had basic self-care skills as he was able to feed, toilet, dress and wash himself with supervision and occasional assistance. He had demonstrated stereotypic responding from infancy and his predominant responses included head-weaving, hand-regard, hand-sniffing and object stereotypy. These had proved resistant to a verbal reprimand intervention implemented previously on an informal basis. He attended a training unit within his villa but his preference for stereotypy over constructive activity had led to his being overlooked for transfer into a less restrictive villa and vocational placements within the hospital. Furthermore, his

mother reported that David's bizarre behaviours were a source of embarrassment to his family on his regular weekend leave in the community. He received a constant dose of trifluoperazine (Stellazine) 5 mg, 3 times per day for psychotic behaviour throughout the course of the study. In addition, for the last six days of treatment, he received thioridazine (Mellaril) 25 mg, 3 times per day to control an acute psychotic episode.

Kevin

Kevin was a 28-year-old man who had been institutionalised for ten months prior to the commencement of the study. The etiology of his retardation was unknown. He was profoundly retarded based on AAMD criteria (Grossman, 1983), and had obtained an age equivalent score on the Vineland Adaptive Behavior Scales of 9 months. He had no expressive and very limited receptive language and apart from feeding himself, he had no other self-care skills. He was mildly affected by spastic quadriplegia but was mobile and had functional control of all limbs. Kevin had a very long history of stereotypy including finger-flicking (usually with objects) and repetitive vocalisations. No previous interventions had been made to reduce this behaviour and, in fact, the finger-flicking had been accommodated by his parents who provided Kevin with pre-cut "flickers". Kevin did not attend any formal training area at the time of the study and he performed no constructive behaviour when materials were available. He was often destructive, tearing notices and boxes to get materials for his stereotypy and he strongly resisted having these taken from him. Kevin was generally passive though tending to withdraw and avoid contact with others. Kevin received Probanthine (15 mgs, 2 times per day) for digestive discomfort.

Paul

Paul was a 7-year-old boy who had been institutionalised for two years. The etiology of his retardation was thought to be due to cyanosis at birth. He was severely retarded, based on AAMD criteria (Grossman, 1983) and he had obtained an age-equivalent score on the Vineland Adaptive Behaviour Scales of 14 months. Paul had an expressive vocabulary of only one word and his receptive vocabulary was very limited. He was not toilet-trained and apart from feeding himself, had no other self-care skills. He had at least a five year history of stereotypy having been described at an assessment at two years of age as preferring to play with paper to toys. When placed in a structured learning situation Paul would usually try to escape but if prevented from doing so, he would mouth his hand or other objects, perform other stereotypic manipulations with the objects, or stare into space for long periods. If physically directed to perform a structured activity, he would grizzle and scream and occasionally head-butt or bite staff. Paul's stereotypic mouthing and pica made him prone to frequent stomach upsets. Paul had attended an assessment unit until his transfer several months previously to his current villa. No previous interventions had been made to reduce his stereotypy and perhaps as a result of this, he had reportedly made little progress during his time there. He was on no medication.

Experimental Personnel

The experimenters were a post-graduate and four undergraduate psychology students and a student training officer. All experimental personnel had some previous experience in behavioural observation and recording techniques but all

received additional training for this study. All experimenters made in-vivo pre-baseline observations and recordings of several potential subjects and recording and reliability skills were practised using video recordings of the subjects until reliabilities reached greater than 90% levels.

Relevant literature on the use of Visual Screening (Barrett et al., 1981; Dick & Jackson, 1983; McGonigle et al., 1982) and Gentle Teaching procedures (McGee, 1985 a, b, c, d; Menalacino & McGee, 1985) were reviewed and several Gentle Teaching videos were viewed. The procedures were modelled and role-played by the experimenters on each other and in-vivo practice was achieved using the techniques with several residents not included in the study who received these procedures as part of their ongoing treatment. Experimenters worked in pairs, each acting alternately as therapist and observer in sessions, and each pair worked exclusively with their subject throughout the study.

In the final phase for Paul, additional personnel were recruited from the regular nursing staff in the residential unit to act as therapists in addition to the two original therapists (A and B). They were three registered psychopaedic staff nurses, one student nurse and a psychopaedic assistant who each served once, apart from one staff nurse who assisted on two occasions. Training consisted of a brief discussion of the rationale of the study, a review of the behavioural definitions (with particular emphasis on stereotypic behaviours) and demonstration of the Task-training and Visual Screening procedures.

Setting

All subjects were treated in a therapy room (7.6 x 3.8 m) adjacent to the dayroom within the subjects' residential villa. The room was carpeted and furnished with a large table and comfortable upholstered chairs. Treatment sessions for David and Kevin were scheduled for three days per week between noon and 2.30 p.m. while Paul was treated on five days from 2.30 p.m. onwards. During these sessions, the observers were also present in the room.

Functional, age-appropriate tasks (Brown, Branston, Hamre-Nietupski, Pumpian, Certo & Gruenewald, 1979; Reid, Parsons, McCarn, Green, Phillips & Schepis, 1985) were chosen for each subject and these were kept constant throughout all phases of the study. For David and Kevin, the tasks were sanding a breadboard and performing a divisions task (where pieces of cardboard are slotted together to form divisions for packaging materials). Paul's tasks included the sanding task as well as gluing pictures on paper and drawing on paper with a ball point pen.

PROCEDURE

Response Definitions

In addition to stereotypy, the target behaviour, various other behaviours were also recorded so that collateral changes, due to the effects of the treatments, could be measured. Observed behaviours were defined as follows.

Stereotypy was defined for all subjects as consistent, repetitive motor behaviour, excessive or pathological in rate, frequency and/or amplitude, with no apparent adaptive significance (Baumeister, 1978).

A disruptive category was included to measure changes in other maladaptive behaviours such as out of seat

behaviour, irregular seating positions, attacks toward therapist or materials, self-injury and screaming or grizzling.

On-task behaviour was defined as constructive manipulation of materials in the manner directed, without physical guidance by the therapist, and compliance with therapist instructions.

Task-training was defined as active manipulation of materials with full or partial physical guidance by the therapist.

Bonding was defined as smiling directed at the therapist, either spontaneously or in response to the therapist, and secondly as physical approach by the subject to within 0.5 m of the therapist, demonstrating eye-contact (for at least two seconds) and/or shaking hands or touching the therapist.

A sixth category, 'other' behaviour, was to be scored only if none of the above behaviours occurred within the 10-second interval.

Data Collection and Reliability

Each 90-minute treatment period consisted of three 30-minute sessions separated by a brief change-over break. A whole interval recording technique was used to collect the data. Each session was divided into 180 10-second intervals and the end of each 10-second interval was signalled to the observer through an earphone connected to a 10-second beeper. The observer then recorded which of the six behavioural categories had occurred within the interval. In order to equate the free response time for subjects during the Alternating Treatments 1 comparison of

Gentle Teaching and Visual Screening, in the Visual Screening condition, recording was stopped and restarted after each screening was given.

Reliability checks were scheduled for 25% of the sessions and these were distributed evenly across all phases. Checks for observer drift were made on approximately every 12th observation by a further independent observer. The point-by-point agreement method (Kazdin, 1982) was used with an agreement being defined as both observers recording the presence or absence of a response in a category during each 10-second interval. The percentage agreement formula was then used to calculate agreement for occurrences and non-occurrences of each behavioural category. The mean inter-observer agreements for David for occurrences and non-occurrences respectively (with ranges in parentheses) were: stereotypy--93% (73 to 100%) and 96% (74 to 100%); disruptive--99% (80 to 100%) and 99% (96 to 100%), on-task--96% (85 to 100%) and 85% (63 to 100%), task-training--97% (71 to 100%) and 99% (96 to 100%), bonding--89% (67 to 100%) and 99% (92 to 100%), and, finally, other--74% (0 to 100%) and 98% (96 to 100%).

The reliability figures for Kevin were: stereotypy--96% (75 to 100%) and 98% (83 to 100%), disruptive--95% (67 to 100%) and 99% (96 to 100%), on-task--83% (50 to 100%) and 95% (87 to 100%), task-training--90% (65 to 100%) and 85% (61 to 100%), bonding--100% (100%) and 100% (100%) and, lastly, other--78% (11 to 100%) and 93% (82 to 100%).

The corresponding figures for Paul were: stereotypy--96% (73 to 100%) and 92% (57 to 100%), disruptive--96% (77 to 100%) and 94% (67 to 100%), on-task--92% (71 to 100%) and

98% (92 to 100%), task-training--96% (84 to 100%) and 89% (65 to 100%), bonding--98% (75 to 100%) and 99% (98 to 100%), and finally, other--92% (0 to 100%) and 99% (93 to 100%). Only data from the primary observer for each daily session was included in the analysis.

The possibility of results being confounded by inattention to the reliability of the independent variable (Peterson, Homer & Wonderlich, 1982) was accounted for, albeit informally, in this study. Videotapes made for the purpose of inter-observer reliability checks were also used to check the accuracy with which each procedure was being used, and feedback was given to the therapists in an attempt to ensure that the procedures continued to be used in the manner originally specified throughout the course of the study.

Experimental Design

An alternating treatments design (Barlow & Hayes, 1979; Barlow & Hersen, 1984; Kazdin, 1982) was used to evaluate the comparative efficacy of Gentle Teaching and Visual Screening procedures along with a no-treatment control condition. This design was chosen because the counterbalancing of the treatments allowed both treatments to be evaluated simultaneously, avoiding problems of serial effects of treatment which can arise in reversal or multiple baseline designs. Furthermore, the design avoids the need for a reversal phase as once the target behaviour has stabilised in the experimental phase, the most effective treatment can be implemented across sessions in subsequent phases to demonstrate that clinical control has been achieved. To avoid the possible risks of multiple treatment interference due to the subjects failing to discriminate between the treatments, in

addition to the alternation of therapists at each session and the brief changeover break, condition-specific cues were developed and presented to the subjects immediately preceding the appropriate condition. These cues are described below along with details of the procedures used in each condition during the various phases.

The study consisted of the following sequence of phases for all subjects: Baseline, Task-training, Alternating Treatments 1, Alternating Treatments 2 and Visual Screening, with an additional phase, Replication of Effect across Therapists, being completed for Paul.

Baseline Phase. In this phase, observations were conducted during the three daily 30-minute sessions (A,B,C) for all subjects. In this phase and in subsequent no-treatment control sessions, tasks were available and a demonstration of appropriate task behaviour was given to ensure that the subjects had some awareness of what to do with the task should they wish to try but otherwise no experimental manipulations were in effect within these sessions. The discriminative cue for this condition consisted of the therapist announcing " _____ (subject's name), we're going to do some work now - we'll do some sanding and _____ " (the other task, as appropriate for each subject). Each activity was modelled once and then the therapist sat approximately 1 metre from the subject and did not initiate any interaction with the subject unless the subject left his seat, when he was directed back to the table with no consequences given. This phase lasted three days for all three subjects.

Task-training Phase. The effect of actively training the subjects in the task on the rate of stereotypy was

assessed during this phase. For this Task-training condition, the therapist announced "Let's do some work" and immediately directed the subject to one of the tasks. The Task-training procedure used here consisted of standard behavioural techniques such as graduated physical guidance, verbal instructions and the use of verbal and tactile reinforcement contingent upon compliance with therapist directions or on-task behaviour (see Singh & Millichamp, 1987). No consequences followed stereotypy but the subject was directed back to the task. This condition was scheduled for two of the daily sessions with a no-treatment control condition continuing in the third session. This phase lasted for four days for both David and Kevin and seven days for Paul.

Alternating Treatments 1. In this phase, the two treatment conditions, Gentle Teaching and Visual Screening, and the no-treatment control were each assigned a 30-minute session each day in the counterbalanced order described above. The conditions were:

(a) Gentle Teaching. The principle of "Teaching Quietly" was selected as the discriminative stimulus for this condition, being one of the most salient features distinguishing this approach from the other treatments used. The therapist approached the subject and, apart from calling his name once to gain the subject's attention, directions to perform the task were given using gestures and physical prompts, with speech being reserved for enthusiastic praise for compliance with therapist instructions and any approximations toward successful on-task behaviour.

(b) Visual Screening. In the discriminative cue for this condition, the observer modelled the subject's stereotypic

behaviours as the therapist said. "Look _____ (subject's name), when you do this _____ or this _____ or this _____, I will do this to you (and demonstrated the screening procedure applied to the observer) ... Now, let's do some work", immediately directing the subject to a task as in the Task-training condition. The component procedures described in the Task-training condition were continued in this condition with the addition of the Visual Screening procedure. Each occurrence of stereotypy resulted in the subject's eyes being covered by the therapist's hand in such a way as to block the subject's vision totally while the other hand held the back of the subject's head. Screening was scheduled for five seconds but release was contingent upon five seconds of non-disruptive behaviour.

(c) No-treatment control. This condition continued as described above. This phase lasted eight days for David and 10 days for both Kevin and Paul.

Alternating Treatments 2. As the Visual Screening procedure was the most effective treatment for all three subjects, it was implemented in two of the three daily sessions with the no-treatment control occurring in the third session. Counter-balancing was used to determine the order of treatments. This phase lasted for four days for David and Kevin, and five days for Paul.

Visual Screening Phase. In this phase, the most effective treatment was extended to all three sessions each day to establish clinical control over the stereotypic responding. This was the final phase for both David and Kevin and lasted five days for Kevin, six days for Paul and eight days for David.

Replication of Effect Across Therapists Phase. This phase was included for Paul to assess the degree to which the Visual Screening procedure could be effectively used by caregivers other than the experimental personnel. Each day, a member of the regular nursing staff became a new therapist and was alternated with the original therapists, with now three therapists each applying the Visual Screening procedure in one session each per day, in a counter-balanced order. This phase lasted six days.

RESULTS

The percentage of intervals during which stereotypy and the measured collateral behaviours occurred during each of the three daily sessions are presented in Figures 1 to 5 for David, Figures 6 to 10 for Kevin and Figures 11 to 16 for Paul. Each data point was derived by dividing the total number of intervals in which a target behaviour occurred by the total number of intervals observed and multiplied by 100. Tables are presented for each subject showing the mean percentages of these behaviours for each type of session over all phases.

David

Figure 1 shows the rates of stereotypy and bonding behaviours across Baseline and experimental phases. High

Insert Figure 1 about here

stable rates of stereotypy occurred in the baseline and no-treatment control conditions throughout all phases of the study where this condition was implemented. Table 1 presents the mean rates of occurrence for each behavioural category in all conditions across each phase. The mean rate of occurrence of stereotypy during baseline was 96%. The

Insert Table 1 about here

introduction of Task-training procedures led to a moderate reduction in the rate of stereotypy to a 44.7% mean occurrence figure. During the Alternating Treatments 1 phase, the Visual Screening condition was immediately effective in reducing the rate of stereotypy further from the Task-training

Figure 1. The percentage intervals of occurrence of stereotypy and bonding behaviour by David across experimental phases.

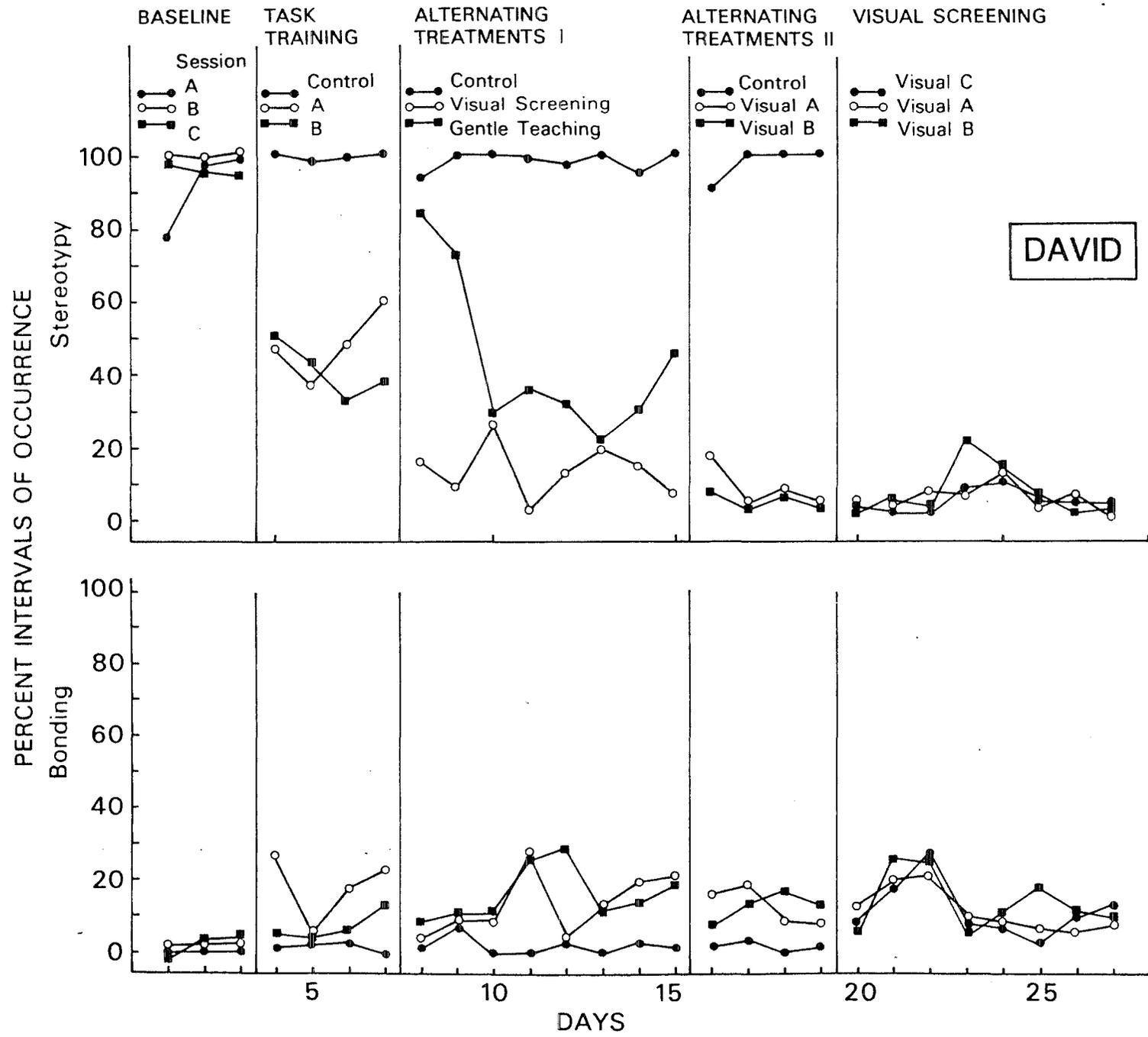


Table 1

Mean Percentage of Occurrence of Behavioural Categories for
David Across Conditions

Experimental phase/Condition	% occurrence of behaviour					
	Stereotypy	Bonding	Disruptive	On-task	Task- training	Other
Baseline						
Sessions A	92	0	0.7	1.3	0	6.7
Sessions B	99	0.3	0	0.3	0	1
Sessions C	97	1.7	0.3	2	0	1
Baseline (\bar{x} ABC)	96	0.7	0.3	1.2	0	2.9
Task-training						
Control	99.3	1.3	0.3	0.5	0	0.8
Task-training A	48	18.5	0.3	62	22.8	2
Task-training B	41.3	7	0	73.5	17.3	4
Task-training (\bar{x} AB)	44.7	12.8	0.2	67.8	20.1	3.2
Alternating Treat- ments I						
Control	98.1	2	2.9	0.8	0	0.4
Gentle Teaching	44	16	0.1	81.4	8.9	2
Visual Screening	13.5	13.4	0.5	87.5	5.3	3.1
Alternating Treat- ments II						
Control	97.8	1.8	0	4	0	0
Visual A	8.8	13.3	4.3	83	4.8	5.3
Visual B	5.8	13	0.5	90.8	8.5	2.8
Visual (\bar{x} AB)	7.3	13.2	2.4	86.9	6.7	4.1
Visual Screening						
Visual A	6.3	11.5	0	89.8	5.6	4
Visual B	7.4	14.6	0.6	85.3	6.6	5.5
Visual C	5.8	12	0.5	89.3	7.1	3.6
Visual (\bar{x} ABC)	6.5	12.7	0.4	88.1	6.4	4.4

condition to a mean rate of 13.5%. Initially the Gentle Teaching condition saw several high data points but by the third day of this phase, the occurrence rate had stabilised at levels around that of the Task-training condition, with a mean of 44%. As Visual Screening was clearly the more effective procedure, this condition was implemented in two of the three sessions in the Alternating Treatments 2 phase, reducing the mean rate of stereotypy to 7.3%. Finally, in the Visual Screening phase, Visual Screening occurred in all three sessions and the mean rate of occurrence remained at a similar level at 6.5% in spite of more variability being evident in this phase.

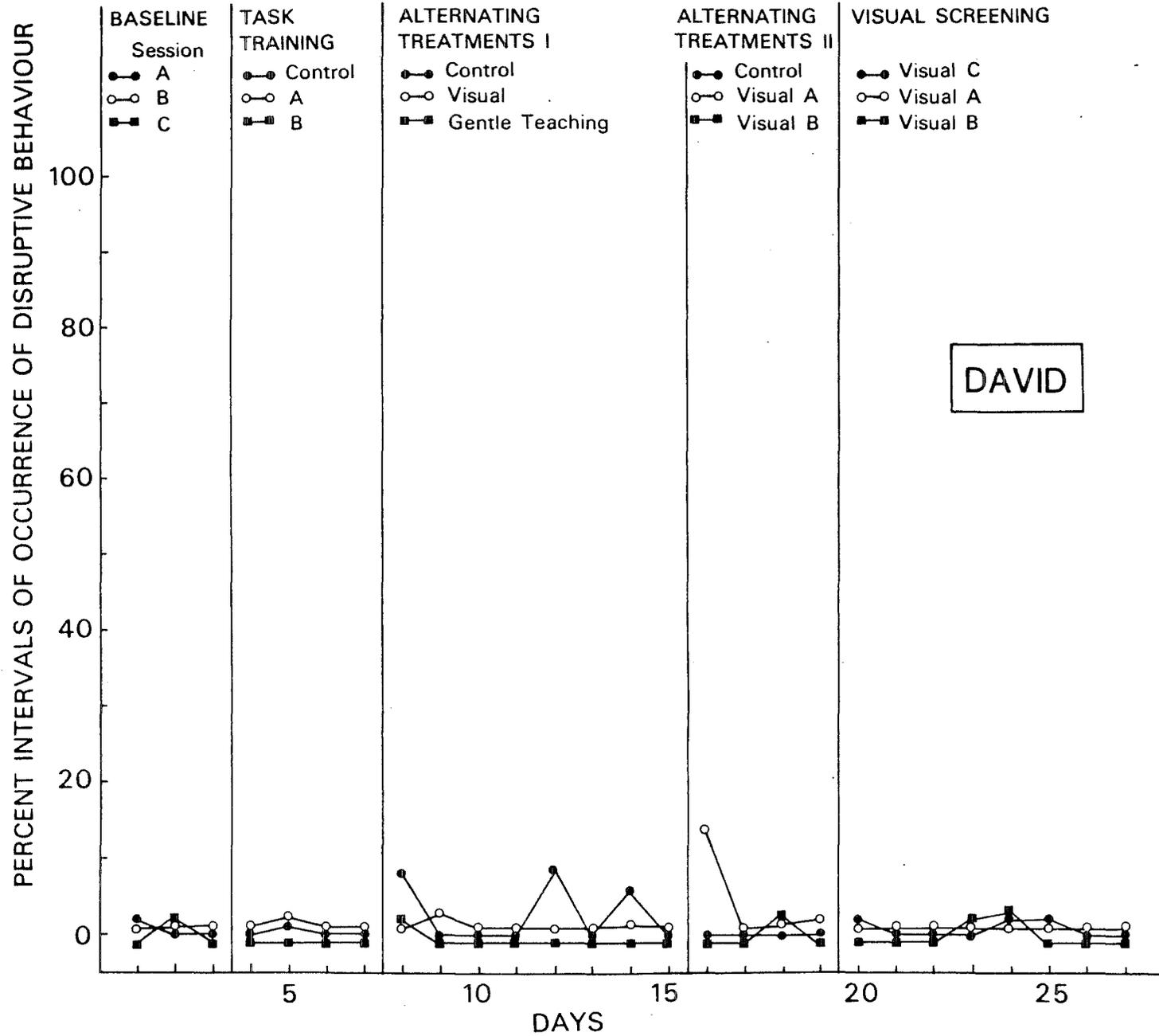
Bonding remained at near zero levels during Baseline and the no-treatment control conditions but it increased and stabilised at a low moderate level in all treatment conditions with no clear differences between the treatment procedures being evident. The mean rates were 12.8% in Task-training, 16% for Gentle Teaching and 13.4% for Visual Screening during the Alternating Treatments 1 phase and 13.2% and 12.7% during the latter two phases where Visual Screening was the only treatment given.

Disruptive behaviour occurred at near zero levels for this subject as can be seen from Figure 2 and there were no differences evident between the various treatment conditions used.

Insert Figure 2 about here

On-task behaviour was at near zero levels during Baseline and in the no-treatment control sessions but increased during the Task-training phase to a mean rate of occurrence

Figure 2. The percentage intervals of occurrence of disruptive behaviour by David across experimental phases.



of 67.8% and increased again in the first Alternating Treatments phase to a very high and comparatively stable level (see Figure 3). The mean rate of on-task behaviour in the

Insert Figure 3 about here

Gentle Teaching condition was 81.4% while the Visual Screening mean was 87.5% in this phase and 86.9% and 88.1% in subsequent phases.

Task-training demonstrated an inverse relationship with on-task behaviour with the amount of Task-training required reducing as David learned the task and was able to perform it independently from the Task-training phase onward. The peak occurrence of this behavioural category, as can be seen from Figure 4 occurred in the Task-training phase with a

Insert Figure 4 about here

mean occurrence of 20.1%, thereafter decreasing in the next phase to 8.9% in the Gentle Teaching condition and 5.3% in the Visual Screening condition, with similar mean rates occurring in subsequent phases in Visual Screening conditions of 6.7% and 6.4%.

As can be seen from Figure 5, the 'other' behaviour category was rarely scored with the mean occurrences in all

Insert Figure 5 about here

conditions across all phases being less than 5% although there was a very slight upward trend toward the end of the study.

In the final Visual Screening phase, from session 22 onward, the data in all behavioural categories became somewhat

Figure 3. The percentage intervals of occurrence of on-task behaviour by David across experimental phases.

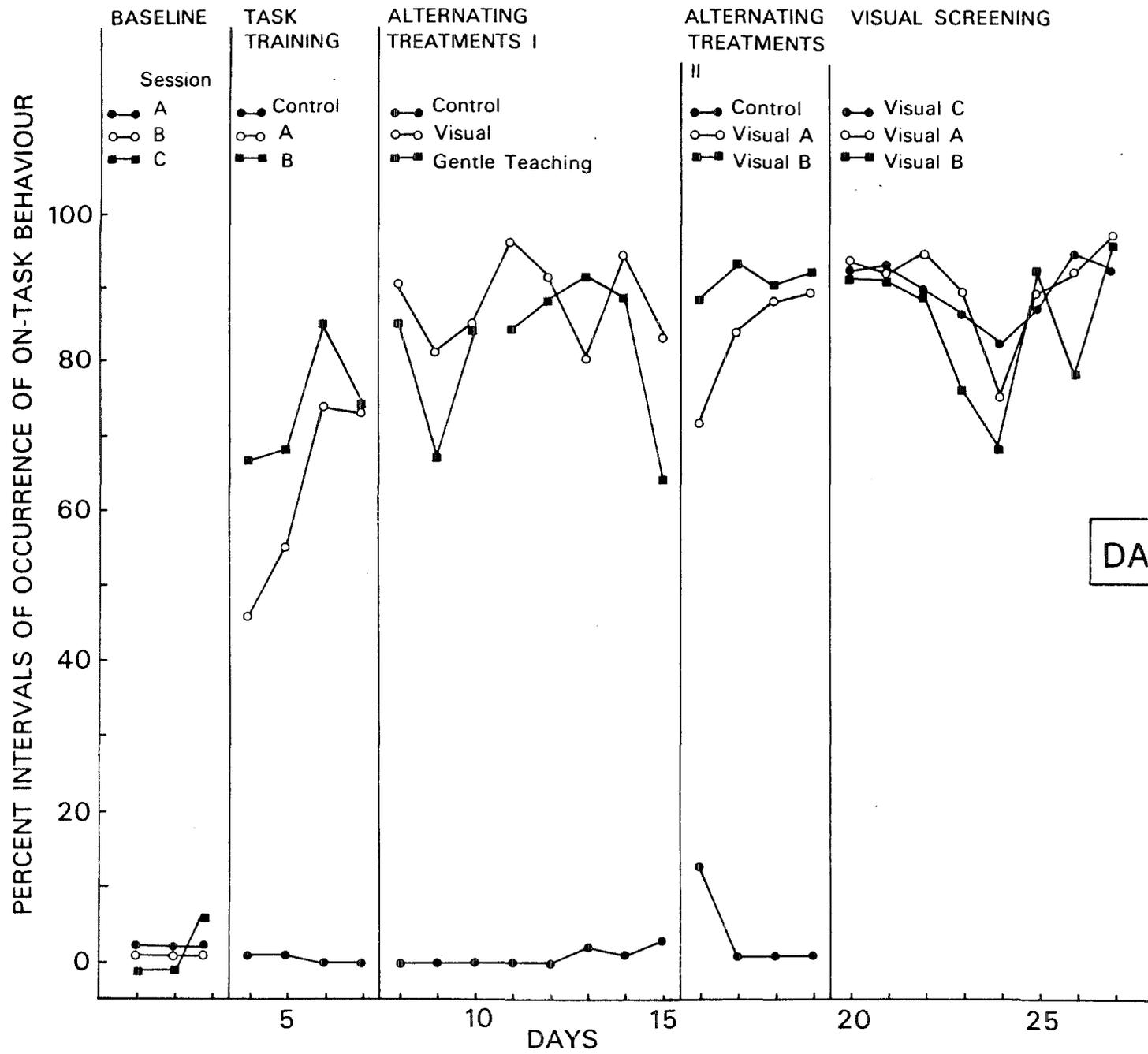


Figure 4. The percentage intervals of occurrence of task-training behaviour by David across experimental phases.

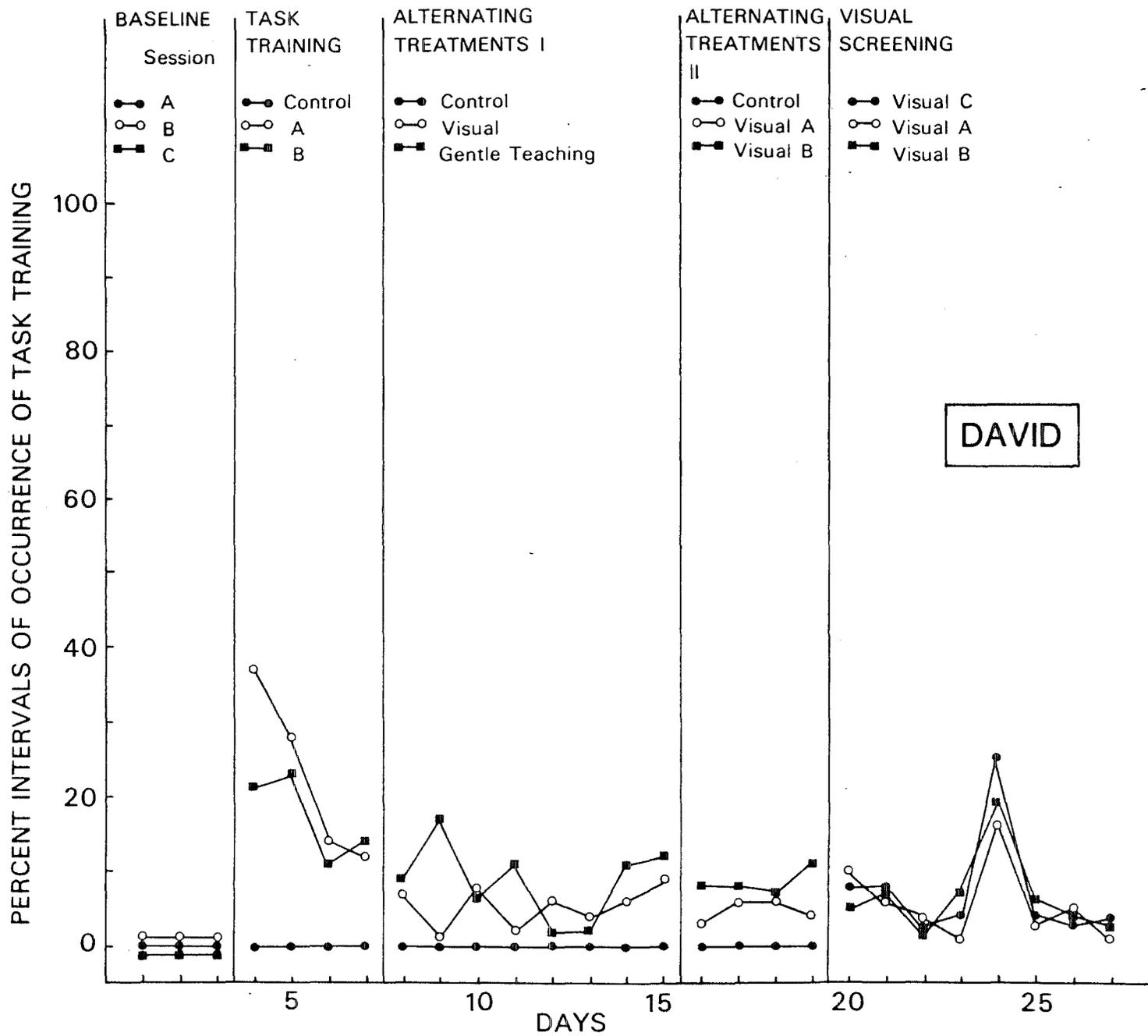


Figure 5. The percentage intervals of occurrence of other behaviour by David across experimental phases.

more variable, as can be seen in Figures 1 to 5, which display the daily data. Disruptions were evident as small but marked increases in the rate of stereotypy and in the amount of Task-training given. There were corresponding decreases in bonding and on-task behaviours observed, however, in all categories, the rates stabilised around their previous levels by the end of the phase.

Details of the applications of the Visual Screening procedure indicate that the mean number of times that David was screened reduced substantially as the study progressed. The mean duration of screening reduced only slightly from 6.2 seconds in Alternating Treatments 1, to 5.96 seconds in Alternating Treatments 2 and then 5.6 seconds in Visual Screening. The mean number of screenings per session in each phase (with the ranges of the durations in parentheses) were as follows: Alternating Treatments 1--22.6 (5-20 sec), Alternating Treatments 2--12.1 (5-19 sec) and Visual Screening--14.2 (5-20 sec).

Kevin

Figure 6 shows the rates of stereotypy and bonding behaviours across Baseline and experimental phases. High and stable rates of stereotypy occurred during Baseline and

Insert Figure 6 about here

in the no-treatment control conditions. The mean rates of occurrence for all behavioural categories across each phase for Kevin are presented in Table 2. The mean rate of

Insert Table 2 about here

stereotypy during Baseline was 93.9%, however with the introduction of the Task-training condition in the following

Figure 6. The percentage intervals of occurrence of stereotypy and bonding behaviour by Kevin across experimental phases.

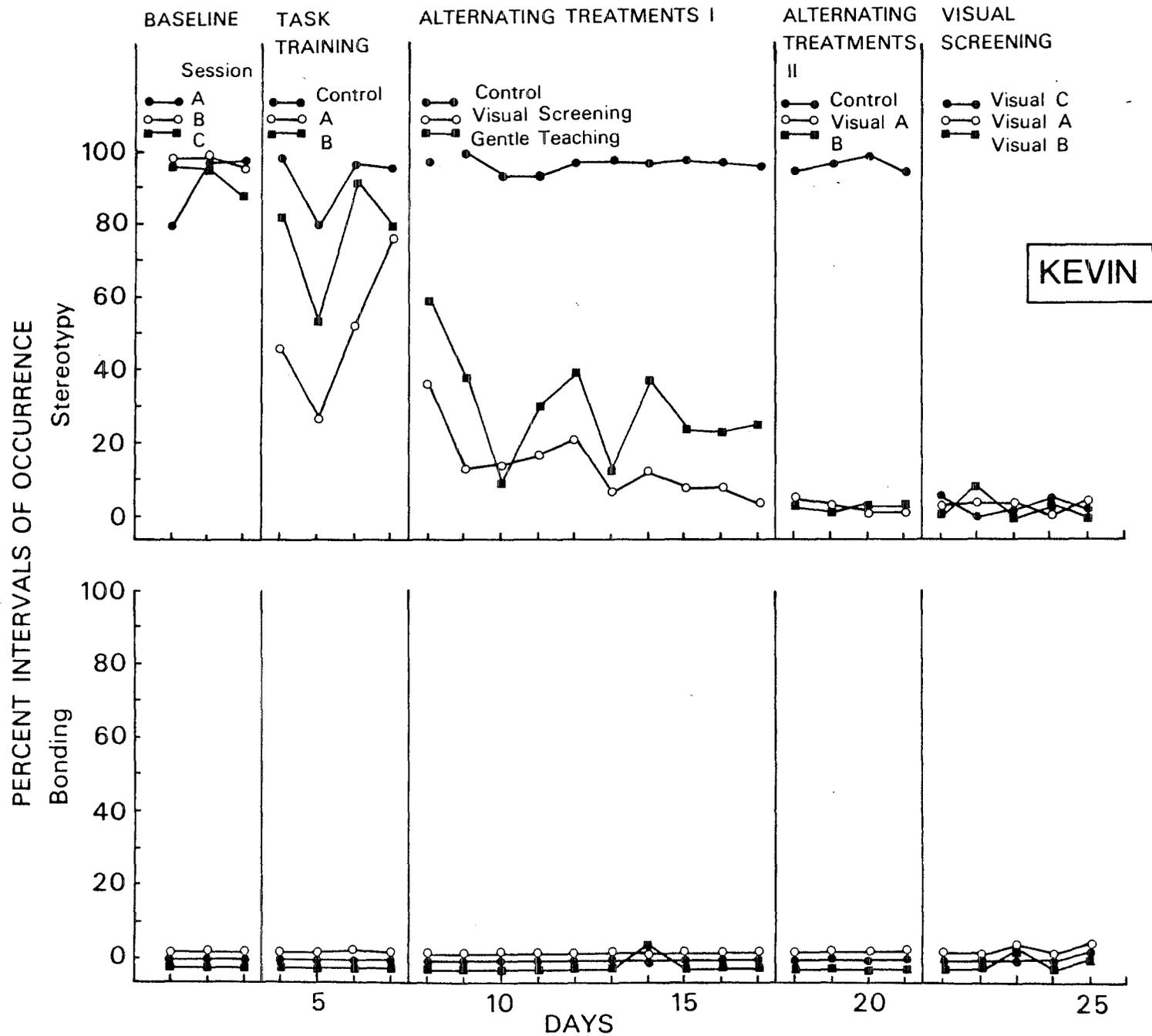


Table 2

Mean Percentage of Occurrence of Behavioural Categories for
Kevin Across Conditions

Experimental phase/Condition	% occurrence of behaviour					
	Stereotypy	Bonding	Disruptive	On-task	Task- training	Other
Baseline						
Sessions A	91	0	9.3	1.7	0	8.3
Sessions B	97	0	2.3	1	0	2.3
Sessions C	93.7	0	7.7	0.7	0	3
Baseline (\bar{x} ABC)	93.9	0	6.4	1.1	0	4.5
Task-training						
Control	92	0	8.5	0.8	0	6.3
Task-training A	50.3	0.3	9.8	17	31.5	14.5
Task-training B	76.5	0	11	7.5	37.8	5.8
Task-training (\bar{x} AB)	63.4	0.2	10.4	12.3	34.7	10.2
Alternating Treat- ments I						
Control	96.5	0	0.5	0.8	0	3
Gentle Teaching	29.8	0.1	2.3	10.2	52	24
Visual Screening	14	0.1	3.2	15.3	55.4	21.6
Alternating Treat- ments II						
Control	96.5	0	0	0.3	0	3.5
Visual A	2.5	0.3	0.3	15.3	57	32.3
Visual B	2.5	0	0	18	66.5	24.3
Visual (\bar{x} AB)	2.5	0.2	0.2	16.7	61.8	28.3
Visual Screening						
Visual A	1.8	0.4	1	20.6	54.2	30.4
Visual B	3.3	0.4	0.8	18.2	62.4	25.6
Visual C	1.8	0.2	0.6	21	56.6	28.2
Visual (\bar{x} ABC)	2.3	0.3	0.8	19.9	57.7	28.1

phase, the mean rate dropped to 63.4%. After an initial increase in this phase, the rate of the target behaviour began to revert toward the Baseline levels and so the next phase, Alternative Treatments 1, was introduced. In this phase, both treatments produced greater reductions in stereotypic responding when compared to the Task-training phase. However, stereotypic responding was consistently lower during Visual Screening than during Gentle Teaching, with the one exception being on day 10 when Kevin actually dozed off during the Gentle Teaching condition. The means reflect the differential effectiveness of the two treatments with the mean rate of occurrence of stereotypy during Gentle Teaching being 29.8% while Visual Screening achieved a rate half of that, at 14%. The mean rate dropped even further to 2.5% in the second Alternating Treatments phase where, as Visual Screening was again the more effective treatment, it was implemented in two of the three sessions. In the final Visual Screening phase, with visual screening being the sole treatment, the mean rate remained at this very low level at 2.3%.

Bonding remained at near zero levels throughout the study in all treatment conditions, as can be seen from Figure 6.

Figure 7 shows the intervals of occurrence of disruptive behaviour in each condition across all phases.

Insert Figure 7 about here

From a mean rate of occurrence of 6.4% during Baseline, disruptive behaviour increased slightly to 10.4% before dropping to 2.3% in the Gentle Teaching and 3.2% in the Visual Screening conditions of the Alternating Treatments 1 phase and then

Figure 7. The percentage intervals of occurrence of disruptive behaviour by Kevin across experimental phases.

to less than 1% for each of the last two phases where Visual Screening alone was in effect.

On-task behaviour occurred at near zero rates during Baseline and no-treatment control conditions, as can be seen from Figure 8. During the Task-training phase, the mean rate

Insert Figure 8 about here

for on-task behaviour was 12.3% while in the Alternating Treatments phase 1, the Gentle Teaching mean of 10.2% and Visual Screening mean of 15.3% were at a similar level. In the final two phases the mean rate of occurrence of on-task behaviour during Visual Screening conditions was 16.7 and then 19.9% respectively.

As the rate of on-task behaviour remained so low, more Task-training was required to engage Kevin in the task. This category increased from 34.7% in the Task-training phase

Insert Figure 9 about here

to 52% for the Gentle Teaching and 55.4% for the Visual Screening conditions in the Alternating Treatments 1 phase. The rate of Task-training given remained at this moderate level in the Alternating Treatments 2 phase with a mean rate of 61.8% but dropped slightly in the Visual Screening phase to a 57.7% mean.

Significantly, the 'other' behaviour category increased in rate of occurrence as the phases progressed, as can be clearly seen in Figure 10. In the Baseline phase,

Insert Figure 10 about here

the 'other' category occurred at a mean rate of 4.5%,

Figure 8. The percentage intervals of occurrence of on-task behaviour by Kevin across experimental phases.

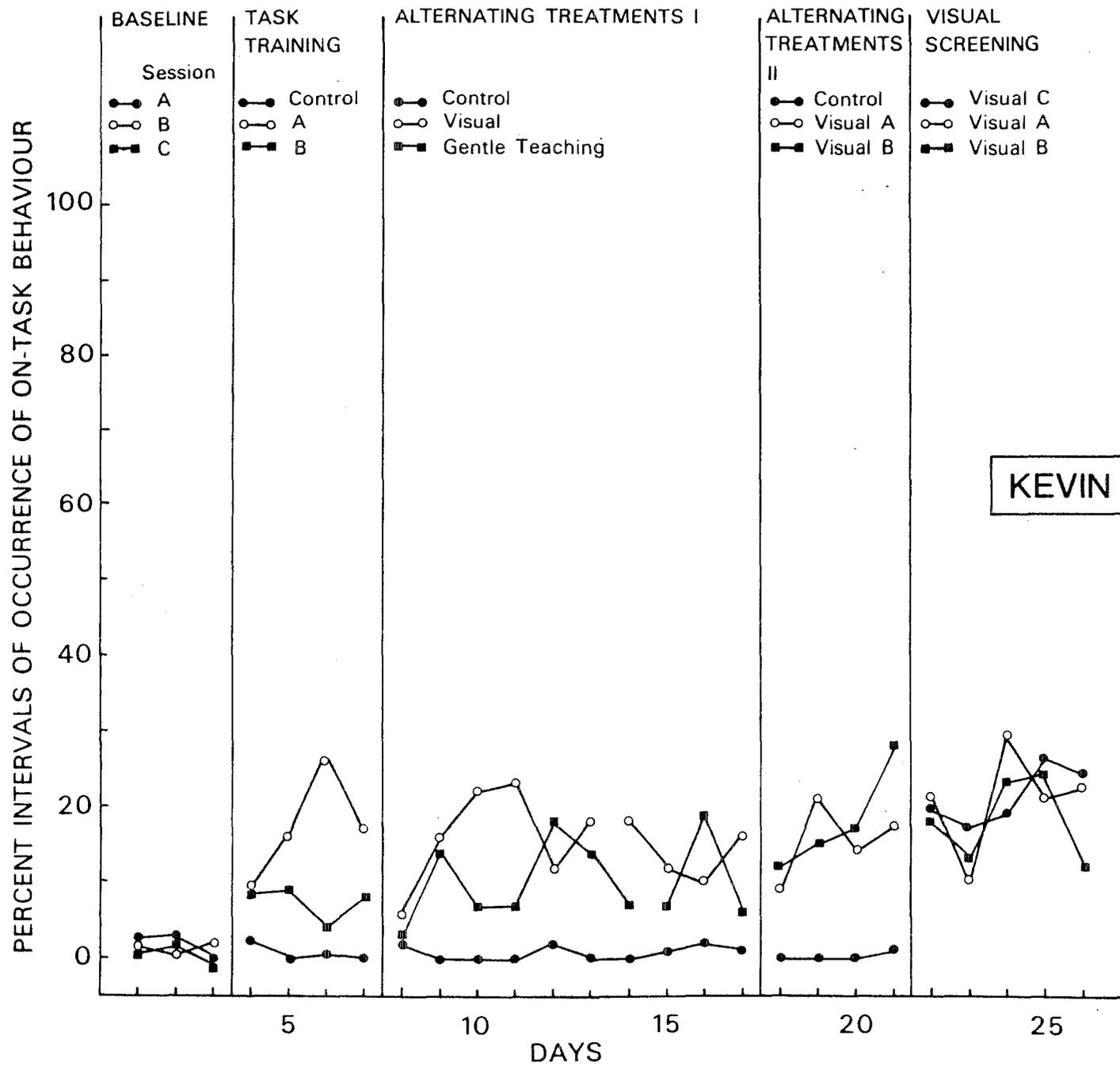


Figure 9. The percentage intervals of occurrence of task-training behaviour by Kevin across experimental phases.

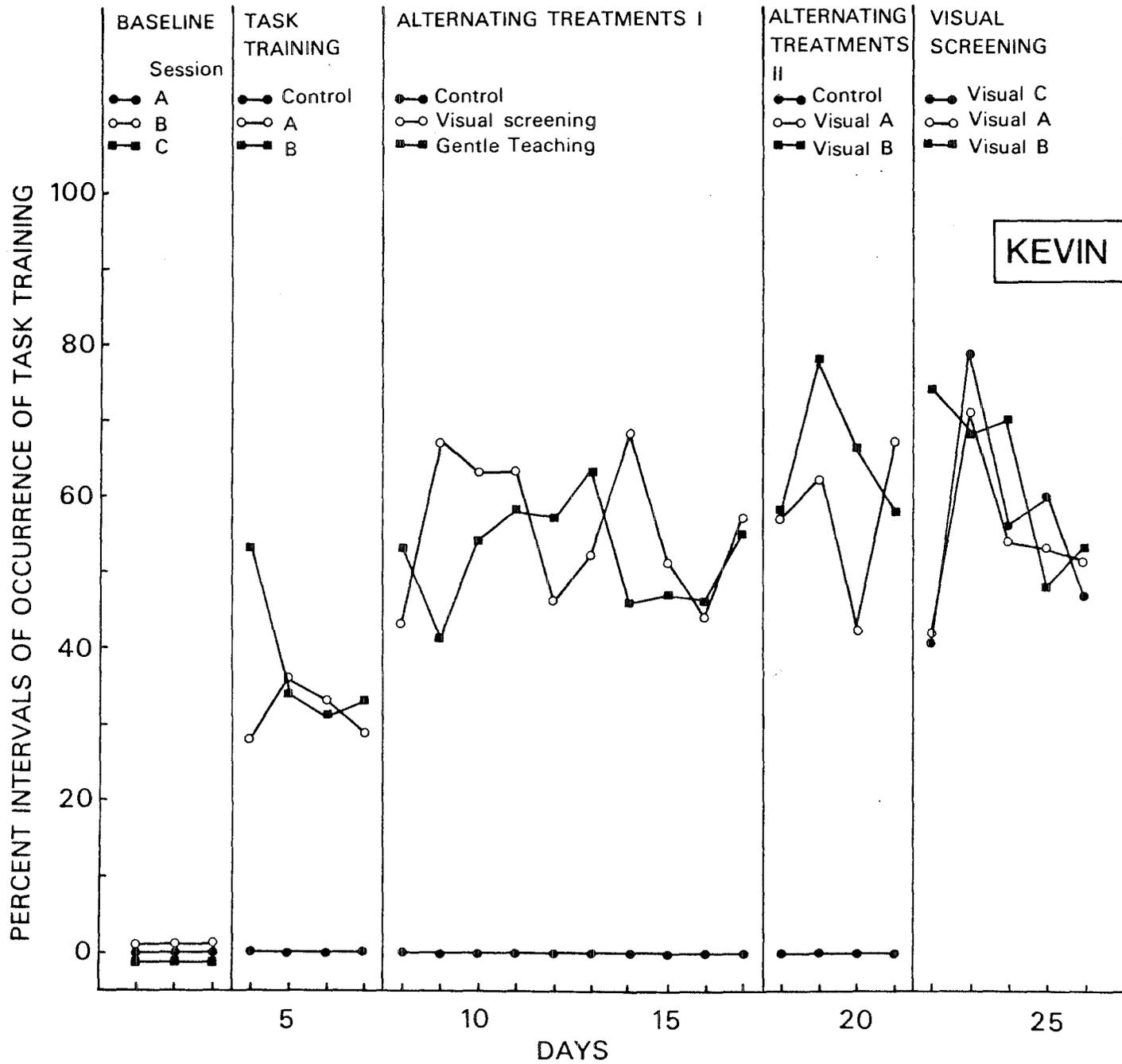
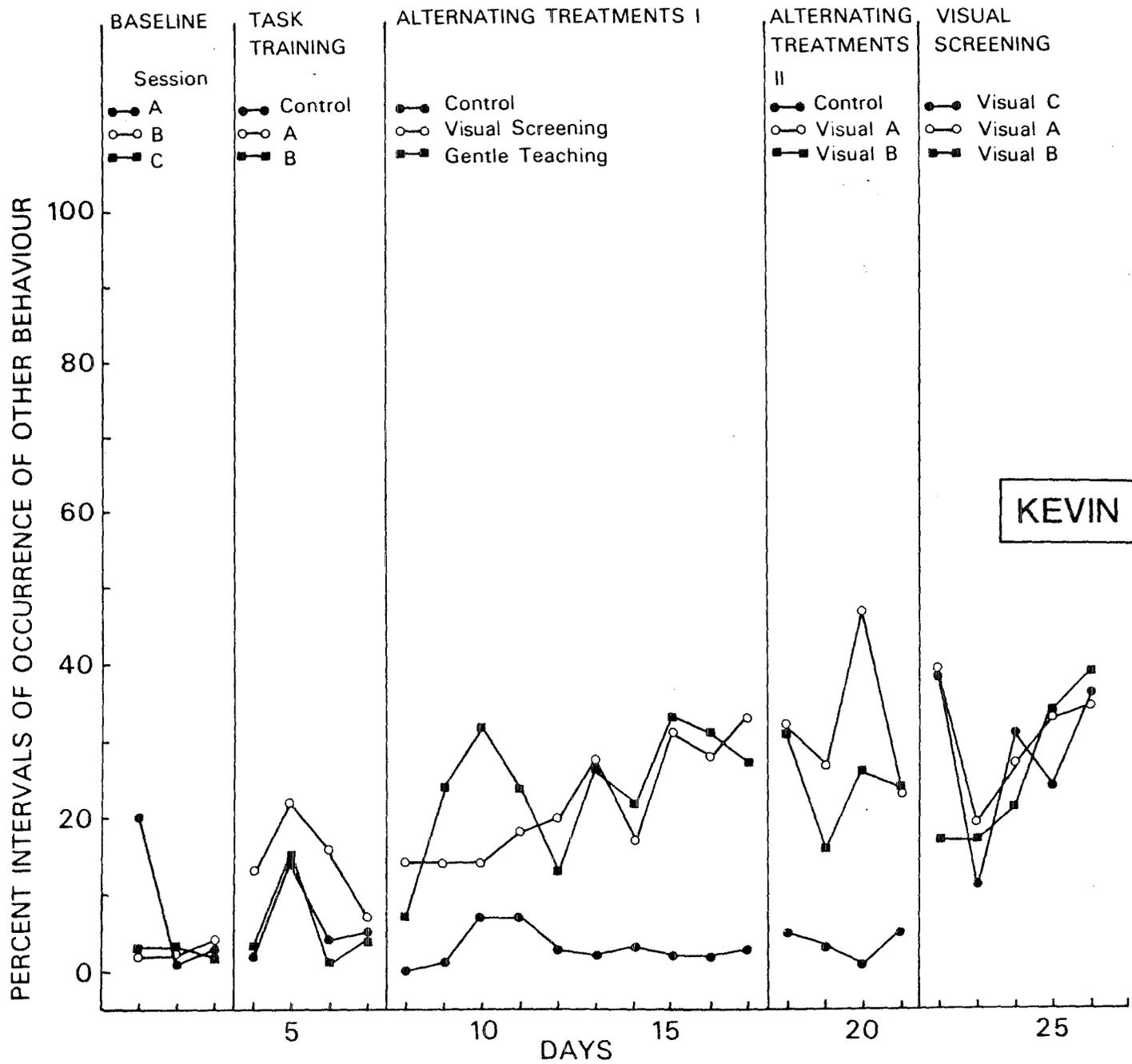


Figure 10. The percentage intervals of occurrence of other behaviour by Kevin across experimental phases.



increasing in the Task-training phase to 10.4%. During the Alternating Treatments 1 phase, the Gentle Teaching mean was 24% while 'other' behaviour occurred at a mean rate of 21.6% in the Visual Screening condition. In the Alternating Treatments 2 phase, 'other' behaviour occurred at a mean rate of 28.3% and remained at this level at 28.1% in the Visual Screening phase.

Details of the applications of the Visual Screening procedure indicate that the mean number of times that Kevin was visually screened reduced dramatically as the study progressed. The mean duration of the screenings reduced only slightly from 7.9 seconds in Alternating Treatments 1 to 6.6 seconds in the Visual Screening phase. The mean number of visual screenings per session in each phase (with the range of the durations in parentheses) were: Alternating Treatments 1--25 (5-30 sec), Alternating Treatments 2--4.4 (5-15 sec), and Visual Screening--3.4 (0-20 sec).

Paul

Figure 11 shows the rate of stereotypy and bonding behaviours across Baseline and experimental phases for Paul.

Insert Figure 11 about here

The rates of stereotypy during Baseline and in the no-treatment control conditions in the other phases where this was used were high and fairly stable. Table 3 gives the mean rates of

Insert Table 3 about here

occurrence for each behavioural category in each condition across all phases. In the Replication Across Therapists phase, as there was little overall variation in the results

Figure 11. The percentage intervals of occurrence of stereotypy and bonding behaviour by Paul across experimental phases.

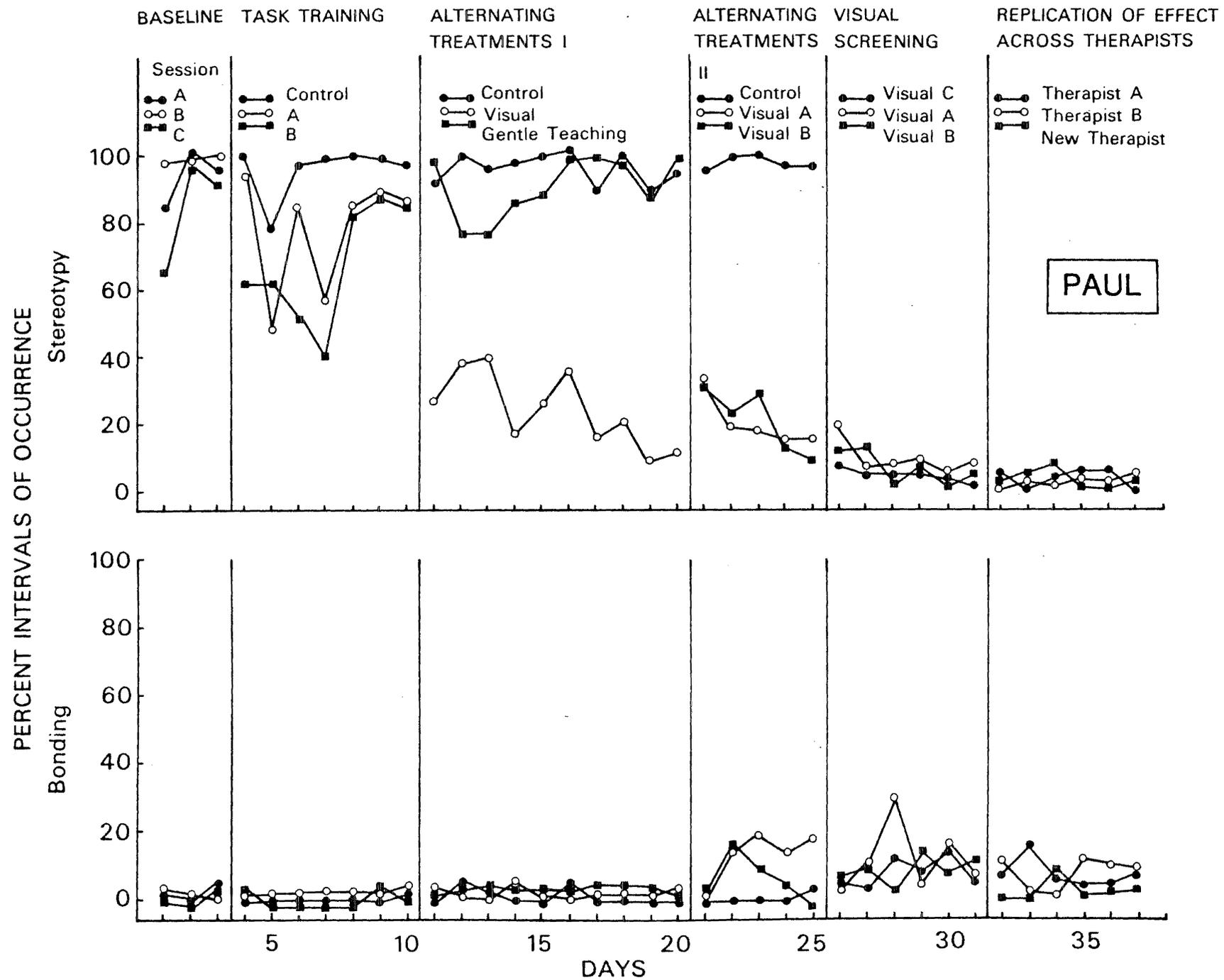


Table 3

Mean Percentage of Occurrence of Behavioural Categories for
Paul Across Conditions

Experimental phase/Condition	% occurrence of behaviour					
	Stereotypy	Bonding	Disruptive	On-task	Task- training	Other
Baseline						
Sessions A	93.7	1.3	80.7	1.7	0	0
Sessions B	99.3	0.3	89.7	3	0	0
Sessions C	85.3	1.3	88	5	0	0.7
Baseline (\bar{x} ABC)	92.8	0.8	86.1	3.2	0	0.2
Task-training						
Control	95.9	0.3	97.7	1.9	0	0.1
Task-training A	77.6	0.9	58.6	13.6	34	0.3
Task-training B	67.7	0.6	68.7	13	31.1	0.9
Task-training (\bar{x} AB)	72.7	0.8	63.7	13.3	32.6	0.6
Alternating Treat- ments I						
Control	96.4	0.5	93.6	1.1	0	0.4
Gentle Teaching	90.8	2.3	22.8	14.8	58.9	0.7
Visual Screening	24.1	1.2	54.6	11.3	52.9	3.8
Alternating Treat- ments II						
Control	98	0.6	97.6	0.4	0	0
Visual A	19.6	13	30.8	18	49.6	5.4
Visual B	21.2	6.2	44.6	9.8	50	2.8
Visual (\bar{x} AB)	20.4	9.6	37.7	13.9	49.8	4.1
Visual Screening						
Visual A	9.1	11.5	21.3	10.6	58.3	10.5
Visual B	7.3	8.5	29	7.5	53.6	12.3
Visual C	5	7.8	27	8.2	50.8	15.2
Visual (\bar{x} ABC)	7.1	9.3	25.8	8.8	54.2	12.7

Table 3 continued

Experimental phase/Condition	% occurrence of behaviour					
	Stereotypy	Bonding	Disruptive	On-task	Task- training	Other
Replication across Therapists						
Therapist A	3.5	7.5	33.7	6.5	58.3	11.7
Therapist B	2.5	7.2	33.5	10.3	48.2	17.8
New Therapist	3.8	2.7	11	7.7	71	11.3
Original Therapists (x AB)	3	7.4	33.6	8.4	53.3	14.8

obtained by the five new therapists, the daily rates of behaviour were collapsed and the mean percentage obtained was presented as the new therapists condition. The data for the two original therapists were also averaged and was presented as the mean for the original therapists in Table 3.

The mean rate of stereotypy during Baseline was 92.8%. In the Task-training phase, stereotypy initially reduced quite dramatically with the Task-training treatment, however the rate soon recovered and approached near Baseline levels (see Figure 11). The mean rate of occurrence during this phase was 72.7%. In the Alternating Treatments 1 phase, the Gentle Teaching treatment initially saw a slight reduction but after the third day of this treatment, the rate of stereotypy in this condition rose to very high rates, on three occasions equalling or being higher than the no-treatment control results. In contrast, Visual Screening was immediately more effective than the previously lowest levels achieved during the Task-training phase and the responding continued to show a downward trend throughout this phase. The mean rates of stereotypy during this phase were 90.8% for the Gentle Teaching condition and 24.1% during the Visual Screening treatment. Once again, as Visual Screening was the most effective treatment, this procedure was implemented in two of the three daily sessions in the Alternating Treatments 2 phase reducing the mean rate to 20.4% and then reducing the rate still further in the three daily sessions of the Visual Screening phase to 7.1%. In the final phase for Paul, Replication of Effects Across Therapists, the mean rate of stereotypy in sessions taken by the two original therapists was reduced even further to 3%. The addition of a number of new

therapists did not affect the rate of stereotypy which remained at the same low level with a mean rate across the sessions taken by the new therapists of 3.8% being achieved.

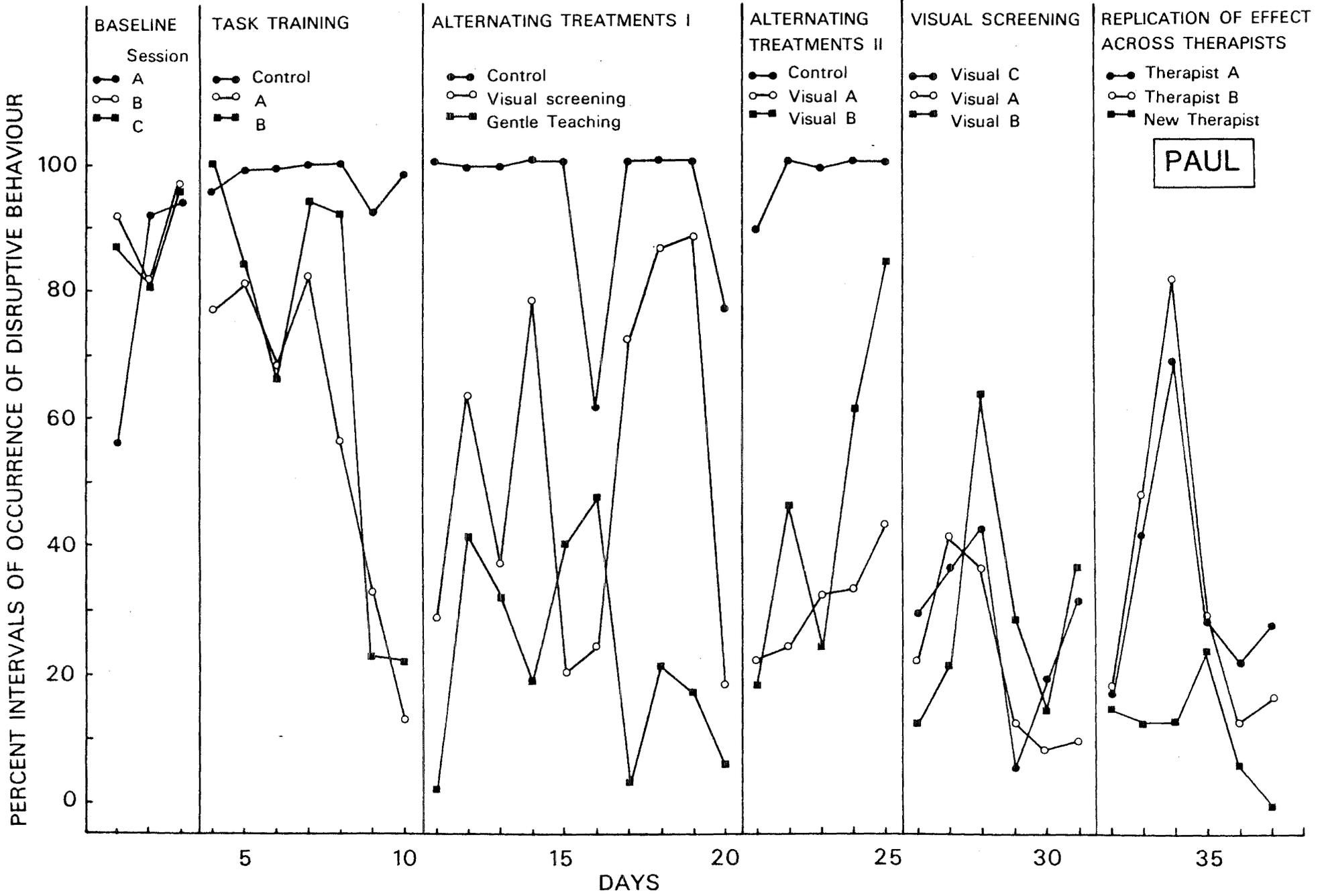
Bonding behaviour remained at near zero levels throughout the Baseline and no-treatment control sessions and in the Task-training phase, increasing slightly in the Alternating Treatments 1 phase in both treatment conditions but only increasing, by any substantial amount, in the Alternating Treatments 2 phase where Visual Screening conditions were in effect in two of the three daily sessions (see Figure 11). From Table 3, we see that the mean rate of bonding during this phase was 9.6% and it remained at around this level in the Visual Screening and Replication of Effects across Therapists phases with mean rates of occurrence of 9.3% and 7.4% (for the original therapists), respectively. The rate of bonding behaviour in sessions where the new therapists were utilised was somewhat lower at a mean rate of occurrence of 2.7%.

The rate of disruptive behaviour was variable from day to day but it occurred at high levels in the Baseline and no-treatment control conditions, as can be seen from Figure 12.

Insert Figure 12 about here

While the variability persisted throughout the study, a general downward trend can be seen in Figure 12 and is evident from the means table for Paul. The mean rate of occurrence of disruptive behaviour during Baseline was 86.1% and this was followed by a marked reduction in the Task-training phase where a mean of 63.7% was obtained. The Alternating Treatments 1 phase saw a clinically significant

Figure 12. The percentage intervals of occurrence of disruptive behaviour by Paul across experimental phases.



difference between the two treatment conditions with the Gentle Teaching mean rate of occurrence being a low 22.8% compared to the Visual Screening mean of 54.6%. As Visual Screening was implemented across two of the three sessions in the next Alternating Treatments phase, the mean rate of disruptive behaviour began to decrease in this condition to 37.7% and this continued in the Visual Screening phase with a mean of 25.5% being achieved. In the final phase, the Replication of Effects Across Therapists, the mean rose slightly to 33.6% for the original therapists although the rate for the new therapists (the regular nursing staff) was the lowest obtained across all phases at 11%.

On-task behaviour occurred at near zero levels throughout Baseline and the no-treatment control sessions, as Figure 13 shows. The Task-training phase saw an increase

Insert Figure 13 about here

to a mean rate of 13.3% occurrence of on-task behaviour and there was little progress beyond this level in subsequent phases. Table 3 shows that the mean rate of occurrence in the Gentle Teaching condition was 14.8% while the Visual Screening mean was 11.3% and in the Alternating Treatment 2 phase, the mean rose slightly to 13.9% before dropping back to 8.8% in the Visual Screening phase. Finally, in the Replication Across Therapists phase, the mean rate for on-task behaviour remained at this level with the rate for the original therapists being 8.4% while the new therapists achieved a 7.7% mean. Figure 14 shows the percent intervals

Insert Figure 14 about here

Figure 13. The percentage intervals of occurrence of on-task behaviour by Paul across experimental phases.

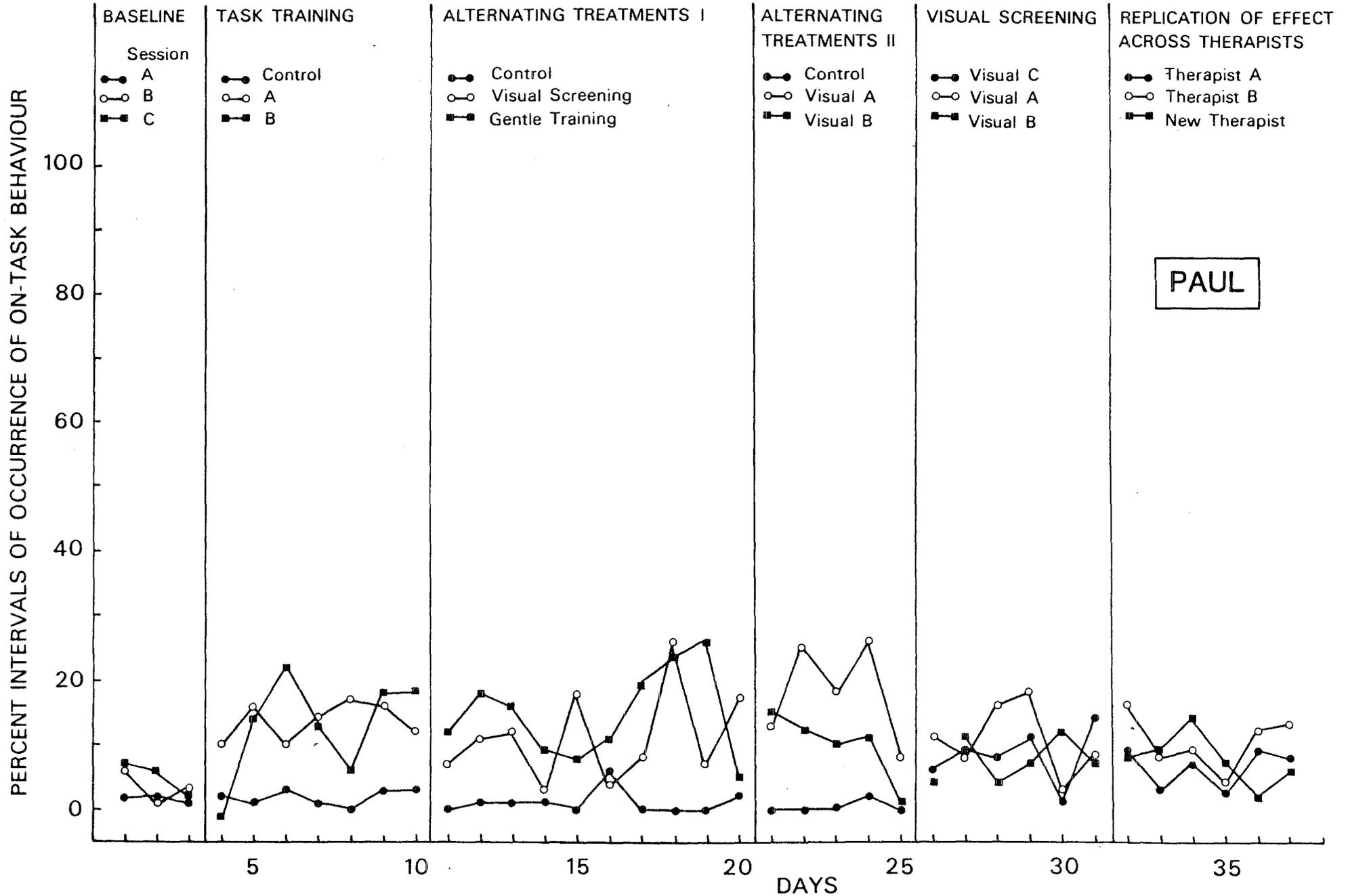
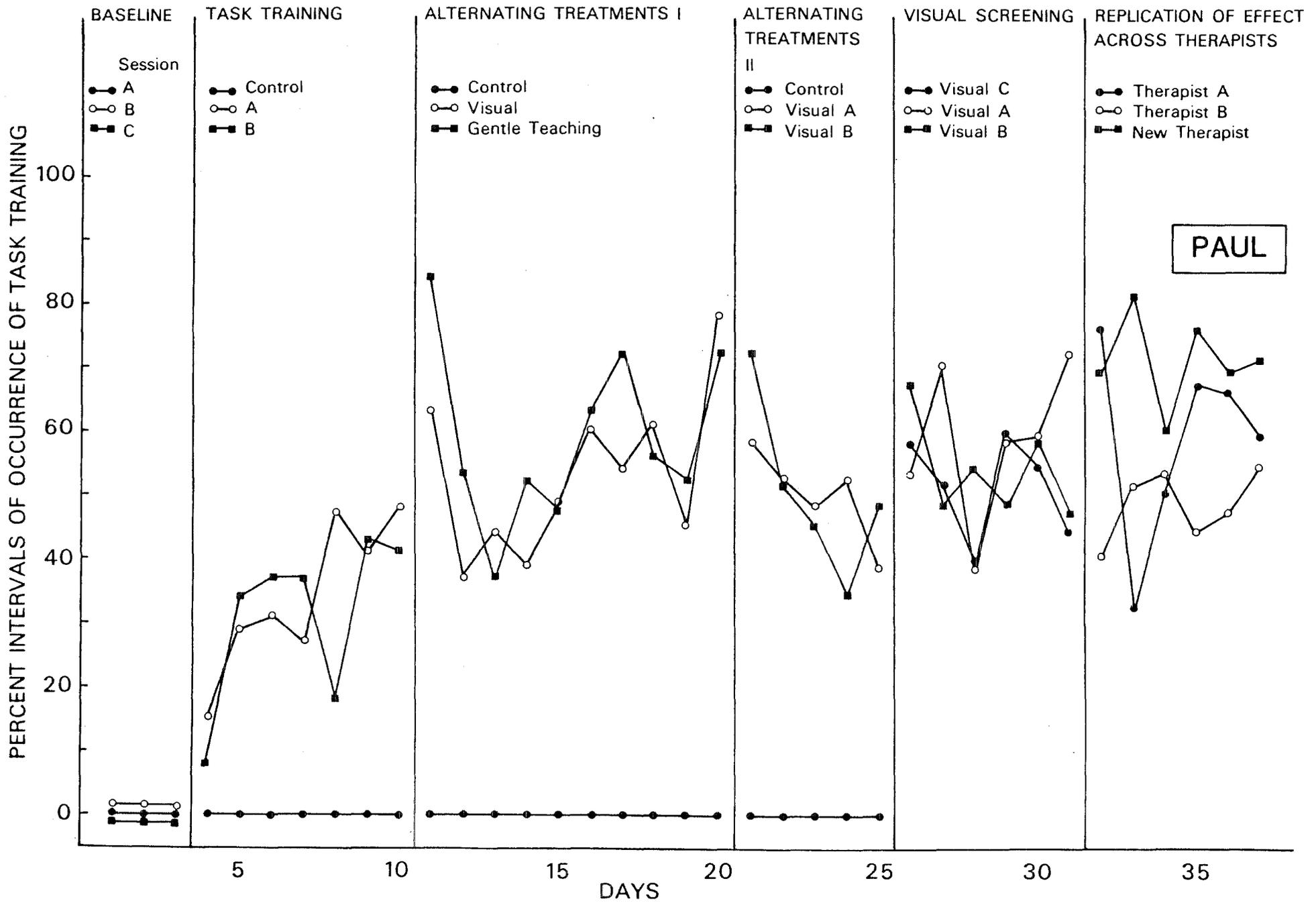


Figure 14. The percentage intervals of occurrence of task-training behaviour by Paul across experimental phases.



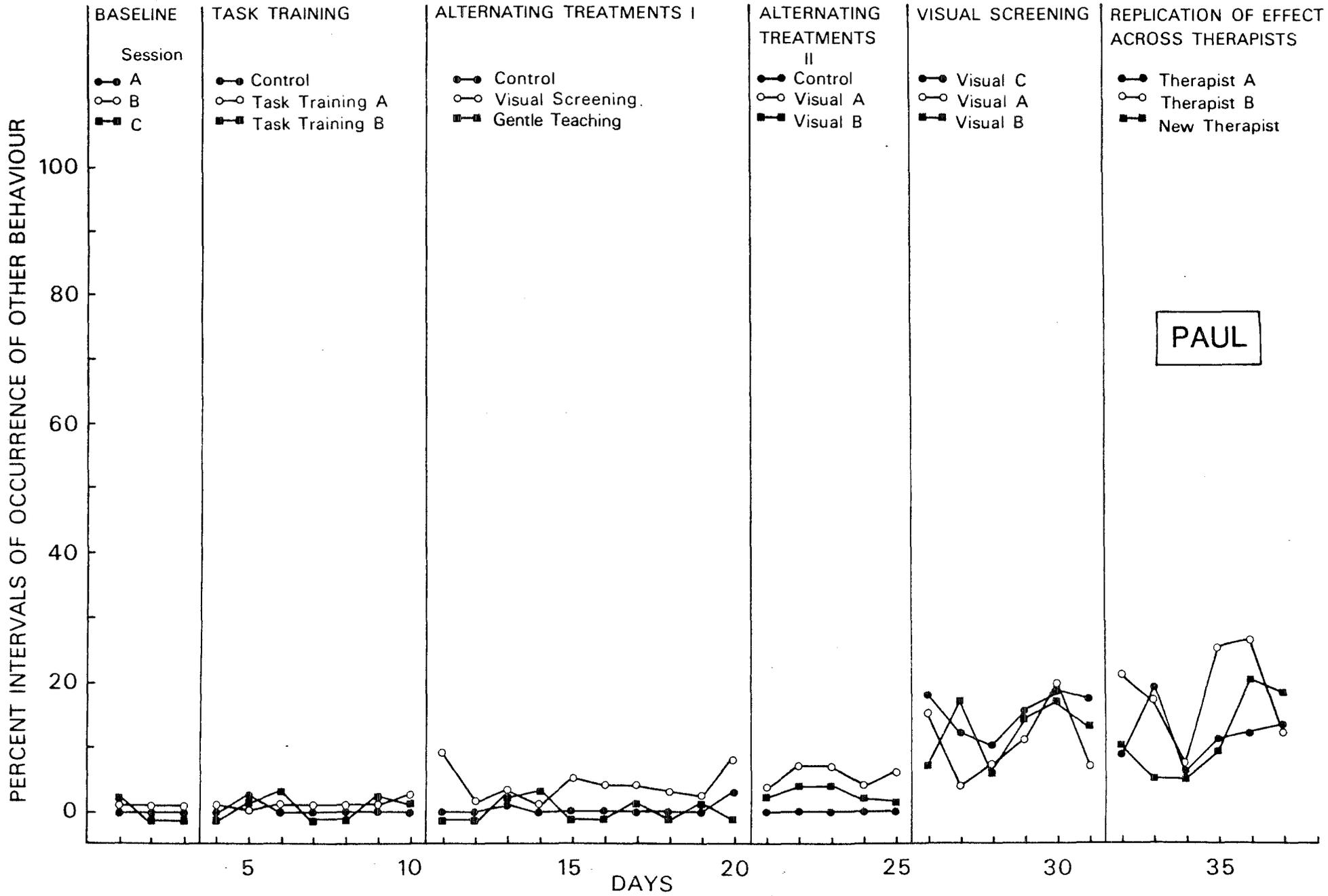
of occurrence of the Task-training behavioural category for Paul across all phases. No Task-training was provided in the Baseline or no-treatment control sessions. In the Task-training phase, the amount of Task-training given was relatively low occurring at a mean rate of 32.6% but showing an increasing trend. The introduction of both treatments in the Alternating Treatments 1 phase saw a rapid initial increase in the amount of Task-training given followed by a drop and then a steady increase to stabilise at a level higher than the previous phase. The mean rate of occurrence for the Gentle Teaching condition was 58.9% while the Visual Screening figure was 52.9%. A similar level was maintained throughout the remaining phases with the Alternating Treatments 2 mean being 49.8%, the Visual Screening mean at 54.2% and the mean for the original therapists in the final phase occurring at 53.3%. The mean for the new therapists at 71% was significantly higher than previous levels given by the original therapists.

The occurrence of 'other' behaviour is shown in Figure 15. During the first two phases, 'other' behaviour

Insert Figure 15 about here

occurred at near zero levels and in the Alternating Treatments 1 phase, the Gentle Teaching mean of 0.7% and the Visual Screening figure of 3.8% were still very low. The mean remained low for the Visual Screening condition in the next phase at 4.1% but increased markedly to 12.7% in the Visual Screening phase and was slightly higher again at 14.8% for the original therapists in the final phase. The mean rate for the new therapists was 11.3%.

Figure 15. The percentage intervals of occurrence of other behaviour by Paul across experimental phases.



The mean number of times that Paul was visually screened reduced substantially as the study progressed, however the mean duration of the screenings given was relatively constant at between 6 and 7 seconds per screening. The mean number of screenings per session in each phase (with the range of the durations in parentheses) were as follows: Alternating Treatments 1--41 (5-45 sec), Alternating Treatments 2--39 (5-32 sec), Visual Screening--13 (5-36 sec) and in the Replication Across Therapists phase--5.8 (0-20 sec).

DISCUSSION

The results of this study showed that Task-training, Gentle Teaching and Visual Screening procedures were more effective than a no-treatment control in reducing stereotypy in three mentally retarded subjects. Visual Screening however produced greater and more consistent suppression than the other procedures for all three subjects.

Baseline and control rates of stereotypic responding were very high and stable for all three subjects. The mean occurrence of stereotypy across all subjects during Baseline was 93.9%. During the Task-training phase while Task-training conditions were in effect, stereotypy was reduced by an average of 34% across all subjects. Of particular interest to this study was the comparison of the efficacy of the Gentle Teaching and Visual Screening procedures in reducing the target behaviour. In all three subjects, Visual Screening was very clearly the more effective technique. The mean percentage figures across subjects were 54% for Gentle Teaching and 17.2% in the Visual Screening condition during the first Alternating Treatments phase. In Alternating Treatments 2, the mean stereotypic occurrence rate was 10.1% for the Visual Screening condition which was implemented in two of the three daily sessions, while in the Visual Screening phase, with Visual Screening in effect in all three daily sessions, the mean rate of stereotypy across subjects was reduced even further to 4.9%. For the third subject, Paul, new therapists were introduced in an additional phase without any resulting increase in the level of stereotypy.

The inclusion of a no-treatment control condition across the first four phases and the consistently high rate of stereotypy of all three subjects in this condition indicates the strength of this treatment effect. In addition, it confirms that the subjects were able to discriminate between treatment conditions.

Changes in collateral behaviours were mixed and idiosyncratic, and using visual analysis there does not appear to be any clear overall differences between the treatments used in the effects on these behaviours. For Kevin and Paul, Visual Screening effectively reduced stereotypy but it did not produce more than moderate levels of on-task behaviour. These two subjects demonstrated an increasing amount of passive behaviour as the level of stereotypy (and disruptive behaviour for Paul) was reduced and so continued to require relatively high levels of assistance in the form of Task-training. Further, Kevin in particular, spent an increasing percentage of time as the study progressed doing nothing, and this was reflected in the increased frequency of scoring of the "other" behaviour category. David, however, demonstrated positive changes in on-task behaviour in all treatment conditions. For David and Kevin, disruptive behaviour occurred at low levels whereas this category was a significant feature in the data obtained for Paul. Disruptive behaviour was highly variable from day-to-day, reflecting both Paul's mood on the day and the catch-all nature of the category. Initially the high levels of disruptive behaviours were achieved through Paul's constant out-of-seat behaviour while in later treatments, when environmental control procedures ensured that Paul remain seated, he grizzled loudly

through a number of sessions, accounting for much of the subsequent disruptive behaviour. Interestingly, this disruptive category was the only area where there was a clear difference between the effectiveness of the two treatments, on this occasion in favour of Gentle Teaching. In this condition, the level of disruptive behaviour was low and occurred at half the rate of that in the Visual Screening condition. While this is a significant finding, Figures 11 and 12 indicate that in this phase, there appears to be an inverse relationship between stereotypy and disruptive behaviours, so that as Gentle Teaching became less effective in controlling the rate of stereotypy, Paul's behaviour became less disruptive. The Gentle Teaching procedure may have provided less of an intrusion into Paul's stereotypy as the gestural directions were easier to ignore by averting his head and staring into space than the interruption provided by verbal instructions. In addition, when redirected, Paul would switch to perform an alternative form of stereotypy such as vocalisation which proved very difficult to divert by redirection.

The results are particularly interesting with regard to the bonding category. Bonding as outlined by McGee and his colleagues could be more conventionally described as pro-social interaction. Significantly, in spite of bonding being propounded as the goal of Gentle Teaching, there was no differential effect between treatments noted in the Alternating Treatments 1 phase with regard to this category. Bonding occurred in all treatment conditions (including Task-training) for David, did not develop at all for Kevin and only increased for Paul in the last three phases where Visual

Screening was the only treatment condition in effect. Such increases in prosocial interaction as a side-effect of combined packages of aversive and reinforcement procedures has been noted elsewhere in the literature (Lovaas et al., 1965). Predictably, Paul displayed a much lower rate of bonding behaviour with the new therapists than with the more familiar original therapists in the final phase of his treatment.

The results of this study, that Visual Screening is an effective treatment for stereotypy, is supported by previous findings in the literature (Barrett et al., 1981; Barrett et al., 1983; Dick & Jackson, 1983; Kohleis, 1986; McGonigle et al., 1982; Watson et al., 1986). The fact that in all three subjects the Visual Screening procedure used (including the components of the Task-training condition which were also common to Gentle Teaching) produced greater reductions from the levels of stereotypy in the Task-training alone condition, suggests that the addition of the mildly aversive screening procedure to interrupt or punish the maladaptive target response was necessary to achieve clinically significant control. These results confirm those of Barrett et al. (1981) who found that Visual Screening was more effective than positive reinforcement alone and a number of other studies where a combination of aversive and positive reinforcement techniques have been found to be superior to reinforcement procedures alone in the reduction of stereotypy (Denny, 1980; Koegel & Covert, 1972; Koegel et al., 1974).

The limited progress made by Kevin and Paul in developing on-task behaviour and their continued dependence on Task-training provided by the therapists to remain engaged in the tasks once the level of stereotypy was reduced proved to be an

unexpected result. This may have been due to factors such as the task being too difficult (Weeks & Gaylord-Ross, 1981), generalised response suppression following the use of a punishment procedure (Koegel et al., 1974), and the reinforcers (Denny, 1980) or indeed the task itself being insufficiently reinforcing for these subjects (Murphy et al., 1986). Since Paul performed all of his tasks independently, the task difficulty explanation does not hold for him and although the divisions task in its entirety was rather challenging for Kevin, the errorless learning procedures used and the availability of the simple sanding task as an alternative, render this explanation rather unlikely. The second explanation also seems unlikely as both subjects performed at least some on-task behaviour independently and, in addition, there was no appreciable drop from the Task-training phase where no consequences followed stereotypy to subsequent phases where Visual Screening was used, as would be expected if generalised suppression of behaviour had occurred. In addition, it is unlikely that bonding would have occurred in Paul's case if this side-effect had occurred. The last two explanations appear to hold more credence for these subjects as although Paul showed occasional interest in the pictures that he was gluing to the paper, generally both he and Kevin had to be prompted to perform the tasks and both would cease any self-initiated activity within a relatively brief period. The social reinforcement consisting of verbal praise and tactile reinforcement did not seem to have much impact on Kevin and while Paul enjoyed and even initiated social interaction at times, these tended to distract him from the task at hand.

The use of primary reinforcers as Denny (1980) suggests, may help to alleviate this problem, as may the introduction of sensory reinforcement, either into the task itself (Murphy et al., 1986) or by utilising appropriate sensory stimuli as reinforcement on a differential reinforcement schedule or possibly by allowing the subject to perform the stereotypy for a brief period of time contingent upon on-task behaviour (Hung, 1978; Wolery et al., 1985). Observations of the subjects' responding during the course of the study suggested that the sensory consequences of the subjects stereotypy did not seem to be relevant in some way. For instance, Kevin would not finger-flick with an object unless it made sufficient noise, suggesting that auditory as well as kinetic stimulation may have been reinforcing this behaviour. David appeared to be reinforced by the kinetic consequences of headweaving while Paul's predominant modality appeared to be visual, which may explain why Paul was the subject who reacted most strongly to the Visual Screening procedure.

The limited effectiveness of Gentle Teaching with these subjects may have been due to the following factors. Firstly, the 'Teaching quietly' component where verbal instructions were minimised, resulted in all cases in the process of redirection taking longer and being more difficult than in the other conditions where instructions and verbal prompts were freely used. An unexpected consequence of this was Kevin closing his eyes and dozing off on day 10! Similarly, the ignore consequence and limited verbal instruction allowed Paul to engage without interruption in high-rate stereotypy as he did not generally attend or respond to the

gestural redirection and even when physical guidance was given to engage Paul in the task, if this interfered with stereotypy such as hand-regard, he would frequently switch to staring or vocalisations which were not incompatible with on-task behaviour. In this way the lack of an active consequence hindered the reduction of the stereotypy as, at times, all subjects were observed to perform on-task behaviour simultaneously with the stereotypic responding. Reinforcement of on-task behaviour risked inadvertent reinforcement of stereotypy while failure to reinforce the desired behaviour was also problematic. Perhaps the major problem with the use of Gentle Teaching with stereotypy is that the only consequence permissible within this procedure is ignoring the behaviour. This is likely to have little effect in extinguishing the behaviour if the behaviour is being maintained by reinforcement other than social consequences. Certainly, with these three subjects, particularly with Kevin and Paul, social attention appeared to be irrelevant to their performance of stereotypy and, in fact, all subjects appeared to prefer being left to their own devices to engage in this, their favoured activity. Thus, ignoring the stereotypy had little effect. The few studies in the literature where time-out or extinction have been successfully used with this problem have generally involved not only a period without social reinforcement but also without access to other effective, powerful reinforcers (Harris & Wolchik, 1979; McKeegan et al., 1984). It seems likely then that Gentle Teaching is likely to be most effective where the stereotypic, or indeed any other maladaptive behaviour, is performed in part at least for social attention or where the subject already places

a high value on social interaction, indicating that the removal of the social consequences is likely to have some effect.

For David, interpretation of the data in the final Visual Screening phase was confounded by the occurrence of an acute psychotic episode and consequent prescription of thioridazine in addition to his usual anti-psychotic medication. In the four-day break between sessions 21 and 22, David began to behave in a disturbed manner with aggressive attacks toward nursing staff, severely inappropriate sexual behaviour and marked hyperactivity. Due to constraints of time and the availability of the therapists working with David, the decision was made to continue with the study rather than wait until the medication was stopped and its effects completely eliminated. Anecdotal reports from the nursing staff indicated that the medication had suppressed the aberrant behaviours as intended and in the villa setting David was reported to be very quiet, although doing nothing unless prompted, apart from constant high-rate handweaving. In the treatment setting, aside from occasional tearfulness and a somewhat wild-eyed and bewildered facial expression, David's behaviour was socially acceptable with none of the disturbed behaviour observed above. In contrast to the literature suggesting that anti-psychotic medication often reduces stereotypy and allows adaptive behaviours to emerge as it reduces other aberrant behaviours, in David's case the medication did appear to reduce the maladaptive behaviours for which it was prescribed but it had adverse effects on the previous observed levels of adaptive behaviours (Wysocki et

al., 1981) and led to slight but noticeable increases in the rate of stereotypy within the treatment setting. Ideally, this phase should have been extended until the behaviour had stabilized. However, the final three data points demonstrate that the previously obtained levels of reduction of the target behaviour were re-established after this brief unavoidable aberration. The clear disruption and then resumption to their previous levels of the collateral behaviours in covariance with the changes in the targeted stereotypy further confirm that the final data points are in line with the previous trends in the data. While the possibility exists that this behaviour might have been related to David's participation in the study, this appears unlikely for a number of reasons. First, nursing staff reported that David had exhibited similar behaviour previously without apparent justification. Second, there were no observed tendencies or occurrences of aggressive or sexual behaviour apparent in the treatment setting as might be expected if it were a direct side-effect. And, third, the timing of the first incident two days after the completion of that week's treatment further lessens the likelihood of a causal link. Again, the stability of the observed behaviour changes in all categories prior to this episode, and the sudden occurrence of the episode near the end of treatment also argues against this proposition.

For Kevin, there were no reported side-effects of the treatment procedure in either direction. On several occasions though, he attempted to enter the therapy room outside his usual treatment time suggesting, at the very least, that participation in the study was not aversive for Kevin.

In Paul's case both positive and negative side-effects were noted over the course of treatment. Positive changes were reported by staff who had previously worked with Paul, in the length of time that he would remain seated in a classroom situation. In addition, both therapists observed that Paul often initiated social interaction with the therapists outside the treatment setting. On the other hand, nursing staff reported anecdotally that for a short time during treatment, Paul's behaviour became disruptive in other settings such as the dining room where he threw his empty plate. This was particularly noticeable at the evening meal which directly followed his daily treatment. Within the treatment setting there was an increase in toileting accidents, with the large majority of these occurring during the Visual Screening conditions. Both negative side-effects disappeared within a relatively short time and did not re-occur during treatment.

The alternating treatments design used has high internal validity and it was chosen to allow a rapid comparison between treatments without the sequence effects common in reversal designs. The external validity of the design was enhanced by the use of condition-specific discriminative stimuli to ensure that subjects were able to discriminate the various treatment conditions and so reduce the possibility of multiple treatment interference (Barlow & Hayes, 1979). The success of these stimuli is indicated by the clear differences between the levels achieved by the treatments in the alternating treatments phase and the anecdotal reports and observations of the subjects' behaviour. All subjects attended to the Visual Screening role-play with varying degrees of

wariness whereas in the control sessions, as soon as the therapists were seated following the introduction of the condition, all subjects immediately engaged in high rate stereotypy.

In this study, visual analysis was used to assess the relative efficacy of the various treatments since the differences in the level of effectiveness of each treatment was readily apparent, avoiding the need for sophisticated statistical analysis. The degree to which the target behaviour, stereotypy, was reduced and the rapidity of this reduction under each treatment condition was the major objective of this comparative study and in this regard, Visual Screening was clearly the more effective procedure for all subjects on both counts. While the length of each phase was comparatively short, sufficient data were collected in each phase to establish the trends and relative levels as well as the direct comparison of the rapidity of each procedure. The level of suppression of stereotypy achieved, while dramatic and highly significant compared to Baseline levels, was not as rapid or complete as might have been expected from the Visual Screening literature. All subjects were approaching total elimination within the treatment setting though and an extension of the treatment may have seen this result achieved. The possibility that Gentle Teaching may have produced greater reductions in the target behaviour had it been given more time might well be argued for Kevin but this appears most unlikely for the other two subjects, where the data showed clear upward trends under Gentle Teaching. The relationship between the target behaviour and collaterals under each condition was also investigated. However the results indicated that changes

in these behaviours were idiosyncratic and no pattern emerged of any single treatment's superiority in producing positive changes in other behaviours. Other criteria suggested for use in evaluating treatment effectiveness by Schroeder, Mulick and Schroeder (1979) which were not addressed in this experimental rather than clinical study, include the durability and clinical significance of the suppression achieved as well as measures of consumer satisfaction and social validity.

The decision to alternate therapists was made to control for possible variations in the attributes and therapeutic effectiveness of the two therapists contributing to the success or otherwise of a particular treatment condition. Although this decision could be criticised by proponents of Gentle Teaching as interfering with the development of bonding, the finding that bonding occurred for both David and Paul at similar levels for both of their respective therapists should allay concern over this point. In future studies with Gentle Teaching though, additional therapists could be introduced to join a primary therapist in a sequential manner once the target behaviour stabilises as indeed McGee recommends (McGee, 1985a). The level of bonding behaviour should then be evaluated using a multiple baseline across therapists design.

An aspect of the procedure in the Replication Across Therapists phase for Paul which may have contributed to the sustained low rates of stereotypy obtained by the new therapists was the continued presence of the original therapists in the experimental room while the New Therapists condition was in effect. This arrangement was necessary in this study

as there was no suitable adjoining observation room. Ideally, observations should be made from outside the room to reduce the possibility of the presence of the original therapists influencing the results obtained. The ease with which the regular staff were taught to effectively use the Visual Screening and Task-training procedures does suggest, however, that the methodology used here could be readily extended to programme for generalisation and maintenance of the treatment effects. For example, the Alternating Treatments procedure could be incorporated into a multiple baseline format across settings, therapists, maladaptive behaviours or other such variables. As well, the incorporation of a verbal reprimand or verbal warning procedure into the Visual Screening treatment is likely to assist in generalising treatment effects into other settings.

The results of this study have clear implications for the treatment of stereotypy in this population and suggest several directions for future research. The data confirm that Visual Screening is an effective procedure for suppressing stereotypy. It also appears that Gentle Teaching is of limited efficacy with this problem and that this procedure does not engender greater levels of positive collateral behaviour changes than the other treatments used here. These results require further verification across all levels of mental retardation as well as with other populations such as blind or autistic subjects of normal intelligence and schizophrenic clients, in order to establish the generality of these findings across other groups exhibiting high rates of stereotyped behaviour.

Further research is also required to provide independent data on the efficacy of Gentle Teaching with other prevalent behaviour problems within the mentally retarded population such as self-injury, aggression, withdrawal, and with other problem behaviours for which McGee and his colleagues suggest that Gentle Teaching is efficacious. One such problem area for which Gentle Teaching holds promise is with disruptive behaviour as this was the one behavioural category where this treatment approach achieved superior results in this study, albeit with one subject only. Comparative studies using similar methodology would be of most value at this stage so that the areas of best application for this procedure can be established and its relative power in reducing maladaptive behaviours and promoting maximum positive overall behaviour change can be measured in relation to other effective accepted treatments. Comparative data need to be gathered on issues such as durability and generalisation attributes of Gentle Teaching relative to other treatments. The complexity of this treatment package should also be investigated and, if possible, the necessary and sufficient component techniques for various behaviour problems identified to simplify the procedure and therefore enable easier implementation. Finally, considerations of parent and staff training in these techniques and of the acceptability of Gentle Teaching relative to other plausible treatments amongst the various consumer groups needs to be further investigated. Such research will allow fair data-based decisions to be made in the selection of treatments with particular maladaptive behaviours for particular individuals.

While McGee and his colleagues promote Gentle Teaching as a combined philosophy and treatment package which should be utilised for the entire gamut of behaviour problems in this population, until further scientific investigation provides independent support for the procedure, wholesale and uncritical acceptance of the approach to the exclusion of other treatments is not warranted.

Furthermore, although the humanistic principles of Gentle Teaching and its proponents' condemnation of some of the extremes of punishment is justified and highly laudible, it can be argued that eschewing the use of punishment in all circumstances cannot be justified. The widespread use of the least restrictive model and the heightened awareness of ethical concerns evident in the mainstream behavioural literature today, go a long way toward protecting the rights of the client, including the right to the most effective treatment, which may in some cases be an aversive procedure. The results of this study strongly suggest that Gentle Teaching is not an effective treatment for stereotypy in this population while Visual Screening clearly is. For this behaviour, a stronger consequence was evidently necessary to reduce this response or, alternatively, more powerful reinforcement than that provided for in Gentle Teaching may be necessary at least initially to increase the frequency of other behaviours, and achieve clinically effective results. In conclusion then, on the basis of these results, the selection of Gentle Teaching as the treatment of choice with stereotypy in this population does not appear to be warranted.

REFERENCES

- Aman, M.G. & Singh, N.N. (1980). The usefulness of thioridazine for treating childhood disorders - Fact or folklore? American Journal of Mental Deficiency, 84, 331-338.
- Aman, M.G. & Singh, N.N. (1983). Pharmacological intervention. In J.L. Matson & J.A. Mulick (Eds.), Handbook of Mental Retardation (pp.317-337). New York: Pergamon Press.
- Aman, M.G. & Singh, N.N. (1986). A critical appraisal of recent drug research in mental retardation: The Cold-water studies. Journal of Mental Deficiency Research, 30, 203-216.
- Aman, M.G., White, A.J. & Field, C. (1984). Chlorpromazine effects on stereotypic and conditioned behaviour of severely retarded patients - a pilot study. Journal of Mental Deficiency Research, 28, 253-260.
- Azrin, N.H., Kaplan, S.J. & Foxx, R. (1973). Autism reversal: Eliminating stereotyped self-stimulation of retarded individuals. American Journal of Mental Deficiency, 78, 241-248.
- Azrin, N.H. & Wesolowski, M.D. (1980). A reinforcement plus interruption method of eliminating behavioral stereotypy of profoundly retarded persons. Behavior Research & Therapy, 18, 113-119.
- Barkley, R.A. & Zupnik, S. (1976). Reduction of stereotypic body contortions using physical restraint and DRO. Journal of Behavior Therapy and Experimental Psychiatry, 7, 167-170.

- Barlow, D.H. & Hayes, S.C. (1979). Alternating treatments design: One strategy for comparing the effects of two treatments in a single subject. Journal of Applied Behavior Analysis, 12, 199-210.
- Barlow, D.H. & Hersen, M. (1984). Single case experimental designs (2nd edition), New York: Pergamon Press.
- Barrett, R.P. & Linn, D.M. (1981). Treatment of stereotyped toe-walking with overcorrection and physical therapy. Applied Research in Mental Retardation, 2, 13-21.
- Barrett, R.P., Matson, J.L., Shapiro, E.S. & Ollendick, T.H. (1981). A comparison of punishment and DRO procedures for treating stereotypic behaviour of mentally retarded children. Applied Research in Mental Retardation, 2, 247-256.
- Barrett, R.P., Staub, R.W. & Sisson, L.A. (1983). Treatment of compulsive rituals with visual screening: A case study with long-term follow-up. Journal of Behavior Therapy & Experimental Psychiatry, 14, 55-59.
- Barron, J. & Sandman, C.A. (1983). Relationship of sedative-hypnotic response to self-injurious behavior and stereotypy by mentally retarded clients. American Journal of Mental Deficiency, 88, 177-186.
- Barron, J.L. & Sandman, C.A. (1984). Self-injurious behavior and stereotypy in an institutionalized mentally retarded population. Applied Research in Mental Retardation, 5, 499-511.
- Barton, L.E., Repp, A.C. & Brulle, A.R. (1985). Reduction of stereotypic behaviors using differential reinforcement procedures and momentary restraint. Journal of Mental Deficiency Research, 29, 71-79.

- Baumeister, A.A. (1978). Origins and control of stereotyped movements in C.E. Meyers (Ed.), Quality of life in severely and profoundly mentally retarded people (pp. 353-584). Research foundations for improvement, Washington DC. American Association on Mental Deficiency.
- Baumeister, A.A. & Forehand, R. (1972). Effects of contingent shock and verbal command on body rocking of retardates. Journal of Clinical Psychology, 28, 586-590.
- Baumeister, A.A. & Forehand, R. (1973). Stereotyped acts. In N.R. Ellis (Ed.), International review of research in mental retardation, Vol. 6 (pp.55-96). New York: Academic Press.
- Baumeister, A.A. & MacLean, W.E. (1984). Deceleration of self-injurious and stereotypic responding by exercise. Applied Research in Mental Retardation, 5, 385-393.
- Baumeister, A.A., MacLean, W.E., Kelly, J. & Kasari, C. (1980). Observational studies of retarded children with multiple stereotyped movements. Journal of Abnormal Child Psychology, 8, 501-521.
- Berkson, G. (1967). Abnormal stereotyped motor acts. In J. Zubin & H.F. Hunt (Eds.), Comparative psychopathology - animal and human (pp.76-94). New York: Grune & Stratton.
- Berkson, G. (1968). Development of abnormal stereotyped behaviours. Developmental Psychobiology, 1, 118-132.
- Berkson, G., McQuiston, S., Jacobson, J.W., Eyman, R. & Borthwick, S. (1985). The relationship between age and stereotyped behaviors. Mental Retardation, 23, 31-33.
- Berkson, G. & Mason, W.A. (1964). Stereotyped movements of mental defectives. IV. The effects of toys and the character of the acts. American Journal of Mental Deficiency, 68, 511-524.

- Bitgood, S.C., Crowe, M.J., Suárez, Y. & Peters, R.D. (1980).
Immobilisation: Effects and side-effects on stereo-
typed behavior in children. Behavior Modification, 4,
187-203.
- Boe, R.B. (1977). Economical procedures for the reduction
of aggression in a residential setting. Mental
Retardation, 15(5), 25-28.
- Bornstein, P.H., Bach, P.J. & Anton, B. (1982). Behavioral
treatment of psychopathological disorders. In J.L. Mat-
son & R.P. Barrett (Eds.), Psychopathology in the
mentally retarded (pp.253-292). Orlando, Florida:
Grune/Stratton Inc.
- Brakman, C. (1985). A human rights committee in a public
school for severely and profoundly retarded students.
Education and Training of the Mentally Retarded, 20,
139-147.
- Brassell, W.R. (1977). Intervention with handicapped infants:
Correlates of progress. Mental Retardation, 15(4),
18-22.
- Breuning, S.E. (1982). An applied dose-response curve of
thioridazine with the mentally retarded: Aggressive,
self-stimulating, intellectual, and workshop behaviors
- A preliminary report. Psychopharmacology Bulletin,
18, 57-59.
- Brown, L., Branston, M.B., Hamre-Nietupski, S., Pumpian, I.,
Certo, N. & Gruenewald, L. (1979). A strategy for
developing chronological-age-appropriate and functional
curricular content for severely handicapped adolescents
and young adults. The Journal of Special Education,
13(1), 81-90.

- Brusca, R. (1985). Chronobiological aspects of stereotypy. American Journal of Mental Deficiency, 89, 650-652.
- Cavalier, A.R. & Ferretti, R.P. (1980). Stereotyped behavior, alternative behaviour and collateral effects: A comparison of four intervention procedures. Journal of Mental Deficiency Research, 24, 219-230.
- Chock, P.N. & Glahn, T.J. (1983). Learning and self-stimulation in mute and echolalic autistic children. Journal of Autism and Developmental Disorders, 13, 365-381.
- Corbett, J.A. (1977). Mental retardation: Psychiatric aspects. In M. Rutter & L. Hersov (Eds.), Child psychiatry: Modern approaches (pp.829-855). London: Blackwell.
- Corbett, J.A. (1979). Psychiatric morbidity. In F.E. James & R.B. Snaith (Eds.), Psychiatric illness and mental handicap (pp.11-25). London: Gaskell.
- Cronin, K.A. & Cuvo, A.J. (1979). Teaching mending skills to mentally retarded adolescents. Journal of Applied Behavior Analysis, 12, 401-406.
- Czyzewski, M.J., Barrera, R.D. & Sulzer-Azaroff, B. (1982). An abbreviated overcorrection program to reduce self-stimulatory behaviors. Journal of Behavior Therapy & Experimental Psychiatry, 13, 55-62.
- Davis, K.V. (1971). The effect of drugs on stereotyped and non-stereotyped operant behaviours in retardates. Journal of Autism and Child Schizophrenia, 2, 234-263.
- Davis K.V., Sprague, R.L. & Werry, J.S. (1969). Stereotyped behavior and activity level in severe retardates: The effect of drugs. American Journal of Mental Deficiency, 73, 721-727.

- Denny, M. (1980). Reducing self-stimulatory behavior of mentally retarded persons by alternative positive practice. American Journal of Mental Deficiency, 84, 610-615.
- Demetral, G.D. & Lutzker, J.R. (1980). The parameters of facial screening in treating self-injurious behavior. Behavior Research of Severe Developmental Disabilities, 1, 261-277.
- Dick, D.M. & Jackson, H.J. (1983). The reduction of stereotypic screaming in a severely retarded boy through a visual screening procedure. Journal of Behavior Therapy & Experimental Psychiatry, 14, 363-367.
- Doke, L.A. & Epstein, L.H. (1975). Oral over-correction. Side effects and extended applications. Journal of Experimental Child Psychology, 20, 496-511.
- Eason, L.J., White, M.J. & Newsom, C. (1982). Generalised reduction of self-stimulatory behaviour: An effect of teaching appropriate play to autistic children. Analysis and Intervention in Developmental Disabilities, 2, 157-169.
- Favell, J.E., McGimsey, J.F. & Schell, R.M. (1982). Treatment of self-injury by providing alternative sensory activities. Analysis and Intervention in Developmental Disabilities, 2, 83-104.
- Fenton, D.M. & Penney, R. (1985). The effects of fluorescent and incandescent lighting on the repetitive behaviours of autistic and intellectually handicapped children. Australia & New Zealand Journal of Developmental Disabilities, 11, 137-141.

- Ferrari, M. & Harris, S.L. (1981). The limits and motivating potential of sensory stimuli as reinforcers for autistic children. Journal of Applied Behavior Analysis, 14, 339-343.
- Flavell, J.E. (1973). Reduction of stereotypies by reinforcement of toy play. Mental Retardation, 11, 21-23.
- Foxx, R.M. & Azrin, N.H. (1972). Restitution: A method of eliminating aggressive disruptive behavior of retarded and brain damaged patients. Behavior Research and Therapy, 10, 15-27.
- Foxx, R.M. & Azrin, N.H. (1973). The elimination of autistic self-stimulatory behavior by over-correction. Journal of Applied Behavior Analysis, 6, 1-14.
- Foxx, R.M., Plaska, T.G. & Bittle, R.G. (1986). The use of contingent electric shock: Guidelines for program administrators. In M. Hersen, R.M. Eisler, & P.M. Miller (Eds.), Progress in behavior modification. New York: Academic Press.
- Gesell, A.L. & Amatruda, C.S. (1965). Developmental Diagnosis (2nd edition). New York: Harper & Row.
- Glynn, T. (1985). Providing a context for Gentle Teaching: An invited reply to "Gentle Teaching" by Dr J.J. McGee. Mental Handicap in New Zealand, 9(4), 21-23.
- Gold, M.W. (1972). Stimulus factors in skill training of retarded adolescents on a complex assembly task: Acquisition, transfer and retention. American Journal of Mental Deficiency, 76, 517-526.
- Gorman-Smith, D. & Matson, J.L. (1985). A review of treatment research for self-injurious and stereotyped responding. Journal of Mental Deficiency Research, 29, 295-308.

- Grossman, H.J. (1983). Classification in mental retardation. Washington, D.C.: American Association on Mental Deficiency.
- Haring, T.G., Breen, C.G., Pitts-Conway, V. & Gaylord-Ross, R. (1986). Use of differential reinforcement of other behavior during dyadic instruction to reduce stereotyped behavior of autistic students. American Journal of Mental Deficiency, 90, 694-702.
- Harris, S.L. & Ersner-Hersfield, R. (1973). Behavioural suppression of seriously disruptive behaviour in psychotic and retarded patients. A review of punishment and its alternatives. Psychological Bulletin, 85, 1352-1375.
- Harris, S.L. & Wolchik, S.A. (1979). Suppression of self-stimulation: Three alternative strategies. Journal of Applied Behavior Analysis, 12, 185-198.
- Heistad, G.T., Zimmerman, R.L. & Doebler, M.I. (1982). Long-term usefulness of thioridazine for institutionalized mentally retarded patients. American Journal of Mental Deficiency, 87, 243-251.
- Hewett, F.M. (1967). Educational engineering with emotionally disturbed children. Exceptional Children, 33, 459-467.
- Hollis, J.H. (1968). Chlorpromazine: Direct measurement of differential behavioral effect. Science, 159, 1487-1489.
- Hollis, J.H. & St Omer, V.V. (1972). Direct measurement of psychopharmacologic response: Effects of chlorpromazine on motor behavior of retarded children. American Journal of Mental Deficiency, 76, 397-407.
- Homer, A.L. & Peterson, L. (1980). Differential reinforcement of other behavior: A preferred response elimination procedure. Behavior Therapy, 11, 449-471.

- Horner, R D. (1980). The effects of an environmental "enrichment" program on the behavior of institutional profoundly retarded children. Journal of Applied Behavior Analysis, 13, 473-491.
- von Hug-Hellmuth, H. (1919). A study of the mental life of the child. Washington, D.C.: Nervous and Mental Disease Publishing Company.
- Hung, D.W. (1978). Using self-stimulation as reinforcement for autistic children. Journal of Autism and Childhood Schizophrenia, 8, 355-366.
- Hutt, C. & Hutt, S.J. (1965). Effects of environmental complexity on stereotyped behaviours of children. Animal Behaviour, 13, 1-4.
- Johnson, W.L., Baumeister, A.A., Penland, M.J. & Inwald, C. (1982). Experimental analysis of self-injurious, stereotypic and collateral behaviour of retarded persons: Effects of over-correction and reinforcement of alternative responding. Analysis and Intervention in Developmental Disabilities, 2, 41-66.
- Kaufman, M.E. & Levitt, H. (1965). A study of three stereotyped behaviors in institutionalised mental defectives. American Journal of Mental Deficiency, 69, 467-473.
- Kazdin, A.E. (1982). Single case research designs: Methods for clinical and applied settings. New York: Oxford University Press.
- Kazdin, A.E. (1980). Acceptability of alternate treatment for deviant child behavior. Journal of Applied Behavior Analysis, 13, 259-273.

- Klier, J. & Harris, S.L. (1977). Self-stimulation and learning in autistic children.. Physical or functional incompatibility? Journal of Applied Behavior Analysis, 10, 311.
- Koegel, R.L. & Covert, A. (1972). The relationship of self-stimulation to learning in autistic children. Journal of Applied Behavior Analysis, 5, 381-387.
- Koegel, R.L. & Egel, A.L. (1979). Motivating autistic children. Journal of Abnormal Psychology, 88, 418-426.
- Koegel, R.L., Firestone, P.B., Kramme, K.W. & Dunlap, G. (1974). Increasing spontaneous play by suppressing self-stimulation in autistic children. Journal of Applied Behavior Analysis, 7, 521-528.
- Koegel, R.L. & Williams, J.A. (1980). Direct versus indirect response - reinforcer relationships in teaching autistic children. Journal of Abnormal Child Psychology, 8, 537-547.
- Kohleis, B. (1986). The effect of visual screening on two maladaptive behaviours. Mental Handicap in New Zealand, 10 (3), 8-17.
- Kravitz, H. & Boehm, J.J. (1971). Rhythmic habit patterns in infancy: Their sequence, age of onset, and frequency. Child Development, 42, 399-413.
- LaGrow, S.J. & Repp, A.C. (1984). Stereotypic responding: A review of intervention research. American Journal of Mental Deficiency, 88, 595-609.
- Lambert, J. (1975). Extinction by retarded children following discrimination learning with and without errors. American Journal of Mental Deficiency, 80, 286-291.

- Lancioni, G.E., Smeets, P.M., Ceccerani, P.S. & Goossens, A.J. (1983). Self-stimulation and task related responding: The role of sensory reinforcement in maintaining the extending treatment effects. Journal of Behavior Therapy and Experimental Psychiatry, 14, 33-41.
- Laws, D.R., Brown, R.A., Epstein, J. & Hocking, N. (1971). Reduction of inappropriate social behaviour in disturbed children by an untrained paraprofessional therapist. Behaviour Therapy, 2, 519-533.
- Leuba, C. (1955). Toward some integration of learning theories: The concept of optimal stimulation. Psychological Reports, 1, 27-33.
- Lewis, M.H. & Baumeister, A.A. (1982). Stereotyped mannerisms in mentally retarded persons: Animal models and theoretical analyses. In N.R. Ellis (Ed.), International review of research in mental retardation, Vol. 11 (pp.123-161). New York: Academic Press.
- Lewis, M., MacLean, W.E., Bryson-Brockmann, W., Arenolt, R., Beck, B., Fidler, P.S. and Baumeister, A.A. (1984). Time-series analysis of stereotyped movements: Relationship of body-rocking to cardiac activity. American Journal of Mental Deficiency, 89, 287-294.
- Lourie, R.S. (1949). The role of rhythmic patterns in childhood. American Journal of Psychiatry, 105, 653-660.
- Lovaas, O.I. & Newson, C.D. (1976). Behaviour modification with psychotic children. In H. Leitenburg (Ed.), Handbook of behaviour modification & behaviour therapy (pp.303-360). Englewood Cliffs, NJ: Prentice Hall, Inc.

- Lovaas, O.I., Schaeffer, B. & Simmons, J.Q. (1965). Building social behaviour in autistic children by use of electric shock. Journal of Experimental Research in Personality, 1, 99-109.
- Lovaas, O.I. & Simmons, J.Q. (1969). Manipulation of self-destruction in three retarded children. Journal of Applied Behavior Analysis, 2, 143-157.
- Luiselli, J.K., Pemberton, B.W. & Helfen, C.S. (1978). Effects and side-effects of a brief overcorrection procedure in reducing multiple self-stimulatory behaviour: A single case analysis. Journal of Mental Deficiency Research, 22, 287-293.
- Lutzker, J.R. (1978). Reducing self-injurious behavior by facial screening. American Journal of Mental Deficiency, 82, 510-513.
- Lutzker, J.R. & Wesch, D. (1983). Facial screening: History and critical review. Australia and New Zealand Journal of Developmental Disabilities, 9, 209-223.
- Maag, J.W., Rutherford, R.B., Wolchik, S.A. & Parks, B.T. (1986). Comparison of two short over-correction procedures on the stereotypic behavior of autistic children. Journal of Autism and Developmental Disorders, 16, 83-87.
- Maag, J.W., Wolchik, S.A., Rutherford, R.B. & Parks, B.T. (1986). Response covariation on self-stimulatory behaviors during sensory extinction procedures. Journal of Autism and Developmental Disorders, 16, 119-132.
- MacLean, W.E. & Baumeister, A.A. (1981). Observational analysis of the stereotyped mannerisms of a developmentally delayed infant. Applied Research in Mental Retardation, 2, 257-262.

- Matson, J.L., Ollendick, T.H., & Martin, J.E. (1979). Over-correction revisited: A long term follow-up. Journal of Behavior Therapy & Experimental Psychiatry, 10, 11-13.
- Matson, J.L. & Stephens, R.M. (1981). Over-correction treatment of stereotyped behaviours. Behaviour Modification, 5, 491-502.
- McGee, J.J. (1985). "Gentle Teaching": A treatment approach to persons with mental retardation and severe behavioral disorders. Paper given at the conference of the New Zealand Association of Teachers of the Mentally Handicapped, Christchurch, April, 1985 (a).
- McGee, J.J. (1985). Gentle Teaching. Mental Handicap in New Zealand, 9(3), 13-24 (b).
- McGee, J.J. (1985). Bonding as the goal of teaching. Mental Handicap in New Zealand, 9(4), 5-10 (c).
- McGee, J.J. (1985). The at-risk nature of mental retardation for severe behavioural disorders. Mental Handicap in New Zealand, 9(3), 4-12 (d).
- McGee, J.J., Menalascino, F.J. & Menousek, P.E. (in press). Gentle Teaching. Texas: Pro-ed.
- McGonigle, J.J., Duncan, D., Cordisco, L. & Barrett, R.P. (1982). Visual screening: An alternative method for reducing stereotypic behaviors. Journal of Applied Behavior Analysis, 15, 461-467.
- McKeegan, G.F., Estill, K. & Campbell, B.M. (1984). Brief report. Use of non-exclusionary time-out for the elimination of a stereotyped behavior. Journal of Behavior Therapy & Experimental Psychiatry, 15, 261-264.

- Menalascino, F.J. & McGee, J.J. (1985). Persons with severe mental retardation and behavioural challenges: From disconnectedness to human engagement. Mental Handicap in New Zealand, 9(3), 25-30. Reprinted from: Journal of Psychiatric Treatment & Evaluation, 5, 187-193, 1983.
- Mitchell, R.G. & Etches, P. (1977). Rhythmic habit patterns (stereotypies). Developmental Medicine and Child Neurology, 19, 545-550.
- Mudford, O.C. (1986). Attitudes to visual screening. Mental Handicap in New Zealand, 10(3), 18-21.
- Mudford, O.C. (1985). Treatment selection in behaviour reduction: Gentle teaching versus the least intrusive treatment model. Australia and New Zealand Journal of Developmental Disabilities, 10, 265-270.
- Murphy, G., Callais, M. & Carr, J. (1985). Increasing simple toy play in profoundly mentally handicapped children: I. Training to play. Journal of Autism & Developmental Disorders, 15, 375-388.
- Murphy, G., Carr, J. & Callais, M. (1986). Increasing simple toy play in profoundly mentally handicapped children: II. Designing special toys. Journal of Autism and Developmental Disorders, 16, 45-58.
- Murphy, R.J., Nunes, D.L. & Hutchings-Ruprecht, M. (1977). Reduction of stereotyped behavior in profoundly retarded individuals. American Journal of Mental Deficiency, 82, 238-245.
- Murphy, M.J. & Zahm, D. (1978). Effect of improved physical and social environment on self-help and problem behaviours of institutionalised retarded males. Behaviour Modification, 2, 193-210.

- O'Brien, F. (1981). Treating self-stimulatory behaviour. In J.L. Matson & J.R. McCartney (Eds.), Handbook of behaviour modification with the mentally retarded (pp.117-150). New York: Plenum.
- Ollendick, T.H., Shapiro, E.S. & Barrett, R.P. (1981). Reducing stereotypic behaviours: An analysis of treatment procedures utilising an alternating treatments design. Behaviour Therapy, 12, 570-577.
- Pendergrass, V.E. (1972). Time-out from positive reinforcement following persistent, high-rate behavior in retardates. Journal of Applied Behavior Analysis, 5, 85-91.
- Peterson, L., Homer, A.L. & Wonderlich, S.A. (1982). The integrity of independent variables in behaviour analysis. Journal of Applied Behavior Analysis, 15, 477-492.
- Piaget, J. (1952). The origins of intelligence in children. New York: International Universities Press.
- Pohl, P. (1976). Spontaneous fluctuation in rate of body rocking: A methodological note. Journal of Mental Deficiency Research, 20, 61-65.
- Rago, Jr. W.V., Parker, R.M. & Cleland, C.C. (1978). Effect of increased space on the social behavior of institutionalised profoundly retarded male adults. American Journal of Mental Deficiency, 82, 554-558.
- Reid, D.H., Parsons, M.B., McCann, J.E., Green, C.W., Phillips, J.F. & Schepis, M.M. (1985). Providing a more appropriate education for severely handicapped persons: Increasing and validating functional classroom tasks. Journal of Applied Behavior Analysis, 18, 289-301.

- Reilich, L.L., Spooner, F. & Rose, T.L. (1984). The effects of contingent water mist on the stereotypic responding of a severely handicapped adolescent. Journal of Behavior Therapy & Experimental Psychiatry, 15, 165-170.
- Repp, A.C. & Barton, L.E. (1980). Naturalistic observations of institutionalized retarded persons: A comparison of licensure decisions and behavioral observations. Journal of Applied Behavior Analysis, 13, 333-341.
- Repp, A.C., Barton, L.E., & Gottlieb, J. (1983). Naturalistic studies of institutionalized retarded persons: II. The effects of density on the behavior of profoundly and severely retarded persons. American Journal of Mental Deficiency, 87, 441-447.
- Repp, A.C. & Deitz, E.D. (1978). On the selective use of punishment - suggested guidelines for administrators. Mental Retardation, 16, 250-254.
- Repp, A.C., Deitz, S.M. & Deitz, D.E.D. (1976). Reducing inappropriate behaviours in classrooms and in individual sessions through DRO schedules of reinforcement. Mental Retardation, 14, 11-15.
- Rice, J.M. & Lloyd, M.E. (1982). The effects of pairing blackout with stereotypic behaviors maintained by visual stimulation. Exceptional Children, 49, 256-259.
- Rincover, A. (1978). Sensory extinction: A procedure for eliminating self-stimulatory behaviour in developmentally disabled children. Journal of Abnormal Child Psychology, 6, 299-310.

- Rincover, A., Cook, R., Peoples, A. & Packard, D. (1979).
Sensory extinction and sensory reinforcement principles
for programming multiple adaptive behavior change.
Journal of Applied Behavior Analysis, 12, 221-233.
- Rincover, A. & Koegel, R.L. (1977). Research on the educa-
tion of autistic children: Recent advances and future
directions. In B.B. Lahey & A.E. Kazdin (Eds.), Advances
in clinical child psychology, Vol.1 (pp.329-359). New
York: Plenum Press.
- Rincover, A., Newsom, C.D. & Carr, E.G. (1979). Using
sensory extinction procedures in the treatment of com-
pulsive like behaviour of developmentally disabled
children. Journal of Consulting and Clinical Psychology,
47, 695-701.
- Rollings, J.P., Baumeister, A.A. & Baumeister, A.A. (1977).
The use of over-correction procedures to eliminate the
stereotyped behaviours of retarded individuals: An
analysis of collateral behaviours and generalisation of
suppressive effects. Behaviour Modification, 1, 29-46.
- Romanczyk, R.G. (1977). Intermittent punishment of self-
stimulation: Effectiveness during application and
extinction. Journal of Consulting and Clinical Psychology,
45, 53-60.
- Rosen, L.A., O'Leary, S.G., Joyce, S.A., Conway, G. & Pfiffer,
L.J. (1984). The importance of prudent negative conse-
quences for maintaining the appropriate behaviour of
hyperactive students. Journal of Abnormal Child
Psychology, 12, 581-604.

- Rotholz, D.A. & Luce, S.C. (1983). Alternative reinforcement strategies for the reduction of self-stimulatory behaviour in an autistic youth. Education and Treatment of Children, 6, 363-377.
- Runco, M.A., Charlop, M.H. & Schrieberman, L. (1986). The occurrence of autistic children's self-stimulation as a function of familiar versus unfamiliar stimulus conditions. Journal of Autism & Developmental Disorders, 16, 31-44.
- Sachs, D.A. (1973). The efficacy of time-out procedures in a variety of behavior problems. Journal of Behavior Therapy & Experimental Psychiatry, 4, 237-242.
- Schopler, E. (1986). Editorial: Treatment abuse and its reduction. Journal of Autism and Developmental Disorders, 16, 99-103.
- Schopp, R.F. (1984). Punishment as treatment and the obligations of treatment providers. International Journal of Law & Psychiatry, 7, 197-205.
- Scibak, J.W. (1983). Behavioral treatment: In J.L. Matson & J.A. Mulick (Eds.), Handbook of mental retardation (pp.339-350). New York: Pergamon Press.
- Schroeder, S.R., Mulick, J.A. & Schroeder, C.S. (1979). Management of severe behavior problems of the retarded. In N.R. Ellis (Ed.), Handbook of mental deficiency (2nd ed., pp.341-366). Hillsdale, N.J.: Erlbaum.
- Schwartz, S.S., Gallagher, R.J. & Berkson, G. (1986). Normal repetitive and abnormal stereotyped behavior of non-retarded infants and young mentally retarded children. American Journal of Mental Deficiency, 90, 625-630.

- Shapiro, E.S., Barrett, R.P. & Ollendick, T.H. (1980). A comparison of physical restraint and positive practice overcorrection in treating stereotypic behaviour. Behaviour Therapy, 11, 227-233.
- Singh, N.N. & Aman, M.G. (1981). Effects of thioridazine dosage on the behavior of severely mentally retarded persons. American Journal of Mental Deficiency, 85, 580-587.
- Singh, N.N., Dawson, M.J. & Manning, P.J. (1981): Effects of spaced responding DRL on the stereotyped behavior of profoundly retarded persons. Journal of Applied Behavior Analysis, 14, 521-526.
- Singh, N.N. & Millichamp, C.J. (1987). Independent and social play in profoundly mentally retarded adults: Training, maintenance, generalisation and long-term follow-up. Journal of Applied Behavior Analysis, 20.
- Singh, N.N. & Winton, A.S.W. (1984). Effects of a screening procedure on pica and collateral behaviors. Journal of Behavior Therapy & Experimental Psychiatry, 15, 59-65.
- Singh, N.N., Winton, A.S. & Dawson, M.J. (1982). Suppression of antisocial behaviour by facial screening using multiple baseline and alternating treatments design. Behaviour Therapy, 13, 511-520.
- Smith, M.D. (1986). Use of similar sensory stimuli in the community-based treatment of self-stimulatory behavior in an adult disabled by autism. Journal of Behavior Therapy & Experimental Psychiatry, 17, 121-125.

- Solnick, J.V., Rincover, A. & Peterson, C.R. (1977). Some determinants of the reinforcing and punishing effects of timeout. Journal of Applied Behavior Analysis, 10, 415-424.
- Spradlin, J.E. & Girardeau, F.L. (1966). The behavior of moderately and severely retarded persons. In N.R. Ellis (Ed.), International review of research in mental retardation, Vol. 1 (pp.257-298). New York: Academic Press.
- Stokes, T.F. & Baer, D.M. (1977). An implicit technology of generalization. Journal of Applied Behavior Analysis, 10, 349-367.
- Strongman, K.T. (1984). Replacement - A theory of stereotypy: A review. Current Psychological Research and Reviews, 3(3), 72-83.
- Tate, B.G. & Baroff, G.S. (1966). Aversive control of self-injurious behavior in a psychotic boy. Behavior Research & Therapy, 4, 281-287.
- Thelen, E. (1981). Kicking, rocking, and waving: Contextual analysis of rhythmical stereotypies in normal human infants. Animal Behaviour, 29, 3-11 (a).
- Thelen, E. (1981). Rhythmical behavior in infancy. An ethological perspective. Developmental Psychology, 17, 237-257 (b).
- Thelen, E. (1979). Rhythmical stereotypies in normal human infants. Animal Behaviour, 27, 699-715.
- Thompson, T.J. & Berkson, G. (1985). Stereotyped behavior of severely disabled children in classroom and free-play settings. American Journal of Mental Deficiency, 89, 580-586.

- Watson, J., Singh, N.N. & Winton, A.S.W. (1986). Suppressive effects of visual and facial screening on self-injurious finger-sucking. American Journal of Mental Deficiency, 90, 526-534.
- Weeks, M. & Gaylord-Ross, R. (1981). Task difficulty and aberrant behavior in severely handicapped students. Journal of Applied Behavior Analysis, 14, 449-463.
- Werry, J.S., Carlielle, J. & Fitzpatrick, J. (1983). Rhythmic motor activities (stereotypies) in children under five: Etiology and prevalence. Journal of the American Academy of Child Psychiatry, 22, 329-336.
- Wesolowski, M.D. & Zawlocki, R.J. (1982). The differential effects of procedures to eliminate an injurious self-stimulatory behaviour (digito-ocular sign) in blind retarded twins. Behaviour Therapy, 13, 334-345.
- Williams, J.A., Koegel, R.L. & Egel, A.L. (1981). Response-reinforcer relationships and improved learning in autistic children. Journal of Applied Behavior Analysis, 14, 53-60.
- Winton, A.S.W., Singh, N.N. & Dawson, M.J. (1984). Effects of facial screening and blindfold on self-injurious behaviour. Applied Research in Mental Retardation, 5, 29-42.
- Wolery, M., Kirk, K. & Gast, D.L. (1985). Stereotypic behavior as a reinforcer: Effects and side-effects. Journal of Autism and Developmental Disorders, 15, 149-161.
- Wysocki, T., Fuqua, W., Davis, V. & Breuning, S.E. (1981). Effects of thioridazine (Mellaril) on titrating delayed matching-to-sample performance of mentally retarded adults. American Journal of Mental Deficiency, 85, 539-547.

Zegiob, L.E., Jenkins, J., Becker, J. & Bristow, A. (1976).

Facial screening: Effects on appropriate and inappropriate behaviors. Journal of Behavior Therapy & Experimental Psychiatry, 7, 355-357.

Zlomke, L., Smith, P. & Piersel, W.C. (1986). Visual blocking suppression of excessive verbalisations. Education and Training of the Mentally Retarded, 21, 138-142.