Decreasing Inappropriate Classroom Behaviours Through a Videotape Self-Modelling and Self-Monitoring Treatment Package

Catherine Ann Coyle

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DECREASING INAPPROPRIATE CLASSROOM BEHAVIOURS THROUGH A VIDEOTAPE SELF-MODELLING AND SELF-MONITORING TREATMENT PACKAGE.

By

Catherine Ann Coyle

A thesis submitted in partial fulfillment of the requirements for the award of Honours in Education (Special Education) at the Faculty of Education, Edith Cowan University

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ABSTRACT

Children with autism frequently display an inability to function independently. This has led researchers to develop treatments that are aimed at overcoming the dependency of these children on parents and teachers and which teach them to manage their own behaviour.

A self-management treatment package consisting of videotaped self-modelling, self-monitoring, and self-reinforcement was investigated in the present study. The focus was the effect of the treatment package on the inappropriate classroom behaviours of three children with autism. The behaviours that were chosen were those that were most likely to interfere with the participants' ability to work independently in the classroom. The dependent variables were off-task behaviour, stereotypic behaviour, latency time to commence a task, inappropriate vocalizations, the accuracy of self-monitoring, and the ability to follow a four-step self-monitoring procedure without assistance from the researcher.

Each of the studies in the present research project was consistent with a single-subject, withdrawal design. The first two studies followed an A-B-A design and the third study followed an A-B-A-C-A design. Follow-up data were collected in Studies 1 and 2. A represented the baseline conditions, B the intervention condition, and C the second intervention condition. Three male students with autism participated in the study. These children were aged between nine years and one month and eleven years and seven months. Two of the children were described as severely autistic and the third was described as moderately autistic. The children demonstrated deficits in the social, language and communication domains as well abnormalities in the range of interests and activities.
The results indicated considerable decreases in each of the inappropriate target behaviours during the period of intervention. Moderate maintenance gains were in evidence for two of the children. Follow-up data revealed some regression in the target behaviours two weeks later. The accuracy of self-monitoring was very high for all of the children. The children were typically inaccurate in self-recording when inappropriate behaviour had occurred. Two of the children displayed very high levels of independence in performing the four-steps of the self-monitoring procedure. The third child demonstrated an inability to follow the procedure without assistance from the researcher. The intervention follow-up data indicated that one of the children had retained the steps of the self-monitoring procedure two weeks after the withdrawal of the intervention.

Some implications for teaching and recommendations for future research are presented.
DECLARATION

I certify that this thesis does not, to the best of my knowledge and belief:

i) incorporate without acknowledgement any material previously submitted for a degree or diploma in any institution of higher education;

ii) contain any material previously published or written by a person except where due reference is made in the text; or

iii) contain any defamatory material.

Signature: ____________________________

Date: 17/1/00
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INTRODUCTION

The present study involved three primary school aged males with autism. Autism was first identified and defined as a psychological disorder by Leo Kanner in 1943 (Matson, Benavidez, Compton, Paclawskyj, & Baglio, 1996). He used the term to describe a cohort of children who displayed "autistic disturbances of affective contact" (Waters, 1990, p.4). In 1943 Kanner proposed a list of 12 features of autism (Waters, 1990). Among these 12 features were the three characteristics that are presently considered to be essential for a diagnosis of autism. Wing and Gould (1979) first labelled these common features the triad of impairments. This label is often used when referring to the autistic disorder (Association for Autistic Children in WA, 1997; Jordan & Powell, 1995). The triad of impairments includes marked impairment in social interaction, in language and communication and in the repertoire of interests, behaviours and activities exhibited by the child (Association for Autistic Children in WA, 1997; Rappaport & Ismond, 1996; American Psychiatric Association, 1994).

In the current context autism is defined as "a neurobiological syndrome characterized by extremely deviant behaviour including failure to develop social relationships, language delay and deviance, hyperactivity, tactile defensiveness, stereotypies, insistence on the preservation of sameness" and in some cases mental retardation (Accardo & Whitman, 1996, p. 29). There is a high degree of variability in disability among children with autism. Some children may display very severe behavioural symptoms, whereas others may display relatively minimal behavioural impairment (Jordan & Powell, 1995). It is for this reason that autism is commonly referred to as a spectrum
disorder (Jordan & Jones, 1999). The autistic spectrum disorder presently represents one of the current subgroups of pervasive developmental disorders used to describe a class of profoundly disturbed children (Rappaport & Ismond, 1996). There are two diagnostic systems that are currently in use to diagnose the autistic disorder (Jordan & Jones, 1999). These are the International Classification of Diseases-10 (cited in Jordan & Jones, 1999, p. 2) and the Diagnostic and Statistical Manual of Mental Disorders-IV (DSM-IV: American Psychiatric Association, 1994). The DSM-IV provides a list of features under three categories. These categories are consistent with the three features included in the triad of impairments.

The impairments in the social domain are characterized by extreme delays in social development, especially concerning interpersonal skills (Jordan & Powell, 1995). The individual may lack non-verbal behaviours like eye contact, gestures and facial expression (Koegel & Kern Koegel, 1996). There is often a lack of social or emotional reciprocity and a failure to develop peer relationships (Rappaport & Ismond, 1996). The individual with autism may often appear oblivious to others and may demonstrate an inability to perceive the needs or emotional state of another person (American Psychiatric Association, 1994).

Impairments in language and communication are often exhibited by children with autism. In extreme cases, spoken language may never develop (Jordan & Powell, 1995). In other cases, language may be delayed and comprise certain peculiarities (Rappaport & Ismond, 1996). For example, the child may demonstrate odd patterns of tone or volume of speech (Rappaport & Ismond, 1996). The individual may display echolalia which refers to the immediate repetition of words or phrases after they are spoken to the child (Association for Autistic Children in WA, 1997). Delayed echolalia can also occur, in which the child retains phrases or words and repeats them some time later (Association for Autistic
Children in WA, 1997). Children with autism often have great difficulty in understanding or using abstract language such as metaphors (Rappaport & Ismond, 1996).

The repertoire of behaviours and interests demonstrated by the child with autism is often very restricted (American Psychiatric Association, 1994). Such impairment is manifested in the individual’s often strict adherence to routine and an apparent inability to adapt to changes in the environment (Rappaport & Ismond, 1996). There is often a lack of imaginative play and non-functional use of toys or play equipment (Jordan & Powell, 1995). Stereotypic and self-stimulatory behaviours are common among children with autism (Koegel & Kern Koegel, 1996). Stereotypic behaviours are defined as repetitive behaviours such as hand-flapping, twirling objects in front of the face, or rocking for prolonged periods (Koegel & Kern Koegel, 1996). These behaviours are often described as self-stimulatory behaviours because they appear to serve no other function than to provide the child with sensory input or kinesthetic feedback (Koegel & Kern Koegel, 1996; Koegel, Rincover, & Egel, 1982).

Autism also affects basic psychological functions (Rappaport & Ismond, 1996). Attention, intellectual functioning and sensory perception are often affected to a severe degree in children with autism (Rappaport & Ismond, 1996; Jordan & Powell, 1995). For example, 40% of children with autism have IQ scores that are less than 50 (Rappaport & Ismond, 1996). Rappaport & Ismond (1996) also noted that epileptic seizures have been reported in about 25% of autistic cases.

The ramifications of the psychological and behavioural disorders of children with autism on learning are great. Inappropriate and challenging behaviour is often a response by these children to the confusing and frustrating world in which they live (Jordan & Jones, 1999). These children often have severe learning difficulties that are frequently another
source of challenging or inappropriate behaviour (Jordan & Jones, 1999). Children with autism generally demonstrate very low levels of motivation (Koegel & Mentis, 1985). Motivation has been identified as a significant variable in skill acquisition (Koegel & Mentis, 1985; Barry & King, 1995). It is believed that the characteristic lack of motivation in children with autism is a result of learned helplessness (Koegel & Kern Koegel, 1996).

Learned helplessness arises when students learn that their behaviour and the environmental consequences are independent (Koegel & Mentis, 1985). Learning that responding and reinforcement are independent occurs when the student experiences frequent failure as a consequence of effort in learning. Koegel and Kern Koegel (1996) suggest that learned helplessness will often occur when students’ disabilities force them to be dependent on others for reinforcement. Therefore, low motivation and passivity in learning situations is a common problem for teachers of children with autism (Koegel & Kern Koegel, 1990).

As a result of low motivation and inappropriate behaviour, teachers commonly find that children with autism are highly dependent on adult supervision (Powell & Jordan, 1992). They typically demonstrate an inability to manage their own behaviour which produces further obstacles for learning (Pierce & Schreibman, 1994; Strain & Sainato, 1987). This reduces the time available to the teacher for academic instruction and for the other students in the class (Johnson & Johnson, 1999). There are many other disadvantages of a strong reliance on external agents of control, such as teachers. The research related to these problems is discussed in greater detail in Chapter 2.

A major goal in any educational program for children with autism is to teach skills that promote independent functioning (Newman, Buffington, O’Grady, McDonald, Poulson, & Hemmes, 1995). Koegel and Kern Koegel (1996) suggest that individuals with
autism are unlikely to learn all of the behaviours that are necessary to function independently if they are taught them individually. The low rate of achievement in children with autism has led some researchers to suggest the essentiality of teaching pivotal, or “keystone” behaviours (Waters, 1990; Koegel & Kern Koegel, 1996). **Pivotal behaviours** are defined as “deficits, which when filled, would result in multiple or widespread behaviour gains” (Waters, 1990, p. 11). The inability of children with autism to manage their own behaviour is such a deficit.

Koegel and Kern Koegel (1996) emphasize self-management as an important pivotal skill for students with autism to learn. They highlight that by teaching children with autism to self-manage their behaviour, the students learn a skill that will facilitate other important behaviour gains. The researchers illustrate this concept with the example of learned helplessness. Teaching children with autism self-management skills allows them to take responsibility for their own behaviour. This can lead to an increased understanding of the interrelationship between their behaviour and the environmental consequences, thereby reducing the likelihood that learned helplessness will occur (Koegel & Kern Koegel, 1996). This is likely to avoid the probability of decreased motivation and its consequent effect on learning.

The present research project assessed the effects of a self-management treatment package on inappropriate classroom behaviours that interfered with the ability to work independently. The conceptual framework for the research is displayed in Figure 1.1. It incorporates three elements of self-management. Specifically, these are self-modelling, self-monitoring and self-reinforcement. The children were first exposed to videotaped self-
SELF-MANAGEMENT INTERVENTION PROGRAM

- Self-modelling
  - Increased self-efficacy and self-awareness
    - Increased motivation
      - Observational learning

- Self-monitoring
  - Self-observation: Increased awareness of behaviour
    - Self-recording: Increased awareness of behaviour
      - Increased self-awareness
        - Reductions in inappropriate behaviour that interfere with ability to work independently

- Self-Reinforcement for appropriate behaviour
  - Appropriate behaviour strengthened

INCREASED INDEPENDENCE

Figure 1.1: Conceptual Framework
modelling in a therapy room. The child then returned to the classroom and participated in self-monitoring and self-reinforcement. The self-monitoring and self-reinforcement elements were combined to form a four-step self-monitoring procedure. Therefore, for the purposes of the present report, the researcher will simply refer to the self-monitoring procedure when relating to the combined process of self-monitoring and self-reinforcement. Hence, in general terms, the present studies involved a self-management treatment package consisting of self-modelling and a self-monitoring procedure.

In broad terms self-management, also known as self-control (Jackson & Boag, 1981) or self-regulation (Johnson & Johnson, 1999; Reid & Harris, 1993), refers to everything an individual does to influence his or her behaviour (Harchik, Sherman, & Sheldon, 1992). More specifically, self-management "...is a set of behaviours, or skills, that facilitate the individual to begin, continue, and end the performance of a task" (Medland, 1990, p.1).

Videotaped self-modelling (VSM) is defined as "the behavioural change that results from the observation of oneself on videotapes that show only desired behaviours" (Dowrick, 1983). There are two types of VSM. One involves the taping of role-plays in which students imitate the target behaviours for recording. The other involves video recording natural behaviour and editing to produce a tape that shows only desirable behaviours (Buggey, 1999). The latter approach is employed in the present study due to the nature of the target behaviours and the students' disabilities.

A number of researchers have reported that more desirable behaviour changes are apparent when the attributes of the model and the observer are similar (e.g. Woltersdorff, 1992; Schunk, 1987). It is assumed that model-observer similarity increases self-efficacy. Self-efficacy refers to beliefs about one's performance capabilities within a given situation
The concept of self-efficacy as it relates to the present research project is discussed in more detail in Chapter 2.

The VSM component is also proposed to increase self-awareness (see Figure 1.1). Self-awareness concerns the awareness of the self in relation to personal involvement in environmental events and an awareness of the nature and occurrences of particular behaviours (Witt, Elliott, & Gresham, 1988; Jordan & Powell, 1995). The latter aspect of self-awareness is also related to the self-monitoring element of the treatment package.

Finally, observational learning is proposed to be related to the VSM component (Figure 1.1). Observational learning involves a model providing an observer with behavioural cues, the observer performing matching responses and being positively reinforced for those responses (Schunk, 1987). In the present study, the VSM component provides the behavioural cues. During the self-monitoring sessions the children are required to provide the matching responses and are positively reinforced for these responses.

Self-monitoring refers to keeping a record of one’s own behaviour (Harchik, Sherman, & Sheldon, 1992). Self-monitoring is comprised of the elements of self-observation, self-recording and self-evaluation (Nelson & Hayes, 1981; Witt, Elliott, & Gresham, 1988). Self-observation involves the participant recognizing that a particular behaviour has occurred (Witt, Elliott, & Gresham, 1988). Self-recording is an overt process in which the individual makes a permanent record of the occurrence of the behaviour on some self-recording device (Jackson & Boag, 1981; Nelson & Hayes, 1981). Self-evaluation involves the student making judgements about his or her behaviour against a set criterion (Rhode, Morgan, & Young, 1983; Webber, Scheuermann, McCall, &
Coleman, 1993). For example, students may need to evaluate whether their behaviour was appropriate during a particular interval to obtain reinforcement.

Reinforcement is a consequence that increases the likelihood of the occurrence, frequency or magnitude of a behaviour (Evans, 1995). A consequence is an event that is contingent upon the performance of a behaviour (Wolery, Bailey, & Sugai, 1988). Reinforcement can be in the form of positive or negative reinforcement (Evans, 1995). In the present study the student was positively reinforced. Positive reinforcement involves providing the student with a desirable consequence after the performance of a targeted behaviour, as opposed to negative reinforcement in which something aversive is removed (Snell, 1993). A consequence is only reinforcing if it holds a high reinforcement value for that student (Snell, 1993). Therefore, in the present study reinforcers for the participants were chosen after consultation with the classroom teacher and observation of the child.

The present study employs the use of a token-economy (Wolery, Bailey, & Sugai, 1988). A token economy involves providing the participant with a "currency-payment system" (Snell, 1993, p. 136), or tokens. These tokens are then exchangeable for some form of primary reinforcement, such as food (Snell, 1993). The tokens are provided on a continuous reinforcement schedule in the present study. In a continuous reinforcement schedule (CRF) every desirable response is reinforced (Wolery et al., 1988). In the present study, the tokens the child received were stickers which were exchangeable for edible reinforcement after six stickers had been accumulated on a card.

Self-reinforcement can be one of two kinds, self-determination of consequences or self-administration of consequences (Jackson & Boag, 1981; Witt, Elliott, & Gresham, 1988). In the present study the latter type of self-reinforcement was used due to the nature of the children's disabilities and for ease of implementation. Self-administration of
consequences requires children to obtain their own reinforcement, from those made available, when they meet the criterion for reinforcement (Witt, Elliott, & Gresham, 1988).

The four-step self-monitoring process was taught through the constant time delay procedure (Alberto & Troutman, 1995; Wolery, Ault, & Doyle, 1992). Constant time delay (CTD) is a response-prompting procedure that allows a teacher to manipulate students' responses to enhance the likelihood that they will perform the desired behaviours (Miller & Test, 1989). Prompting involves providing a stimulus that controls the targeted behaviour (Touchette & Howard, 1984). Constant time delay (CTD) is an errorless, or near errorless, learning technique in which prompts are provided on time intervals (Koscinski & Gast, 1993; Browder, Morris, & Snell, 1981). Initially, the teacher presents the controlling stimulus, or prompt, with the target stimulus (Schuster, Gast, Wolery, & Guiltinan, 1988). These are zero-second trials. The aim of the CTD procedure is to transfer the stimulus control from the prompt to the target stimulus. Following zero-second trials, a delay is then inserted between the target stimulus and the controlling prompt (Schuster et al., 1988). This provides the child with an opportunity to respond independently. In constant time delay, the interval between the target stimulus and the controlling prompt remains constant, as opposed to progressive time delay in which the delay intervals are systematically increased (Alberto & Troutman, 1995).

Two other response-prompting procedures were used in the present research project. The most-to-least prompting procedure was used during the training of the self-monitoring procedure (Alberto & Troutman, 1995). In Studies 1 and 2, the second target behaviours for each of the participants were monitored by recording the number and level of intrusiveness of prompts given to inhibit the inappropriate behaviour. The prompts were
administered within a hierarchy that was consistent with the least-to-most prompting procedure (Alberto & Troutman, 1995).

The most-to-least procedure involves providing the student with a hierarchy of prompts, beginning with the most intrusive prompt, and gradually decreasing the assistance as the student becomes more competent (Alberto & Troutman, 1995). This procedure was chosen for training the self-monitoring procedure because the children had shown no prior ability in this skill. Research has shown that assistance before the prompt is more beneficial than correction after the prompt (Schoen, 1986). It has also been suggested by researchers that low error rates speed the acquisition of skills (Schoen, 1986; Schuster et al., 1988; Browder et al., 1981; Wolery, Ault, Gast, Doyle, & Griffen, 1991). Therefore, to ensure correct responding and to speed skill acquisition the most-to-least prompting procedure was used.

The least-to-most prompting procedure is the inverse of the most-to-least procedure. It involves administering prompts on a hierarchy ordered from the least intrusive prompt to the most intrusive prompt needed to control the response (Doyle, Wolery, Gast, Ault, & Wiley, 1990). The students were given an opportunity to respond independently before the prompt was given. If the students did not provide a correct response within a specified time, they were presented with the least intrusive prompt (Gast, Jones, Ault, Wolery, Doyle, & Belanger, 1988). The researcher continued to provide more intrusive prompts until the children responded correctly or until the most intrusive prompt was given (Gast et al., 1988).

Each of the studies in the present research project is consistent with a single-subject experimental research design (Neuman & McCormick, 1995). In single-subject designs, each of the participants serves as his own control (McReynolds & Kearns, 1983). The
single-subject experimental design and the advantages of such a design concerning the present research project are discussed in more detail in Chapter 3. Each of the present studies is also consistent with a withdrawal design (Wolery, Bailey, & Sugai, 1988). Withdrawal designs involve a baseline condition, followed by an intervention condition, followed by the withdrawal of the intervention in a return-to-baseline condition (Wolery, Bailey, & Sugai, 1988). The first two studies followed an A-B-A design with a two-week follow-up and the final study followed an A-B-A-C-A design. A represented the baseline conditions and B represented the intervention condition. Study 3 was extended for one week and a second intervention condition, C, was included.

This chapter has provided a general description of the present research project. It has made reference to and defined the major elements and features of the study. A general description of autism was presented. In the Introduction section in Chapters 4, 5, and 6 more detailed descriptions of the participants and the features of autism demonstrated by them are provided. In Chapter 3 a more detailed overview of the methodology involved in the present research project appears. The specific procedures involved in each of the studies is then outlined in the Method sections of Chapters 4, 5, and 6. Each of the latter chapters then contains a Results section in which the research data are presented. The results of each of Studies 1, 2, and 3 are discussed in the final Chapter 7.

Aim of the present study
The specific aim of the study will now be reiterated to make subsequent reading clear. The researcher aimed to use a self-modelling and self-monitoring treatment package to decrease the inappropriate classroom behaviours of three children with autism. The self-modelling element of the package involved the children viewing self-modelling videotapes that showed only the desirable target behaviours. The children then returned to the classroom
to participate in a self-monitoring session. The self-monitoring element of the package involved self-observation, self-recording and self-reinforcement of the appropriate target behaviours.

The target behaviours that were the focus of the study were chosen because they interfered with the children's ability to work independently. Therefore, the ultimate aim of the present research project was to promote the independent functioning of each of the participants. The aim of the extended study, Study 3, was to assess whether greater control over the self-monitoring procedure could be transferred to the child. This was consistent with the aim of promoting independent functioning. A second focus of the extended study was to investigate whether self-monitoring for longer intervals would produce further changes to the level and slope of inappropriate behaviour. The focus of the present research project was centred around the concept of promoting independent functioning in three children with autism through a self-management treatment package. The specific research questions for the present study are presented in the Methodology Chapter (Chapter 3).
CHAPTER 2
LITERATURE REVIEW

The first section of this chapter outlines some of the disadvantages of a reliance on external agents to control and manage behaviour. The advantages of self-control over one's own behaviour are then listed. A recommendation for the use of self-management techniques with autistic children is then presented. Following, is a review of the literature concerning each component of self-management that is relevant to the present research project.

The review is divided into four sections. The first section reviews the relevant literature on videotaped self-modelling. The second section reviews studies that investigated the use of a single component of self-management, or studies that compared one component with others. The third section reviews studies involving packages that combine a number of elements of self-management, including self-reinforcement, self-monitoring, and contingent reinforcement. The final section includes studies that were mainly concerned with assessing whether the participants responded to self-management procedures in the absence of a treatment provider and whether effects such as these can be generalized to other contexts.

Behaviour modification programs for children with developmental disorders have usually relied upon external agents, such as teachers, to control and administer contingencies for particular behaviours (Johnson & Johnson, 1999). Dependency on others impedes the development of individual responsibility (Jackson & Boag, 1981). Such dependency can limit the time available for teaching because of the academic and social behaviour management necessities in the classroom (Johnson & Johnson, 1999). As a consequence of the restricted time schedules of teachers, a large proportion of a particular
behaviour may go unnoticed, resulting in inconsistent contingencies for that behaviour (Rosenbaum & Drabman, 1979).

The administration of contingencies for certain behaviour by an external agent poses another problem. The child may begin to associate the external agent with the administration of contingencies (Rosenbaum & Drabman, 1979). This means that the external agent may become the discriminative stimulus that cues the behaviour. Consequently, generalization to situations where that cue is not available becomes very difficult (Rosenbaum & Drabman, 1979).

Self-management techniques allow subjects to be their own agents of control. Independence is valued and typically expected in our culture (O’Leary & Dubey, 1979). An important outcome of increased independence is a reduction in adult supervision (Kern Dunlap, Dunlap, Kern Koegel, & Koegel, 1991). This provides a number of advantages for a teacher, including an increased time available to teach academic skills. The ease at which the procedure can be adapted to a variety of natural settings makes self-management a valuable technique (Koegel & Kern Koegel, 1990). Given the current trend toward inclusion, a major advantage is the application of the procedure to allow the child with disabilities to participate and be integrated into the regular classroom (Fowler, 1984).

Situations in which people have a degree of control can increase participation in academic tasks and reduce problem behaviour (Harchik, Sherman, & Sheldon, 1992). Other advantages of self-management of behaviour that are listed in the literature include more durable behaviour changes (O’Leary & Dubey, 1979), an increased likelihood of generalization (Kern Dunlap et al., 1991), and the possibility of control over behaviour when the contingencies are too small or too delayed to be effective (Harchik et al., 1992).
Increased independence is one major goal in programs designed for children with autism (Newman, Buffington, O’Grady, McDonald, Poulsen, & Hemmes, 1995). Self-management treatments have been implemented to increase independence with a variety of groups, ranging from average achieving students to those with moderate to severe disabilities (O’Leary & Dubey, 1979; Rosenbaum & Drabman, 1979; Kern Dunlap et al., 1991; Harchik et al., 1992; Webber, Scheuermann, McCall, & Coleman, 1993).

Despite the reported success of self-management interventions, the application of this category of treatment to children with autism remains limited (Newman, Buffington, & Hemmes, 1996). Some researchers have advocated the use of self-management procedures with autistic children (e.g., Newman et al., 1995). Others have questioned the reason as to why such procedures are not being implemented in the contemporary classroom (Connell, Carta, & Baer, 1993; Johnson & Johnson, 1999).

The research concerning videotaped self-modelling is reviewed in the next section. The researcher reviewed both current literature and those from earlier periods. Studies involving the use of videotaped self-modelling with children with autism have rarely been published. Consequently, studies involving videotaped self-modelling with people with other categories of disability are first presented. Following this, some studies involving autistic persons and videotaped models other than self-models are described. Studies investigating individual self-management components and self-management packages are then presented in the following section. Following are the studies concerned with reducing the presence of a treatment provider and assessing generalization.
Videotaped self-modelling

Thelen, Fry, Fehrenbach, and Frautschi (1979) reviewed videotaped and film modelling from the late 1960's to the late 1970's. In this review only one study had employed self-modelling, with adult alcoholics. All other models in the studies were peers and various adults. Half of the review was devoted entirely to discussing the importance of similarity between the model and observer. Two variables were specifically addressed. These were model age in relation to the observer and the presentation of a coping versus a mastery model. A coping model involved the model making mistakes on a task and displaying coping behaviours. A mastery model was one who displayed only the appropriate behaviours concerning the task and who experienced success.

The Thelen, Fry, Fehrenbach, and Frautschi (1979) study showed that when a child viewed an adult model, the effects on fear reduction were minimal. However, they did show that when children viewed child models who were the same age or younger, fear reduction was significantly reduced. The researchers also demonstrated that a coping model, in which the model displayed some undesirable behaviour as well as desirable behaviour, was superior to a mastery model in many cases. The latter, however, was more concerned with the acquisition of cognitive skills (e.g., subtraction skills in mathematics). The researchers hypothesized that children viewed adults as more capable and, therefore, an adult model would have little effect on the motivation of the child to perform the observed behaviour. Similarly, a mastery model who displays only appropriate behaviour and experiences only success may be viewed as a more competent individual. These hypotheses relate to the concept of self-efficacy.

Self-efficacy refers to personal beliefs about one's performance capabilities within a given situation (Bandura, 1986). Modelling is hypothesized to be an important source of
eficacy information (Schunk & Hanson, 1985). An observer who sees a model perform a particular behaviour and is successful or rewarded for it is likely to perform that behaviour (Schunk, 1987). The more similar the model to the observer, the more likely it will be that the observer believes they are capable of performing the behaviour. That is, the self-efficacy of the observer is higher when the model is similar to the observer. Higher self-efficacy is believed to be related to greater motivation and, therefore, to greater effort (Schunk & Hanson, 1985). The importance of model similarity to the observer has been highlighted by other researchers (Schunk, 1987; McCurdy & Sharpio, 1988; Woltersdorf, 1992; Buggey, 1995; Buggey, 1999).

The findings that models with similar attributes to observers were often superior in producing the desired behaviour changes (e.g., Schunk & Hanson, 1985) has led researchers to explore the area of self-modelling (e.g., Dowrick & Dove, 1980). In self-modelling the participants act as their own models. This heightens to its full potential the similarity of attributes between the model and the observer (Bandura, 1986). In self-modelling the video is edited to remove inappropriate behaviour, the result being that the individuals view themselves acting in an appropriate manner (Dowrick, 1983; Schunk & Hanson, 1989; Buggey, 1999). Dowrick (1983) termed this “feedforward”, as the child observes how he or she might behave in the future. Self-efficacy is heightened as the child observes personal performance.

Dowrick and Dove (1980) investigated the use of videotaped self-modelling (VSM) to improve the swimming performance of spina bifida children. Three children participated, one aged 10 years and two aged five years. Four videotapes were made from one recording. Video X (three minutes long) showed all of the children in the pool performing behaviours within each of the children’s capabilities. The researchers stated
that this video provided a viewing experience that did not contain self-modelling characteristics. The children were rated from the videotape on the Water Confidence Behaviours Checklist. Videos A, B and C (each two minutes in length) were the self-model videos and contained only the target child displaying behaviours that slightly exceeded the child’s capability. This was achieved by recording at an angle so that any prompting given to the child could not be seen on the video. The child appeared to be performing the behaviour independently. This illustrates the concept of “feedforward” (Dowrick, 1983).

The first child in the Dowrick and Dove (1980) study was shown Film A at the same time as the other two viewed Film X. They viewed the tapes three times a week. No comments were made during viewing. Two weeks later, Child 2 was shown Film B in place of Film X. Two weeks after this Child 3 was shown Film C in place of Film X. The swimming observation session followed immediately after the third viewing of the tape. The researchers attempted to assess whether the progress of Child 1 could be increased further by making a new videotape, A1, in which the child performed more checklist behaviours than before. This was followed by a second new tape, A2, showing further improvement three weeks later. A follow-up one week and ten weeks after withdrawal of the intervention was conducted for all of the children.

Dowrick and Dove (1980) found that the scores of the three children did not improve after viewing Video X. After the third viewing of the appropriate self-modelling videos Child 1, Child 2, and Child 3 improved by five, four, and two points respectively on the checklist. These increases occurred at the times the intervention was introduced for each of the three children. The data showed little variability and further increases over this phase were minimal. When Child 1 was shown Film A1 his score increased by four on the checklist. Following the viewing of video A2 his score increased by a further five points.
The follow-ups showed these skills were maintained for all three children. These results showed that the self-modelling videos were very effective in producing rapid improvement in behaviour. Video X produced no change in behaviour which suggests that viewing peer models had no effect on each child’s achievement.

Dowrick and Hood (1981) conducted a study to compare the effects of VSM and cash incentives on individuals with disabilities working in a sheltered workshop setting. Fifteen participants, aged 17 to 30 years, with moderate to severe handicaps were involved. Three groups were formed. The researchers matched ability levels between the groups. Group 1 was the VSM group, Group 2 was the cash rewards group, and Group 3 was the control group. A baseline phase was conducted over two weeks.

A videotape was made of the subjects in Group 1 in the Dowrick and Hood (1981) study. It showed each subject performing only desirable behaviour for 60 seconds. Every day at midday the five subjects in Group 1 watched the videotape for a total of five minutes. Films were made weekly to avoid boredom. Each day the researchers also visited each subject in Group 2 and calculated their daily productivity rate for the day before. Productivity rates were measured by collecting a tally of the numbers of hours worked and the products completed. Any 10% increase from the baseline was rewarded with one point. At the end of the week a bonus of 10 cents was paid for each point. The researchers also visited Group 3 subjects daily and discussed their work generally.

Dowrick and Hood (1981) found that the productivity rates increased by 15% for Group 1 during treatment. For Group 2 there was an increase of 3% which was the same as the increase for the control group. The superior effect of the VSM treatment was evident. However, the researchers allowed all of the subjects to view themselves plus the other four...
subjects. This made it impossible to ascertain whether the results were due to self-
observeration or whether they occurred through observation of other workers.

Dowrick and Hood (1981) did not collect post-baseline data after the removal of the
intervention, although a four-month follow-up was conducted. The VSM group had
actually continued to increase their productivity rates on average. The mean productivity
rate during the intervention phase was 76.4% and at follow-up it was 110%. The difference
in the rate between the intervention phase and the follow-up for the cash rewards group was
5.8. The rate of productivity in the control group had increased by 21 from the intervention
phase to the follow-up, outperforming the cash rewards group. A return-to-baseline phase
after the removal of the intervention would have been useful to more clearly demonstrate
the short-term maintenance gains and the rates of increase to follow-up.

McCurdy and Sharpio (1988) applied self-modelling (SM) to the classroom context.
They studied the effects of self-observation and peer observation on the level of
inappropriate classroom behaviour. Five students, aged nine to 11 years, attending a school
for socially and emotionally disturbed children were involved in the study. The dependent
variables were out-of-seat behaviour, touching, vocalizations, playing, disorientating,
making noise and aggression. All were targeted for reduction. A multiple-baseline design
across subjects was employed. The children were videotaped and the recording was edited
to show the children performing only the target behaviours.

Three of the children in the McCurdy and Sharpio (1988) study were exposed to
baseline, observing a peer, and self-observation conditions. The fourth child was exposed
to baseline, self-observation, and follow-up conditions. The fifth child was exposed to the
same conditions as the first three children, but the peer and self-observation conditions
were reversed. The researchers collected baseline data after the session in which the
children were recorded because the researchers had given instructions for the subjects to "show the cameraman the best possible behaviour during taping" (p. 373). They wanted to assess the effect of instructions to behave appropriately on the behaviour of the children. Follow-up data was only collected on one child two days after the removal of the intervention.

The results of the McCurdy and Sharpio (1988) study indicated highly variable results. A change in the number of disruptive intervals of inappropriate behaviour after peer observation was evident only for Subject 3 (baseline = 69.5 disruptive intervals; peer-observation = 51.4 disruptive intervals). There was some decrease in the number of disruptive for Subject 2 but the number increased to baseline levels towards the end of the intervention phase. Self-observation after the peer-observation produced treatment effects for Subject 2 (peer-observation = 54.8 disruptive intervals; self-observation = 42.6 disruptive intervals) and Subject 3 (peer-observation = 51.4 disruptive intervals; self-observation = 38 disruptive intervals). There were no treatment effects for Subject 1. Subject 1 did have to be excluded from the study because of high truancy levels, which may have accounted for the lack of treatment effects.

Subject 4 in the McCurdy and Sharpio (1988) study was exposed to only a self-observation treatment condition. There was a gradual decrease in inappropriate behaviour over the condition (baseline = 75.9 disruptive intervals; self-observation = 47.6 disruptive intervals). The follow-up two weeks later showed the mean level of behaviour to have been maintained at treatment condition levels. The inclusion of a return-to-baseline phase immediately after the removal of intervention would have been useful. This would have shown whether the behaviour decreased any further, before perhaps
increasing to the level observed at follow-up. The lack of this baseline data created an unexplained “gap” in the pattern of data.

Subject 5 in the McCurdy and Sharpio (1988) study showed initial decreases in inappropriate behaviour after the self-observation condition, although these effects were quickly lost (baseline = 74.5 intervals of disruptive behaviour; self-observation = 66.1 intervals of disruptive behaviour). This subject was then exposed to a peer-observation condition and no effects on inappropriate behaviour were evident. Again there was no return-to-baseline phase, which made it impossible to follow the proceeding pattern of behaviour.

The second baseline, after the videotaping session, showed that the instructions given to the students did not reduce inappropriate behaviour levels substantially. Overall, the study provided some support for self-observation, although the inconsistent effects made it difficult to draw unambiguous conclusions. In addition, the unexplained lack of follow-up data on all but one of the children makes it impossible to ascertain whether any effects produced by the intervention were maintained over time.

Woltersdorf (1992) applied VSM to an ADHD sample in a classroom setting. The researcher added another dimension to his study in that he observed the children in two different types of classroom. Two children were in a traditional classroom with fixed rows of desks. The other two children were in a nontraditional classroom in which the desks were moveable and the children sat in “learning clusters”. Four children aged between nine and ten years and who met the diagnostic criteria for ADHD participated in the study. The dependent variables were fidgeting, distractibility, vocalizations and math performance. The children were assessed on the math subtest of the WRAT-R prior to the commencement of the study.
The children were videotaped while engaged in an independent mathematics activity. All inappropriate behaviours were edited out of the final three-minute recording. A multiple baseline design across children within each of the two classrooms was employed. The children earned some payment for watching the videotapes and received a bonus for the amount of time they actually gazed at the screen. Viewing continued daily and data on inappropriate behaviour were collected immediately after the child returned to the classroom. The maintenance phase then began during which the children watched the video only once a week and data were collected each day. Next the follow-up phase was conducted over four months in which no intervention took place.

The results of the Woltersdorf (1992) study supported all three hypotheses initially proposed for the study. These were that VSM would reduce inappropriate behaviours and that the classroom setting may effect the potency of the intervention, that VSM would improve academic under-performance, and that VSM would produce durable treatment effects. The combined treatment effects for all behaviours across each phase were 2.82 occurrences of inappropriate behaviour during intervention, 2.08 occurrences during maintenance, and 1.74 occurrences during follow-up. The children in the traditional classroom demonstrated more reductions in behaviour than those in the contemporary classroom.

Woltersdorf (1992) found that maths performance increased. Effect sizes ranged from 1.66 to 10.14 for intervention; from -1.28 to 7.03 for maintenance; and from 1.49 to 7.09 in follow-up. The researcher concluded that this was due to increased attention to task. While this may have been the case, further research would have been necessary to support this conclusion as other researchers have questioned the link between increasing attentional behaviours and academic performance (Reid & Harris, 1993; Maag, Reid, &
DiGangi, 1993). The hypothesis that VSM would produce durable behaviour changes was supported by the maintenance and follow-up data. These data showed that behaviour was maintained over the 5.5 months of data collection. The study demonstrated the overall effectiveness of VSM as a powerful tool in the reduction of inappropriate behaviour.

**Videotaped modelling applied to autistic samples**

The video modelling technique was applied to an autistic sample by Haring, Kennedy, Adams, and Pitts-Conway (1987). They investigated the effects of video modelling on the generalization of purchasing skills with autistic adolescents. The models were familiar same-aged non-handicapped peers. Three individuals, one female and two males, with autism participated in the study. Each participant was 20 years old, although two were functioning at the four-year-old level of the Vineland Adaptive Behaviour Scales and the other at the five-year-old level.

Two of the participants in the Haring, Kennedy, Adams, and Pitts-Conway (1987) study were trained to purchase items in the school cafeteria. The other participant was taught to purchase items in a convenience store near to the school. Task analyses of the purchasing skills in each setting were performed. The task analyses included both social and operational responses. First, baseline data on each child’s ability to follow the steps in the task analysis was assessed. The shopping training condition followed. Each child was taught the purchasing skills in the training setting. When each child met the criterion of 80% accuracy for three consecutive trials, the videotape generalization training began.

During the videotape generalization training, the children watched the models performing the purchasing skills in the generalization settings whilst the researcher asked a series of questions about the task. For example, the individual was asked, “What will she do next?” Students were praised for correct answers and were given corrective feedback
for incorrect answers. Generalization probes were then conducted in the generalization settings in the same manner as during baseline. The videotape training was discontinued when the participant achieved the criterion of 90% correct responding over the three generalization settings. Maintenance probes were then conducted one and two weeks after the removal of the intervention.

The results of the Haring, Kennedy, Adams, and Pitts-Conway (1987) study showed that during the baseline condition both social and operational responses occurred at zero, or near zero, levels. During the shopping training phase, two of the children showed rapid increases in social responses. The third child showed a rapid increase in social responses after two weeks of training. The operational responses for all three children were at comparatively higher levels during the shopping training condition than at baseline. The generalization probe data showed that both operational and social correct responding remained at levels similar to at baseline during the shopping training phase. The progress that was evident in the training setting, as the training continued, did not generalize to the generalization settings. When the videotape training was introduced, rapid and durable improvements in behaviour were found for both social and operational responses in the generalization settings. The videotape self-modelling was also associated with an increase in the amount of trials in which the children displayed 100% correct operational responses. The researchers report that the maintenance probes indicated that the children could independently purchase items on most occasions. Probes in three novel settings showed that the children were again successful.

Haring, Kennedy, Adams, and Pitts-Conway (1987) demonstrated the efficiency of videotaped modelling combined with training in one natural setting on the generalization of purchasing skills to new settings for three individuals with autism. The videotaped training
increased the independence and social functioning of all three children. The report lacked any statistical information which would have been useful to support the researchers’ findings.

A second study applied video modelling to an autistic sample two years later. Charlop & Milstein (1989) investigated the effectiveness of using familiar adult models on videotape to teach conversational skills. Three male children with autism participated. Two were aged seven years and one was aged six years. Five videotapes were made that showed familiar adults modelling five conversations. A multiple-baseline across children for conversations A and B and within subjects across A and B was used. After baseline data were collected and the treatment began. Each child was shown the first videotape three times. The child was then tested to see whether he would engage in the modelled conversation with the therapist. In each conversation the child was required to say three lines. If he met that criterion he was given praise and an edible reinforcer. The child was required to be able to complete a whole conversation on two consecutive trials of three. The videotape was repeatedly watched until the child met this criterion. Generalization probes (to other people, settings and topics) were presented two to five days after acquisition criterion had been met.

The results of the Charlop and Milstein (1989) study indicated the efficacy of teaching conversational skills to autistic children. None of the children met criterion level at baseline for any of the conversations. Child 1 met criterion for Conversation A after 20 exposures to the videotape. Probes for generalization across persons, settings and topics of conversation indicated some generalized responding, although criterion level was not met. Criterion for Conversation B was met after nine exposures to the tape and for Conversation C only four exposures were needed to meet criterion. Generalization probes indicated some
generalized responding in these two cases but criterion level was not met. Child 2 needed only three exposures to the video to meet criterion for Conversation A. Criterion level for all but one of the generalization probes were met by this child. Similarly, Child 3 met criterion for Conversation A after six presentations of the video. The criterion was met for generalization across people. In addition the concomitant increases in response variation (new, unmodelled responses) and question asking were evident for all children.

Charlop and Milstein (1989) conducted follow-ups one, two, three, six, and 15 months after the withdrawal of the intervention. These follow-up data showed that effects observed in the intervention condition were maintained at each follow-up. Overall, the study showed the rapid and desirable treatment effects of video modelling on the conversation skills of three children with autism. It must be noted that this study involved adult models and not self-models.

A third study involving videotaped modelling with an autistic sample was cited in Buggey (1999). The Buggey, Toombs, Gardner, and Cervetti (1998) study involved videotaped self-modelling with autistic children to improve responding behaviours (cited in Buggey, 1999). Unfortunately, this was a manuscript submitted for publication and was not available to the research community. A review by Buggey (1995) which examined the effectiveness of videotaped self-modelling to teach specific linguistic structures to preschoolers omitted any reference to autistic samples.

In summary, the research available on videotaped self-modelling with autistic children is limited. However, the findings of the few studies employing videotaped self-modelling with individuals with developmental delays have provided evidence that it may be a valuable tool in behaviour modification with this cohort of students. There are two studies that involved VSM and its effects on classroom behaviour (McCurdy & Sharpio,
The McCurdy and Sharpio (1988) study only found small magnitudes of behaviour change and the results were inconclusive. The Woltersdorf (1992) study found more pronounced behaviour changes.

All studies showed that the behaviour changes were durable over an extended period of time. A common limitation in many of the studies was that the researchers failed to return to a baseline condition immediately after the removal of the intervention (e.g., Dowrick & Hood, 1981; McCurdy & Sharpio, 1988). This made it impossible to assess the short-term maintenance gains. It also had the effect of creating unexplained “gaps” in the patterns of data. There was no means of comparing short-term and long-term behavioural maintenance in these cases.

Studies investigating single components of self-management

Some researchers have claimed that for children with developmental disabilities self-recording alone produces desirable behaviour changes (Reid & Harris, 1993; Sugai & Rowe, 1984). Sugai and Rowe (1984) studied the effects of self-recording alone on the out-of-seat behaviour of a boy with moderate intellectual disability who was 15 years old. The researchers included no reinforcement, feedback, mention of self-recording accuracy, or praise to ensure the changes in behaviour were a result of the self-recording only. The boy was simply given a recording chart and told to record any occurrence of out-of-seat behaviour in a tally. Towards the end of the intervention a fading strategy was introduced. The length of the recording intervals were increased from 10 to 13 minutes and then to 18 minutes during fading.

Results of the Sugai and Rowe (1984) study indicated a rapid and dramatic decrease in out-of-seat behaviour. The behaviour decreased from 63% over a ten-minute interval at baseline to 20% in the first day of intervention. The level decreased and remained at the
zero level towards the end of the intervention phase. When a baseline condition was reinstated, the level of out-of-seat behaviour increased to 15% on the first day and had increased to 50% by the end of the baseline phase. After the intervention was reinstated, the behaviour did not exceed 10% on any occasion. These results showed self-recording alone to be very effective. However, only one subject was used in the study, which makes it difficult to generalize the results. The researchers also failed to include follow-up data, which made it impossible to observe whether the behaviour was maintained over time after the removal of the intervention.

Broden, Hall and Mitts (1971) assessed the effects of self-recording alone and then investigated other dimensions of intervention. They investigated whether the time of self-recording made any difference to the reduction of inappropriate vocalizations of an eighth grade boy. The participant was given a slip of paper that displayed a large box and the instruction to put a mark down every time he called out. No further instructions were given and the child received no reinforcement or praise. During the first phase he self-recorded only during the first half of the session. During the second intervention phase he self-recorded only over the last half of the session. In the final intervention phase he recorded over the entire session.

Broden, Hall and Mitts (1971) reported a decrease from 1.1 call-outs per minute in the first half of the session at baseline to 0.3 per minute during the first intervention phase. The call-outs in the second half of the session remained the same. When he self-recorded in the second half of the session, the number of call-outs decreased in that half of the session but increased in the first half of the session. Self-recording over the entire session produced rates of call-out behaviour well below baseline levels. The levels increased during a return-to-baseline phase. The effectiveness of self-recording in reducing calling
out behaviour was demonstrated in this study. It was also shown that the timing of self-recording was important. Recording over the entire session was most effective. Only one child was involved in the study which made it difficult to generalize the results. No follow-up data were collected which made it impossible to assess the long-term maintenance of behaviour.

Anderson-Inman, Paine, and Deutchman (1984) compared the effects of self-recording and direct instruction on the neatness of writing skills. The group study involved 15 students, aged ten to 12 years, with mild intellectual disability, learning disability, emotional disturbance and low level academic performance. The researchers compared the effects of a direct instruction intervention and a direct instruction plus self-recording intervention in promoting nine writing skills.

The direct instruction intervention was ineffective in producing any substantial increases in any of the writing skills, with one exception. In the direct instruction plus self-recording intervention phase, the children were required to complete a checklist indicating whether they had performed each of the skills in their writing after each task. The results showed the intervention to be highly effective with mean levels exceeding the 90% improvement criterion. The children received no form of reinforcement or praise, and the accuracy of self-recording was never discussed. It was therefore possible for Anderson-Inman, Paine, and Deutchman (1984) to conclude that the self-recording was accountable for the improvement in behaviour.

Rooney, Hallahan, and Wills Lloyd (1984) assessed the effectiveness of self-recording on on-task behaviour. The researchers then added a reward system to reinforce the children when they followed the self-recording procedure. The participants were 14 second-grade students with learning disabilities and attention problems. A cassette that
emitted a tone at set intervals was used to cue the children to self-record. The teacher modeled on-task and off-task behaviour to convey expectations to the children. In the first intervention phase the children simply self-recorded at the tone. In the second intervention phase, the children were reinforced for correct use of the self-recording procedure. It was emphasized that the children were not reinforced for accuracy of self-recording or for the on-task behaviour, but simply for the correct performance of the procedure.

The results of the Rooney, Hallahan, and Wills Lloyd (1984) study indicated that on-task behaviour was at a mean level of 24% during the baseline phase. During the self-recording phase the mean level of on-task behaviour increased to 60%. This demonstrated the effectiveness of the self-recording alone. When the self-recording plus reinforcement phase was introduced, the mean level of on-task behaviour increased to 86%. The researchers stressed that although many other experimenters had been concerned with the accuracy of self-recording, of fundamental importance was whether the children were actually following the procedure as they had been taught. They also noted that the sequential order of treatments may have contributed to the increased levels of on-task behaviour. No maintenance data were included which made it impossible to assess whether this behaviour continued after the removal of the intervention.

Studies investigating multiple components of self-management Sainato, Strain, Lefebvre, and Rapp (1990) investigated the effectiveness of a self-management treatment package on the independent work skills of three pre-school children with autism. They then gradually eliminated components until a self-assessment only condition existed. Two of the children were classified as severely autistic. The other was described as moderately autistic. Another normally developing child served as a control in the study (Child 2). Three behaviours were monitored. These were appropriate behaviour,
inappropriate behaviour, and teacher behaviour (i.e., verbal prompting, praise and negative behaviours towards the child).

The participants in the Sainato, Strain, Lefebvre, and Rapp (1990) study were observed initially during a baseline condition. This was followed by a second baseline condition in which the classroom teacher gave no more than two prompts to the children. The first treatment condition involved a number of components, namely self-assessment, matching self-assessments with the researcher, praise, and reinforcement. The children received praise for accurate self-assessment and for appropriate behaviour. In addition, the children were reinforced with small toys if they matched the researcher ratings of self-assessment on at least seven out of nine ratings. This condition was compared with one in which the reinforcement component was removed. Following this was a condition in which matching was removed and self-assessment was the only treatment in effect. A baseline phase was scheduled between each of these conditions. Self-assessment was facilitated by using visual aids. Photographs of the children displaying the appropriate behaviour were inserted into a book. The children circled either a smiley or sad face beside each photograph to record their behaviour.

The results of the Sainato, Strain, Lefebvre, and Rapp (1990) study showed that all of the children's appropriate behaviour was initially maintained by high levels of teacher prompting (mean levels = 79%, 89%, 76%, and 62% for Child 1, 2, 3, and 4). Following a reduction in teacher prompting in the second baseline phase, appropriate behaviour decreased to unacceptable levels (mean levels = 30%, 50%, 60%, 44% for Child 1, 2, 3, and 4). When the complete self-evaluation package was introduced, appropriate behaviour increased dramatically to 71% for Child 1, 93% for Child 2, 89% for Child 3, and 90% for Child 4. Similar behaviour levels were maintained for seven days after the return to-
baseline condition. A second teacher entered the classroom and behaviour levels decreased. Child 4 maintained a level of 85% of appropriate behaviour during this phase and for the rest of the study. The children were then exposed to a second condition of the full treatment package. Levels of appropriate behaviour increased from 46%, 70%, and 61% for Child 1, 2, and 3 at baseline to 82%, 82%, and 93% respectively.

When Sainato, Strain, Lefebvre, and Rapp (1990) removed the reinforcement component, Child 1’s occurrences of appropriate behaviour decreased slightly from 82% to 80%, Child 2’s score increased to 97%, and Child 3’s score decreased slightly from 93% to 90%. These results showed that there were minimal changes to behaviour levels when the reinforcement component was removed. Finally, when the matching component was withdrawn, Child 1’s appropriate behaviour increased slightly to a mean level of 82%, Child 2’s decreased very slightly from 97% to 96%, and Child 3’s decreased slightly from 90% to 88%. Again the changes to behaviour were minimal when the second component was removed. At the return-to-baseline phase that followed, the levels were 71%, 96%, and 88% for Child 1, 2, and 3. The level of behaviour had been maintained.

The accuracy of the children’s self-assessment ranged from 60% to 95% during the first full-package exposure. The accuracy level rose to 100% towards the end of the intervention. These results showed a high level of accuracy in self-assessment. There were no follow-up data presented in the study which made it impossible to ascertain whether the behaviour was maintained in the long-term. Overall, the results showed the short-term effectiveness of self-assessment alone on the level of appropriate behaviour.

Strain, Kohler, Storey, and Danko (1994) proposed that they would show the effectiveness of a self-monitoring intervention package to teach social skills to preschool children with autism. The researchers extended their study to the home setting for two of
the children. Three preschool boys with autism participated, along with their non-disabled classmates and siblings. The researchers compared the effects of social skills training, the use of posters to prompt behaviour, teacher prompting, and self-monitoring with reinforcement of appropriate behaviour. During self-monitoring, the children were taught to place foam disks into a container after each positive behaviour. After a specific number of disks were placed into the container the children were allowed to choose a small edible reinforcer. To facilitate the children's social interactions, the teacher gave prompting that was gradually faded.

Strain, Kohler, Storey, and Danko (1994) found that at baseline the mean percentages of positive interactions at school were 10%, 3%, and 5% for the three children. There were no data reported after the researchers trained the children in social skills. The poster only condition followed immediately. The posters depicted children performing the learned social skills. This condition had little impact on the percentage of interaction at school. The first child displayed decreased levels of interaction (6%), whilst the other two children demonstrated similar low levels of interaction (4% and 5% respectively). The teacher prompting condition with reinforcement for appropriate responding was only implemented with the first child because of low levels of interaction demonstrated by this child. This motive, however, seems questionable as the other two children displayed even lower levels of interaction. The teacher prompting phase increased this child's mean interaction levels to 23%.

When the self-monitoring phase was introduced all three children demonstrated increased levels of social interaction. The first child displayed a mean level of 41% of social interaction, Child 2 a mean level of 40%, and Child 3 a mean level of 36%. Similarly, at home the mean baseline levels of social interaction for one child was 10% and
for the other was near zero levels. After the self-monitoring intervention was implemented, the mean levels increased to 35% and 40% respectively. The mothers of the children had provided the prompting in the home.

Strain, Kohler, Storey, and Danko (1994) concluded that the self-monitoring and social skills training package had similar effects in the two settings, though there were differential effects on some social behaviours. The self-monitoring component was clearly superior to the other components in increasing social interaction. It must be noted that the self-monitoring component was combined with a schedule of reinforcement. This made it impossible to conclude that the children's recording of their behaviour was entirely accountable for the change in behaviour. The researchers did not include a return-to-baseline condition, nor did they report follow-up data. Information in respect to maintenance was not provided. There were no data reported on the accuracy of the children's self-monitoring.

Sharpio, McGonigle, and Ollendick (1980) analysed the separate effects of self-assessment and self-reinforcement in a self-managed token economy with children with intellectual disabilities. Five children aged between seven and 12 years participated in the study. The target behaviours were on-task behaviour and disruptive behaviour. Each child was given ten independent work tasks to be completed during the 45-minute period. Following baseline was a token economy phase lasting eight days. An index card containing 20 squares was placed on each child's desk. A tape played music at random intervals. When the music played the teacher announced those who were on-task and they were praised and given a star on their card. Those who were off-task were given corrective feedback and those who were disruptive were given corrective feedback and had a star removed. The child chose a reward if a criterion of 15 stars out of 20 was reached.
A baseline condition was reinstated after the token economy phase, but was discontinued because of excessive levels of disruptive behaviour. The token economy phase was then reintroduced. Following this condition a self-management instruction phase was introduced. This phase assessed the effects of the instructions only. The children were instructed to take a star if they were on-task when the music played, not to take a star if they were off-task, and to remove a star if they were disruptive. A self-assessment training condition followed this phase in which the children learned to discriminate on-task behaviour through teacher prompting that was gradually faded. The children were reinforced by the teacher if they accurately declared themselves on-task. The self-management instruction phase was then repeated. Following was a self-reinforcement training condition in which children learned to obtain their own reinforcement through teacher prompting that was gradually faded. The self-management instruction phase was then reinstated.

The results of the Sharpio, McGonigle, and Ollendick (1980) study showed that the implementation of the token economy resulted in an increase in on-task behaviour from a mean baseline level of 35% to an intervention level of 86%. Disruptive behaviour decreased from a mean baseline level of 37% to 4% during this condition. When the self-management instruction phase was implemented, on-task behaviour decreased from the mean level of 88% during the token economy phase to 61%. Disruptive behaviour increased from a mean level of 3% to 15%. The self-assessment training phase marked an increase in on-task behaviour (to 98%) and a decrease in disruptive behaviour (to 3%). The self-management instruction phase was then reimplemented. There was an immediate decrease in on-task behaviour from 98% to 69%. Concurrently, there was an increase in disruptive behaviour from 3% to 9%. Self-reinforcement training in the next phase
increased on-task behaviour to 88% and while disruptive behaviour decreased to 3% once again.

The results of the Sharpio, McGonigle, and Ollendick (1980) study showed that an increase in on-task behaviour and a decrease in disruptive behaviour that was initially obtained through a teacher-controlled token economy could be maintained with a self-management strategy. The study assessed various components of self-management. Self-management instructions were not found to be efficient in maintaining on-task behaviour alone. On-task behaviour was found to be effected similarly by the two components of self-assessment and self-reinforcement.

The self-assessment phase produced a slightly higher mean level of on-task behaviour than the self-reinforcement phase. This may illustrate that the children simply being aware of their behaviour could have produced the increases in on-task behaviour. It may also illustrate that the self-reinforcement component was not necessary. However, the children did receive reinforcement in the self-assessment condition which made it impossible to attribute the effects only to the self-assessment of behaviour. As in the previous studies, a lack of data after the removal of the intervention made information on the short and long-term maintenance of behaviour unattainable.

Newman, Buffington, and Hemmes (1996) compared the effects of self-reinforcement and external reinforcement in teaching autistic teenagers to use appropriate conversation. Three teenage males participated. During baseline, the participant was read a story. The researcher then attempted to engage the individual in a conversation about the story. The participant was allowed three seconds to respond after which the experimenter began a hierarchy of questions, allowing a three-second responding interval each time a question was asked. The subjects received ten tokens non-contingently at the end of each
conversation to be exchanged for reinforcers. The external reinforcement condition followed the same format as the baseline phase, except the boys were awarded a token contingent on each appropriate response. During the self-reinforcement phase, the participants were prompted for the first seven sessions to take a token after each correct response. After the seventh session prompting ceased. A baseline followed, after which the self-reinforcement condition was reimplemented.

Newman, Buffington, and Hemmes (1996) found that external reinforcement was effective in improving the conversation skills of the three autistic youths. Furthermore, self-reinforcement was shown to be as effective as external reinforcement in maintaining the behaviour change. During baseline the mean levels of appropriate conversation were 10%, 20%, and 36% respectively. The external reinforcement phase increased appropriate conversation to 63%, 64%, and 59% respectively for each child. Responding was maintained in the self-reinforcement conditions, at mean levels of 63%, 65%, and 67% for each child. The return to baseline condition resulted in decreases to mean levels of 23%, 41%, and 38%, before these levels increased to 56%, 65%, and 63% when the self-reinforcement phase was reimplemented.

The accuracy of self-recording for the first and second self-reinforcement conditions were 49% and 60% for Subject 1, 76% and 57% for Subject 2, and 62% and 58% for Subject 3. These levels are relatively low. Despite low levels of accuracy there was an increase in the target behaviour. This is consistent with the view of other researchers that the accuracy of self-monitoring is not a variable affecting the change in behaviour (Webber, Scheuermann, McCall, & Coleman, 1993; O'Leary & Dubey, 1979; Rosenbaum & Drabman, 1979). The researchers did not report any follow-up data which meant that any long-term maintenance information was omitted.
Studies concerned with fading treatment provider presence and promoting generalization

Sharpio, Browder, and D'Huyvetters (1984) investigated the use of a self-management treatment package to increase the academic productivity of four severely disabled children with autistic-like tendencies. The children were aged between six and ten years of age. The researchers assessed generalization across time and tasks with two of the children. In addition they were concerned with whether the child could follow the self-management procedure in the absence of a treatment provider. The dependent measure was the rate of paper-and-pencil worksheet completion. Productivity rates were expressed as the mean number of accurately completed worksheets per minute.

The researchers divided the work period into three sessions which they labelled A, B, and C. The children worked on mathematics activities during Session A. During Session B the children worked on reading activities to assess generalization across tasks. The children were given a second set of mathematics activities during Session C to assess generalization across time. Self-management procedures were only in effect in Session A. Sessions B and C were identical to the baseline condition. In each experimental condition the child worked through Sessions A, B, and C.

Sharpio, Browder, and D'Huyvetters (1984) arranged for two baseline conditions. The first involved no intervention. The second involved the child receiving stickers for accurate task completion which was to be the procedure throughout the study. The child then entered an external reinforcement training phase. Each time the child completed a worksheet, the teacher took a penny from a container and placed it on a board containing circles. When all of the circles were filled the child chose a reinforcer. Sessions B and C followed with no intervention. Next was a prompted self-monitoring phase in which the
teacher modelled the self-monitoring procedure. After modelling, the child was required to put the pennies on the board after completion of a worksheet, facilitated by teacher prompting. The child received verbal praise for accurate self-monitoring. Sessions B and C followed with no intervention. The next condition involved the child following the self-monitoring procedure without teacher prompting. Sessions B and C followed with no intervention. Two additional experimental conditions followed. The self-management procedure was applied first in Session B and then, in the following condition, in both Sessions B and C.

The results of the Sharpio, Browder, and D'Huyvetters (1984) study showed that all children showed low productivity rates at baseline across Sessions A, B, and C. At baseline the mean productivity rates in Session A for each child were 0.13, 0.61, 0.01, and 0.44 respectively. These levels were somewhat lower during the second baseline condition with stickers (mean levels = 0.05, 0.61, 0, and 0.93). Following baseline the results of the study were inconsistent.

Productivity rates increased during the external reinforcement condition for three of the children, the productivity rates being 0.41, 0.83 and 0.13. The productivity rate for one child decreased to 0.51 (from 0.93 in the previous phase). For the former three children these increases in productivity rates were maintained over the subsequent self-monitoring conditions. Generalized increases in productivity rates across tasks (Session B) and time (Session C) were observed with two of the children during the self-monitoring phases in Session A. One of these children demonstrated even larger increases when self-monitoring was applied directly to those tasks. Two of the children showed generalized increases in accurate completions during the self-monitoring phases. The data for the fourth child were highly variable.
The researchers concluded that the results of their study were inconclusive. They stated that this was consistent with the findings of other researchers investigating self-management with severely disabled children, although they only provide one reference which was a study by Sharpio and Klein (1980). Overall, the study did show that productivity rates increased, or were at least sustained, during self-monitoring and that this behaviour was maintained when the teacher ceased prompting. Therefore, the children were able to learn the self-management procedure and to follow it independently of teacher prompting.

Sharpio, Browder, and D'Huyvetters (1984) also referred to the accuracy of self-monitoring. They found that only two of the children reached acceptable levels of accuracy. The other children maintained higher productivity rates despite their inaccurate self-monitoring, even when teacher prompting ceased. The researchers concluded that this showed the accuracy of self-monitoring not to be a variable influencing the behaviour of these children. As with many of the previous studies described, these researchers failed to provide return-to-baseline or follow-up data. Therefore, the effectiveness of the intervention on short and long-term maintenance could not be assessed. The inconsistent results meant that the results of the intervention on generalization were inconclusive.

Koegel and Kern Koegel (1990) investigated the use of a self-management treatment package on the stereotypic behaviour of four children with autism aged between nine and 13 years. The researchers assessed whether the children could use the self-management procedure for extended periods of time in the absence of a treatment provider. They also investigated whether the self-management procedure could be applied in a variety of natural settings. A self-management interval for each child was chosen based on the average length of intervals that did not contain stereotypic behaviour at baseline. Three
students were trained in a therapy room and the fourth child was trained in various community settings, such as restaurants and grocery stores. The children in the therapy room were engaged in academic self-help tasks and the student trained in the community settings was engaged in independent living tasks.

The participants underwent discrimination training during which the researcher taught each child, through modelling, to discriminate their stereotypic and appropriate behaviours. Students were reinforced for accurate discriminations. A self-management procedure was then implemented. The subjects were taught to place a mark in a box after intervals (cued by a chronograph alarm watch) without stereotypic behaviour. Researcher prompting facilitated the child to follow the procedure. Both appropriate behaviour and accurate self-recording were verbally praised. The subjects were then trained in independence. This was achieved by fading prompting and reinforcement.

Koegel and Kern Koegel (1990) extended their study with two of the children to selected community settings. These were the home for one student and the classroom and park for the other student. Baseline probes in each setting were first administered. The children were not equipped with the self-management materials at these times. The researchers were not present in these settings. The self-management procedure was then implemented in these settings. No prompts were given to the child. The treatment provider left the child for increasingly longer period of time and conducted validation checks with the parent or teacher about the occurrence of stereotypic behaviour. The researchers then conducted maintenance checks by contacting the parents and teachers of the children.

The results of the first experiment conducted by Koegel and Kern Koegel (1990) showed that all children initially exhibited high levels of stereotypic behaviour (mean level = 80% to 100%). The implementation of the self-management procedure produced rapid
decreases in stereotypic behaviour, often to 0% levels for two of the students. The other two students demonstrated more variable patterns of behaviour, although they also frequently reached the 0% level. Self-management procedures were withdrawn for one child for a short period. The levels of stereotypic behaviour increased at this time. The reimplemention of the self-management procedure produced further decreases in stereotypic behaviour to near 0% levels. When the teacher prompting and reinforcement were faded, the changes in behaviour were maintained. The results provided support for the effectiveness of the intervention in community settings as the third child was trained in such settings.

The accuracy of self-recording was monitored by Koegel and Kern Koegel (1990) in Experiment 1. The overall accuracy of self-recording occurrences was 39% (ranging from 18% to 72%). Accuracy of self-recording non-occurrences was 93% (ranging from 90% to 93%). The researchers concluded that if accuracy was a variable at all, it was the children's recording of absences of stereotypic behaviour that produced the behaviour change.

The second experiment of the Koegel and Kern Koegel (1990) study showed that the stereotypic behaviour levels of two students were around 100% and 90% respectively during the baseline probes. When the self-management intervention was implemented, there was an immediate decrease in stereotypic behaviour. There was a rapid increase in behaviour during a withdrawal condition and a rapid decrease once more when the intervention was reimplemented. Fading and maintenance probes showed that the self-management procedure could be used to reduce levels of stereotypic behaviour in the absence of a treatment provider. The data collected in the novel setting (e.g., the park) showed high levels of stereotypic behaviour before the self-management materials were
given to the child. After implementation of the self-management procedure, the behaviour immediately decreased. The results indicated that reductions in stereotypic behaviour did not occur spontaneously across settings. However, self-management occurred very rapidly in the community settings, causing a reduction in stereotypic behaviour. The weekly maintenance probes showed that the reductions in stereotypic behaviour were maintained by the intervention. There was not a withdrawal phase reported which made it impossible to assess any maintenance gains when the intervention was removed.

Kern Koegel, Koegel, Hurley, and Frea (1992) assessed the effects of self-monitoring with reinforcement and prompting to improve the social skills and disruptive behaviour of four children with autism. They overcame the problem of the confounding effects of self-monitoring and reinforcement to an extent. The researchers added a withdrawal condition in which two of the children received reinforcement on the same interval schedule as during self-monitoring, but the self-monitoring component was removed. The withdrawal condition existed to ensure any changes in behaviour were not due to the increased reinforcement only.

Kern Koegel, Koegel, Hurley, and Frea (1992) extended their study to assess the effects in the school, community, home setting and clinic settings. The children were aged between six and 11 years. In the self-management condition, the children were given a wrist counter. The teacher modelled appropriate and inappropriate responses and how to push the button on the counter to record an appropriate response. The children were then taught to record appropriate responses through prompting and reinforcement that was gradually faded. The procedure was then applied to the school, community and home setting.
Kern Koegel, Koegel, Hurley, and Frea (1992) found that at baseline the percentage of appropriate responding to others' questions were typically low at 59%, 61%, 49%, and 35% for each child. Even lower levels were noted in the school, home and community settings. After the implementation of the self-management treatment, the levels rose to 95% to 100% of appropriate responding in the clinic setting. The withdrawal condition implemented with two of the children resulted in rapid decreases in appropriate responding, followed by rapid increases when the self-management was reinstated. This showed that reinforcement, while producing behaviour change, was not as effective as self-recording in increasing appropriate responding. Concurrent with the increases in appropriate responding was the decrease in disruptive behaviours.

The researchers noted that the children learned the self-management procedures very quickly and substantial behaviour changes were apparent within a few sessions. Furthermore, the results in the home and community settings paralleled those in the clinic setting when the self-management procedure was implemented in those settings. There was evidence of cross-setting generalization in the community setting before the implementation of the self-management procedure, although it was relatively brief, with appropriate responding returning to baseline levels.

The children in the Kern Koegel, Koegel, Hurley, and Frea (1992) study demonstrated a high accuracy of self-recording with mean levels of 84%, 72%, 72% and 89% accuracy for the four children. The results clearly indicated the powerful effects of self-recording behaviour. The children were able to generalize their self-monitoring skills to other settings and with other people, which shows self-monitoring of behaviour to be a valuable intervention in increasing independence. The unfortunate lack of data after the
removal of the intervention did not allow any conclusions to be drawn about either short-
term or long-term maintenance of behaviour change.

Stahmer and Schreibman (1992) conducted a similar study to Koegel and Kern Koegel (1990) but provided data collected after the removal of the intervention and follow-up data. They investigated the effects of using a self-management treatment package on the appropriate play skills of children with autism. As with the Koegel and Kern Koegel (1990) study, Stahmer and Schriebman (1992) were concerned with whether the child would be able to follow the procedure in the absence of a treatment provider and whether the effects would generalize to additional settings and toys.

Three children with autism participated in the Stahmer and Schriebman (1992) study. They were aged between seven and 13 years. Three behaviours were monitored. These were appropriate behaviour, inappropriate behaviour and self-stimulatory behaviour. The children first underwent discrimination training in which they were taught, through modelling, to distinguish appropriate and inappropriate behaviour. The self-management procedure was then implemented. The procedure involved the children playing with a toy for an interval that was measured on a chronograph alarm wristwatch. The subjects were taught to place a mark in a box after the interval if they had played appropriately. They were also taught to obtain their own reinforcement if they placed a mark in the box. The experimenter's presence was then faded. Finally, the self-management materials were removed and posttreatment video probes were obtained. Generalization measures were taken in the clinic generalization setting and in the home and with new toys.

The results of the Stahmer and Schriebman (1992) study showed that during baseline the students demonstrated little, if any, appropriate play. After the implementation of self-management the appropriate play of the children increased to average levels of 82%,
80\%, and 96\% respectively for each child. Concurrent reductions in stereotypic behaviour and inappropriate behaviour were noted. The children maintained these increases in unsupervised posttreatment measures as well as across generalization settings and toys. Two of the children maintained high levels of appropriate play without further training one month later. The third child recovered after one training session one month later. The results showed that the self-management package was effective in increasing the appropriate play of three children with autism in unsupervised settings. In addition, generalization was achieved without retraining.

Stahmer and Schriebman (1992) also assessed the accuracy of self-recording. The children generally learned to self-record their behaviour accurately in a short period of time. By the end of the intervention the children were self-recording with accuracy levels of 90\%, 84\%, and 85\% respectively. The researchers reported that the children had most difficulty in recording inappropriate behaviour. This is consistent with the findings of Koegel and Kern Koegel (1990) discussed previously. The researchers stated that their inaccuracy in recording inappropriate behaviour did not affect their appropriate play or generalization.

Shearer, Kohler, Buchan, and McCullough (1996) compared the effects of a self-management treatment on the independent interactions of preschoolers with autism with their non-disabled peers. The researchers were concerned with comparing the effects of an adult versus a child implementation agent. Three children, all aged five years, with autism participated in the study. The children underwent social skills training and were concurrently taught to self-monitor their behaviour. A string of twelve beads was placed in close proximity to the children. They were required to move a bead across each time a positive initiation or response was exhibited. The children received a small reward if eight...
or more beads were moved at the end of the 15-minute training session. An alternating intervention condition then followed. On alternating days, the procedure was controlled by the teacher and then by the children. During the adult-controlled condition the children were allowed five prompts to engage in social overtures and to move the beads. During the child-controlled condition the children received only three prompts to engage in social overtures. A follow-up condition was then administered in which the children were required to follow the procedure with no prompting.

The results of the Shearer, Kohler, Buchan, and McCullough (1996) study showed that the package was effective in increasing the children’s positive interactions with their peers. They also showed that the package was equally effective when applied by an adult or the children. During the alternating treatment condition the children’s engagement with their peers increased from 1% to 42%, from 24% to 64%, and from 16% to 50% for each child. The children demonstrated an ability to follow the procedure and maintain the behaviour even in the later absence of adult prompts. The follow-up condition produced little change in the children’s positive engagement. The researchers failed to include data collected after the removal of the intervention. This made it impossible to conclude whether the behaviour changes were maintained when the intervention was no longer in effect.

Shearer, Kohler, Buchan, and McCullough (1996) also monitored the consistency and accuracy of self-recording. The children were very inconsistent in recording their behaviour, recording only 50% to 60% of their positive exchanges. They were accurate, however, when they did self-record. The researchers concluded that a 50% to 70% consistency level was adequate to ensure the short-term effectiveness of children’s self-monitoring. This finding is inconsistent with the results of the Rooney, Hallahan, and Wills
Lloyd (1984) study discussed earlier. Rooney et al. (1984) showed that when children were reinforced for actually following the procedure, the mean level of off-task behaviour increased. They stated that of fundamental importance was whether the participants were consistent in following the procedure.

Summary

The studies discussed here involved very diverse techniques. For example, some researchers used different cues for self-recording such as an alarm (Koegel & Kern Koegel, 1990) or occurrences of appropriate responses (Newman, Buffington, Hemmes, 1996). Some differed in the methods of actually recording behaviour such as putting foam discs into a container (Strain, Kohler, Storey, & Danko, 1994) and putting pennies on a board (Sharpio, Browder, & D’Huyvetters, 1984). Still others differed in methods of making desirable behaviour explicit, such as by using posters (Strain, Kohler, Storey, & Danko, 1994) or by teacher modelling (Sharpio, Browder, & D’Huyvetters, 1984).

Overall, the studies indicated that self-management techniques were effective in producing desired effects on the behaviours of children with moderate to severe developmental disorders. Some researchers showed that simple treatments involving one component of self-management were effective. For example, Sugai and Rowe (1984) indicated that self-recording alone brought about the desired behaviour change. Other researchers have combined a number of self-management elements to produced desired behaviour changes (e.g., Sainato, Strain, Lefebvre, & Rapp, 1990).

A number of target behaviours have been studied. Examples of such behaviours are on-task behaviour (e.g., Rooney, Hallahan, Wills Lloyd, 1984), stereotypic behaviour (e.g., Koegel and Kern Koegel, 1990), disruptive behaviours (e.g., Sharpio, McConigle, & Ollendick, 1980), and independent work skills (e.g., Sainato, Strain, Lefebvre, & Rapp,
1990). In addition, these behaviours have been studied in a variety of settings, such as in the classroom (e.g., Anderson-Inman, Paine, & Deutchman, 1984) and in the community setting (Kern Koegel, Koegel, Hurley, & Frea, 1992).

The accuracy of self-monitoring was recorded by some researchers (e.g., Sainato, Strain, Lefebvre, & Rapp, 1990). It was generally agreed that the accuracy of self-monitoring was not a variable affecting the behaviour change (e.g., Newman, Buffington, & Hemmes, 1996). Other researchers monitored the consistency at which the child followed the self-management procedure (e.g., Rooney, Hallahan, & Wills Lloyd, 1984). Rooney et al. (1984) maintained that consistency was an important variable in behaviour change. Shearer, Kohler, Buchan, and McCullough (1996) challenged this view as they found desirable effects on behaviour even when consistency in following the procedure was low.

The goal of the present study was to reduce the inappropriate classroom behaviour that interfered with each child's ability to work independently. Therefore, the focus was on increasing independence. The study employed videotaped self-modelling and self-monitoring. Self-management techniques are consistent with the aim of the present study as such techniques promote independence because the children act as their own agents of control (O'Leary & Dubey, 1979).

The review highlighted that the similarity between the model and the observer is an important variable in the level of self-efficacy of the participant (Thelen, Fry, Fehrenbach, & Frautschi, 1979). In turn, self-efficacy influences the level of motivation and effort exerted by the child (Schunk & Hanson, 1985). In the current study, the participants acted as their own models on videotape and viewed their own performance. It was expected that the consequence would be an increase in the children's levels of self-efficacy which, in
turn, would increase motivation and effort. As the children viewed themselves performing the desirable target behaviours and were reinforced for these behaviours, it was expected that the participants will perform the behaviours (Schunk, 1987).

The studies that were reviewed involved different methods of making the target behaviour explicit. For example, one study involved the teacher modelling the appropriate and inappropriate target behaviours (Sharpio, Browder, & D'Huyvetters, 1984), whilst another involved the use of posters depicting the behaviours (Strain, Kohler, Storey, & Danko, 1994). In the present study, the self-modelling videotapes were the means of making the target behaviours explicit. The researcher used COMPIC cards that depicted the desirable target behaviours to draw the participant’s attention to the behaviour while the child viewed the video. Additionally, the researcher described and gave verbal praise for the child's behaviour on the videotape as reinforcement for that behaviour. It was expected that this procedure would convey expectations of appropriate behaviour to the children and indicate to them that they would be reinforced for the appropriate behaviour.

The target behaviours in the current research project were off-task behaviour, inappropriate vocalizations (calling out and distractible noises), stereotypic behaviour and latency time to commence a task. Two studies that were reviewed involved similar target behaviours to those that were the focus of the present study (McCurdy & Sharpio, 1988; Woltersdorf, 1992). For example, McCurdy and Sharpio (1988) investigated the effects of SM on inappropriate classroom behaviours including vocalizations, touching objects and people, and making noises. Woltersdorf (1992) investigated the effects of VSM on fidgeting, distractibility and vocalizations. The results of the McCurdy and Sharpio (1988) study were highly variable and, as a result, the study was inconclusive. However,
Woltersdorf (1992) found that there were substantial decreases in the inappropriate target behaviours and that these behaviour changes were durable.

As one of the two studies involving self-modelling and inappropriate classroom behaviours was inconclusive, it made hypothesizing the effects of the VSM component in the present study on such behaviours relatively difficult. However, the studies reviewed that involved other target behaviours, such as swimming performance and productivity rates in a sheltered workshop, indicated that VSM and videotapes of similar models to the observer were highly effective (Dowrick & Dove, 1980; Dowrick & Hood, 1981).

Therefore, the current researcher could predict that the VSM component in the present study would be a valuable element in the reduction of inappropriate classroom behaviour.

The review indicated that self-recording alone was highly effective in producing the desired behaviour changes (Reid & Harris, 1993; Sugai & Rowe, 1984). The behaviours involved in these studies were consistent with the target behaviours in the present study, such as inappropriate vocalizations (Broden, Hall, & Mitts, 1971) and off-task behaviour (Rooney, Hallahan, & Wills Lloyd, 1984). It was expected that the reactivity of self-recording reported in the review would be reflected in the present study, making self-recording a valuable element in the treatment package.

Some researchers have employed treatment packages containing a number of elements of self-management (e.g., Sainato, Strain, Lefebvre, & Rapp, 1990; Strain, Kohler, Storey, & Danko, 1994). A number of these studies have involved participants with autism (e.g., Newman, Buffington, & Hemmes, 1996; Koegel & Kern Koegel, 1990). The general finding was that these treatments produced the desirable behaviour changes initially proposed in each of the studies (e.g., Sainato, Strain, Lefebvre, & Rapp, 1990; Kern Koegel, Koegel, Hurley, & Frea, 1992). Many of the target behaviours in these
studies were consistent with the target behaviours in the present study, such as stereotypic behaviour (Koegel & Kern Koegel, 1990) and independent work skills (Sainato, Strain, Lefebvre, & Rapp, 1990). Moreover, the children generally learned the self-management procedures quickly and behaviour changes were often apparent within a few sessions (Kern Koegel, Koegel, Huley, & Frea, 1992). Consequently, it was possible to predict that the self-management treatment package in the current study, consisting of self-modelling, self-recording, and self-reinforcement, would produce reductions in each of the target behaviours and increase the independent functioning of three children with autism. It was expected that the children would be able to learn the self-management procedure in a relatively short period of time and that behaviour changes would be apparent within a few sessions.

The review highlighted that a number of researchers have concluded that the accuracy of self-monitoring is not an important variable concerning the reactivity of self-recording (Sainato, Strain, Lefebvre, & Rapp, 1990; Newman, Buffington, & Hemmes, 1996). In the present study, the accuracy of self-recording was monitored on each opportunity for the child to self-record. It was not expected that the accuracy of self-recording would be an important variable in behaviour change.

Other researchers have shown that the consistency with which the child follows the self-monitoring procedure is an important variable in behaviour change (e.g., Rooney, Hallahan, & Wills Lloyd, 1984). Shearer, Kohler, Buchan, and McCullough (1996) challenged this view and concluded that consistency in following the self-monitoring procedure was not an important variable in behaviour change. Therefore, in the current research project, the consistency with which the children followed the four-step self-monitoring procedure was recorded at each step. This allowed conclusions to be drawn
about the relationships between the levels of consistency in following the self-monitoring procedure and the changes in levels of behaviour.

Finally, the common limitation in many of the studies that were reviewed was the lack of follow-up data, or in some cases a return-to-baseline phase after the removal of the intervention. This limitation was noted in a review by Jackson & Boag (1981) on self-control procedures with people with intellectual disability. It seems their recommendation for future research to contain these elements has gone unnoticed by researchers since then (e.g., Shearer, Kohler, Buchan, & McCullough, 1996). The current research attempted to overcome this limitation. Data were collected immediately after the removal of the intervention in a return-to-baseline condition. Additionally, data were collected two weeks after the removal of the intervention in a follow-up condition. It was expected that this would provide a more detailed and holistic insight into the patterns of data which reflected the changes in behaviour produced by the intervention.
CHAPTER 3
METHODOLOGY

This chapter contains a general outline of the methodology that was employed in the present research project. First, the application of the single-subject design to the present study is presented. Secondly, the designs employed in the research studies are indicated. Thirdly, the target behaviours for each of the children are discussed. The participants in Studies 1 and 2 followed a modified TEACCH program that had been implemented by the classroom teacher at the beginning of the year. These studies were organized around the TEACCH program. Therefore, a description of the format of this program is then presented. Fifthly, reference is made to the data collection methods employed in the research project. Following this is a description of the presentation of the data concerning the target behaviours of each of the participants and the methods of data analysis are included. Sixthly, procedures that were employed to substantiate internal validity are outlined. Following this is reference to the method that was used to reduce threats to external validity. Finally, the researcher presents the hypotheses and research questions for the present research project. It must be emphasized that this chapter presents a brief overview of the study only. More explicit detail is contained in each of the Method sections in Chapters 4, 5 and 6.

Parental consent was obtained from the parents of each of the participants before the commencement of the research project. The current study involved three male children who met the DSM-IV classification for autism (American Psychiatric Association, 1994). Each study was consistent with a single-subject experimental research design. These designs allow researchers to assess the effectiveness of an independent variable on an
individual participant (Neuman & McCormick, 1995). Single-subject research has appeared in many fields of study including applied behaviour analysis (Kratochwill, 1992), communicative disorders (McReynolds & Kearns, 1983) and special education (Tawny & Gast, 1984).

In the research project reported here, the single-subject design was employed to test the hypotheses. First, it allowed the research to be conducted with a small population. Each subject served as his own control. This eliminated the difficulty of finding the homogenous samples that group studies require (McReynolds & Kearns, 1983).

Secondly, the design emphasized the uniqueness of the individual and the setting (Sommer & Sommer, 1980). This meant that the effects of the interventions on the participants could be studied in much depth and relevance. Judgements could be made about relationships between the intervention variables and any changes in behaviour concerning each participant (Sommer & Sommer, 1980).

Thirdly, the design highlighted intrasubject variability (Neuman & McCormick, 1995). In group-based designs, the results can often suggest that an intervention is effective although there is high variability in the group (Sheskin, 1984). The consequence is that the results apply to a "hypothetical" average individual and there are rarely "average" individuals in special education (McReynolds & Kearns, 1983). In the current research project, the single-subject design allowed the researcher to assess the direct effects of the independent variables on the behaviour of each individual.

Finally, the single-subject design allowed very detailed recording of behavioural variations, an advantage not always possible in group designs (McReynolds & Kearns, 1983). Each response was counted as a data point. This allowed the researcher to collect
data that was very sensitive to small changes in behaviour (McReynolds & Kearns, 1983). Therefore, the effects of each experimental condition could be clearly monitored.

The studies reported in this research employed time-series designs (Gay, 1992; Wolery, Bailey, & Sugai, 1988; Shontz, 1986). This involves the contrast of pre- and post-intervention data (McCleary & Welsh, 1992). Pre-intervention data were collected in a baseline condition in which no intervention took place. Variables in the baseline phase were controlled so that the conditions remained constant across all experimental conditions (Drew & Hardman, 1985). The only difference between the experimental phases was the implementation or withdrawal of the intervention.

Each study was consistent with a withdrawal design (Wolery, Bailey, & Sugai, 1988). The first two studies followed an A-B-A design. The final study employed an A-B-A-C-A design. In each case A was the baseline condition and B and C represented the intervention conditions. The intervention conditions involved exposing the child to a self-modelling and self-monitoring treatment package. Self-modelling involved the children viewing videotapes of themselves engaging in the appropriate target behaviours. The four-step self-monitoring process was taught using the constant time delay procedure with prompts ordered on a most-to-least hierarchy. The zero-second trials took place during the training sessions. During the self-monitoring sessions in condition B, a four-second delay interval was inserted between prompts. The prompts were ordered in a least-to-most hierarchy during the self-monitoring sessions. During condition B, the children self-monitored for 30-second intervals. In the intervention condition C, in Study 3, the delay interval was 10 seconds and the child self-monitored for one-minute intervals.

A withdrawal condition (A) was introduced after each intervention condition to assess the maintenance of behaviour after the removal of the intervention. Follow-up data
were collected two weeks after the completion of the study for Participants 1 and 2. The follow-up data were used to further assess the maintenance of the behaviour after a period of time. It was not possible to collect follow-up data on the final child due to attrition, which refers to the participant “dropping out” of the study because of repeated absence (Gay, 1992). Follow-up data included the assessment of behaviour first under baseline conditions and then after the reimplementation of the intervention. The first two studies took place over one week with follow-up data collection two weeks after the withdrawal of the intervention. The second study took place over two weeks.

Two target behaviours were chosen for each of the children. These were inappropriate behaviours that interfered with the children’s ability to work independently. For each child, the first target behaviour was off-task behaviour. The second target behaviour for each child was chosen on an individual basis according to the child’s needs. For Participant 1, the second target behaviour was stereotypic hand-flapping. For Participant 2, the second target behaviour was latency time to commence a task. Finally, for Participant 3, the second target behaviour was inappropriate vocalizations. The Behavioural Definitions section in Chapters 4, 5 and 6 clearly define each of the target behaviours.

A modified TEACCH program was used by the classroom teacher to aid the independence of Participants 1 and 2. A task analysis of the modified TEACCH program is shown in Table 3.1. The participants and a third child in the class sat at adjacent desks. Each child had a velcro strip on which was placed the small cards displaying the
Table 3.1: Task Analysis of the steps involved in the modified TEACCH program used to aid Participants 1 and 2 to work and commence new tasks independently.

<table>
<thead>
<tr>
<th>Step in modified TEEACH program</th>
<th>Task Analysis</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Pull the appropriate number off the velcro strip</td>
</tr>
<tr>
<td>2</td>
<td>Find that activity in the tray and stick on the number</td>
</tr>
<tr>
<td>3</td>
<td>Pull the activity out of the tray</td>
</tr>
<tr>
<td>4</td>
<td>Take the activity out of its packet</td>
</tr>
<tr>
<td>5</td>
<td>Commence the activity</td>
</tr>
<tr>
<td>6</td>
<td>Place finished activity in “finished” tray</td>
</tr>
<tr>
<td>7</td>
<td>Repeat procedure for tasks 2, 3, 4 and 5</td>
</tr>
</tbody>
</table>
numbers 1-5. They also had two trays located to the right and left of them. The tray on the
left-hand side contained five activities that were labelled 1-5.

A “finished” COMPIC card was taped to the bottom of a tray placed to the right of
the children. They were required to pull the number 1 from the velcro strip, find that
number activity in the other tray, stick the number on the velcro on the activity and then
commence the activity. After completing the activity he was to put it into the “finished”
tray and pull the number 2 off the Velcro strip, repeating the procedure. The teacher’s aim
was to have the children perform this procedure independently, leaving her time for
assessment of the children and teaching intervention where needed.

The methods of data collection involved elements of time-sampling and event-based
recording (Barlow & Hersen, 1984; Sommer & Sommer, 1980; Neuman & McCormick,
1995). Event-based recording involves noting the occurrence of the target behaviour
(Wolery, Bailey, & Sugai, 1988). Time-sampling involves the recording of behaviour
according to specific time intervals (Wolery, Bailey, & Sugai, 1988).

The figures presented in the Results sections of Chapters 4, 5, and 6 display the
time-series data collected in this study. Time-series data are collected through repeated
measures of behaviour over periods of time (Barlow & Hersen, 1984; Shontz, 1986;
McReynolds & Kearns, 1983). The time-series graphs allowed the analysis of patterns of
test scores (Gay, 1992). These test scores reflected patterns of behaviour before the
intervention was introduced, during intervention, and after it was removed, hence the term
interrupted time-series data to denote the research design paradigm (McCleary & Welsh,
1992). Information about the trend of data was available through visual analysis of these
This allowed the researcher to determine the effectiveness of the intervention variables on the dependent variables.

The use of visual analysis is advocated by single-subject researchers as a valuable aid in understanding results (Neuman & McCormick, 1995). It allows the researcher to observe any pronounced changes in the levels of behaviour and in the trend of behaviour across experimental conditions (Parsonson & Baer, 1992). Researchers have questioned the need for statistical analysis in single-subject designs (Sheskin, 1984). The present study utilizes some statistical analysis to support the judgements made through visual analysis.

Visual analysis involved expecting the level, trend and variability in data across each experimental condition. This analysis was facilitated by the use of visual aids (Parsonson & Baer, 1992). Trend lines and envelopes were the aids that were used. Trend lines allow the researcher to assess the direction and degree of slope in the data (Cohen & Manion, 1994). Envelopes allow the researcher to assess the degree of variability in the data in each experimental condition (Neuman & McCormick, 1995).

A semilogarithmic graph is employed to display the data on behaviour in the report of one of the studies. The semilogarithmic scale shows more clearly the rate of change in behaviour, rather than the amount of change in behaviour (Wolery, Bailey, & Sugai, 1988). Some researchers have advocated the use of such graphs in the area of analysis and precision teaching (e.g., Wolery, Bailey, & Sugai, 1988).

Two procedures were used to substantiate internal validity. Internal validity is concerned with the degree to which the results are attributable to the intervention (Neuman & McCormick, 1995; Barlow & Hersen, 1984). The first substantiation of internal validity was assessed by calculating inter-observer reliability or agreement (McReynolds & Kearns, 1983). This involved a second observer simultaneously scoring behaviour with the
researcher. Secondly, a consistency of implementation measure was taken (Neuman & McCormick, 1995). This involved a second observer completing a checklist that outlined the steps in the procedure. The second observer noted, on the checklist, any occasions when the researcher deviated from the procedure as outlined in the Method sections in Chapters 4, 5 and 6.

The researcher also attempted to protect internal validity during the videotaping of the participants. To reduce the likelihood of Hawthorne effects (Wolery, Bailey, & Sugai, 1988), the researcher followed the procedure outlined below with each of the participants. The children were videotaped whilst working at their desks on independent activity tasks. They were not aware, during videotaping, that they were the target children. Had they been aware, their behaviour may have responded differently to the stimulus conditions (Barlow & Hersen, 1984). This would prevent an accurate representation of their typical behaviour during this session.

The children in the class were told by their teacher that the researcher was there “to see what kind of work the senior class does” and that she would be present each morning for one week. The class was told that the video camera was being used to help the researcher “remember what happened that day” and to carry on with their work as usual. The researcher then moved around the room recording a number of children. The researcher tried to remain as unobtrusive as possible when recording, preferring to avoid close proximity to the target children.

During data collection periods the researcher also attempted to decrease the likelihood of Hawthorne effects (Salkind, 1997). The researcher sat at the back of the classroom during these periods. This allowed observation to be conducted less obtrusively (Barlow & Hersen, 1984) and the identity of the child to remain concealed during baseline
data collection. The children were still unaware, during baseline data collection, that they were the target children. These measures were taken in an attempt to control for Hawthorne effects (i.e., the presence of the researcher altering behaviour so as to prevent the collection of reliable baseline data; Salkind, 1997).

Measures were taken to reduce external threats to several expressions of the experimental design. First, the researcher attempted to describe the independent and dependent variables explicitly (Cohen & Manion, 1994). The former makes future replications of the study possible and the latter ensures that there are clear guidelines for recording behaviour (Cohen & Manion, 1994). Secondly, the researcher attempted to overcome Hawthorne effects (Cohen & Manion, 1994). The likelihood of such effects was reduced by the researcher remaining as unobtrusive to the children in the class as possible (Barlow & Hersen, 1984). The children were alerted to and given a reason for the presence of the researcher in the classroom. During periods of data collection, the researcher sat at the back of the classroom to avoid close proximity to the child.

The ultimate aim of the study was to use a self-modelling and self-monitoring treatment package to reduce inappropriate classroom behaviours that interfered with the children's ability to work independently. The purpose of extending the final study to include a second intervention condition (C) was to assess whether greater control over the self-monitoring procedure could be transferred to the child. This was consistent with the aim of promoting independence. It also allowed the researcher to assess whether self-monitoring for an extended period of time would produce further changes to the level and slope of behaviour. The research questions for each of the studies are as follows:
1. Can three children with autism be taught to follow a four-step self-monitoring procedure trained through the constant time delay procedure?

2. Will the implementation of the combined self-modelling and self-monitoring treatment package be effective in producing a change in the level of off-task behaviour? Will it produce a change in the slope of behaviour over the period of intervention?

3. Will the implementation of the self-modelling and self-monitoring treatment package be effective in producing a decrease in the level of the second target behaviours for each child? Will it produce a change in the slope of behaviour over the period of intervention?

For Study 3, two additional research questions were added. These are as follows:

4. Can greater control over the self-monitoring procedure be transferred to the child by increasing the time delay intervals in the constant time delay procedure?

5. Will self-monitoring for longer intervals produce further changes to the level and slope of inappropriate behaviour?

The present chapter has provided a brief outline of the methodology involved in the present research project. It was intended as an overview only of the basic elements comprising the methodology of the study. In the following Chapters 4, 5 and 6 more detail concerning descriptions of the participants, behavioural definitions of the target behaviours and the procedures used in each of the studies are presented.
CHAPTER 4

STUDY I

Introduction

The present chapter contains the details of the participant, the intervention, and the results of the intervention in Study 1. First, a description of the child involved in this study and the autistic features demonstrated by him are presented in the Introduction section. This section is completed by a reiteration of the research questions that are relevant to Study 1. The next section in the chapter states the two target behaviours and provides behavioural definitions for each. Following is the Method section in which an in depth discussion of the materials, setting, and procedures employed in Study 1 is provided. The chapter concludes with the Results section in which all of the findings of Study 1 are contained.

Aaron was the child involved in this study. He was 11 years and seven months of age and was in the senior class at a Special Education Centre in the northern suburbs. The class was very large, containing 15 children. There were two full-time teachers in the classroom. A speech pathologist visited Aaron regularly.

The participant had been diagnosed as autistic at age five years by a medical practitioner. There were no psychological assessments available in the school records. Since his diagnosis he has reportedly not been tested on any intelligence scales because the administration of such a test would prove too difficult due to his nature of disabilities. He has been described as a severely autistic, low functioning child and a psychologist estimated that he has a moderate intellectual disability.

The child displayed several of the characteristics contained in the DSM-IV Diagnostic Criteria for the Autistic Disorder. Aaron showed deficits in social interaction.
He rarely showed eye-to-eye gaze and would usually watch the mouth if he was looking at a person who spoke to him. He lacked facial expression to regulate social interaction, although he would make various facial expressions and contortions. Examples of these included "screwing up" his face, squinting his eyes, or smiling.

Peer relationships were inappropriate for his age level, which is a typical characteristic of autism (Rappaport & Ismond, 1996). It was common for him to turn his back on children who tried to initiate a social interaction with him. He often appeared unable to hear their attempts to involve him in a social interaction. He showed no emotional or social reciprocity, which is indicated as deficit in autistic children (Rappaport & Ismond, 1996).

The child demonstrated developmental deficits in communication. Such deficits are highlighted as an autistic characteristic (Rappaport & Ismond, 1996). There was an absence of language, except for echolalic words spoken after the teacher when prompted, or delayed echolalic two to three word phrases. The latter was observed, for example, when he was prompted by the researcher to stop hand-flapping with the command "hands down". He responded by saying "stop it!" repeatedly which is a phrase used by his mother when he hand-flaps.

Stereotypic and peculiar use of speech was observed. Rappaport & Ismond (1996) include such speech patterns in the criteria for a diagnosis of autism. For example, he would copy the accent and intonation of the speaker when repeating words. He would also whisper words when asked to repeat them on occasions.

Aaron displayed very repetitive and stereotypic patterns of behaviour, particularly in relation to interests and activities which is common among autistic individuals (Rappaport & Ismond, 1996). He exhibited a very inflexible adherence to routine and had
an exceptional memory for such routines. Jordan & Jones (1999) highlight this characteristic in describing autistic behaviour. For example, each morning he was required to take the lunch orders to the canteen. If the teacher forgot this routine and instructed him to sit with the other children on the mat, he would hold the lunch-order COMPIC and begin hand-flapping near the door, refusing to sit down.

Stereotypic motor movements were demonstrated continually during the preliminary observation period. Stereotypic movements are commonly exhibited by children with autism (Koegel & Kern Koegel, 1996). He exhibited self-stimulatory behaviour through hand-flapping. The term hand-flapping was familiar to the child to describe his stereotypic behaviour. He would slap his hands hard against each other repeatedly. During periods of hand-flapping he would rock back and forth vigorously and would make a loud clicking noises. He would also make loud screeches or singing noises during these times. When standing up and hand-flapping, he would lunge forwards and backwards vigorously, sometimes moving around the classroom in a rocking motion. He would occasionally run from one end of the classroom to the other whilst hand-flapping.

A modified TEACCH program was used by the teacher to aid Aaron’s independence. He sat facing two other children with whom the same program was used. The modified TEACCH program was described in Chapter 1. A task analysis of the procedure was presented in Figure 1.1. The teacher’s aim was to have the children perform this procedure independently, leaving her time for assessment of the children and teaching intervention where needed.

The teacher was concerned about Aaron’s inability to work independently in class. Aaron displayed high levels of off-task behaviour. During periods of off-task behaviour he
would hand-flap or fiddle with objects, inspecting them closely. Sometimes he would sit
and stare blankly or watch the other children in the class.

Aaron's hand-flapping also interfered with his ability to work independently.
During these periods hand-flapping would become more vigorous if he was left to continue.
He would usually leave his seat if he was left to hand-flap for long enough and begin the
rocking motion described previously. To call him back on-task the teacher commonly had
to verbally prompt him with the phrase “hands down”. She often had to prompt him
physically to stop hand-flapping.

Off-task behaviour and hand-flapping limited the teacher’s time with the other
students in the class, which in turn affected their performance. Similarly, it made it
difficult for her to maintain assessment records. Obviously, the off-task behaviour and
hand-flapping limited Aaron’s own performance on learning tasks. Therefore, this research
aimed to decrease the classroom behaviours that interfered with his ability to work
independently.

The intervention incorporated self-management skills through self-modelling and
self-monitoring. The ultimate aim was to decrease inappropriate classroom behaviour.
Teaching self-management skills was consistent with aim of increasing independence. The
self-monitoring procedure contained four steps and was taught through the constant time
delay procedure.

Data were collected on two target behaviours. These were off-task behaviour and
hand-flapping. The data were based on the number of seconds the child was off-task
during 30-second intervals and on the number and type of prompts needed to inhibit hand-
flapping. Data were also collected on the child’s consistency in following each step of the
self-monitoring procedure. The accuracy of the child’s self-recording was also monitored.
The aim of the intervention was to expose the child to videotaped self-modelling and to teach a four-step self-monitoring procedure to reduce off-task behaviour and hand-flapping in the classroom during independent work time. The research questions were as follows:

1. Can Aaron be taught to follow a four-step self-monitoring procedure through the constant time delay procedure?
2. Will the implementation of the combined self-modelling and self-monitoring package be effective in producing a decrease in the level of off-task behaviour? Will it produce a change in the slope of behaviour over the period of intervention?
3. Will the implementation of the self-modelling and self-monitoring package be effective in producing a decrease in the level of inappropriate vocalizations? Will it produce a change in the slope of this behaviour over the period of intervention?

Target Behaviours

Two behaviours were chosen. Both interfered with Aaron's ability to complete an independent work task. The behaviours were chosen after consultation with the classroom teacher and observation of the child in the classroom during the independent work session. Target Behaviour 1 was off-task behaviour and Target Behaviour 2 was hand-flapping.

Behavioural Definitions

Target Behaviour 1: Off-task Behaviour

Off-task behaviour was defined as any behaviour that was incompatible with an independent work task. That is, it was any behaviour that was incompatible with on-task behaviour. On-task behaviour consisted of behaviours necessary to complete an independent task efficiently. The requirements were as follows:

- The child was required to remain seated during the independent work session.
The child was required to follow the procedures involved in the modified TEACCH program (see Figure 1.1).

The child was required to look at his work to maintain concentration.

During the period of independent work, he was required to refrain from touching any object other than work-related materials.

The child was required to refrain from fiddling with any object or body part.

Examples of off-task behaviour are, looking around at other children, fiddling with a pencil or other objects, inspecting objects at close proximity, staring blankly, and watching other children in the class.

**Target Behaviour 2: Hand-Flapping**

Hand-flapping was defined as excessive or repetitive hand movements of an inappropriate kind (Brimer, 1990). Aaron slapped his hands past each other vigorously. During these times he made loud clicking noises and rocked back and forth, or lunged back and forth when in a standing position. Hand-flapping was monitored by counting the number and types of prompts necessary to inhibit hand-flapping.

Aaron would sometimes only hand-flap for one or two seconds and then cease hand movement. Hand-flapping would become vigorous if left for longer than three seconds. It was during these times that the hand-flapping interfered with his independent work and he needed to be prompted to cease hand-flapping. Therefore, a three-second delay was allowed for Aaron to spontaneously stop flapping.
Method

Settings

Each Training session took place in a therapy room located near to the child's classroom. The room was approximately 4.0m x 4.0m. The room contained one window and two doors. There was a large table in the centre of the room with chairs around it. The room also contained a sink, cupboards and a microwave. The chair and table were arranged facing a large television set equipped with a video cassette recorder. The self-monitoring sessions that followed took place in the classroom setting. When in the classroom, Aaron sat opposite two other children following the same modified TEACCH program. As this was the regular arrangement, it was retained in this study.

The self-monitoring sessions were conducted during the morning independent work period. The child was required to remain seated at his desk whilst engaging in independent tasks. The other children in the class were required to do the same. A modified TEACCH program assisted the children to work independently (see description in the Introduction). Examples of Aaron's activities were name and address writing, sorting times, matching Letterland pictures, placing specified counters into canisters, and completing weather sentences by choosing the correct COMPIC.

Materials

A video cassette recorder was used in all training sessions. Prior to the commencement of the study, the researcher used a video camera to record Aaron working. Recording took place during the morning independent work session. Specific segments from the recording were chosen and transferred to a videocassette. The researcher selected segments for the final videotape that showed the child displaying only the desirable target behaviours. Approximately three minutes of recording was transferred to the videotape.
Several sets of materials were used in both training and self-monitoring sessions. These included a sample of the child's independent work, a timer that could be set to "beep" after a specific number of seconds (made by Jadco), self-monitoring sheets for both behaviours (see Appendix 1 for sample sheets), and a writing pencil. The researcher used two COMPIC cards that had been enlarged (approximately 15cm x 10cm), placed on card and laminated. These COMPIC cards depicted "working" and "hands down". They are shown in Appendix 2. Additional materials used in the self-monitoring sessions included a dictaphone, earphones, and data collection sheets (see Appendix 3). The dictaphone contained a tape that, when played, emitted a beep every second for 30-second intervals.

The child was reinforced for appropriate responses during both training and classroom self-monitoring sessions. Reinforcers were chosen following consultation with the classroom teacher. Aaron was motivated by stickers and this was observed by the researcher in the classroom on a separate occasion. As part of the classroom management system, the children each had a stamp chart on which they received stamps and stickers for special achievements. When the child had received a specific number of stamps he was allowed to choose from a set of prizes. As this was a reinforcement system with which the child was familiar a similar one was used in this study. A sticker card that was divided into six squares, stickers, and popcorn were used as reinforcers.

**Design**

The study employed the use of a single-subject design. The design for this study is illustrated more clearly in table 4.1. It is consistent with an A-B-A withdrawal design to be conducted over five sessions. Follow-up data were collected two weeks after the withdrawal of the intervention. A Baseline Phase A took place during Session 1 of the
Table 4.1: The A-B-A withdrawal design employed in this study.

<table>
<thead>
<tr>
<th>Session</th>
<th>Phase</th>
<th>Conditions</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>Baseline: No intervention. Child in classroom setting, working on an independent task.</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>Intervention: Training session, followed by self-monitoring session with prompting on 3 second delay intervals. Timer set for 30 seconds.</td>
</tr>
<tr>
<td>3</td>
<td>B</td>
<td>Intervention: Training session, followed by self-monitoring session with prompting on 3 second delay intervals. Timer set for 30 seconds.</td>
</tr>
<tr>
<td>4</td>
<td>B</td>
<td>Intervention: Training session, followed by self-monitoring session with prompting on 3 second delay intervals. Timer set for 30 seconds.</td>
</tr>
<tr>
<td>5</td>
<td>A</td>
<td>Baseline: No intervention. Child in classroom setting, working on an independent task.</td>
</tr>
</tbody>
</table>

The child was observed working independently for fifty minutes, under natural conditions in the classroom for this session.

The intervention Phase B followed Phase A. There were three sessions in Phase B. Each session began with a short 10-15 minute training phase in the training room. A constant time delay procedure was used throughout this study to teach the child to follow the four steps of the self-monitoring procedure. During training the child received prompting on zero-second delay intervals to facilitate correct responding.

Training was followed by a self-monitoring session in the classroom that lasted approximately 45 minutes. The constant delay interval was extended from zero seconds, in training, to three seconds in classroom self-monitoring sessions. The timer was set for 30 seconds each time the child was required to self-monitor during Phase B.
A return-to-baseline Phase A followed Phase B during Session 5. The intervention was withdrawn and the child was observed in the natural setting (i.e., in the classroom whilst no intervention took place).

Procedure

Written parental consent was obtained from the participant’s parents before the commencement of the study.

Baseline Phase A

A baseline was established in order to obtain pre-intervention data. Baseline data were collected during the first session. The child was observed whilst engaged in the independent tasks during the morning independent work session. During this session, the child was required to remain seated at his desk. He was required to follow the procedures of the modified TEACCH program described in Chapter 1.

Baseline data were also collected in a return-to-baseline Phase A during Session 5. Each baseline phase was conducted in an identical manner, at the same time and in the same context. During the baseline conditions, Aaron received prompting to control hand-flapping on the same schedule as during the intervention condition.

Recording during Baseline

The frequency of off-task behaviour (Target Behaviour 1) was monitored using elements of time-sampling and event-based recording. Hand-flapping (Target Behaviour 2) was monitored through event-based recording, based on the number of prompts needed to inhibit Aaron’s hand-flapping.


**Figure 4.1:** Procedure for recording the frequency of Target Behaviours during baseline. Off-task (Target Behaviour 1) behaviour is recorded during the 30-second intervals only. Target Behaviour 2 was monitored over the entire 50-minute self-monitoring session.
The baseline session lasted for approximately 50 minutes. It was divided into ten 30-second intervals. After each 30-second interval, a five-minute break was scheduled. The five-minute break was programmed to allow a longer period of observation to avoid over- or under-estimation of behaviour during the session.

Recording of off-task behaviour (Target Behaviour 1) was conducted during each 30-second interval only. Hand-flapping (i.e. the number of prompts) was measured over the entire 50-minute session. The format of baseline sessions is more clearly represented in Figure 4.1.

Scoring of target behaviours.

The researcher used the data collection sheet shown in Appendix 3 to collect baseline data. The numbers one to 30 on the data collection sheet represent each second of each 30-second interval. There were ten 30-second intervals of data collection during baseline.

Off-task behaviour (Target Behaviour 1) was recorded in each 30-second interval. The researcher used the dictaphone and earphones to aid the collection of this data. The dictaphone contained a tape that emitted a beep every second for ten 30-second intervals. Each beep corresponded to the numbers one to 30 on the data collection sheet. At each beep (i.e., every second) the researcher looked at Aaron. If he was off-task, a stroke was placed through the number representing that particular second of the interval. If Aaron was on-task, that number would be left blank on the data collection sheet. Recording proceeded in this manner for each second of the 30-second interval. Following the 30-second interval was the five-minute break, during which no recording of off-task behaviour took place.

The number and types of prompts necessary to stop Aaron hand-flapping were recorded over the entire session. Aaron was given up to three verbal prompts followed by a
physical prompt if necessary. Three-second delays were scheduled between each prompt. When the researcher gave the verbal prompt "hands down" she pointed at the enlarged COMPIC card on his desk so that the child received a visual prompt also. Each time a prompt was given it was recorded under the verbal or physical prompt column as a tally. The total numbers of verbal and physical prompts for each session were then calculated.

**Intervention Phase B**

Intervention Phase B took place in Sessions 2 to 4. Each session consisted of a 10-15 minute training period in the training room, followed by a 45-minute self-monitoring session in the classroom. Training involved the child watching a videotape, practising the self-monitoring procedure, and receiving reinforcement.

**Training using the videotape.**

Each morning the child was taken to the training room. He was seated at a desk facing a television set, coupled with a videocassette recorder. The researcher told Aaron the following:

"We are going to watch a video. You will see yourself on the video. You will see yourself working really well. Watch very carefully to see how you look when you are working really well. Do you understand?"

Then the video was played. While the video played, the researcher used two COMPIC cards to draw attention to the desirable behaviours exhibited by Aaron on the videotape. For Target Behaviour 1, the COMPIC card "working" depicted on-task behaviour. For Target Behaviour 2, the COMPIC card "hands down" depicted an absence of hand-flapping.
For example, as the video showed the child displaying on-task behaviour the researcher stood adjacent to the television set and held up the "working" and "hands down" COMPIC cards. The researcher told the child similar to:

"Look! Here's Aaron working. What a good boy. We know he is working because he is sitting at his desk properly with his hands down. He is looking at his work and he is doing his work. Look! Aaron is doing his work. He has his hands down. What a good worker. That's how we should work in class".

The researcher drew Aaron's attention to the appropriate behaviour and at the same time gave him praise for that behaviour. The researcher also conveyed pleasure for appropriate behaviour using vocal tone, gesture and body language as extra reinforcement. For example, the researcher smiled and used the "thumbs up" sign frequently.

Training of self-monitoring.

The child was then asked to remember how he looked when he was "working with hands down" as seen on the videotape. The two enlarged COMPIC cards were placed on his desk and his attention was drawn to them. Aaron was then told that the researcher had a special way to help him remember to work with his hands down in class. He was presented with the self-monitoring and reinforcement materials and the procedure was explained to him.

The researcher then gave the prompt, "Show me working with hands down (pointing to the COMPIC cards). Ready, steady, go!" She then pushed the start button on the timer which had been set for thirty seconds. The child was required to remain on-task and refrain from hand-flapping for the thirty seconds.
Table 4.2: Four steps in the self-monitoring procedure. The beep of the timer is the stimulus used to cue the chained response.

<table>
<thead>
<tr>
<th>Stimulus Cue</th>
<th>Steps in Self-Monitoring Procedure</th>
</tr>
</thead>
<tbody>
<tr>
<td>Timer beeps after 30 seconds</td>
<td>1. Child pushes stop button</td>
</tr>
<tr>
<td></td>
<td>2. Child completes self-recording Sheet 1 for Target</td>
</tr>
<tr>
<td></td>
<td>Behaviour 1 (off-task behaviour)</td>
</tr>
<tr>
<td></td>
<td>3. Child completes self-recording Sheet 2 for Target</td>
</tr>
<tr>
<td></td>
<td>Behaviour 2</td>
</tr>
<tr>
<td></td>
<td>4. Child self-reinforces when appropriate</td>
</tr>
</tbody>
</table>

A constant time delay procedure was used throughout this study. It was used to teach the child to follow the four steps of the self-monitoring procedure. The steps in the self-monitoring procedure are shown in Table 4.2. During training the child received prompting on zero-second delay intervals (i.e., the stimulus cue and controlling prompt were presented together). The child received prompting on a most-to-least hierarchy. This facilitated correct responding during training. The schedule of prompting during training is shown in Table 4.3.
Table 4.3: Schedule of prompting during training.

<table>
<thead>
<tr>
<th>Steps in self-monitoring procedure</th>
<th>Nature of prompt</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>Training Session 1</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Verbal + Physical</td>
<td>0&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Verbal + Physical</td>
<td>0&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Verbal + Physical</td>
<td>0&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Verbal + Physical</td>
<td>0&quot;</td>
</tr>
<tr>
<td>Training Sessions 2+3</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Verbal</td>
<td>0&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal + Physical</td>
<td>3&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Verbal</td>
<td>0&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal + Physical</td>
<td>3&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Verbal</td>
<td>0&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal + Physical</td>
<td>3&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Verbal</td>
<td>0&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal + Physical</td>
<td>3&quot;</td>
</tr>
</tbody>
</table>
The beep of the timer was used as the stimulus to cue the child to respond. The controlling prompt consisted of a combined physical and verbal prompt given by the researcher during the first training session. A prompt was given at each step of the self-monitoring procedure. During the second and third training sessions the child received the verbal prompt only on zero-second delay intervals. If he failed to respond appropriately within three seconds he was then given the combined verbal and physical prompt.

The prompts that were given at each step are presented in Table 4.4. The timer beeped and the child was given the controlling prompt for Step 1 of the self-monitoring procedure. The child was then immediately given the controlling prompt for Step 2 of the procedure. As the researcher gave the prompt, she pointed to the relevant COMPICs on the self-recording sheet (Sheet 1). The child was required to self-record his behaviour by placing a mark in the appropriate box. Aaron was then given the controlling prompt for Step 3 of the procedure. Again the researcher pointed to the relevant COMPICs on the self-recording sheet (Sheet 2) and he was again required to place a mark in the appropriate box.

Finally, the child was given the controlling prompt for Step 4 of the procedure, signalling him to self-reinforce his own behaviour. Aaron was required to put a sticker on his card. He received a sticker each time he performed the desirable on-task behaviour and worked without hand-flapping during the interval before the timer beeped. When he had filled his card with six stickers he could have some popcorn. The child was praised for appropriate behaviour and told why he received a sticker. The researcher pointed at the enlarged COMPIC cards as she praised that behaviour. The child was verbally praised for following each step of the self-monitoring procedure. This self-monitoring procedure was
Table 4.4: Prompts given at each step in the self-monitoring procedure.

<table>
<thead>
<tr>
<th>Steps in self-monitoring procedure</th>
<th>Verbal prompt given</th>
<th>Physical prompt given</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Push stop</td>
<td>Full physical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>assistance to push</td>
</tr>
<tr>
<td></td>
<td></td>
<td>stop button.</td>
</tr>
<tr>
<td>2</td>
<td>Was Aaron working or</td>
<td></td>
</tr>
<tr>
<td></td>
<td>not working? Aaron</td>
<td>Full physical</td>
</tr>
<tr>
<td></td>
<td>was</td>
<td>assistance to make</td>
</tr>
<tr>
<td></td>
<td></td>
<td>mark in box.</td>
</tr>
<tr>
<td>3</td>
<td>Did Aaron have hands</td>
<td></td>
</tr>
<tr>
<td></td>
<td>down? Aaron</td>
<td>Full physical</td>
</tr>
<tr>
<td></td>
<td></td>
<td>assistance to put mark</td>
</tr>
<tr>
<td></td>
<td></td>
<td>in box.</td>
</tr>
<tr>
<td>4</td>
<td>Do you get a sticker?</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Aaron does/does not</td>
<td>Full physical</td>
</tr>
<tr>
<td></td>
<td>get a sticker</td>
<td>assistance to put</td>
</tr>
<tr>
<td></td>
<td>because</td>
<td>sticker on card.</td>
</tr>
</tbody>
</table>

practised three times during each training session. The whole procedure is illustrated clearly in Figure 4.2.

**Classroom Self-Monitoring.**

Following training, the child returned to the classroom for the self-monitoring session. This session was divided into the same intervals as during the baseline session (refer to Figure 4.1). During Phase B there were only eight 30-second intervals as opposed to ten at baseline due to time constraints.

The researcher sat at the back of the classroom during this phase of the study. She began to collect data on Target Behaviour 1 (off-task behaviour), marking the beginning of
Researcher gives verbal prompt: “Show me working with hands down. Ready, steady, go!”

Timer beeps

Child pushes the stop button on the timer

Child works independently for interval set on the timer

Child self-records his behaviour on self-recording Sheets 1 + 2

Child self-reinforces when appropriate

The child self-monitored during the five-minute interval that followed each 30-second interval. At the beginning of the five-minute interval the researcher returned to the child’s desk and reminded him of the self-monitoring procedure. The COMPIC cards remained on his desk for the entire session and served as a visual reminder of the behaviour that was expected of him. He was encouraged to remember the procedure without being prompted. The researcher then gave the prompt, “Show me working with hands down...
Table 4.5: Constant time delay procedure used in Phase B. The verbal prompts given were identical to those given in the training sessions shown in Table 4.4.

<table>
<thead>
<tr>
<th>Steps in self-monitoring procedure</th>
<th>Prompt</th>
<th>Delay</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Repeat Verbal Prompt</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal Prompt</td>
<td>6&quot;</td>
</tr>
<tr>
<td>2</td>
<td>Repeat Verbal Prompt</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal Prompt</td>
<td>6&quot;</td>
</tr>
<tr>
<td>3</td>
<td>Repeat Verbal Prompt</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal Prompt</td>
<td>6&quot;</td>
</tr>
<tr>
<td>4</td>
<td>Repeat Verbal Prompt</td>
<td>3&quot;</td>
</tr>
<tr>
<td></td>
<td>Verbal Prompt</td>
<td>6&quot;</td>
</tr>
</tbody>
</table>

(pointing at the enlarged COMPIC cards). Ready, steady, go!" and set the timer.

Following this, the child began working independently until the timer beeped.

As during the training phase, a constant time delay procedure was used. Again it was used to aid the child to follow each step of the self-monitoring procedure. Table 4.5 illustrates the constant time delay procedure used in Phase B classroom self-monitoring.
sessions. During training the child had received prompting on zero-second delay intervals at each step in the self-monitoring procedure. During the classroom self-monitoring session, these intervals were increased to three-second delay intervals and the child received the verbal prompts only (refer to Table 4.4 for verbal prompts given at each step). This was done to transfer more control of the self-monitoring procedure to the child with the aim of increasing independence. If the child did not respond within three seconds, he was given the prompt one more time.

Five types of responses were recorded. These were prompted correct response, unprompted correct response, prompted incorrect response, unprompted incorrect response and no response. Each time the child self-monitored his responses were recorded at each step in the self-monitoring procedure. For example, if the child responded correctly before the prompt for a particular step was given, his response would be recorded as “unprompted correct”. If Aaron made no response within three seconds after being given a prompt, he was prompted once more. His response was then recorded as one of the five types (see data collection sheet for Self-Monitoring Procedure in Appendix 3). Data were also collected on the accuracy of the child’s self-recording (see data collection sheet for Accuracy of child’s Self-Recording in Appendix 3).

The self-monitoring procedure was repeated three times in each five-minute interval. There were eight five-minute intervals during Phase B. Therefore, the child self-monitored a total of 24 times per session and data were collected each time. Figure 4.3 illustrates the format of the sessions in Phase B.

Phase A

Following Phase B there was a return-to-baseline Phase A. The format of this session was identical to that of the pre-intervention baseline session (refer to Figure 4.1). Data on
TRAINING
Child is trained in training room for (10-15 minutes) using videotape, self-monitoring materials and self-monitoring procedure.

SELF-MONITORING AND RECORDING
Child and researcher return to classroom. Child is seated at desk and begins work. Target Behaviour 2 monitored over entire classroom session.

5-MINUTE SELF-MONITORING INTERVAL
1. Timer set for 30 seconds.
2. Child works at desk.
3. Timer beeps.
5. Responses at each step in self-monitoring procedure recorded.
7. Repeat a total of three times.

30-SECOND RECORDING INTERVAL
Target Behaviour 1 is monitored and recorded whilst child works at desk.

5-MINUTE SELF-MONITORING INTERVAL
1. Timer set for 30 seconds.
2. Child works at desk.
3. Timer beeps.
5. Responses at each step in self-monitoring procedure recorded.
7. Repeat a total of three times.

30-SECOND RECORDING INTERVAL
Target Behaviour 1 is monitored and recorded whilst child works at desk.

REPEAT UNTIL:
TOTAL 30-SECOND RECORDING INTERVALS = 8
TOTAL 5-MINUTE S/M INTERVALS = 8

Figure 4.3: Format of the sessions throughout intervention Phase B
Target Behaviour 1 (off-task behaviour) were collected in the same manner as in the pre-intervention baseline session. Target Behaviour 2 (hand-flapping) was recorded using the same method as at baseline.

Follow-up

Follow-up data were collected two weeks after the withdrawal of the intervention. Baseline data were collected in the same manner as before for off-task behaviour and hand-flapping. The intervention was then reintroduced. The child was shown the videotape and then returned to the classroom. Following this, Aaron was presented with the self-monitoring materials and he was reminded of the procedure. The child then followed the self-monitoring procedure as during Phase B. Recording of accuracy of self-monitoring and responses at each step in the procedure was conducted as in Phase B. The child repeated the procedure three times.

Following self-monitoring, the child was left to work independently. The researcher then moved to the back of the room. The researcher recorded any off-task behaviour for a further thirty seconds.

Inter-observer Reliability

A second observer was present for both training and classroom self-monitoring during Session 4. This observer simultaneously scored behaviour with the researcher. Inter-observer reliability scores were calculated for Target Behaviours 1 (off-task) and 2 (hand-flapping), for accuracy of self-monitoring and for responses at each step in the self-monitoring procedure. Percentage agreement was calculated by dividing agreement by agreement plus disagreement and multiplying by 100.

The reliability scores for Target Behaviours 1 and 2 were 98.3% and 88.9% agreement respectively. They indicate a high percentage agreement for the target
behaviours. The reliability score for accuracy of self-monitoring was 100% agreement. There was also 100% agreement for the child’s responses at each step in the self-monitoring procedure.

Consistency of Implementation

The second observer in Session 4 also completed a checklist containing an outline of the treatment procedure (see Appendix 4). This was done to ensure the results presented in this research were related to the treatment procedures outlined in the Method section (Neuman & McCormick, 1995).

The observer completed the first part of the checklist during training. The second part of the checklist was completed during the classroom self-monitoring session. The observer randomly chose a period in this session to complete the checklist. A percentage of consistency of implementation was calculated by dividing the number of steps followed by the number of steps followed plus the number of steps not followed and multiplying by 100. The observer recorded a 100% consistency of implementation.

Results

Aaron was the participant involved in Study 1. The intervention involved exposing the child to self-modelling and teaching a four-step self-monitoring procedure to reduce the levels of inappropriate classroom behaviour. Self-monitoring was taught using a constant time delay procedure. The effectiveness of the intervention was assessed on two target behaviours. Target Behaviour 1 was off-task behaviour and Target Behaviour 2 was hand-flapping. Data were based on the number of seconds the child was off-task during 30-second intervals for Target Behaviour 1. Target Behaviour 2 was based on the number and type of prompts given to inhibit hand-flapping.
Data were collected on prompted and unprompted responses at each step in the self-monitoring procedure. This allowed the effectiveness of the constant time delay procedure to be assessed. Additional data were also collected on the accuracy of the participant’s self-recording.

**Target Behaviour 1: off-task behaviour**

The number of seconds the child was off-task per 30-second recording interval is presented in Figure 4.4. There were ten recording intervals in each of the baseline sessions and eight in each of the intervention sessions. In addition, there were five 30-second intervals at baseline follow-up and five at intervention follow-up. There was a total of 54 recording intervals for Target Behaviour 1 in the present study.

During baseline, Aaron displayed very high levels of off-task behaviour. The mean level of off-task behaviour at baseline was 25.5 seconds. The standard deviation at baseline was 4.9. The minimum number of seconds the child was off-task in this phase was 17 seconds and the maximum was 30 seconds. The range of scores was 13.

Figure 4.5 (Appendix 5) displays the data with the addition of trend lines and envelopes. The envelopes have been added to this time-series graph as a visual aid to help determine variability (Wolery, Bailey, & Sugai, 1988). Trend lines are another aid for interpreting visual data and illustrate the direction of data (Wolery et al., 1988; Neuman & McCormick, 1995) or slope of behaviour over time.

At baseline, considerable variability in the data was evident. This is indicated by the width of the envelope (Figure 4.5, Appendix 5). The trend line was relatively steep and showed a rapid upward, or positive, trend in off-task behaviour. The steep gradient of the slope indicates a rapid rate of change in behaviour.
Figure 4.4: Number of seconds of off-task behaviour per 30-second interval. (A) represents baseline, (B) represents the intervention condition, (BF) represents baseline follow-up, and (IF) represents intervention follow-up.

During the intervention Phase B the mean level of off-task behaviour decreased markedly. The number of seconds Aaron was off-task decreased from 30 seconds at baseline to 11 seconds in the first interval of the intervention phase. The data then shows a rapid decrease from 11 to three seconds at the second interval of the intervention phase. Following this decrease, the data stabilizes until interval 31 when there is a slight regression to seven seconds of off-task behaviour. The mean level of off-task behaviour during Phase B was 1.6 seconds (SD = 2.7). The mean level in Phase B had decreased by 23.9 from the baseline, showing a considerable decrease in off-task behaviour.
There was a considerable change in the slope of behaviour in Phase B compared with at baseline. During Phase B the trend line shows that the data had a relatively flat profile with a very slight positive trend. This indicates that the intervention variables had produced a pronounced change in the slope of behaviour from the baseline phase to the intervention Phase B. This added greater credibility to the conclusion that the intervention was responsible for the change in behaviour (Wolery et al., 1988).

During Phase B, the behaviour ranged from no off-task behaviour to 11 seconds of off-task behaviour. This produced a range of 11 and showed a decrease of two from the range at baseline. A range of 11 would indicate relatively large variability. However, an outlying score has made any summary representation of variability misleading (Blackmore, 1994).

The first data point in Phase B is an outlying score (Blackmore, 1994). This accounted for the relatively wide envelope that suggests substantial variability. The data were, in fact, relatively stable. A broken envelope line was also added in this phase to show the envelope with the exclusion of the outlying score. It showed that the envelope was narrow when this score was not included, indicating little variability in data. This indicated that the intervention variables had brought the behaviour under some control and reduced the fluctuations evident at baseline.

At the return-to-baseline Phase A, the mean level of off-task behaviour increased substantially. There was a small increase from three seconds to four seconds during the first interval in Phase A. Following this interval there was a dramatic increase from four seconds of off-task behaviour to 26 seconds. The mean level of off-task behaviour in the return-to-baseline Phase A was 14.5 (SD = 6.8). The mean level for Phase A had
increased by 12.9 from Phase B, showing a large increase in off-task behaviour. There was a degree of overlap in the levels of behaviour between Phase B and the return-to-baseline Phase A (overlap = 7).

In the return-to-baseline Phase A, some regression was in evidence. Regression refers to the “fall back” of behaviour (Shontz, 1986). In essence, regression implies that the mean levels of behaviour are moving towards the mean levels observed in the previous phase (Shontz, 1986). By comparing the mean level of off-task behaviour during the baseline (M = 25.5) with the mean level during the return-to-baseline condition, regression in behaviour was clear. During the return-to-baseline Phase A, behaviour did not reach the height of the mean level at the baseline Phase A (mean = 25.5).

The minimum number of seconds of off-task behaviour in the return-to-baseline Phase A was four and the maximum was 26. The range in this phase was 22 seconds. It had doubled in the return-to-baseline Phase A from Phase B. This indicated more variability in data during the return-to-baseline phase than in Phase B. The envelope was very wide during the return-to-baseline Phase A. This further indicated that the data became somewhat more variable after the removal of the intervention. There was slightly more variability during the return-to-baseline Phase A than at the baseline Phase A.

During the return-to-baseline Phase A, there was a further change in the slope of behaviour. The trend line becomes very steep in the positive direction. The data showed much the same trend as during the baseline Phase A, providing further evidence of regression in behaviour. Off-task behaviour began to increase rapidly once the intervention was removed, although did not reach the mean level observed at baseline. The sudden increasing trend after the intervention was removed, added further credibility to the
conclusion that it was the intervention variables that were responsible for the change in behaviour.

The baseline follow-up data are presented in the phase labelled BF. The child was observed under baseline conditions for five 30-second intervals. The mean level of off-task behaviour was similar to that at return-to-baseline Phase A, showing the behaviour had been maintained at the return-to-baseline level. The mean at baseline follow-up was 14.2 (SD = 5.9), compared with a mean of 14.5 (SD = 6.8) for the previous phase. The range at baseline follow-up was eight and indicated some variability in the data.

The trend line for the BF phase showed that the data followed a slope that had a similar gradient to the slope in the return-to-baseline Phase A. It showed a positive trend. The envelope was relatively wide, further indicating variability in data.

The intervention follow-up data are displayed in the phase labelled IF. The intervention was reintroduced and then the child was observed for a further five 30-second intervals. The behaviour showed a marked decrease to near zero levels after the intervention was reintroduced. The mean level of off-task behaviour was one (SD = 1). The range at the intervention follow-up was two. This indicated relative stability in data.

After the intervention was reintroduced in the IF phase, there was a marked change in the slope of behaviour. The trend line showed a slight negative trend. The envelope was extremely narrow, further indicating relative stability in data. The sudden change in slope and variability after the intervention was reintroduced added even further credibility to the conclusion that the intervention variables were responsible for the behaviour change.

Target Behaviour 2: hand-flapping

Data on hand-flapping were collected by counting the number and types of prompts given to inhibit the behaviour. Prompts were of two types. Aaron was allowed three verbal
Figure 4.6: Number of verbal and physical prompts needed to stop hand-flapping per session. (A) represents baseline, (B) represents the intervention condition, (BF) represents baseline follow-up, and (IF) represents intervention follow-up.

Prompts followed by a physical prompt if necessary. The verbal prompt was the command "hands down".

Figure 4.6 shows a graphical representation of the data on hand-flapping. During baseline the level of verbal prompting was very high at 30 prompts over a 50-minute period, showing a high incidence of hand-flapping. The level of physical prompts was much lower at four prompts over the session.

During Phase B, the level of verbal prompting decreased from 30 to 12 prompts in the first session of intervention. This indicated a large decrease in the occurrence of hand-flapping. The mean number of verbal prompts given in Phase B was 12.6, showing a decrease of 17.4 from baseline. The standard deviation during the period of intervention...
for verbal prompts was four, showing moderate variability in data. There was a range of eight verbal prompts during this phase (minimum = 9, maximum = 17). A negative slope in behaviour change was evident over Phase B. This showed that the behaviour was decreasing. The slope had a relatively small gradient which indicated that the rate of behaviour change was gradual. The level of physical prompting in Phase B also decreased from the baseline level and remained at low levels. The mean was 0.7 (SD = 0.6). The small range of one also shows that the data were stable in this phase. The behaviour change slopes in a downward trend, showing a decreased level of physical prompting.

Verbal and physical prompting increased in level during the return-to-baseline phase. Verbal prompting rose to a level of 29 and physical prompting to a level of four. Both types of prompting had regressed to much the same levels as at baseline after the withdrawal of intervention. The standard deviation for both verbal and physical prompts was zero.

The numbers of prompts were calculated over 50-minute periods in all previous phases. At follow-up it was only possible to observe the child over a 25-minute period for each of baseline follow-up and intervention follow-up. Therefore, the numbers of prompts counted at follow-up have been doubled for graphical representation. This was done to maintain equal proportion with the rest of the graph.

At baseline follow-up, the levels of verbal and physical prompts counted were similar to the return-to-baseline level. There were 16 verbal prompts given (relative to 32 verbal prompts over a 50-minute period) and one physical prompt (relative to two). This indicated that hand-flapping was maintained at return-to-baseline levels during the baseline follow-up.
After the intervention was reintroduced the levels of verbal and physical prompting decreased considerably. The number of verbal prompts given was seven (relative to 14) and there were zero physical prompts given. This finding indicated that the intervention was effective in producing decreased levels of hand-flapping after it was reintroduced. The intervention reduced hand-flapping to much the same levels as it did during Phase B.

**Effectiveness of constant time delay procedure to teach the self-monitoring steps**

The self-monitoring procedure consisted of four steps. It was taught through the constant time delay procedure. The participant's response at each step of the self-monitoring procedure was recorded as one of five types. These were prompted correct, prompted incorrect, unprompted correct, unprompted incorrect and no response. The level of unprompted responding indicated the degree to which the child had learned to follow the self-monitoring procedure independently. An increase in unprompted correct responding showed a decrease in dependence on the researcher.

Figure 4.7 displays the number of steps per trial at which the child demonstrated prompted and unprompted correct responses. There were four steps in the self-monitoring procedure, with four opportunities for the child to respond in each trial. Therefore, the child could score a maximum of four for either prompted or unprompted correct responses in each trial. For example, if the child followed two of the steps in the self-monitoring procedure in trial one without being prompted, he would obtain a score of two unprompted correct responses for this trial. There was a total of 72 trials in which the child was required to follow the self-monitoring procedure during intervention. At follow-up there
Figure 4.7: Number of steps in the self-monitoring procedure at which the child demonstrated prompted and unprompted correct responses per trial. Were another 15 trials in which the child was required to follow the self-monitoring procedure. Every third trial is presented in Figure 4.7.

Figure 4.7 illustrates the high rate at which Aaron was able to learn the self-monitoring procedure and to perform it without being prompted. The level of prompted correct responses remained at 100% until Trial 9. This showed that Aaron needed to be prompted at all four steps in the self-monitoring procedure until Trial 9. Consequently, until Trial 9 the level of unprompted correct responses remained at zero.

After the ninth trial, the level of prompted responses decreased to two at Trial 12. This demonstrated that the subject only needed to be prompted at two of the steps in the
self-monitoring procedure. That is, the number of prompts needed for the child to follow the self-monitoring procedure was halved.

By Trial 15, the number of prompted correct responses had decreased to zero. Nearly all prompted responses remained at zero levels for the remaining period of intervention, with some regression to one prompted response. This indicated that the child was following the self-monitoring procedure independently after Trial 15, although he needed to be given one prompt on three occasions. On the first and second occasion the child had to be prompted to push the stop button. On the third occasion the child had to be prompted to self-reinforce after following the other steps.

At follow-up the results showed that the child had retained the procedure well. Each data point in Figure 4.7 shows the results of every third trial that Aaron self-monitored. During follow-up, he had to be given two prompts during the first interval of self-monitoring (not shown on the graph). He had to be prompted to push the stop button and to self-reinforce. After this interval the child did not have to be prompted at any step in the self-monitoring procedure.

**Accuracy of self-monitoring**

Each time Aaron self-monitored the accuracy of responses was recorded. It was noted whether he had remained on-task for the 30-second interval and whether he had refrained from hand-flapping. These are expressed as percentages in Table 4.6. A percentage accuracy for the self-recording of the target behaviours and for self-reinforcement was calculated by dividing accuracy by accuracy plus inaccuracy and multiplying by 100.

Table 4.6 shows the accuracy of self-monitoring for each session over the intervention phase. Aaron showed a high percentage accuracy of self-recording Target Behaviours 1 and 2. He recorded his off-task behaviour with 100% accuracy and his hand-
Table 4.6: Accuracy of self-monitoring.

<table>
<thead>
<tr>
<th>Session</th>
<th>% time on-task</th>
<th>% time refraining from hand-flapping</th>
<th>% accuracy of self-recording (off-task)</th>
<th>% accuracy of self-recording (hand-flapping)</th>
<th>% accuracy of self-reinforcement</th>
<th>Total % accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>100</td>
<td>91.7</td>
<td>100</td>
<td>91.7</td>
<td>91.7</td>
<td>94.4</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>Total %</td>
<td>100</td>
<td>97.2</td>
<td>100</td>
<td>97.2</td>
<td>97.2</td>
<td>97.2</td>
</tr>
</tbody>
</table>

Flapping with 97.2% accuracy. The percentage accuracy of self-recording hand-flapping corresponds to the percentage of time the child refrained from hand-flapping. That is, the child consistently placed a mark in the “hands down” box, even on the occasion that he should have marked the “flapping” box because he engaged in hand-flapping. Similarly, it was after this interval that he was inaccurate in his self-reinforcement. He placed a sticker on his card when he should not have done because he had been hand-flapping during the 30-second interval.
At follow-up the child showed 100% accuracy for all elements of self-monitoring. He also displayed 100% on-task behaviour and absence of hand-flapping during self-monitoring intervals.

The intervention was successful in reducing the inappropriate classroom behaviours that were the target of this study. Off-task behaviour showed the most substantial decreases, often reaching zero levels. Hand-flapping was also reduced during the period of intervention, although not to the extent of off-task behaviour.

Off-task behaviour did not return to baseline levels in the return-to-baseline phase which indicated some learning had taken place. This behaviour was maintained at return-to-baseline levels at follow-up. The rapid decrease in off-task behaviour indicated the effectiveness of the intervention at intervention follow-up.

Hand-flapping returned to baseline levels at return-to-baseline, indicating the behaviour change was not maintained after the removal of the intervention. The level of hand-flapping was slightly above the baseline level during the baseline follow-up. After the intervention was reintroduced an immediate effect was observed. This supported the effectiveness of the treatment observed in Phase B.

Analysis of the results of the self-monitoring procedure indicate that the child learned very quickly to follow the procedure independently. He only had to be prompted during the first interval of self-monitoring during the follow-up. After being reminded, he remembered the procedure and was capable of following it independently after a two-week break. The constant-time delay procedure was shown to be very effective in teaching the steps of the self-monitoring procedure. It must be noted that the video self-modeling was used in conjunction with the self-monitoring procedure and the constant time delay.
procedure. Such a composite study does not allow conclusions to be drawn about the individual components, as their separate effects were never assessed.
CHAPTER 5

STUDY II

Introduction

Chapter 5 contains the details of the participant, the intervention, and the results of the intervention in Study 2. First, a description of the participant involved in this study and the autistic features demonstrated by the child are presented in the Introduction section. This section is completed by a reiteration of the research questions that are relevant to Study 2. The next section in the chapter states the two target behaviours and provides behavioural definitions for each. Following is the Method section in which an in depth discussion of the materials, setting, and procedures employed in Study 2 is provided. The chapter concludes with the Results section in which all of the findings of Study 2 are contained.

Sam was the child involved in this experimental study. He was nine years and ten months of age. He is the first of three children. Sam attended a Special Education Centre at a primary school in the northern suburbs. He was in the same senior class as the participant in Study 1. There were two full time teachers in the class. Sam had visits from a speech pathologist and an occupational therapist.

A psychologist administered assessments in 1998 when Sam was eight years five months of age. He was assessed on the Peabody Picture Vocabulary Test (PPVT), the Test for Reception of Grammar (TROG), the Renfrew Action Picture Test, and the LARSP profile of Grammatical Development.

The child obtained a standard score below 40 on the PPVT and this equated with an age equivalence of two years ten months. His score on the TROG was at much the same level. He could understand two to three key words and had an overall comprehension level
of 2.5 - three years. The Renfrew Action Picture Test (which shows that a child can use appropriate sentence structure) equated with an age equivalence of 3.6 – 3.11 years. The LARSP profile showed a slightly lower grammatical development level of two – 2.6 years.

The Stanford-Binet Intelligence Scale (fourth edition) and the Vineland Adaptive Behaviour Scale were completed by a psychologist when Sam was five years of age. On the Stanford-Binet, Sam obtained a standard score of 69 for verbal reasoning, 60 for abstract/visual reasoning, zero for quantitative reasoning, and 52 for short-term memory. The test composite score was 54. It showed Sam to be in the moderately intellectually disabled range.

Both the classroom and interview editions of the Vineland Adaptive Behaviour Scales were used for diagnostic purposes. The results of the interview edition indicated a low flat profile in the moderate range. He was assigned an age equivalencies of three years four months for socialization skills, two years three months for daily living skills, one year ten months for communication skills and three years for motor skills. On the classroom edition Sam obtained a standard score of 63 in the Communication Domain, 63 in the Daily Living Domain, 62 in the Socialization Domain and 64 in the Motor skills Domain. The Adaptive Behaviour Test composite score was 61. The overall age equivalence on the Vineland Adaptive Behaviour Scales was two years seven months.

Sam showed developmental delays in each of the language, social and intellectual domains which are indicated as characteristics of autism (Rappaport & Ismond, 1996). He was over a year old before he began to crawl and was 18-20 months before he walked. At age six he began to use words. Since then he has been seeing a speech therapist. Sam has poor muscle tone, causing a deficit in gross motor skills. He is prone to "absences" or petit mals (Brimer, 1990) throughout the day and has had epileptic fits. He was not on
epilepsy medication at the time of this study. Sam usually has short sleep periods during the day every day.

The participant has recently been diagnosed with autism and has been described as low functioning by the psychologist. His behaviour is consistent with the DSM-IV Diagnostic Criteria for the Autistic Disorder. Sam demonstrated deficits in social interaction, manifested by his lack of non-verbal behaviours. Such deficits in social interaction are a common characteristic in children with autism (Rappaport & Ismond, 1996). He frequently lacks eye-to-eye gaze, although he will give eye contact upon request and spontaneously on some occasions. He does not use facial expression to regulate social interaction but consistently smiles and made facial expressions to get the attention of the researcher on a number of occasions.

Deficits in communication were also demonstrated and such deficits are a feature of autism (Rappaport & Ismond, 1996). He showed an inability to sustain a conversation. For example, when greeted he would not reply and when asked a question he would often say phrases that were completely out of context such as “There’s a tractor”. He would use repetitive and stereotyped language. For example, during one training session he repetitively said “Been to church”.

Sam indicated very restricted and stereotyped patterns of behaviour, especially in the areas of personal interests and activities. Rappaport & Ismond (1996) highlight such patterns of behaviour when describing autism. During free time Sam chose the play-dough every day. He had a preoccupation with making large men out of play-dough and blue-tac. Sam would not display any symbolic or imaginative play with these men, preferring simply to carry them around with him.
The modified TEACCH program described in the previous Chapter 1 promoted Sam's independence. The classroom teacher had implemented this program with Sam at the beginning of the school year. Sam displayed very high levels of off-task behaviour and showed great difficulty in maintaining attention, often even while being prompted. He displayed very high latency times between being given a task and commencing work. It was common for the teacher to give many prompts, often resorting to physical prompts to get him to start work. The teacher expressed the difficulty she experienced in working with the three children because of high levels of off-task behaviour exhibited by Sam and the participant in Study 1. She often found it difficult to work with the third child because the other two children needed constant prompting to remain on-task.

The time available to the teacher for assessment and teaching intervention was limited because of the need to prompt Sam constantly after each task to begin the next one. Sam had five tasks to complete in each session. During periods of off-task behaviour, Sam would fiddle with objects and inspect them at close proximity. He would often stare blankly. Therefore, this research aimed to decrease the classroom behaviours that interfered with his ability to work independently for the same reasons as in Study 1.

The intervention incorporated self-management skills through videotaped self-modelling and self-monitoring. The ultimate aim was to decrease inappropriate behaviour. Teaching self-management skills was consistent with the aim of increasing independence. The self-monitoring procedure contained four steps and was taught through the constant time delay procedure.

Data were collected on two target behaviours. These were off-task behaviour and latency time to commence a task. The data were based on the number of seconds the child was off-task during 30-second intervals and the number of prompts needed to get the child
to commence a task. Data were also collected on the child's ability to follow each step of the self-monitoring procedure. The accuracy of the child's self-recording was also monitored.

The intervention involved exposing the child to videotaped self-modelling and teaching a four-step self-monitoring procedure to reduce inappropriate behaviour. The effects on off-task behaviour and latency time to commence tasks during independent work time comprised the target behaviours. The research questions were as follows:

1. Can Sam be taught to follow a four-step self-monitoring procedure through the constant time delay procedure?
2. Will the implementation of the videotaped self-modelling and self-monitoring package be effective in producing a decrease in the level of off-task behaviour? Will it produce a change in the slope of behaviour over the period of intervention?
3. Will the implementation of the videotaped self-modelling and self-monitoring package be effective in producing a decrease in the level of latency time? Will it produce a change in the slope of this behaviour over the period of intervention?

Target Behaviours

Two behaviours that interfered with Sam's ability to complete an independent work task were chosen for the treatment program. The behaviours were chosen after consultation with the classroom teacher and observation of the child in the classroom during the independent work session. Target Behaviour 1 was off-task behaviour and Target Behaviour 2 was latency time to commence a task.
Behavioural Definitions

Target Behaviour 1: Off-task Behaviour

Off-task behaviour was defined as in Study 1 (see Target Behaviours section in Study 1). In essence this referred to any behaviour that was incompatible with working on an independent task.

Target Behaviour 2: Latency time

Latency time was defined as the time taken to commence a task. Latency time was measured according to the number and type of prompt necessary to make Sam begin work on each task labelled one to five. Sam was given prompts based on a hierarchy of least-to-most prompts.

Sam was considered to have started a task when he performed the requirements of the task for at least five seconds. If Sam simply touched or held the task related materials he was not considered to have commenced work. Similarly, if he had commenced the task but maintained on-task behaviour for less than five seconds, he was not considered to have adequately commenced the task.

Method

Settings

Training sessions took place in the same training room as in Study 1. The self-monitoring sessions that followed took place in the classroom setting. In the classroom, Sam sat opposite the two other children. The modified TEACCH program was implemented with these three children by the teacher. As this was the regular arrangement, it was retained during this study.

The self-monitoring sessions were conducted during the morning independent work period. The child was required to remain seated at his desk whilst engaging in independent
tasks. Tasks commonly involved such activities as name writing, ordering rods by size, sorting male/female or big/small, placing specified counters into canisters, and completing weather sentences by choosing the correct COMPIC.

**Materials**

A video cassette recorder was used in all training sessions. Sam was recorded using a video camera during the morning period and segments of recording were then transferred to a videotape. The segments showed the child only performing appropriate behaviours that were incompatible with the inappropriate target behaviours. That is, the segments showed the child displaying appropriate on-task behaviour and beginning new tasks without being prompted. Approximately three minutes of recording was transferred to the videotape.

Several sets of materials were used in both training and self-monitoring sessions. These included a sample of the child's independent work, a timer that could be set to "beep" after a specific number of seconds (made by Jadco), self-monitoring sheets for both behaviours (see Appendix 1 for sample sheets), and a writing pencil. The researcher used two COMPICs that had been enlarged (approximately 15cm x 10cm), placed on card and laminated. These COMPICs cards depicted "working" and "quickly". They are shown in Appendix 2. Additional materials used in the self-monitoring sessions included a dictaphone, earphones, and data collection sheets (see Appendix 3). The dictaphone contained a tape that, when played, emitted a beep every second for 30-second intervals.

The child was reinforced for appropriate responses during both the training and classroom self-monitoring sessions. Reinforcers for Sam was chosen following consultation with the classroom teacher and observation of the child in the classroom. A sticker card that was divided into six squares, stickers, and Nutrograin (a breakfast cereal) were used as reinforcers.
Design

The study employed the use of a single-subject design. It is also consistent with an A-B-A withdrawal design to be conducted over five sessions. Follow-up data were collected two weeks after the withdrawal of the intervention. A Baseline Phase A took place during Session 1 of the study. The child was observed working independently for fifty minutes, under natural conditions in the classroom for this session.

The intervention Phase B followed Phase A. There were three sessions in Phase B. Each session began with a short 10-15 minute training phase in the training room. A constant time delay procedure was used throughout this study to teach the child to follow the four steps of the self-monitoring procedure. During training the child received prompting on zero-second delay intervals to facilitate correct responding.

Training was followed by a self-monitoring session in the classroom that lasted approximately 45 minutes. The constant delay interval was extended from zero seconds, in training, to three seconds in classroom self-monitoring sessions. The timer was set for 30 seconds each time the child was required to self-monitor during Phase B.

A return-to-baseline Phase A followed Phase B during Session 5. The intervention was withdrawn and the child was observed in the natural setting (i.e., in the classroom whilst no intervention took place). The design for this study is illustrated more clearly in Table 4.1 in the previous chapter.
Procedure

Written consent was obtained from Sam’s parents before the commencement of the study.

Baseline Phase A

A baseline was established in order to obtain pre-intervention data. Baseline data were collected during the first session. The child was observed whilst engaged in the independent tasks during the morning independent work session. During this session, the child was required to remain seated at his desk. He was required to follow the procedures of the modified TEACCH program described previously (in Chapter I).

Baseline data were also collected in a return-to-baseline Phase A during Session 5. Each baseline phase was conducted in an identical manner, at the same time and in the same context.

Recording during Baseline.

The frequency of off-task behaviour (Target Behaviour 1) was monitored using elements of time-sampling and event-based recording. Latency time (Target Behaviour 2) was monitored through event-based recording, based on the number of prompts needed to get Sam to begin a new task.

The baseline session lasted for approximately 50 minutes. It was divided into ten 30-second intervals. After each 30-second interval, a five-minute break was scheduled. The five-minute break was programmed to allow a longer period of observation to avoid over- or under-estimation of behaviour during the session.

Recording of off-task behaviour (Target Behaviour 1) was conducted during each 30-second interval only. Latency time (i.e., the number of prompts) was recorded each time the child had to begin one of the tasks in his tray labelled one to five (refer to
The description of the modified TEACCH program in Chapter 1). Therefore, there were five opportunities to record data for Target Behaviour 2 during the baseline session.

The format of baseline sessions is more clearly represented in Figure 4.1 in the previous chapter.

**Scoring of target behaviours.**

The researcher used the data collection sheet shown in Appendix 3 to collect baseline data. The numbers one to 30 on the data collection sheet represent each second of each 30-second interval. There were ten 30-second intervals of data collection during baseline.

Off-task behaviour (Target Behaviour 1) was recorded in each 30-second interval. The researcher used the dictaphone and earphones to aid the collection of this data. The dictaphone contained a tape that emitted a beep every second for ten 30-second intervals. Each beep corresponded to the numbers one to 30 on the data collection sheet. At each beep (i.e., every second) the researcher looked at Sam. If he was off-task, a stroke was placed through the number representing that particular second of the interval. If Sam was on-task, that number would be left blank on the data collection sheet. Recording proceeded in this manner for each second of the 30-second interval. Following the 30-second interval there was the five-minute break, during which no recording of off-task behaviour took place.

Latency time (Target Behaviour 2) was measured through event-based recording. A count was taken of the number and types of prompts needed to get Sam to begin working on each of tasks one to five. The modified TEACCH program involved seven steps to aid the child to work independently. These steps are shown in Table 1.1. Sam was prompted at each step where necessary to get him to begin the task.
Prompting was administered on a hierarchy of least-to-most prompts at each step in the modified TEACCH program (the steps are shown in Table 1.1). At each step the researcher began the hierarchy again at the least intrusive prompt. The first prompt in the hierarchy was a verbal prompt (least intrusive), followed by a model prompt by the researcher, followed by a physical prompt (most intrusive). Sam was allowed three verbal prompts before receiving one model prompt and one physical prompt if necessary. A three-second delay was scheduled before any prompt was given and between each prompt.

The verbal prompt was the command “do your work”. If after three verbal prompts the child had not commenced working on the task, he was given the model prompt. The model prompt involved the teacher demonstrating the requirements of the task. For example, if the task involved ordering rods by size, the researcher would say “Look. My turn” and place the first rod in the appropriate space. The researcher would then say “Now it’s Sam’s turn”. If he still did not start to perform the requirements of the task, he was given the physical prompt. This involved the researcher physically manipulating Sam’s movements until he performed the requirements of the task for longer than five seconds (the criterion for having commenced the task).

The frequency of verbal prompts, model prompts and physical prompts was then calculated for that session. Therefore, there were three scores for Target Behaviour 2 (latency time) at the end of the session.

**Intervention Phase B**

Intervention Phase B comprised Sessions 2 to 4. Each session consisted of a 10-15 minute training period in the training room, followed by a 45-minute self-monitoring session in the classroom. Training involved the child watching a videotape, practising the self-monitoring procedure, and receiving reinforcement.
Training using the videotape.

Each morning the child was taken to the training room. He was seated at a desk facing a television set, coupled with a videocassette recorder. The researcher told Sam the following:

"We are going to watch a video. You will see yourself on the video. You will see yourself working really well. Watch very carefully to see how you look when you are working really well. Do you understand?"

The video was then played. While the video played, the researcher used two COMPIC cards to draw attention to the desirable behaviours exhibited by Sam on the videotape. For Target Behaviour 1, the COMPIC card “working” depicted on-task behaviour. For Target Behaviour 2, the COMPIC card “quickly” depicted a short latency time to commence a new task.

For example, as the child watched the video the researcher held up the “working” and “quickly” COMPIC cards. The researcher told the child similar to:

"Look! Here’s Sam working. What a good boy. We know he is working because he is sitting at his desk properly. He is looking at his work. Look! Sam is doing his work. He is working very quickly. Look how he goes onto the next task really quickly. What a good worker. That’s how we should work in class”.

The researcher drew Sam’s attention to the appropriate behaviour and at the same time gave him praise for that behaviour. The researcher also conveyed pleasure for
appropriate behaviour using vocal tone, gesture and body language as extra reinforcement. For example, the researcher smiled and used the “thumbs up” sign frequently.

Training of self-monitoring.

The child was then asked to remember how he looked when he was “working quickly” as seen on the videotape. The enlarged COMPIC cards used in training were placed on his desk and his attention was drawn to them. The COMPIC cards remained on his desk for the entire session and served as a visual reminder of the behaviour that was expected of him. Sam was then told that the researcher had a special way to help him remember to work quietly in class. He was presented with the self-monitoring and reinforcement materials and the procedure was explained to him.

The researcher then gave the prompt “Show me working quickly (pointing at the enlarged COMPIC cards). Ready, steady, go!” She then pushed the start button on the timer that had been set for 30 seconds. The child was required to remain on-task for the thirty seconds and was reminded to change tasks quickly.

The constant time delay procedure was used to teach the child to follow the four steps of the self-monitoring procedure. These steps are shown in Table 4.2 in the previous chapter. During training the child received prompting on zero-second delay intervals (i.e. the stimulus cue and the controlling prompt were presented together). The child received prompting on a most-to-least hierarchy. This facilitated correct responding during training.

The beep of the timer was used as the stimulus to cue the child to respond. The controlling prompt consisted of a combined physical and verbal prompt given by the researcher during the first training session. A prompt was given at each step of the self-monitoring procedure. During the second and third training sessions the child received the
verbal prompt only on zero-second delay intervals. If he failed to respond appropriately within three seconds he was then given the combined verbal and physical prompt. Table 4.3 in the previous chapter shows the schedule of prompting. The prompts given at each step in the self-monitoring procedure are shown in Table 4.4 in the previous chapter.

The self-monitoring procedure was practised three times during each training session. The procedure is more clearly illustrated in Figure 4.2 in the previous chapter.

Classroom Self-Monitoring.

Following training the child returned to the classroom for the self-monitoring session. This session was divided into the same intervals as during the baseline session (refer to Figure 4.1 in the previous chapter). During Phase B there were only eight 30-second intervals as opposed to ten at baseline due to time constraints.

The researcher sat at the back of the classroom during this phase of the study. She began to collect data on Target Behaviour 1 (off-task behaviour), marking the beginning of the first 30 second interval. Data on this behaviour were collected in the same manner as during baseline. Data on Target Behaviour 2 (latency time) were collected in the same manner as at baseline each time Sam was required to begin one of tasks labelled one to five.

The child self-monitored during the five-minute interval that followed each 30-second interval. At the beginning of the five-minute interval the researcher returned to the child's desk and reminded him of the self-monitoring procedure. He was encouraged to remember the procedure without being prompted. The researcher then gave the prompt "Show me working quickly (pointing at the enlarged COMPIC cards). Ready, steady, go!" and set the timer. Following this, the child began working independently until the timer beeped.
A constant time delay procedure was used during self-monitoring sessions. Again it was used to aid the child to follow each step of the self-monitoring procedure. During training the child had received prompting on zero-second delay intervals at each step in the self-monitoring procedure. During the classroom self-monitoring session, these intervals were increased to three-second delay intervals and the child received the verbal prompts only (refer back to Table 4.3 in the previous chapter for verbal prompts given at each step). This was done to transfer more control of the self-monitoring procedure to the child and, so, increase independence. If the child did not respond within three seconds, he was given the prompt one more time. The constant time delay procedure used in Phase B classroom self-monitoring sessions is more clearly illustrated in Table 4.4 in the previous chapter.

Five types of responses were recorded. These were prompted correct response, unprompted correct response, prompted incorrect response, unprompted incorrect response and no response. Each time the child self-monitored his responses were recorded at each step in the self-monitoring procedure. If Sam made no response within three seconds after being given a prompt, he was prompted once more. His response was then recorded as one of the five types (see data collection sheet for Self-Monitoring Procedure in Appendix 3). Data were also collected on the accuracy of the child’s self-recording (see data collection sheet for Accuracy of child’s Self-Recording in Appendix 3).

The self-monitoring procedure was repeated three times in each five-minute interval. There were eight five-minute intervals during Phase B. Therefore, the child self-monitored a total of 24 times per session and data were collected each time. Figure 4.3 in the previous chapter illustrates more clearly the format of sessions in Phase B.
Phase A

Following Phase B there was a return-to-baseline Phase A. The format of this session was identical to that of the pre-intervention baseline session. Data on Target Behaviours 1 and 2 were collected in the same manner as in the pre-intervention baseline session.

Follow-up

Follow-up data were collected two weeks after the withdrawal of the intervention. Baseline data were collected in the same manner as before for off-task behaviour and latency time. The intervention was then reintroduced. The child was shown the videotape and then returned to the classroom. Following this, Sam was presented with the self-monitoring materials and he was reminded of the procedure. The child then followed the self-monitoring procedure as during Phase B. Recording of accuracy of self-monitoring and responses at each step in the procedure was conducted as in Phase B. The child repeated the procedure three times.

Following self-monitoring, the child was left to work independently. The researcher then moved to the back of the room. The researcher then recorded off-task behaviour for a further thirty seconds and recorded latency time when he was required to start the next task.

Inter-observer Reliability

A second observer was present for both training and classroom self-monitoring during Session 3. This observer simultaneously scored behaviour with the researcher. Inter-observer reliability scores were calculated for Target Behaviours 1 (off-task) and 2 (latency time), for accuracy of self-monitoring and for responses at each step in the self-monitoring procedure. Percentage agreement was calculated by dividing agreement by agreement plus disagreement and multiplying by 100.
The reliability score for Target Behaviour 1 was 97.9% agreement. Percentage agreement for Target Behaviour 2 was 80.8% for verbal prompts, 100% for model prompts and 100% for physical prompts. These indicate a high percentage agreement for the target behaviours. The reliability score for accuracy of self-monitoring was 100% agreement. There was also 100% agreement for the child's responses at each step in the self-monitoring procedure.

Consistency of Implementation

The second observer in Session 4 also completed a checklist containing an outline of the treatment procedure (see Appendix 4). This was done to ensure the results presented in this research were related to the treatment procedures outlined in the Method section (Neuman & McCormick, 1995). The observer completed the first part of the checklist during training. The second part of the checklist was completed during the classroom self-monitoring session. The observer randomly chose a period in this session to complete the checklist. A percentage of consistency of implementation was calculated by dividing the number of steps followed by the number of steps followed plus the number of steps not followed and multiplying by 100. The observer recorded a 100% consistency of implementation.

Results

Sam was the participant involved in Study 2. The present study focused on reducing the levels of inappropriate classroom behaviours that interfered with Sam's ability to work independently. The intervention involved exposing the child to self-modelling and teaching four-step self-monitoring procedure. Self-monitoring was taught using a constant time delay procedure. The effectiveness of the intervention was assessed on two target behaviours.
Target Behaviour 1 was off-task behaviour and Target Behaviour 2 was latency time to commence a task. Data were based on the number of seconds the child was off-task during 30-second intervals for Target Behaviour 1. Target Behaviour 2 was based on the number and type of prompts given for Sam to commence work on each of Tasks 1-5.

Data were collected on prompted and unprompted responses at each step in the self-monitoring procedure. This allowed the effectiveness of the constant time delay procedure to be assessed. Additional data were also collected on the accuracy of the participant's self-recording.

**Target Behaviour 1: Off-task behaviour**

The number of seconds the child was off-task per 30-second recording interval is presented in Figure 5.1. There were ten recording intervals in each of the baseline sessions and eight in each of the intervention sessions. In addition, there were ten 30-second intervals at BF and eight at IF. There was a total of 62 recording intervals for Target Behaviour 1 in the present study.

During the baseline phase, Sam demonstrated very high levels of off-task behaviour. The mean number of seconds he was off-task during the baseline phase was $25.9 \ (SD = 9.2)$. The range for the baseline was 30 (minimum = 0, maximum = 30). The range indicates very high variability in data. The third data point is an outlier and accounts for the very large range in this phase (Blackmore, 1994). If this data point were excluded there would be very little variability in data (range = 6). A rapid upward trend was in evidence during the baseline phase when the outlier was included. When the outlier was excluded, the trend of data demonstrated a relatively flat profile.
Figure 5.1: Number of seconds of off-task behaviour per 30-second interval. (A) represents baseline, (B) represents the intervention condition, (BF) represents the baseline follow-up, and (IF) represents the intervention follow-up.

During the first interval of Phase B, the mean level of off-task behaviour decreased dramatically from 27 seconds of off-task behaviour to no off-task behaviour. It then regressed slightly to eight seconds of off-task behaviour (Interval 12), before decreasing to three seconds (Interval 13). Following Interval 13, the data are very variable. The mean level of off-task behaviour during the intervention Phase B was 5.5 (SD = 6.5). There was an overlap of data (overlap = 21). The mean level for Phase B had decreased by 20.4 from the baseline phase. This indicated a considerable decrease in off-task behaviour during the period of intervention.

A range of 21 was indicated during Phase B. The minimum score for off-task behaviour was zero and the maximum was 21. There was considerable variability in data
during the intervention phase, as indicated by the large range and standard deviation. Visual analysis of the graph revealed that there was a notable decrease in the mean level of off-task behaviour during Phase B, although there were frequent regressions in behaviour.

Marked changes in the slope and direction of data were in evidence during Phase B. At baseline, there was a very steep positive trend in the data. During Phase B the gradient of the slope was much smaller and there was a slight negative trend in the occurrence of off-task behaviour. This finding indicated that the rate of behaviour change was slower than during the baseline phase but that it was changing in the desired direction in Phase B. The change in direction as well as the gradient of the slope strengthens the conclusion that the intervention was accountable for the change in behaviour (Wolery et al., 1988).

When the intervention was withdrawn, a rapid regression in off-task behaviour was observed. The child was off-task for three seconds in the last interval of Phase B. This increased to nine seconds during the first interval of the return-to-baseline Phase A before regressing considerably to 30 seconds of off-task behaviour (Interval 36). The mean level of off-task behaviour for the return-to-baseline Phase A was 19.3 (SD = 9.1). This indicated an increase of 13.8 from Phase B. The mean level of off-task behaviour in the return-to-baseline Phase A did not reach the average levels observed in the baseline Phase A (M = 25.9). There was a difference of 6.6 between these levels. The increase in off-task behaviour during the return-to-baseline phase adds further support to the conclusion that the intervention was a cause of the behaviour change.

During the return-to-baseline Phase A the range was 30 (minimum = 0, maximum = 30). This indicated considerable variability in data, to much the same degree as at baseline. The gradient of the slope in data increased from Phase B during the return-to-baseline Phase A. A downward trend was evident. There was an overlap in data of 21 between
Phase B and the return-to-baseline Phase A. This was the same as the overlap between the baseline Phase A and Phase B.

Baseline follow-up is represented in the phase labelled BF. The mean level of off-task behaviour had increased by 4.2 from the return-to-baseline Phase A during Phase BF. The mean level of off-task behaviour for Phase BF was 23.5 ($SD = 4$). This shows that the behaviour had not been maintained at return-to-baseline levels two weeks after the intervention was withdrawn. The behaviour had regressed to near baseline levels during BF ($M$ for baseline = 25.9). The range during Phase BF was 12, which indicated moderate variability. A slight upward trend was observed in data during the baseline follow-up phase.

The intervention was reintroduced in the intervention follow-up Phase IF. The results showed a rapid decrease in the mean level of off-task behaviour. The mean number of seconds the child was off-task during this phase was 5.8 ($SD = 8.4$). This was a 17.4 decrease from the mean in the Phase BF. The mean level of off-task behaviour during the IF Phase was much the same as the levels during the intervention Phase B ($M = 5.5$). This indicated that the treatment had similar effects on the off-task behaviour when reintroduced two weeks later.

The range of 25 (minimum = 0, maximum = 25) during the intervention follow-up phase indicated considerable variability in the data. This range was similar to the range of scores during the intervention Phase B. There was a notable change in the slope and direction of data from Phase BF. There was evidence of a steep negative trend during the IF Phase. This indicated a high rate of behaviour change in the desirable direction when the intervention was reintroduced.
Target Behaviour 2: Latency time

The time taken for the child to begin each of tasks one to five comprised latency time.

Data were based on the numbers and types of prompts needed to get Sam to begin each of the tasks. Prompts were of three types. Sam was allowed three verbal prompts, followed by a model prompt, followed by a physical prompt, if this was necessary. He was given the prompts on a most-to-least hierarchy. A total for each of verbal, model, and physical prompts was calculated for each session.

Figure 5.2 shows a graphical representation of the data on latency time. A semilogarithmic graph has been used to display this data. The semilogarithmic scale shows more clearly the rate of change in behaviour, rather than the amount of change (Wolery et al., 1988). Some researchers have advocated the use of such graphs in the area of behaviour analysis and precision teaching (e.g., Wolery, Bailey & Sugai, 1988). The graph shows that the rate of change in the level of each type of prompt from Phase A to B was very similar. The only exception was during the BF phase when the rate of physical prompting decreases as the rates of verbal and model prompting increase.

During the baseline phase, latency time was very long. The child required 65 verbal prompts, 17 model prompts and 11 physical prompts over the session to commence working on tasks one to five.

Less than one third of the verbal prompts needed in Phase A were required in the intervention Phase B. The mean level of verbal prompting given to Sam during the period of intervention was 22 (SD = 4.6). This represented a decrease of 43 from the baseline and reflected a decrease in latency time to commence a task. The range of scores for Phase B
Figure 5.2: Latency time: number of verbal, model, and physical prompts needed for child to begin Tasks 1-5.

was nine (minimum = 17, maximum = 27). The range and standard deviation for Phase B indicated that there was little variability in verbal prompt data. The data showed a slight upward trend. This finding indicated that the rate of behaviour change was slow and was moving in an undesirable direction.

The number of model prompts given in Phase B also decreased considerably. The mean number of model prompts in Phase B was 3.7 (SD = 0.6), representing a decrease of 13.3 from the baseline phase. This demonstrated a decrease in latency time to commence a task. The small standard deviation and range of one (minimum = 3, maximum = 4) indicated that there was very little variability in the data for model prompts. The data showed a slight upward trend.
Physical prompts decreased in frequency during Phase B. There was a decrease from 11 prompts at baseline to three in the first session of the intervention period. The mean number of physical prompts decreased from 11 at baseline to 3.3 (SD = 0.6) during Phase B. This showed that the latency time to commence a task had decreased. The range of physical prompts was one (minimum = 3, maximum = 4), which indicated little variability. There was a flat trend in physical prompt data during Phase B.

During the return-to-baseline phase, the number of verbal, model and physical prompts increased. Regression in behaviour was evident. Verbal prompts increased to a level of 43 (SD = 0) which indicated an increase of 21 from Phase B. The level of model prompts increased to 11 (SD = 0) which represented a 7.3 increase. The mean level of physical prompts increased by 5.7 to nine (SD = 0). The levels of prompting did not reach the mean levels observed during the baseline phase. This indicates that the latency time to commence tasks one to five was not as high in the return-to-baseline phase as it was in the baseline Phase A. This suggests that the behaviour was maintained to a small degree after the withdrawal of the intervention.

Baseline follow-up data are represented in the phase labelled BF. The level of both verbal (M = 59, SD = 0) and model prompts (M = 20, SD = 0) were higher during Phase BF than in the return-to-baseline Phase A. This indicates that the latency time to commence a task had increased in this period. It signified that the behaviour change observed at the return-to-baseline Phase A was not maintained two weeks after the intervention was withdrawn.

The number of physical prompts (M = 5, SD = 0) required in the baseline follow-up phase had decreased from the return-to-baseline Phase A. This showed that the number of
intrusive prompts needed to get Sam to begin a task had decreased. Therefore, the effort required by the teacher to get Sam to start a task had decreased somewhat.

When the intervention was reintroduced in Phase II, all types of prompting decreased markedly. This reflected a considerable decrease in the latency time to commence a task. Verbal prompts decreased by 38 to 21 (SD = 0) in the intervention follow-up phase. Only a quarter of the model prompts needed in the baseline follow-up were required during Phase II (M = 5, SD = 0). The proportion of physical prompts needed (M = 1, SD = 0) in the intervention follow-up phase had decreased by one fifth from Phase BF. These results indicated that the treatment was effective in reducing the latency time to commence the tasks once it was reintroduced.

Effectiveness of the constant time delay procedure to teach the self-monitoring steps

The self-monitoring procedure consisted of four steps. It was taught through the constant time delay procedure. The participant's response at each step of the self-monitoring procedure was recorded as one of five types. These were prompted correct, prompted incorrect, unprompted correct, unprompted incorrect, and no response.

The level of unprompted responding indicated the degree to which the child had learned to follow the self-monitoring procedure independently. An increase in unprompted correct responding showed a decrease in dependence on the researcher.

Figure 5.3 displays the number of steps per trial at which the child demonstrated prompted and unprompted correct responses. There were four steps in the self-monitoring procedure, meaning there were four opportunities for the child to respond in each trial. Therefore, the child could score a maximum of four for either prompted or unprompted correct responses in each trial. For example, if the child followed two of the
Follow-up

Figure 5.3: Number of steps in the self-monitoring procedure at which the child demonstrated prompted and unprompted correct responses per trial.

steps in the self-monitoring procedure in Trial 1 without being prompted, he would obtain a score of two unprompted correct responses for this trial. There was a total of 72 trials in which the child was required to follow the self-monitoring procedure during intervention. At follow-up there were another 15 trials in which the child was required to follow the self-monitoring procedure. Every third trial is presented in Figure 5.3.

The data represented by Figure 5.3 were extremely variable. Sam had relative difficulty retaining the steps in the self-monitoring procedure without being prompted. Prompted responses remain high until around Trial 19 when there was a decrease to one prompted response. Prompted responding then increased again and returned to four prompted responses at Trial 23. There were only three occasions when Sam followed the self-monitoring procedure independently (indicated when the prompted response line
reached zero). Towards the end of the intervention period Sam began to show an ability to follow the procedure more independently. This is indicated on the graph after Trial 54. The number of prompted responses remained low after this trial and fluctuated between zero and one prompted responses, with one fluctuation to two prompted responses. The prompted response data followed a slight downward trend during the intervention Phase B. Conversely, the unprompted response data showed a slight upward trend.

At follow-up Sam showed an inability to retain the steps of the self-monitoring procedure two weeks after the intervention had been withdrawn. After the sixth trial during follow-up (the second trial shown on the graph in the follow-up phase), the number of prompted responses decreased from four to three. Sam did not perform any more than one step without prompting at follow-up. These results suggest that the constant time delay procedure was not effective in teaching this child to follow the self-monitoring procedure independently.

Accuracy of self-monitoring

The accuracy was recorded each time Sam self-monitored. It was also noted whether he had remained on-task for the 30-second interval and whether he had begun new tasks "quickly". These are expressed as percentages in Table 5.1. A percentage accuracy for the self-recording of the target behaviours and for self-reinforcement was calculated by dividing accuracy by accuracy plus inaccuracy and multiplying by 100.

Table 5.1 shows the accuracy of self-monitoring for each session over the intervention phase. Sam showed a relatively high percentage accuracy of self-recording Target Behaviours 1 and 2. He recorded both his off-task behaviour and latency time with an overall accuracy of 95.8%. The percentages for accuracy of self-monitoring correspond
Table 5.1: Accuracy of self-monitoring.

<table>
<thead>
<tr>
<th>Session</th>
<th>% time on-task</th>
<th>% time changed tasks quickly</th>
<th>% accuracy of self-recording (off-task)</th>
<th>% accuracy of self-recording (latency time)</th>
<th>% accuracy of self-reinforcement</th>
<th>Total % accuracy</th>
</tr>
</thead>
<tbody>
<tr>
<td>2</td>
<td>95.8</td>
<td>95.8</td>
<td>95.8</td>
<td>95.8</td>
<td>95.8</td>
<td>94.4</td>
</tr>
<tr>
<td>3</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>4</td>
<td>91.7</td>
<td>91.7</td>
<td>91.7</td>
<td>91.7</td>
<td>91.7</td>
<td>94.4</td>
</tr>
<tr>
<td>Total %</td>
<td>95.8</td>
<td>95.8</td>
<td>95.8</td>
<td>95.8</td>
<td>95.8</td>
<td></td>
</tr>
</tbody>
</table>

to the percentages of time on-task and times he worked “quickly”. That is, the child consistently placed a mark in the “working” and “quickly” boxes even when he should not have because he had not been working or had not changed tasks quickly. Similarly, he placed a sticker on his card when he should not have self-reinforced at these times. It was as though he had simply learned which box to “tick” and did not understand that a tick had to be placed in the box corresponding to the behaviour displayed.

At follow-up Sam showed a 75% accuracy for all elements of self-monitoring. This corresponded to his behaviour being appropriate for 75% of the time during follow-up. He remained on-task and changed tasks relatively quickly during each self-monitoring interval
at follow-up, except during two intervals out of the eight. He consistently placed marks in the “working” and “quickly” boxes once more, even though he did not display these behaviours. Similarly, he again self-reinforced on these occasions when he should not have.

The intervention was effective in reducing the inappropriate classroom behaviours that were the target of this study. Off-task behaviour showed the most substantial decreases, occasionally reaching zero levels. There was a high degree of variability in data. The number of prompts required to get the child to begin working on tasks one to five decreased during the period of intervention. This reflected a decrease in the latency time to commence a task exhibited by the child.

Off-task behaviour did not return to the baseline level after the removal of the intervention, although the behaviour changes produced during the period of intervention were not maintained. Off-task behaviour remained high during the baseline follow-up phase. There was a rapid decrease in behaviour when the intervention was reintroduced during the intervention follow-up. This indicated that the treatment was effective in controlling off-task behaviour.

The number of prompts required to get the child to begin tasks returned to near baseline levels in the return-to-baseline phase. At baseline follow-up the number of prompts had increased further, with the exception of physical prompts. These results reflect an increase in latency time during the return-to-baseline phase and a further increase in the baseline follow-up phase. The results also suggest that the child needed less intrusive prompting during the baseline follow-up phase, as the level of physical prompting had decreased from the return-to-baseline phase and was lower than at the baseline Phase.
A. The rapid decrease in the level of prompting during the intervention follow-up phase indicated that the treatment was effective when it was reintroduced two weeks later.

The results of the responses at each step in the self-monitoring procedure indicated that the child had difficulty independently following the procedure. He relied very much on the researcher prompting him and was still unable to follow the procedure independently at the end of the intervention period. Similarly, when the intervention was reintroduced he had to be prompted at every step for many trials before he began performing any step independently. He did not perform any more than one step independently at the intervention follow-up. The constant time delay procedure was not very effective in teaching the child to follow the steps of the self-monitoring procedure independently. Even so, the intervention did decrease the inappropriate target behaviours. This is the important outcome as this was the focus of this study.
CHAPTER 6

STUDY III

Introduction

The present chapter contains the details of the participant, the intervention, and the results of the intervention in Study 3. First, a description of the child involved in this study and the autistic features demonstrated by the child are presented in the Introduction section. This section is completed by a reiteration of the research questions that are relevant to Study 3. The next section in the chapter states the two target behaviours and provides behavioural definitions for each. Following is the Method section in which an in depth discussion of the materials, setting, and procedures employed in Study 3 is provided. The chapter concludes with the Results section in which all of the findings of Study 3 are contained.

Tim was the third child involved in this research project. He was nine years and one month of age and was verbal. He is one of four children. Tim attended a Special Education Centre at a primary school in the northern suburbs. He was in a senior class of ten children. He had regular visits from an occupational therapist and speech pathologist. He also received assistance from a psychologist.

The psychological assessments available were conducted in 1995 when he was five years and seven months of age. At that time his behaviour was assessed using the Vineland Adaptive Behaviour Scale (revised edition). The standard score for his communication skills was 56 (age equivalent two years three months), for daily living skills was 61 (age equivalent two years 11 months), for socialization was 77 (age equivalent three years two months), and for motor skills was 65 (three years one month). The overall standard score
on this scale was 60. It showed his adaptive behaviour to be at an age equivalent of three years and one month.

A psychologist assessed his intellectual functioning in 1995 with a Stanford Binet Intelligence Scale. Tim obtained an IQ score of 64 for verbal reasoning. His abstract/visual reasoning score was a slightly lower IQ of 61. He obtained a standard score of 88 for quantitative reasoning and 70 for short-term memory. The standard test composite score was 65. He was described as having a mild intellectual disability. It was also noted that his behavioural and emotional development was age equivalent to two years and six months.

At five years of age Tim was reported to be using four or more word sentences. At the time of assessment (at age five years and seven months) he was assessed using the Word Finding Vocabulary Scale. His age equivalence was reported to be 3.5 – 4.0 years. He now uses longer sentences in speech, containing approximately six to eight words. He has good comprehension skills although he does display frequent non-compliance. Of the three children involved in this research project, Tim demonstrated the highest communication and comprehension skills.

Tim displayed several of the characteristic autistic behaviours. His behaviour was compared with the DSM-IV diagnostic criteria for the autistic disorder. This analysis suggested an autistic classification (Rappaport & Ismond, 1996). Tim displayed deficits in social interaction. He avoided close proximity to others, often avoided eye-to-eye contact, and showed an absence of facial expression and gestures during social interactions. He has failed to develop appropriate relationships with his peers. This was evident in his solitary “play” and in his ignoring children who tried to initiate interactions with him.
The child demonstrated deficits in communication skills which is consistent with the diagnostic criteria for autism (Rappaport & Ismond, 1996). He used repetitive and stereotyped language and exhibited echolalia. This was observed by the researcher when he repeated phrases repetitively that were out of context. For example, during a training session he repeated “We wear shorts” on many occasions. His language was idiosyncratic, often lacking intonation. Much of the time he would repeat noises like, “Doh, doh, doh, doh....” when sitting at his desk.

The participant demonstrated stereotypic patterns of interest, again consistent with the diagnostic criteria for autism (Rappaport & Ismond, 1996). For example, each Monday as the other children in the class sat in a circle and told their news, Tim would sit in the corner with a large clock with moveable hands. He would inspect the clock very closely, move the hands and then proceed to inspect it closely again. He would remain occupied with this activity for the entire half-hour news session.

Stereotypic and repetitive motor movements were observed by the researcher and have been discussed by other researchers (Koegel & Kern Koegel, 1996). Tim would stretch his hand flat, stiffen it and make “angles in the air” with his hands. When he produced repetitive noises or singing sounds he would rock his head back and forth or around and around.

Tim sat at a desk that was isolated from the other children. The researcher was informed that this arrangement existed because of his intolerance to close proximity and because he was easily distracted. He was also highly distractible to the other children in the class. Tim exhibited very high levels of off-task behaviour. He showed very low motivation to work independently.
The child frequently called out to the teacher for help. When the teacher moved to his desk he began questioning excessively. The teacher reported that he questioned excessively to avoid having to work. This was observed by the researcher when the teacher persisted to answer his questions by saying “What do you think?” Tim would then answer each of his questions correctly. Examples of questions he asked are “Is this a dog?”, “Shall I start now?”, “Shall I use a pencil?” and “What does this say?”

If the teacher moved away from his desk or ignored his verbal interjections, the participant often became highly distressed. During these times he would bang on his desk, or kick the leg of the table repeatedly. He made loud noises or shouted “I hate this page!”, “I’m not doing this!” or “I can’t do it!” He was also observed to throw his pencil across the room in a temper and reportedly threw objects at the other children frequently. He would sometimes leave his seat.

His teacher was concerned about his inability to work independently in class. Not only did his off-task behaviour interfere with his own performance but also with that of the other children in the class. The latter was true for two reasons. First, the teacher had to spend a disproportionate time with Tim compared with the other children in the class. Secondly, his loud outbursts, throwing of objects, banging and kicking were highly distractible to the other children in the class. Therefore, this study aimed to decrease the classroom behaviours that interfered with his ability to work independently.

The intervention Phase B was identical to the intervention phases in the previous two studies. The intervention incorporated self-management skills through self-modelling and self-monitoring. The ultimate aim was to decrease inappropriate behaviour. Teaching self-management skills was consistent with increasing independence. The self-monitoring procedure contained four steps. In Phase B the child received prompting on three-second
delay intervals and the timer was set for 30 seconds each time the child was required to self-monitor.

The present study was then extended by one week. The intervention Phase C took place in Week 2. During Phase C the constant delay intervals were extended to 10-second intervals and the timer was set for one minute instead of thirty seconds. The purpose of Phase C was to assess whether greater control over the self-monitoring procedure could be transferred to the child.

The longer 10-second delay intervals allowed the child more time to produce unprompted responses, thus reducing the dependence on the researcher. Ten seconds was chosen as the delay interval after averaging the time taken by the child to respond without being prompted during training. The longer interval on the timer, allowed the researcher to assess whether the child would be able to self-monitor for a longer interval than thirty seconds. It also allowed the researcher to assess whether this would produce further decreases in the level of off-task behaviour and changes to the slope of behaviour over the intervention period.

Data were collected on two target behaviours. These were off-task behaviour and inappropriate vocalizations. These data were based on the number of seconds the child was off-task during 30-second intervals and on the number of inappropriate vocalizations produced per session. Data were also collected on the child's ability to follow each step of the self-monitoring procedure. The accuracy of the child's self-recording was also monitored.

The intervention involved exposing the child to self-modelling and teaching a four-step self-monitoring procedure to reduce off-task behaviour and inappropriate vocalizations in the classroom during independent work. Phase C assessed whether greater control over
the self-monitoring procedure could be transferred to the child. It also assessed whether self-monitoring for an interval of longer than 30-seconds would produce further changes to the level and slope of inappropriate behaviour. The research questions were as follows:

1. Can Tim be taught to follow a four-step self-monitoring procedure through the constant time delay procedure?
2. Will the implementation of the self-monitoring procedure be effective in producing a decrease in the level of off-task behaviour? Will it produce a change in the slope of behaviour over the period of intervention?
3. Will the implementation of the self-monitoring procedure be effective in producing a decrease in the level of inappropriate vocalizations? Will it produce a change in the slope of behaviour over the period of intervention?
4. Can greater control over the self-monitoring procedure be transferred to the child by increasing the time delay intervals?
5. Will self-monitoring for longer intervals produce further changes to the level and slope of inappropriate behaviour?

Target Behaviours

Two target behaviours that interfered with Tim's ability to complete an independent work task were chosen for the treatment program. The behaviours were chosen after consultation with the classroom teacher and observation of the child in the classroom during the independent work session. Target Behaviour 1 was off-task behaviour and Target Behaviour 2 was inappropriate vocalizations.

During sessions 1–4, inappropriate vocalizations comprised one category. From Session 5 onwards, inappropriate vocalizations were classified as either Category 1 or Category 2 vocalizations. It had become apparent during Sessions 1–4 that there were two
distinct types of vocalization. Consequently, the two categories were formed. Category 1 vocalizations were calling out behaviours. Category 2 vocalizations were inappropriate/distractible noises.

**Behavioural Definitions**

**Target Behaviour 1: Off-task Behaviour**

Off-task behaviour was defined as in the previous studies. In essence this referred to any behaviour that was incompatible with working on an independent work task. The requirements were as follows:

- The child was required to read and to write during the Language session.
- The child was required to look at his work to maintain concentration.
- During the period of independent work, he was required to refrain from touching any object other than his pencil, rubber and workbook.
- The child was required to refrain from fiddling with any object or body part.

Examples of off-task behaviour are, looking around at other children, fiddling with his pencil, inspecting objects at close proximity, throwing items, and flicking through pages in his workbook.

**Target Behaviour 2: Inappropriate vocalizations**

Category 1 vocalizations consisted of any sentences, phrases or statements spoken in a noticeably loud volume at any time other than when the teacher had nominated Tim to speak. An example of this type of vocalization was excessive questioning. For example, Tim would be given a worksheet and would ask "Excuse me. Is this a cat? (pointing to the picture of the cat). Does it have four legs? Is this dog red? Shall I use a pencil?" and so on. The teacher was observed to say "What do you think?" He would then proceed to
answer all of his questions correctly before beginning questioning again. It was also common for him to call out statements like, “I hate this page. I’m not doing it!”

Category 2 vocalizations were any sounds made by the child that were excessively loud. They were often repetitive and distracting to himself and the class. During the intervals he produced these sounds, he would throw his head back and forth or around and around. Sometimes he would stare straight ahead as he made them. He was, nevertheless, distracting himself from work at these times. Examples are when he would produce loud singing noises or say “Oh, oh, oh, oh, oh….” repetitively. He would also bang on his desk to get the teacher’s attention.

Method

Settings

Each training session took place in a storeroom located near to the child’s classroom. The room was approximately 4.0m x 2.5m. There were no windows in the room and only one door. Shelves ran the length on both walls and contained various books and teaching materials. An appropriately sized chair and desk were placed in the room. These were arranged facing a large television set equipped with a video cassette recorder.

The self-monitoring sessions that followed took place in the classroom setting. When in the classroom, Tim sat at a desk that was isolated from the other children in the class. As this was the regular arrangement, it was retained in this study.

The self-monitoring sessions were conducted during the morning independent work session. The child was required to remain seated at his desk whilst engaging in an independent language task. The other children in the class were required to do the same. Language tasks commonly involved such activities as filling in letters to make words,
writing the names of objects depicted in pictures, and following written instructions to draw pictures.

**Materials**

A videocassette recorder was used in all training sessions. Prior to the commencement of the study, Tim was videotaped during the morning independent work session. Specific segments from the recording were chosen and transferred to a videocassette. The segments showed the child performing appropriate behaviours that were incompatible with the inappropriate target behaviours. That is, the segments showed the child displaying appropriate on-task behaviour and refraining from producing inappropriate vocalizations. Approximately three minutes of recording was transferred to the videotape.

Several sets of materials were used in both the training and self-monitoring sessions. These included a sample of the child’s independent work, a timer that could be set to “beep” after a specific number of seconds (made by Jadco), self-recording sheets for both behaviours (see Appendix 1 for sample sheets), and a writing pencil. In addition, the researcher used two COMPICs that had been enlarged (approximately 15cm x 10cm), placed on card and laminated. These COMPIC cards depicted “working” and “quietly”. They are shown in Appendix 2. Additional materials used in the self-monitoring sessions included a dictaphone, earphones, and data collection sheets (see Appendix 3). The dictaphone contained a tape that, when played, emitted a beep every second for 30-second intervals.

The child was reinforced for appropriate responses during both the training and self-monitoring sessions. Reinforcers for Tim was chosen after consultation with the classroom teacher. Tim was highly motivated by stickers and this was observed by the researcher in the classroom on a separate occasion. As part of the classroom management system, the
children each had a “passport book” in which they received stamps for special achievements. When the child had received a specific number of stamps he was allowed to choose from a set of prizes. Tim was very highly motivated by this system. Therefore, a sticker card that was divided into six squares, stickers, his passport book and stamps were used as reinforcers.

Design

The study employed the use of a single-subject design. It also met the requirements of an A-B-A-C-A withdrawal design to be conducted over nine sessions. Five sessions took place in Week 1 of this study and four sessions took place in Week 2 of this study. A baseline Phase A took place during Session 1 of Week 1 of the study. The child was observed working independently for fifty minutes, under natural conditions in the classroom for this session.

An intervention Phase B followed Phase A. There were three sessions in Phase B. Each session comprised a short 10-15 minute training period in the training room. A constant time delay procedure was used throughout this study to teach the child to follow the four steps of the self-monitoring procedure. During training the child received prompting on zero-second delay intervals to ensure correct responding.

Training was followed by a self-monitoring session in the classroom that lasted approximately 45 minutes. During the Phase B self-monitoring sessions the child received prompting on three-second delay intervals. The timer was set for 30 seconds each time the child was required to self-monitor.

A return-to-baseline Phase A followed Phase B during Session 5. The intervention was withdrawn and the child was observed in the natural setting (i.e. in the classroom whilst no intervention took place).
The intervention Phase C followed Phase A in Week 2. There were three sessions in Phase C. Each session followed the same format as the session in Phase B. During Phase C the child received prompting on constant 10-second delay intervals. The timer was set for one minute each time the child was required to self-monitor.

In the final session of the study there was a second return-to-baseline Phase A. All intervention was withdrawn and the child was observed under natural conditions in the classroom.

Procedure
Written consent was obtained from the Tim’s parents before the commencement of the study.

Baseline Phase A
A baseline was established in order to obtain pre-intervention data. Baseline data were collected during the first session. The child was observed whilst engaged in the language task during the morning independent work session. During this session, the child was required to remain seated at his desk. He was to complete his work independently without disrupting the other children in the class. The children in the class were required to raise their hands if they had a problem, whilst the teacher circulated the class.

Baseline data were also collected in a return-to-baseline Phase A during Session 5, and in a second return-to-baseline Phase A in Session 9. Each baseline phase was conducted in an identical manner, at the same time and in the same context.

Recording during Baseline.
The frequency of off-task behaviour (Target Behaviour 1) was monitored using elements of time-sampling and event-based recording. The frequency of inappropriate vocalizations (Target Behaviour 2) was monitored through event-based recording.
The baseline session lasted for approximately 50 minutes. It was divided into ten 30-second intervals. After each 30-second interval, a five-minute break was scheduled (refer back to Figure 4.1). The five-minute break was programmed to allow a longer period of observation to avoid over- or under-estimation of behaviour during the language session.

Recording of off-task behaviour (Target Behaviour 1) was conducted during each 30-second interval. Inappropriate vocalizations (Target Behaviour 2) were recorded through event-based recording over the entire 50-minute session.

**Scoring of target behaviours.**

The researcher used the data collection sheet shown in Appendix 3 to collect baseline data. The numbers one to 30 on the data collection sheet represent each second of each 30-second interval. There were ten 30-second intervals of data collection during baseline.

Off-task behaviour (Target Behaviour 1) was recorded in each 30-second interval. The researcher used the dictaphone and earphones to aid the collection of this data. The dictaphone contained a tape that emitted a beep every second for ten 30-second intervals. Each beep corresponded to the numbers one to 30 on the data collection sheet. At each beep (i.e., every second) the researcher looked at Tim. If Tim was off-task, a stroke was placed through the number representing that particular second of the interval. If Tim was on-task, that number would be left blank on the data collection sheet. Recording proceeded in this manner for each second of the 30-second interval. Following the 30-second interval was the five-minute break, during which no recording of off-task behaviour took place.

Inappropriate vocalizations (Target Behaviour 2) were recorded through event-based recording over the entire 50-minute session. That is, any occurrence of inappropriate vocalization during the whole session was recorded. The data collection sheet contained a
space at the bottom in which to place a tally. Inappropriate vocalizations were recorded using a tally method.

**Intervention Phase B**

Intervention Phase B took place in Sessions 2 to 4 in Week 1. Each session consisted of a 10-15 minute training session in the training room, followed by a 45-minute self-monitoring session in the classroom. Training involved the child watching a videotape, practising the self-monitoring procedure, and receiving reinforcement.

*Training using the videotape.*

Each morning the child was taken to the training room. The child was seated at a desk facing a television set, coupled with a videocassette recorder. The researcher told Tim the following:

"We are going to watch a video. You will see yourself on the video. You will see yourself working really well. Watch very carefully to see how you look when you are working really well. Do you understand?"

The video was then played. While the video played, the researcher used two COMPIC cards to draw attention to the desirable target behaviours exhibited by Tim on the videotape. For Target Behaviour 1, the COMPIC card "working" depicted on-task behaviour. For Target Behaviour 2, the COMPIC card "quietly" depicted an absence of inappropriate vocalizations.

For example, as the video showed the child displaying on-task behaviour the researcher stood adjacent to the television set and held up the "working" and "quietly" COMPIC cards. The researcher told the child:

"Look! Here's Tim working. What a good boy. We know he is working
because he is sitting at his desk properly. He is very quiet. He is looking at his work and he is writing. Look! Tim is doing his work. He is working quietly. What a good worker. That's how we should work in class”.

The researcher attempted to draw Tim’s attention to the appropriate behaviour and at the same time give him praise for that behaviour. The researcher also conveyed pleasure for appropriate behaviour using vocal tone, gesture and body language as extra reinforcement. For example, she used the “thumbs up” sign frequently.

**Training of Self-Monitoring.**

The child was then asked to remember how he looked when he was “working quietly” as seen on the videotape. The enlarged COMPIC cards used in training were placed on his desk and his attention was drawn to them. Tim was then told that the researcher had a special way to help him remember to work quietly in class. He was presented with the self-monitoring and reinforcement materials and the procedure was explained to him.

The researcher then gave the prompt “Show me working quietly (pointing at the COMPIC cards). Ready, steady, go!” She then pushed the start button on the timer, which had been set for thirty seconds. The child was required to remain on-task without producing inappropriate vocalizations for the thirty seconds.

A constant time delay procedure was used throughout this study to teach the child to follow the four steps of the chained self-monitoring procedure. The steps in the self-monitoring procedure were shown in Table 4.2. During training in Week 1 the child received prompting on zero-second delay intervals (i.e. the stimulus cue and controlling
prompt were presented together). The child received prompting on a most-to-least hierarchy. This ensured correct responding during training.

The beep of the timer was used as the stimulus to cue the child to respond. The controlling prompt consisted of a combined physical and verbal prompt given by the researcher at each step of the self-monitoring procedure during the first training session. During the second and third training sessions the child received the verbal prompt only on zero-second delay intervals. If he failed to respond appropriately within three seconds he was then given the combined verbal and physical prompt. Table 4.3 showed the schedule of prompting. The prompts given at each step in the self-monitoring procedure were shown in Table 4.4.

The self-monitoring procedure was practised three times during each training session. The procedure was more clearly illustrated in Figure 4.2.

Classroom Self-Monitoring.

Following training, the child returned to the classroom for the self-monitoring session. The self-monitoring session was divided into the same intervals as during the baseline session (refer back to Figure 4.1). During Phase B there were only eight 30-second intervals as opposed to ten as in baseline due to time constraints.

The researcher sat at the back of the classroom during the period of observation. She began to collect data on Target Behaviour 1 (off-task behaviour), marking the beginning of the first thirty second interval. Data on this behaviour were collected in the same manner as during baseline. Data on Target Behaviour 2 (inappropriate vocalizations) were collected over the entire self-monitoring session in the same manner as in baseline.

The child self-monitored during the five-minute interval that followed each 30-second interval. At the beginning of the five-minute interval the researcher returned to the
child's desk and reminded him of the self-monitoring procedure. He was encouraged to remember the procedure without being prompted. The researcher gave the prompt, "Show me working quietly (pointing at the COMPIC cards). Ready, steady, go!" and set the timer. The child began working independently until the timer beeped.

As during the training phase, a constant time delay procedure was used. Again it was used to aid the child to follow each step of the self-monitoring procedure. During training the child had received prompting on zero-second delay intervals at each step in the self-monitoring procedure. During the classroom self-monitoring session, these intervals were increased to three-second delay intervals and the child received the verbal prompts only (refer to Table 4.3 for verbal prompts given at each step). This was done to transfer more control of the self-monitoring procedure to the child and, so, increase independence. If the child did not respond within three seconds, he was given the prompt one more time. The constant time delay procedure used in Phase B classroom self-monitoring sessions was more clearly illustrated in Table 4.4.

Five types of responses were recorded. These were prompted correct response, unprompted correct response, prompted incorrect response, unprompted incorrect response and no response. Each time the child self-monitored his responses were recorded at each step in the self-monitoring procedure. If Sam made no response within three seconds after being given a prompt, he was prompted once more. His response was then recorded as one of the five types (see data collection sheet for Self-Monitoring Procedure in Appendix 3). Data were also collected on the accuracy of the child's self-recording (see data collection sheet for Accuracy of child's Self-Recording in Appendix 3).

The self-monitoring procedure was repeated three times in each five-minute interval. There were eight five-minute intervals during Phase B. Therefore, the child self-
monitored a total of 24 times per session and data were collected each time. Figure 4.3 illustrated more clearly the format of sessions in Phase B.

Return-to-baseline Phase A

Following Phase B there was a return-to-baseline Phase A. The format of this session was identical to that of the pre-intervention baseline session. Data on Target Behaviour 1 (off-task behaviour) were collected in the same manner as in the pre-intervention baseline session. Target Behaviour 2 (inappropriate vocalizations) was recorded using the same method but was divided into two categories (see Behavioural Definitions). This phase took place in session 5, Week 1.

Intervention Phase C

Phase C took place in Sessions 6, 7 and 8 in Week 2. As in Phase B, each session consisted of a 10-15 minute training phase followed by a 45-minute self-monitoring phase in the classroom. The purpose of Phase C was to transfer greater control of the self-monitoring procedure to the child to further increase independence. By extending the constant delay intervals to ten seconds the researcher attempted to increase the number of unprompted correct responses, so that the child was showing decreased dependence on the researcher. The timer was also set for a longer interval (one minute). This allowed the researcher to determine whether longer intervals of self-monitoring would produce further changes in the level and slope of behaviour.

Training using videotape and self-monitoring.

A 10-15 minute training session took place each morning in the training room. The videotape procedure used in Phase B training was used in Phase C training. As in Phase B, the child then practised the self-monitoring procedure three times. The timer was set for a
longer interval than in Phase B during Phase C. It was set for one minute as opposed to 30 seconds in Phase B.

A constant time delay procedure was again employed so that the child would follow the steps involved in the self-monitoring procedure. During the first training session in this phase, the researcher determined a delay interval that was appropriate for the child in an attempt to increase the number of unprompted responses. This would transfer more control of the self-monitoring procedure to the child and, as a result, reduce the dependence on researcher input.

The child was allowed up to 15 seconds to respond at each step. The child was then prompted if he had not responded. The time taken by the child to respond at each step was recorded for each practice. If the child had to be prompted the time noted was 15 seconds. This was done in order to assess an appropriate delay interval for self-monitoring in Phase C. The mean number of seconds the child took to respond over this session was calculated. The mean score was then used as the time delay during Phase C self-monitoring sessions.

**Classroom Self-Monitoring.**

Following training the child returned to the classroom and a self-monitoring phase followed. The self-monitoring sessions in Phase C followed the same format as those in Phase B. Two differences existed. First the timer was set for one minute in Phase C. Secondly, the delay interval for the constant time delay procedure was 10 seconds. The same prompts and hierarchy of prompts as in Phase B were used.

Data were collected for the target behaviours in the same manner as in preceding phases. Data were again collected on the accuracy of the child's self-monitoring and his ability to perform the steps of the self-monitoring procedure.
**Return-to-baseline Phase A**

In Session 9, Week 2, a return-to-baseline phase took place. This phase was identical to previous baseline phases.

**Inter-observer Reliability**

A second observer was present for both training and classroom self-monitoring during Session 3 in Week 1 and Session 8 in Week 2. This observer simultaneously scored behaviour with the researcher. Inter-observer reliability scores were calculated for Target Behaviours 1 (off-task) and 2 (inappropriate vocalizations), for accuracy of self-monitoring and for responses at each step in the self-monitoring procedure. Percentage agreement was calculated by dividing agreement by agreement plus disagreement and multiplying by 100.

The percentage agreement for Target Behaviour 1 was 98.3% in Week 1 and 100% for Week 2. For Target Behaviour 2, the percentage agreement for Week 1 was 80% and for Week 2 it was 100%. These scores indicated high reliability for Target Behaviours 1 and 2.

The percentage agreement for accuracy of self-monitoring was 100% in Week 1 and Week 2. For prompting at each step in the self-monitoring procedure, the percentage agreement for Weeks 1 and 2 were also 100%.

**Consistency of Implementation**

The second observer in Sessions 3 and 8 also completed a checklist containing an outline of the treatment procedure (see Appendix 4). This was done to ensure the results presented in this research were related to the treatment procedures outlined in the Method section (Neuman & McCormick, 1995).

The observer completed the first part of the checklist during training. The second part of the checklist was completed during the classroom self-monitoring session. The
observer randomly chose a period in this session to complete the checklist. A percentage of consistency of implementation was calculated by dividing the number of steps followed by the number of steps followed plus the number of steps not followed and multiplying by 100. The observer recorded a 100% consistency of implementation for both weeks.

Results

Tim was the child involved in Study 3. This study was focused on reducing the levels of inappropriate classroom behaviours that interfered with the Tim's ability to work independently. The intervention involved exposing the child to self-modelling and teaching a four-step self-monitoring procedure. Self-monitoring was taught using a constant time delay procedure. The study was extended for one week to assess whether greater control over the self-monitoring procedure could be transferred to the child. It was also assessed, in Week 2, whether self-monitoring for extended intervals would bring about further changes in behaviour.

Target Behaviour 1 has previously been defined as off-task behaviour. Target Behaviour 2 was inappropriate vocalizations. There were two types after Session 4, namely Category 1 and Category 2 vocalizations. Category 1 vocalizations were calling out behaviour and Category 2 vocalizations were inappropriate noises.

Data were collected on the number of seconds the child was off-task in 30-second intervals for Target Behaviour 1. For Target Behaviour 2, the number of inappropriate vocalizations was recorded over each session through event-based recording. In addition, the effectiveness of the constant time delay procedure to teach the four steps in the self-monitoring procedure was monitored by recording prompted and unprompted responses at each step. Data were also collected on the accuracy of the child's self-recording.
Target Behaviour 1: Off-task Behaviour

The number of seconds the child was off-task per 30-second interval is presented in Figure 6.1. There were ten recording intervals in each of the baseline sessions and eight in each of the intervention sessions. There was a total of 78 recording intervals in the present study. Tim was not available for follow-up.

During baseline, Tim displayed high levels of off-task behaviour. The mean level of off-task behaviour per 30-second interval was 25.8 (SD = 7.5). The range of 22 (minimum = 8, maximum = 30) indicates much variability in the data. The third data point in the baseline phase is an outlying score (Blackmore, 1994). If this score was excluded the range in the baseline phase would only be ten. A very steep positive trend in data was also in evidence during the baseline phase. This shows that the rate of behaviour change was very rapid and that the data are moving in an undesirable direction.

There was an very marked decrease in the mean level of off-task behaviour during the intervention Phase B. The mean number of seconds the child was off-task decreased by 24.3 from the baseline to 1.5 (SD = 2.2) during Phase B. There was a very small range of eight (minimum = 0, maximum = 8) which indicated relatively little variability in data. There was an overlap of 1 between the baseline phase and Phase B which indicated the degree to which the level of behaviour had decreased.

There was a considerable change in the slope of behaviour from the baseline phase to Phase B. During the latter phase there was a flat, linear trend in data. This contrasted markedly with the steep upward slope at the baseline phase. The sudden change in the direction and slope of the data adds further credibility to the conclusion that the treatment accounted for the behaviour change (Wolery et al., 1988). The fact that the trend showed no slope further indicates the stability in data during the intervention Phase B.
The intervention was withdrawn during the return-to-baseline Phase A. During this phase there was a considerable increase in the mean level of off-task. The mean for the return-to-baseline Phase A was 14.2 (SD = 11.2). This represented a 12.7 increase in the mean level of off-task behaviour from the intervention Phase B. Off-task behaviour did not return to the mean level observed at baseline during the return-to-baseline Phase A. This showed that the intervention was effective in producing a behaviour change and that the change was maintained to a small degree after the intervention was removed. This indicated that some learning of new behaviour had taken place.

The range of 30 (minimum = 0, maximum = 30) during the return-to-baseline Phase A was very large. The range and standard deviation for this phase indicated considerable variability in data after the treatment was removed. There was a very steep upward trend evident in the data during the return-to-baseline Phase A. This indicated the very rapid rate
of change in behaviour in an upward direction after the intervention was withdrawn. There was a relatively small overlap in data between the intervention Phase B and the return-to-baseline Phase A (overlap = 8).

A substantial decrease in off-task behaviour was observed during the intervention Phase C. During this phase the child was required to self-monitor for one-minute intervals, rather than 30-second intervals as in the intervention Phase B. In addition, the constant time delay intervals increased from three seconds during Phase B to ten seconds during Phase C. The constant time delay procedure was used to teach the four-step self-monitoring procedure.

The mean level of off-task behaviour decreased by 13.5 from the return-to-baseline Phase A to 0.7 (SD = 1.7) in Phase C. These results indicated that during the intervention Phase C, off-task behaviour remained at near zero levels. In comparison, the mean level of off-task behaviour in Phase C was 0.8 seconds lower than the mean level in the intervention Phase B (M = 1.5, SD = 2.2). This indicated that the child performed slightly better during the intervention Phase C than in the intervention Phase B. The range in scores during the intervention Phase C was six (minimum = 0, maximum = 6). This indicated little variability in data. The range of six in Phase C was comparable with a range of eight in the intervention Phase B.

During Phase C a moderate negative slope was evident in the data. When compared with the steep upward slope in the return-to-baseline Phase A, this trend in data suggests that the change in behaviour was due to the intervention variables. The downward slope in behaviour change observed in Phase C was compared with the trend in data during the intervention Phase B. The former indicated a more rapid rate of change in behaviour
during Phase C than was the case during Phase B. There was an overlap of six in data between the intervention Phases B and C.

When the intervention was withdrawn in the final return-to-baseline Phase A, the mean level of off-task behaviour again increased. The mean level of off-task behaviour during the final return-to-baseline Phase A was eight (SD = 5.1). The average level of off-task behaviour during this phase was considerably lower than in the first return-to-baseline Phase A (M = 14.2, SD = 11.2) and in the baseline Phase A (M = 25.8, SD = 7.5). This indicates that the behaviour changes in the intervention Phase C had been reasonably well maintained in the final return-to-baseline Phase A. New behaviour had been learned.

There was a sharp upward trend in off-task behaviour during the final return-to-baseline Phase A. This contrasted with the downward slope in Phase C which added further credibility to the conclusion that the intervention was accountable for the behaviour change. There was a range of 14 (minimum = 0, maximum = 14) in the final baseline phase. This indicated moderate variability in the data. Variability in the data in the final baseline phase was notably less than the variability in the previous baseline phases. This suggests that the intervention in Phase C was effective in bringing the off-task behaviour under more control and that this was maintained after the intervention was withdrawn.

**Target Behaviour 2: Inappropriate vocalizations**

Inappropriate vocalizations were monitored through event-based recording. Data were based on the number of occurrences of this behaviour over an entire session. Until Session 4 inappropriate vocalizations comprised a single category. After Session 4 two categories of inappropriate vocalizations existed. Category 1 vocalizations were calling out behaviour. Category 2 vocalizations were inappropriate/distractible noises.
Figure 6.2 shows a graphical representation of the data on inappropriate vocalizations. During the baseline Phase A level of inappropriate vocalizations produced by Tim was very high. Over the baseline session there were 38 ($SD = 0$) inappropriate vocalizations.

There was a marked decrease in the number of inappropriate vocalizations following the implementation of treatment during Phase B. The number decreased from 38 at baseline to two in the first session of intervention. The occurrence of behaviour remained at low levels across the intervention period. The mean number of inappropriate vocalizations during Phase B was 2.7 ($SD = 1.2$). These results indicate that the intervention was effective in reducing inappropriate vocalizations considerably.

The range during the intervention Phase B was two (minimum = 2, maximum = 4). Both the range and standard deviation indicated low variability in data during the period of intervention. There was evidence of a flat linear trend in data during this phase which indicated the stability in data.

In the return-to-baseline Phase A the inappropriate vocalizations were divided into two categories. Figure 6.2 displays the total number of inappropriate vocalizations to remain consistent with the previous two phases. It also shows the numbers of Category 1 (calling out behaviour) and Category 2 (distractible noises) inappropriate vocalizations for comparison.

During the return-to-baseline Phase A the total number of inappropriate vocalizations increased. The mean level of inappropriate vocalizations increased from 2.7 during Phase B to 19 ($SD = 0$) during the return-to-baseline Phase A. This represented a 16.3 increase from Phase B. The number of Category 1 vocalizations was 15, and the
number of Category 2 vocalizations was four. The total number of inappropriate vocalizations was considerably less in the return-to-baseline Phase A than in the baseline Phase A ($M = 38$).

The intervention in Phase C differed from the intervention in Phase B in two ways. First, a one-minute self-monitoring interval was employed, compared with a 30-second interval in Phase B. Secondly, the constant time delay interval was scheduled at ten seconds instead of three as in Phase B.

The mean level of total inappropriate vocalizations decreased by 17.7 from the return-to-baseline Phase A to 1.3 (SD = 0.6) in Phase C. Category 1 vocalizations decreased to a mean level of 1.3 (SD = 0.6). This represented a 17.7 decrease from the
return-to-baseline Phase A. Category 2 vocalizations decreased to a zero level ($SD = 0$) during Phase C which represented a decrease of four from the return-to-baseline Phase A.

During the intervention Phase C the ranges for total inappropriate vocalizations, Category 1 and Category 2 vocalizations were one, one, and zero respectively. These ranges indicated very little variability in data during the intervention Phase C. There was a very slight upward trend in the data for total vocalizations and Category 1 vocalizations. The trend for Category 2 vocalizations showed a flat linear trend.

When the intervention was withdrawn in the final return-to-baseline Phase A, there was an increase in all levels of inappropriate vocalizations. The total number of inappropriate vocalizations increased to a level of 15. This level was not as high as in the previous two baseline phases. Category 1 vocalizations increased to a level of 13 and Category 2 vocalizations to a level of 2. Neither of these levels were as high as those observed in the previous return-to-baseline Phase A. These results indicate that the treatment was effective in reducing the occurrences of inappropriate vocalizations. They also showed that after the intervention was withdrawn, the behaviour changes were maintained to some extent, although the trend in data suggested the need for continuing the intervention. This indicated that the child had learned some new behaviour.

**Effectiveness of constant time delay procedure to teach the self-monitoring steps**

The self-monitoring procedure consisted of four steps. It was taught through the constant time delay procedure. The participant's response at each step in the self-monitoring procedure was recorded as one of five types. These were prompted correct, prompted incorrect, unprompted correct, unprompted incorrect and no response.
Figure 6.3: Number of steps in the self-monitoring procedure at which the child demonstrated prompted and unprompted correct responses per trial. The level of unprompted responding indicated the degree to which the child had learned to independently follow the self-monitoring procedure. An increase in unprompted correct responding showed the possibility of a decrease in dependence on the researcher.

Figure 6.3 displays the number of steps per trial at which the child demonstrated prompted and unprompted correct responses. Every third trial is displayed. There were four steps in the self-monitoring procedure, meaning there were four opportunities for the child to respond in each trial. Therefore, the child could score a maximum of four for either prompted or unprompted correct responses in each trial. For example, if the child followed two of the steps in the self-monitoring procedure in trial one without being prompted, he would obtain a score of two unprompted correct responses for this trial.
There was a total of 72 trials in which the child was required to follow the self-monitoring procedure during each intervention phase. Therefore, there was a total of 144 trials over the whole study in which the child was required to follow the self-monitoring procedure.

Figure 6.3 indicated the high rate at which Tim was able to learn to follow independently the self-monitoring procedure. At no time did Tim need to be prompted at all steps in the self-monitoring procedure. This is illustrated on the graph by the fact that the level of prompted responses never reaches four. Rather, the child needed to be prompted at three steps in the self-monitoring procedure until Trial 36. Tim consistently pressed the stop button, but then had to be prompted to complete each self-recording sheet and then to self-reinforce during these trials.

After Trial 36, the participant was able to follow all steps without being prompted. Once he remembered to complete the first self-recording sheet without being prompted he seemed to retain the routine of completing the second self-recording sheet and then to self-reinforce. There was a slight fluctuation at Trial 48 when the child had to be prompted at the final step in the procedure. There was a second fluctuation in data at Trial 51, when Tim had to be prompted at every step after he performed the first step in the procedure independently. After this trial, the child followed the self-monitoring procedure independently for the rest of the phase.

During Phase C the child was required to self-monitor for one-minute intervals, rather than 30-second intervals as in Phase B. The constant delay interval was increased to ten seconds to assess whether the child could exert greater control over the self-monitoring procedure. The longer delay interval provided the child with a greater opportunity to respond without being prompted. By definition, the higher the level of unprompted responding, the lower the level of dependence on the researcher.
The results in Phase C indicated a strong effect. The child followed the self-monitoring procedure independently across the phase. Figure 6.3 showed a single exception when the child did not follow all of the steps independently. On this occasion he did not self-reinforce and had to be prompted to do so. Figure 6.3 illustrated the effectiveness of the constant time delay procedure in teaching the steps of the self-monitoring procedure.

**Accuracy of self-monitoring**

The accuracy of self-recording was monitored on each opportunity for Tim to self-record. It was also noted whether he had remained on-task during the 30-second self-monitoring interval and whether he had refrained from producing inappropriate vocalizations. These are expressed as percentages in Table 6.1. A percentage accuracy for self-recording the target behaviours and for self-reinforcement was calculated by dividing accuracy by accuracy plus inaccuracy and multiplying by 100.

Table 6.1 shows the accuracy of self-monitoring for each session of the intervention phase. Tim showed a high percentage of accuracy in self-monitoring. Tim was inaccurate in self-monitoring on the occasions that he had displayed off-task behaviour or inappropriate vocalizations. On these occasions he consistently ticked the “working” and “quietly” boxes when he should not have done. It was a though he had simply learned which boxes to “tick” and did not relate them to the behaviour he was displaying.

The intervention was very successful in reducing the target behaviours that were the focus of this study. Off-task behaviour showed substantial decreases which were maintained to a moderate degree in the final return-to-baseline phase. The reductions in off-task behaviour were very rapid which indicated that the intervention was effective in producing changes in behaviour in relatively short periods of time. Similarly, the
Table 6.1: Accuracy of self-monitoring.

<table>
<thead>
<tr>
<th>Session</th>
<th>% time on-task</th>
<th>% time refraining from vocalizing</th>
<th>% accuracy of self-recording (off-task)</th>
<th>% accuracy of self-recording (vocalizations)</th>
<th>% accuracy of self-reinforcement</th>
<th>Total % accuracy</th>
</tr>
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<td>95.8</td>
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<td>95.8</td>
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</tr>
<tr>
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<td>99.3</td>
<td>96.5</td>
<td>99.3</td>
<td>96.5</td>
<td>96.5</td>
</tr>
</tbody>
</table>
reductions in inappropriate vocalizations occurred rapidly, although they were not as pronounced as the reductions in off-task behaviour. The levels of inappropriate vocalizations did not reach baseline levels after the removal of the intervention. These results indicated that the child had learned more appropriate behaviours.

The second week of intervention produced even further reductions in both target behaviours. Both behaviours remained at near zero levels during the period of intervention. Neither behaviours returned to the levels observed during the previous baseline phases. These results suggest that the longer self-monitoring intervals produced substantial decreases in the target behaviours.

Overall, the results indicated that the constant time delay procedure was very effective in teaching the child to follow the four steps of the self-monitoring procedure. During the second week of intervention, greater control of the self-monitoring procedure by the child was indicated. This was reflected in the consistent unprompted correct responding of the child at each step of the procedure during this phase. The longer delay interval allowed the child a greater opportunity to respond independently, the result being a decrease in dependence on the researcher.
CHAPTER 7

DISCUSSION

A discussion of the results of Studies 1, 2, and 3 is presented in this chapter. First, the overall findings of the studies are analysed in relation to the research questions posed in the introduction sections of Chapters 4, 5 and 6. Following this discussion, additional findings are examined. Next, possible explanations for these findings are considered in relation to conclusions derived from the literature. Finally, the implications for future research and for teaching are noted.

The present research project employed a self-management treatment package that consisted of self-modelling, self-monitoring and self-reinforcement components. The researcher monitored whether three children with autism could be taught a four-step self-monitoring procedure through a constant time delay procedure. She also assessed the effects of the package on changes to the levels and slopes of the data concerning the target behaviours. The purpose of the extended study (Study 3) was twofold. First, the researcher investigated whether greater control over the self-monitoring procedure could be transferred to the child. Secondly, it was determined whether self-monitoring for longer intervals produced further changes to the level and slope of behaviour. The accuracy of self-recording was monitored during the intervention conditions.

Overall, the results provide strong support for the effectiveness of the self-management package in reducing the inappropriate classroom behaviour of three children with autism. There was a large magnitude of desirable behaviour change for each of the children and this change occurred very rapidly during the period of intervention. The effectiveness of the treatment package is consistent with other studies employing similar
components of self-management with autistic children (e.g., Sainato, Strain, Lefebvre, & Rapp, 1990; Strain, Kohler, Storey, & Danko, 1994).

The first target behavior for each of the participants in the present study was designated as off-task behavior. During the baseline, off-task behavior remained at very high levels for all of the participants. With the implementation of the self-management package the levels of off-task behavior decreased dramatically for each of the children. Very similar patterns of data concerning off-task behavior were in evidence for Child 1 (Aaron) and Child 3 (Tim) during the intervention condition (B). Off-task behavior remained at near zero levels for these children during period of intervention. The data collected on the off-task behavior of Child 2 (Sam) were highly variable. However, a marked decrease in the mean level of off-task behavior was still observed for Sam. The results indicated that the intervention produced a change in both the level and slope in data for off-task behavior with each of the participants. Other researchers have found similar effects on off-task behavior with the implementation of self-management packages with children with developmental delays (e.g., Rooney, Hallahan, and Wills Lloyd, 1984; Sharpio, McGonigle, & Ollendick, 1980).

After the intervention was withdrawn, the mean levels of off-task behavior increased substantially for each of the participants. However, these levels did not return to the mean levels of off-task behavior observed at baseline. After the withdrawal of the intervention the mean level of off-task behavior for Aaron was 11 seconds below the mean level observed at baseline. In the withdrawal condition, the mean levels for Sam and Tim were 6.6 seconds and 11.6 seconds, respectively, below the mean levels observed during the baseline for these children. These findings indicate that the behavior changes in evidence during the intervention condition were maintained to a moderate degree after the
removal of the intervention. The maintenance levels of off-task behaviour for Tim and Aaron were at almost half the levels observed during the initial baseline. Sam showed the lowest maintenance levels during this condition, although short-term maintenance of reductions in off-task behaviour was in evidence.

Follow-up data were collected on off-task behaviour for Aaron and Sam. The data indicated that the off-task behaviour for Aaron remained at levels similar to the levels observed in the withdrawal condition. This demonstrated that the off-task behaviour reductions were maintained at return-to-baseline levels during the follow-up condition two weeks later. The data regarding off-task behaviour for Sam indicated that the behaviour had regressed to levels similar to those observed during the initial baseline during the follow-up condition. The maintenance gains that were evident in the withdrawal condition were not observed two weeks later.

The second target behaviour in the present research project was particular to each child and was based on individual needs. The target behaviour for Aaron was hand-flapping. The data indicated that during baseline the level of hand-flapping was very high. With the introduction of the intervention, the mean level of occurrences of hand-flapping decreased considerably. The data demonstrated that the intervention brought about a change in both the level and slope of data concerning stereotypic behaviour. Other researchers have used similar elements of self-management to those employed in the present study to successfully reduce stereotypic behaviour in children with autism (e.g., Koegel & Kern Koegel, 1990). When the intervention was removed, the level of occurrences of hand-flapping increased to much the same levels as at baseline. Follow-up data revealed similar patterns. The results indicated that the behaviour was not maintained after the removal of the intervention. These findings are consistent with those of Koegel.
and Kern Koegel (1990) who reported that stereotypic behaviour increased after the self-management procedure was withdrawn.

As in the present study, Stahmer and Schreibman (1992) employed a self-management package with children with autism. They found concurrent decreases in stereotypic behaviour as the intervention produced increases in appropriate play. The researchers concluded that the stereotypic behaviour was incompatible with appropriate play and that this accounted for the reductions. This explanation could be applied to the finding that stereotypic behaviour decreased for Aaron in the present study. Hand-flapping is incompatible with on-task behaviour whilst engaged in a work task. Perhaps it was the increase in levels of on-task behaviour, produced by the self-management procedure, which brought about concurrent decreases in stereotypic behaviour. It could be that the behaviours required to remain on-task replaced the hand-flapping and provided the child with a choice of more appropriate behaviour.

Alternatively, it is possible that the self-monitoring procedure provided replacement behaviours for hand-flapping. Aaron would ordinarily create pauses in work time by engaging in stereotypic behaviour. The need to self-record and self-reinforce created such interruptions in work time but provided the student with more appropriate behaviour in which to engage. This is consistent with the suggestion by Witt, Elliott, and Gresham (1988) that self-recording provides alternative behaviour that is incompatible with inappropriate behaviour.

It is also possible to apply the concept of shaping through successive approximation to the reductions in hand-flapping (Cipani & Spooner, 1994). Stereotypic behaviour is typically resistant to external manipulation (Woltersdorf, 1992). Therefore, it would be placing very high expectations on the student to expect him to spontaneously cease hand-
flapping with the introduction of a schedule of contingent reinforcement. The self-
monitoring procedure only required the child to refrain from hand-flapping for thirty
second intervals after which reinforcement was available. In this way, the child was
reinforced for successive approximations towards the ultimate goal, which was an
elimination of stereotypic behaviour during independent work time. Koegel, Rincover, and
Egel (1982) stress that shaping behaviour through successive approximations is often
essential when working with children with autism.

Another explanation for the pattern of hand-flapping data could be that the
differential reinforcement of other behaviour (DRO) facilitated the decreases in stereotypic
behaviour (Koegel, Rincover, & Egel, 1982). Aaron was reinforced with a sticker when he
remained on-task and refrained from hand-flapping for a thirty second interval that was
measured by the timer. In essence, Aaron was reinforced for any other behaviour that was
incompatible with hand-flapping and off-task behaviour. As a result of reinforcement,
these other behaviours may have increased and provided alternatives for the stereotypic
hand-flapping, causing it to decrease. Koegel, Rincover, and Egel (1982) highlight DRO as
a treatment for stereotypic behaviour. When the DRO schedule was withdrawn in the
present study, these other behaviours were no longer reinforced. This may have influenced
a decrease in the occurrence of the more appropriate replacement behaviours, causing an
increase in hand-flapping after the removal of the intervention.

The second target behaviour for Sam was latency time to commence a task. The
data indicated that the mean level of latency time was initially very high during the baseline
condition. The intervention produced considerable changes in both the level and trend of
data concerning latency time to commence a task. Less than one third of the verbal
prompts at baseline were necessary to decrease the latency time during the intervention.
condition. Following the removal of the intervention the number of prompts given increased substantially, indicating an increase in latency time to commence a task. However, these levels did not reach the levels observed during the baseline. Therefore, a small degree of maintenance was in evidence. The follow-up data indicated that the levels of prompting had regressed further, almost reaching levels observed in the initial baseline. These data demonstrated that the small maintenance gains evident in the withdrawal condition were not durable.

Inappropriate vocalizations comprised the second target behaviour for Tim. He demonstrated very high levels of inappropriate vocalizations during the baseline condition. The intervention produced a change in both the level and slope of data. Large decreases in inappropriate vocalizations were in evidence during the intervention condition. When the intervention was removed the level of inappropriate vocalizations increased, although this level was considerably lower than the level observed during the baseline condition. This finding signifies that the behaviour was maintained to a moderate degree. These findings are consistent with the results of other studies employing similar elements of self-management to those used in the present study to reduce inappropriate vocalizations (e.g., Broden, Hall, & Mitts, 1971; Sainato, Strain, Lefebvre, & Rapp, 1990).

Many researchers have highlighted the fact that durable behaviour changes are often found after the implementation of self-management techniques (e.g., Dowrick & Dove, 1980; Dowrick & Hood, 1981; Sainato, Strain, Lefebvre, & Rapp, 1990). In the present study, the maintenance of most target behaviours was observed. The children had achieved great magnitudes of reduction in inappropriate behaviour over a very short period of intervention. Generally, these reductions in inappropriate behaviour were maintained to a moderate degree after the intervention was withdrawn, although the levels of inappropriate
behaviour tended to increase during the follow-up condition two weeks later. The reductions in inappropriate behaviour in the current study were not maintained to the same degree as reported in some of the studies (e.g., Dowrick & Dove, 1980; Sainato, Strain, Lefebvre, & Rapp, 1990). However, in the research reported here, the children were not exposed to the intervention conditions for the extensive periods detailed in many of these studies. For example, in the Dowrick and Dove (1980) study, Child 1 viewed the self-modelling video 18 times, Child 2 viewed the video 15 times, and Child 3 viewed the video 14 times. The intervention took place over a period of more than nine weeks. Similarly, the Sainato, Strain, Lefebvre, and Rapp (1990) study took place over 77 sessions.

In Studies 1 and 2 the children viewed their self-modelling videos only three times. Studies 1 and 2 took place over one week and included five sessions. The children were exposed to three intervention sessions and the other two comprised the baseline and return-to-baseline sessions. In Study 3, the participant viewed his self-modelling video six times and the study was conducted over a two-week period consisting of nine sessions. Of these nine sessions, six involved the intervention condition, whilst the other three sessions involved baseline conditions. Therefore, the children in the present study were exposed to the intervention for a considerably shorter period of time than the participants in the studies cited (e.g., Dowrick & Dove, 1980). This may have accounted for the lower degree of maintenance observed in the present study.

Tim's program was extended by one week. The self-monitoring intervals increased from thirty seconds in the first week to one-minute intervals in the second week. Slightly superior reductions in both off-task behaviour and inappropriate vocalizations were apparent in the data during the second week of intervention. This may indicate that exposure to the intervention over a longer period of time (i.e., two weeks compared with
one week) effects further reductions in the levels of inappropriate behaviour. Alternatively, this finding may suggest that self-monitoring for longer intervals of time (i.e., one-minute intervals compared with 30-second intervals) promoted the further reductions in off-task behaviour and inappropriate vocalizations. Further research is needed to investigate these hypotheses.

During the final return-to-baseline condition for Tim, maintenance of both on-task behaviour and inappropriate vocalizations were evident to some extent, although the upward trends in data indicated a need to continue the intervention. Broden, Hall, and Mitts (1971) reported similar reductions in inappropriate vocalizations to those in the present study after a self-recording treatment. These researchers also found that when the intervention was removed the level of inappropriate vocalizations increased to above the baseline level.

The concrete dimensions of the self-management package probably contributed to the behaviour changes. Many researchers have suggested the need for concrete or visual mediation when teaching children with autism (e.g., Powell & Jordan, 1992). The videotaped self-modelling and the COMPIC cards on the children's desks may have served as visual referents and reminders of the behaviour that was expected of them (Sainato, Strain, Lefebvre, & Rapp, 1990). Such referents may have prompted the decrease in levels of inappropriate behaviour observed during the intervention. These prompts were no longer available after the removal of the intervention which may have influenced the increases in inappropriate behaviour that were observed.

Similarly, the COMPICs depicting each of the target behaviours appeared on each of the self-recording sheets. The children were required to decide which COMPIC appropriately described their behaviour during the preceding 30-second interval and to
place a mark in the appropriate box. Therefore, the act of self-recording may have also served to constantly remind the participant of the behavioural expectations and of the researcher's desire for the child to perform these behaviours (Anderson-Inman, Paine, & Deutchman, 1984). This is consistent with the view of Webber, Scheuermann, McCall, and Coleman (1993), who cite Rachlin (1974) as suggesting that the act of self-monitoring simply acts as the discriminative stimulus to cue the child to perform the target behaviour. Once the self-monitoring procedure was removed, this cue was no longer present. This may also have influenced the increases in inappropriate behaviour for each of the children after the removal of the intervention.

All of the children in the present research project typically displayed high levels of accuracy in self-recording. Many researchers have reported that the accuracy of self-recording is not an important variable in behaviour change or in the magnitude of behaviour change (e.g., Sharpio, Browder, & D'Huyvetters, 1984; O'Brien, Riner, & Budd, 1983; Webber, Scheuermann, McCall, & Coleman, 1993). The present study could not lend support to this claim because the children were typically accurate in self-recording. The children in the present study displayed very high levels of accuracy even though the researcher did not specifically aim to promote accurate self-recording. Many researchers have outlined extensive matching procedures and reinforcement schedules which are systematically faded to increase the accuracy of self-recording (e.g., Kern Koegel, Koegel, Hurley, & Frea, 1992; Connell, Carta, & Baer, 1993). In the present study, the children were simply trained how to record appropriate and inappropriate behaviour, but no contingencies for accurate self-monitoring were in place. Other researchers have not addressed the accuracy of self-monitoring and discovered similar levels of accuracy of self-recording as in the present study (e.g., Koegel & Kern Koegel, 1990; Stahmer &
These findings suggest that extensive training and reinforcement schedules may not be necessary to achieve acceptable levels of accuracy of self-monitoring. Future research should investigate levels of accuracy attained by children without extensive training in accurate self-monitoring. Research should also more closely examine the relationship between the accuracy and reactivity of self-monitoring.

The participants in the current studies were inaccurate in self-recording only when the inappropriate target behaviours had been exhibited. The children consistently placed marks in the boxes for the appropriate behaviour, even when they displayed inappropriate behaviour. Koegel and Kern Koegel (1990) found similar results with four children with autism who did not accurately record occurrences of stereotypic behaviour. These researchers suggested that a possible explanation could be that stereotypic behaviour interferes with the student's ability to evaluate his own behaviour. This may have explained Aaron's inaccuracies in self-recording after the occurrence of stereotypic behaviour.

In the present study, the participants were reinforced for appropriate behaviour and not accurate self-monitoring. Koegel and Kern Koegel (1990) proposed that a similar DRO schedule in their study may have contributed to the increases in appropriate behaviour, but may not have effected the accuracy of self-recording. Koegel and Kern Koegel (1990) suggest that it may be the recording of an absence of the inappropriate behaviour that is responsible for the behaviour change. This seems a logical suggestion, as consistently marking the box for appropriate behaviour may continually remind the child to perform that behaviour, irrespective of whether it was appropriate to place a mark in that box.

The consistency of responses to the self-monitoring procedure was monitored by recording one of five possible responses. Aaron and Tim learned to follow the four-step
self-monitoring procedure independently at a rapid rate. On no occasion throughout the intervention did Tim have to be prompted at all four steps of the self-monitoring procedure. Aaron had to be prompted at all four steps in the procedure for only nine trials after which he began make independent responses. These findings may be attributed to the exceptional rote memory sometimes exhibited by children with autism (Cesaroni & Garber, 1991) which facilitated Tim and Aaron's ability to retain the behaviour required for each step of the self-monitoring procedure. The strict adherence to routines that is commonly demonstrated by children with autism (Rappaport & Ismond, 1996) may also have facilitated the rapid learning of the self-monitoring procedure. The findings indicating that these children learned the self-monitoring procedure and could follow it independently in a short time also demonstrates the effectiveness of the CTD procedure in teaching self-monitoring. Other researchers have successfully used the CTD procedure to teach chained tasks to individuals with developmental delays (e.g., Schuster, Gast, Wolery, & Guiltinan, 1988).

When the intervention was reimplemented two weeks after its withdrawal, Aaron could consistently follow each step in the self-monitoring procedure without assistance from the researcher. He did not have to be prompted to follow any step in the procedure during the follow-up two weeks later. This supports the notion that Aaron possessed a very good rote memory as he had retained the behaviour necessary to follow each step of the self-monitoring procedure two weeks later.

During the second week the longer time delay intervals provided a greater opportunity for the child to respond independently before being prompted at each step in the self-monitoring procedure. The data indicated that Tim followed all four steps of the self-monitoring procedure without any prompting across the intervention condition (C)
except in one trial. These results demonstrate that Tim was highly independent during this phase and control over the self-monitoring procedure was successfully transferred to the child. It may simply have been that the participant displayed such increases in independence because he had been repeatedly exposed to the self-monitoring procedure in the prior week. Therefore, practice alone may have accounted for the increased ability to independently follow the procedure.

The increase in independence could possibly be attributed to the increase in the delay interval during Week 2. The four-second interval may not always have provided a sufficient amount of time for the child to think about the next step and perform it before the prompt was given. In the second week, the ten-second interval was chosen after monitoring the child and calculating the mean number of seconds he took to respond at each step under natural conditions. Therefore, the ten-second interval may have provided more ample time for Tim to respond before the prompt, resulting in an increase in independence.

The findings in Week 2 highlights an important implication for teachers employing the CTD procedure with children with developmental delays. The most common delay interval suggested in the literature is four seconds (Wolery, Ault, & Doyle, 1992). However, the current study demonstrated that when the average time taken by the child to respond at each step of the self-monitoring procedure was monitored under natural conditions, Tim took much longer than four seconds to respond. When the delay interval was increased he was able to demonstrate greater self-control over the self-monitoring procedure which was consistent with the aim of increasing independence in the present study. This suggests that when using the CTD procedure, teachers may need to monitor a child and calculate a delay interval that is appropriate for the individual, rather than simply accepting four-second delay intervals as the common norm.
Sam demonstrated an inability to follow consistently each step of the self-monitoring procedure without prompting from the researcher. The data on prompted and unprompted correct responses at each step in the self-monitoring procedure indicated high variability. Over the entire intervention Sam only followed every step in the self-monitoring procedure without prompting on three trials. In the remaining trials the child had to be consistently prompted.

Sharpio, McGonigle, and Ollendick (1980) found similar results with a child with intellectual disability, who also needed constant prompting to follow the self-monitoring procedure involved in their study. The researchers suggested that attentional deficits and cognitive level discrepancies may have accounted for their findings. These suggestions could possibly explain the child's inability to independently follow the self-monitoring procedure in the present study. Sam was epileptic and frequently experienced petit mals which would be expected to cause attentional deficits (Brimer, 1990). The petit mals may also have been responsible for Sam having difficulty in retaining the behaviours necessary for each step in the self-monitoring procedure. The high variability in all data concerning Sam's behaviour could also be explained by the occurrence of petit mals.

Sam demonstrated the lowest cognitive functioning of all the children involved in the present research project. He was the only participant described as having a severe intellectual disability of the three children involved. Therefore, cognitive discrepancies may have accounted for the high variability in the data and in Sam's limited ability to follow the self-monitoring procedure independently. Future research could investigate a simpler self-monitoring procedure with children with low intellectual ability. For example, Strain, Kohler, Storey, and Danko (1994) used a simple method of placing foam disks into a container to record occurrences of target behaviour.
Two studies highlighted in the review involving self-management procedures specifically addressed the consistency with which the participants followed the procedure. Rooney, Hallahan, and Wills Lloyd (1984) contended that consistency was an important variable in the behaviour change. Shearer, Kohler, Buchan, and McCullough (1996) reported a contrasting view as they found effects on behaviour even when consistency was low. It is difficult to support either view with the results of the present research project because the child was prompted whenever he did not follow a step independently. Therefore, the children consistently followed the procedure, although not always independently. Future research should more closely investigate the relationship between the consistency with which the participant follows the self-monitoring procedure and the effect on behaviour change and magnitude of behaviour change.

Overall, the present self-management treatment package, consisting of self-modelling, self-monitoring and self-reinforcement, was highly effective in reducing the levels of inappropriate classroom behaviour of three children with autism. The findings of the present research project cannot be generalized to the wider population of autistic children as only three participants were involved in the study. Further investigation, possibly through replication of the present study with other individuals with autism, is necessary before the findings can be generalized.

Theoretical explanations for the reactivity of self-modelling and self-monitoring

A number of theoretical explanations can be applied to the findings of the present studies to explain the effects of the treatment package on the behaviour. Some of these explanations have previously been offered when they have concerned specific findings with specific participants. The following discussion addresses the more general explanations for the overall effectiveness of the treatment package. The present study was a composite
study, which combined elements of self-modelling and self-monitoring. Therefore, the following discussion addresses each of the theoretical models as applied to both self-monitoring and self-modelling as interrelated treatments. The researcher does not attempt to separate the models as those explaining the reactivity of self-modelling and those that explain the reactivity of self-recording.

Dowrick (1983) provides support for the reactivity of self-modelling from three existing lines of research. These are self-image studies, observational learning and feedback studies. There are at least three theoretical models that are proposed to explain the reactivity of self-monitoring (Nelson & Hayes, 1981; Witt, Elliott, & Gresham, 1988). These are the feedback model, the operant conditioning model, and the cognitive-behavioural model (Theoresen & Mahoney, 1974; Nelson & Hayes, 1981; Witt, Elliott, & Gresham, 1988). Therefore, there are five theoretical explanations that could be applied to the findings of the present study. These are outlined in the following discussion.

First, support from self-image studies is discussed. Secondly, observational learning is applied to the findings. Thirdly, the researcher outlines the cognitive-behavioural model in connection to the results of the present study. Fourthly, the feedback model is presented and applied to the findings of the present study. Fifthly, the operant-conditioning model is used to explain the findings of the present study.

Self-image studies involve aspects such as self-awareness and self-efficacy (Dowrick, 1983). Two components of self-awareness appear to be relevant to the current research project. The first concerns an awareness of the self in relation to personal involvement in environmental events. The second involves a self-awareness of the nature and occurrences of particular behaviours.
Jordan and Powell (1995) relate that children with autism often have difficulty in experiencing events as happening to themselves. Jordan and Jones (1999) suggest that these children lack a sense of personal engagement with their experiences and it is “as if events are being recorded rather than experienced in a conscious way” (p. 31). In essence, these children have no spontaneous episodic memory (Jordan & Powell, 1995). Recall of episodes and the recognition of personal involvement in those episodes often have to be specifically cued (Cesaroni & Garber, 1991). For these children to perceive events in any meaningful way it is essential that they develop self-awareness, or the connection between events and their personal involvement in them (Jordan & Powell, 1995).

In the current study, the video may have cued the recall of the specific event (i.e., working on an independent work task) and promoted the recognition of the child’s personal involvement in the event. The researcher may have further facilitated this connection when she provided a verbal description of the event and the child’s involvement in it. For example, when the videotape was played the researcher indicated that the child was viewing himself and that he was “doing his work”. This technique is similar to a treatment suggested by Jordan and Powell (1995). They proposed that photographs of the child with autism involved in specific activities can help to develop an external sense of the self and to cue memories of personal involvement. The authors indicate that the teacher is required to draw the child’s attention to specific features contained in the photographs, such as the child’s facial expressions. The present researcher provided a description of the child’s behaviour as it was viewed on the video tape to draw attention to specific features.

Researchers have found that individuals with developmental disabilities are often unaware of the nature and of the frequency of the behaviours that they display (e.g., DeRoo & Haralson, 1971). Witt, Elliott, and Gresham (1988) relate that self-awareness, or the
ability to recognize that a behaviour is occurring, is essential for the motivation for behaviour change. Motivation to change behaviour has been highlighted by many researchers as an important variable in the reactivity of self-management procedures (Zegiob, Klukas, & Junginger, 1978; O’Leary & Dubey, 1979; Webber, Scheuermann, McCall, & Coleman, 1993).

The videotapes in the present study and the commentary given to the children during viewing made the appropriate behaviour highly explicit. In addition, self-observation and self-recording during the self-monitoring procedure drew the children’s attention to the occurrence of particular appropriate and inappropriate behaviours. This may have promoted self-awareness in respect to the behaviours that were exhibited. Praise was given for the desirable behaviour displayed on the videotape and the children received reinforcement after intervals in which they displayed appropriate behaviour during self-monitoring sessions. These schedules of reinforcement may have increased the likelihood that the children would discriminate between appropriate and inappropriate behaviour. The DRO schedule could also have initiated, and possibly maintained, the motivation to change inappropriate behaviour and to replace it with the more acceptable behaviour that was reinforced.

Observational learning may have contributed to the behaviour changes observed in the present study (Dowrick, 1983). Observational learning involves a model providing an observer with behavioural cues, the observer performing matching responses and being positively reinforced for those responses (Schunk, 1987). Research has shown that autistic children are capable of observational learning and can imitate modelled responses (e.g., Haring, Kennedy, Adams, & Pitts-Conway, 1987). The VSM component of the current treatment package provided such behavioural cues. The child was then specifically
instructed by the researcher to perform matching responses, through the task direction “Show me [target behaviour]” in the self-monitoring sessions. Following a self-monitoring interval in which the child performed these matching responses (i.e., displayed the desirable target behaviours), he was reinforced for the behaviour.

Varni, Lovaas, Koegel, and Everett (1979) indicate that there is commonly an inconsistency in the facets of a stimuli that children with autism actually attend to during observational learning. This relates to stimulus overselectivity which is common in children with autism (Wainwright-Sharp & Bryson, 1993; Koegel & Kern Koegel, 1996). Stimulus overselectivity refers to the responding of these children to highly restricted facets of a stimulus (Koegel & Kern Koegel, 1996). The use of the COMPJC cards in the present study and the description of the behaviour by the researcher as the child viewed the video may have helped to overcome the problem of stimulus overselectivity. The child’s attention was drawn to the relevant cues on the videotape. Dowrick and Dove (1980) suggest, with much supporting evidence, that in VSM procedures more desirable behaviour changes are apparent when additional information about behaviour is given to the child during replay.

The cognitive-behavioural model is based on the assumption that cognitive processes mediate the influence of variables in the external environment and their effects on behaviour (Witt, Elliott, & Gresham, 1988). Children with autism do not successfully monitor their own thinking in the way that their normally developing peers do (Jordan & Powell, 1995). This implies the need to provide a structure for these children which will enable them to engage in metacognition (Jordan & Powell, 1995). Self-monitoring can be implemented to provide such a structure (Witt, Elliott, & Gresham, 1988).
Self-monitoring draws the child's attention to his own behaviour. This facilitates an awareness of the occurrence of particular behaviours (Witt, Elliott, & Gresham, 1988). Many researchers have suggested that an increased awareness of the occurrences of appropriate and inappropriate behaviour lead to covert self-statements of approval or disapproval (Schunk & Hanson, 1989; Dowrick & Dove, 1980; Webber, Scheuermann, McCall, & Coleman, 1993). In the present study, support for this theory was in evidence. Tim (Child 3) made comments on a number of occasions that indicated that the self-monitoring and the self-modeling induced statements of self-approval. Whilst viewing the video, Tim often exclaimed, “I'm a good boy!” During self-recording after intervals of appropriate behaviour, Tim would make similar comments. These incidents indicated to the researcher that viewing himself acting appropriately and recording appropriate behaviour produced self-statements of approval by the child which were possibly reinforcing.

In the cognitive behavioural model covert self-statements are synonymous with cognitive awareness (Witt, Elliott, & Gresham, 1988). It is argued that increased cognitive awareness is proposed to promote to self-regulation. Self-regulation is supposedly controlled by covert cognitive processes which are characterized by the internalization of the self-management procedure. The result is assumed to be covert self-reinforcement or self-punishment which motivates the behaviour change (Witt, Elliott, & Gresham, 1988).

The cognitive-behavioural model can be applied to the present self-management procedure. For example, the self-recording of on-task behaviour increases the cognitive awareness in the child of the occurrence of that behaviour. The child is aware that on-task behaviour is appropriate because this behaviour was praised during the VSM procedure, was reinforced on other occasions, was displayed on the COMPIC card on his desk, and
because he was directly instructed by the researcher to perform the behaviour. The recording of the appropriate behaviour signals to the child that he is “a good boy” and produces self-statements of approval. These statements may be reinforcing for the child as they are a form of praise. Thinking about the behaviour in this way may motivate the child to self-regulate his behaviour (i.e., he may attempt to perform the behaviour in the next interval so that he can praise himself for being a “good boy”). It is important to notice the influence of the motivation of the child to change his behaviour in this example.

The notion underpinning the feedback model is a comparison of one’s own behaviour with a standard (Witt, Gresham, & Elliott, 1988). It is assumed under this model that any deviation from the standard causes self-adjustive responses to meet the standard (Witt, Elliott, & Gresham). This model is consistent with the concept of rule-governed behaviour which has been suggested to influence the reactivity of self-management treatments (Malott, 1984; Dowrick & Hood, 1981; Newman, Buffington, O'Grady, McDonald, Poulson, & Hemmes, 1995). Kern Dunlap, Dunlap, Clarke, Childs, White, and Stewart (1992) suggest that self-monitoring identifies rules about the parameters of acceptable and unacceptable behaviour. These rules are identified as the child is reinforced for some behaviours and not for others. Similarly, it has been suggested that the superior performance of the child on the videotape during VSM implies future goals for behaviour (Dowrick & Hood, 1981). In the research project reported here, the child was praised for the appropriate behaviour as it was viewed on the videotape which may have enhanced the formation of goals for future behaviour.

The feedback model can be applied to the self-management procedure employed in the current study. The VSM component may have initiated the formation of rules about on-task behaviour, for example. The child was praised for the on-task behaviour exhibited by
the self-model on the videotape, indicating that on-task behaviour was appropriate and would be rewarded. In addition, the researcher described the behaviour as the child viewed his video. This may have explicitly indicated to the child the types of behaviour that are consistent with on-task behaviour. For example, while the child viewed the tape the researcher told Tim that she knew he was working, "...because he is looking at his work and he is writing". This type of commentary may have promoted recognition of the parameters of the appropriate behaviour and implied future goals for behaviour. The process of self-monitoring, involving self-observation and self-recording of on-task behaviour, may have provided an opportunity for the child to think about the rule (i.e., I get a sticker if I do my work). In this way, behaviour is governed by rules.

The operant-conditioning model is based on the notion that environmental contingencies control behaviour (Witt, Elliott, & Gresham, 1988). It assumes that when reinforcement is contingent upon the demonstration of a particular behaviour, the reinforced behaviour is strengthened in frequency and magnitude (Evans, 1985). For example, in the present study the participants were reinforced after intervals in which they displayed appropriate behaviours in an attempt to increase the occurrence of these behaviours. The concept of reinforcing behaviour in some way to increase its occurrence permeates each of the explanations discussed previously. Therefore, it seems that the operant-conditioning model is basic to each of the theoretical models that have been proposed to explain the reactivity of self-modelling and self-monitoring. For example, in the cognitive-behavioural model, it is proposed that self-statements of approval are a form of self-reinforcement (Witt, Elliott, & Gresham, 1988). The model is based on the assumption that self-reinforcement of a behaviour increases the probability that it will occur. Therefore, it may be suggested that the operant-conditioning model provides a
possible explanation for the increases in appropriate behaviour that were observed in the currently reported study.

Two fundamental concepts have been highlighted by the previously discussed explanations. One relates to attention. For any event to be meaningfully perceived by the children, their attention to relevant environmental cues and events must occur (Schunk, 1987). It is commonly believed that the degree of observational learning that occurs in any situation is directly influenced by attention (Bandura, 1969; Dowrick & Dove, 1980; Hallenbeck & Kauffman, 1995). Attending closely to one’s own behaviour also increases self-awareness, the importance of which has previously been described (Stahmer & Schreibman, 1992).

Dowrick and Hood (1981) assert that the “self” commands attention in VSM procedures. Research has actually shown that students experience greater levels of autonomic arousal when observing their own behaviour than when observing a peer (Woltersdorf, 1992) and that increased levels of autonomic arousal can effect increases in observational learning (Hallenbeck & Kauffman, 1995). Buggey (1995) alleges that VSM also adds “.elements of attention that would be inherent in viewing oneself on a universally accepted form of media” (p. 435). Moreover, many children are typically immersed in this form of media for most of their lives and, thus, it is one with which they are familiar (Buggey, 1999). Therefore, the effectiveness of the treatment package can be related to the fundamental principle of attention to relevant environmental factors and to one’s own behaviour.

A second fundamental concept underlying the explanations described previously, concerns motivation. Children with autism commonly display very low levels of motivation (Koegel & Mentis, 1985; Jordan & Jones, 1999). These children often
experience repeated failure during classroom tasks and, consequently, their motivation to exert effort and participate in these tasks declines (Koegel & Egel, 1979; Koegel & Kern Koegel, 1996). Often, the outcome of students in this situation is learned helplessness (Koegel, Rincover, & Egel, 1982). When learned helplessness occurs, the student attributes success or failure to external factors and learns that one’s behaviour and environmental consequences are independent (Koegel & Kern Koegel, 1996).

In self-management procedures participants fulfill more active roles in learning and have more responsibility for their own behaviour. The emphasis is on shared control between the participant and the external agent (Koegel & Mentis, 1985). This serves to consolidate the relationship between one’s own behaviour and environmental consequences (Koegel & Kern Koegel, 1996). The strengthening of this relationship can lead the child to recognize that he can exert a degree of control over the consequences in the external environment by choosing to display appropriate behaviour. Therefore, in the present study, the increases in the participants’ appropriate behaviour may have reflected increases in motivation to change their behaviour. The increases in motivation may have been facilitated by the recognition of the children that their behaviour and reinforcement were interdependent.

Another factor that possibly contributed to increased motivation relates to model-observer similarity. Bandura’s (1969) social learning theory implies that the more similar the attributes of the model and the observer, the more observational learning will take place. This is explained by the concept of self-efficacy, which concerns the observers perceived ability to emulate the behaviour of the model that is observed (Schunk & Hanson, 1985). The videotapes used in the VSM component of the present study displayed an idealized view of the children performing only appropriate behaviour (Buggey, 1995).
They may have implicitly suggested to the child that they were capable of performing these behaviours because they viewed personal performance. Therefore, the VSM component may have increased the children's levels of self-efficacy. Self-efficacy is related to motivation and effort (Schunk & Hanson, 1985).

Limitations and future research studies

In the current research project, the researcher attempted to overcome two common limitations that exist in self-management studies. Jackson and Boag (1981) indicated that in many of the studies they reviewed two common limitations were the lack of adequate subject descriptions and the lack of follow-up data or return-to-baseline conditions after the removal of the intervention. The researcher attempted to provide a detailed description of each of the participants which could aid future researchers in replicating the study with a similar sample (Jackson & Boag, 1981). The researcher also included a withdrawal condition after the removal of the intervention and a follow-up phase two weeks later. During the follow-up, the participants' behaviour was first monitored under baseline conditions. The intervention was then reimplemented to assess any behaviour changes and also to monitor the degree to which the children were able to follow the self-monitoring procedure two weeks after the removal of the intervention. Consequently, the researcher attempted to provide a more detailed and holistic insight into the patterns of data that reflected the behaviour changes produced by the intervention.

The project involved composite variables that did not allow the effectiveness of individual components to be assessed. Future research may assess the effects on behaviour of the individual elements of self-management. For example, a replication of the current study may include a withdrawal condition scheduled after the child has viewed the self-modelling videotape and returned to the classroom. Such a withdrawal condition before the
child participates in the self-monitoring procedure would allow the researcher to assess the separate contribution of the self-modelling component.

Future research studies may assess the generalization of behaviour changes using a similar self-management treatment package to the one employed in the study presented here. Research may investigate the generalization to other behaviours and in additional settings. The current study may also be extended to examine the effects of systematically reducing the treatment provider's presence to further increase the independent functioning of the child. Possible methods of fading the presence of the treatment provider may also be explored. For example, Koegel and Kern Koegel (1990) trained self-monitoring independence by having the treatment provider leave the room for increasing intervals of time and conducting validation checks after returning to the treatment room. A replication of the study may also include thinning of the reinforcement schedule to reduce the dependence of the child on external contingencies. For example, the researcher could systematically increase the number of stickers that need to be obtained on the sticker card before the child receives edible reinforcement.

A self-monitoring procedure that contains fewer steps may also be explored for children with lower intellectual ability. For example, Sam displayed an inability to follow each step in the self-monitoring procedure without being prompted. It may have been that his low level of cognitive ability made it difficult for him to retain the behaviours necessary for each step in the procedure (Sharpio, McGonigle, & Ollendick, 1980). For example, a treatment in which self-recording and self-reinforcement are combined may be employed to reduce the number of steps in the procedure. Sharpio, Browder, and D'Huyvetters (1984) taught the children to place pennies on a board to record the occurrence of appropriate behaviour. When the board was full, the child received reinforcement. In the present
study, the child was required to first self-record, and then place a sticker on his card. When his card was full, he was given edible reinforcement. Therefore, two separate steps were involved compared with one step (i.e. placing pennies on a board) in the Sharpio, Browder, and D'Huyvetters (1980) study.

A replication of the study reported here should also monitor teacher and peer behaviour in respect to social praise for the participants (Kern, Wacker, Mace, Falk, Dunlap, & Kromrey, 1995). For example, Broden, Hall, and Mitts (1971) monitored teacher behaviour during their intervention and found an uncharacteristically high rate of positive teacher attention towards the participant during the intervention. They suggested that the increase in frequency of appropriate behaviour provided additional opportunities for the teacher to praise the child which led to greater teacher attention towards the child. In their review of self-management studies, Jackson and Boag (1981) also highlighted the possibility that the participants may have received additional praise from teachers and peers with the increases in appropriate behaviours.

Additional peer attention during the period of intervention was observed in the current project. The other children in the class were interested in the self-monitoring procedure and were told by the classroom teacher that it was being used to help Sam and Aaron “work better in class”. Following this explanation, some of the children approached the participants and told them that “they were working really well today”. Similarly, when some of the children observed the researcher praising the participants, it was not uncommon for them to provide accompanying praise, such as, “Good boy, Sam”. Monitoring peer and teacher behaviour would allow the researcher to assess whether there are any concurrent increases in positive attention towards the participant during the period
of intervention. This would provide some insight into a possible variable affecting the behaviour change.

Future studies may also assess the differential effects of self-monitoring different target variables. For example, Maag, Reid, and DiGangi (1993) found support from their study for the hypothesis that self-monitoring different target variables can have differential effects on the participant's academic productivity, engagement and accuracy. In the current study, academic productivity or accurate completion of the tasks was not monitored. A future replication may address these variables and may investigate the differential effects of self-monitoring each of these variables.

Educational Implications

Some educational implications for teaching have been highlighted in previous sections. The treatment package was highly effective in reducing the inappropriate classroom behaviours that were targeted in a very short period of time. Moreover, these reductions were observed in the relevant context (i.e., in the classroom). Very limited instructional time, concerning the treatment provider, was necessary to produce such changes. For example, the children were trained for only ten to 15 minutes each morning for three days over a week. This indicates that such a treatment is a very time-effective tool (Charlop & Milstein, 1989; Kern Koegel, Koegel, Hurley, & Frea, 1992; Buggey, 1995). The time-efficiency of an intervention is of utmost importance to teachers who often have very restricted schedules in the classroom.

The intervention is also a very cost-effective teaching tool for classroom use (Sugai & Rowe, 1984; Buggey, 1995). The most expensive material that was used in the intervention was the timer. Many schools would already possess such an item. Alternatively, one can be purchased without extensive cost to the teacher or school. The
other materials that were employed were ordinary classroom materials such as COMPICs, stickers, and paper.

The behaviours that were targeted for intervention were those that interfered with the child's ability to work independently in class. The considerable decreases in all of the target behaviours that were observed in the present study indicate that comprehensive achievements towards the final goal of independence were in evidence. The independence of the child has implications for both the teacher and the student. For the teacher, increased independence of the child reduces the behaviour and classroom-management restrictions. This allows a greater time for academic teaching and for formative assessment. For the student with autism, any structure that will promote independent functioning will aid the child in overcoming the passivity problem that is characteristic of autism (Newman, Buffington, O'Grady, McDonald, Poulson, & Hemmes, 1995). In addition, it has been suggested that increased responsibility and participation in learning reduces problem behaviours and avoidance strategies by the child (Harchik, Sherman, & Sheldon, 1992).

In the currently reported study the children were taught to self-administer reinforcement after intervals of appropriate behaviour. The teacher was required to provide edible reinforcement for the child only after the child had obtained all of the stickers necessary to fill a sticker card. The implication for a teacher employing a similar intervention is a reduced responsibility to administer contingencies for behaviour. Two major problems with a reliance on external agents to administer contingencies have previously been noted. First, as a consequence of the restricted time schedules of teachers, a large proportion of a particular behaviour may go unnoticed, resulting in inconsistent contingencies for that behaviour (Rosenbaum & Drabman, 1979). Secondly, the child may begin to associate the external agent with the administration of contingencies (Rosenbaum
Drabman, 1979). This can lead to the external agent becoming the discriminative stimulus to cue the behaviour, making generalization to situations in which that cue is not available very difficult (Rosenbaum & Drabman, 1979). In the immediate study, the child was taught to self-administer his own contingencies based on the occurrence of particular behaviours. This could promote the relationship between the child's behaviour and the external consequences (Koegel & Kern Koegel, 1996). Consequently, learned helplessness in classroom situations may be reduced or avoided (Koegel, Rincover, & Egel, 1982).

A major implication that can be drawn from the present study concerning independence, is that self-monitoring is a pivotal behaviour (Koegel & Kern Koegel, 1996). Koegel and Kern Koegel (1996) highlight that by teaching a child with autism to self-manage behaviour, the student learns a skill that will facilitate other important behaviour gains. For example, in the present study the child learned to use the same self-management procedure (pivotal skill) to reduce off-task behaviour and a second target behaviour that interfered with his ability to work independently. It is imperative that future research studies explore the generalizability of the use of the self-management procedure in other contexts and with other target behaviours. Positive results of these studies would indicate that instead of teaching new functional behaviours for each new task, the self-management procedure can be implemented to allow children to direct their own behaviour and provide a structure in which to make their own decisions (Jordan & Powell, 1995).

The current policy trend toward full inclusion allows the child with disabilities to be integrated into the regular classroom (Fowler, 1984). The treatment package has a major advantage in facilitating the inclusion process. The increased levels of independence would also aid the regular classroom teacher in adapting to the child with disabilities in the classroom. The intervention has a particular advantage for special education students who
participate in partial integration for specified periods throughout the week. The structure of the self-management procedure and the employment of it as a pivotal skill would facilitate the transition from the special education classroom to the regular classroom. Two of the children in the present study were highly independent in following the four-step self-monitoring procedure. For these children the self-monitoring procedure would allow the child to carry a familiar and supportive structure from their typical environment to the unfamiliar environment. For the child who was not independent in following the procedure in the present study, the implication is that he may need greater practise at the procedure before it would provide such a support. Alternatively, it may be that a simpler adaptation of the procedure may be necessary for such a low-functioning child.

The present study indicated that the self-management treatment package was highly effective in reducing the inappropriate classroom behaviours that interfered with the children's ability to work independently. Although the degree of maintenance often reported in studies involving self-management techniques were not as considerable in the present study, some maintenance of behaviour was in evidence. It was suggested that the very limited exposure to the intervention in the present study may have been an accounting variable. Many advantages of self-management procedures have been offered, including shared responsibility for behaviour, reduced learned helplessness, reductions in time restrictions for teachers, and more stable contingencies for particular behaviours.

The conceptual framework presented in Figure 1.1 indicated a learning model that was directed towards the final goal of independence. Most importantly, the results of the present study provide support for the employment of the package to increase the independent functioning of three children with autism. Special education teachers aim to equip students with the functional skills and abilities that they will require to fulfill a
satisfactory and pleasurable standard of living. Independence is typically valued and expected in our culture (O'Leary & Dubey, 1979). It is an essential attribute for individuals to experience some degree of autonomy and choice about factors that affect their lives. The findings of the present studies have highlighted a possible method of facilitating students to attain independence. The results contained within this research project provide an opportunity for the present researcher to join others in recommending the use of self-management procedures with children with autism in the classroom, so that they might achieve independence and experience satisfaction in their lives to its full potential.
REFERENCES


APPENDIX 1:

SAMPLE SELF-MONITORING SHEETS

- Working
- Not working
Flapping

Hands Down
quick

slow
quietly

noisey
APPENDIX 2:

COMPIC CARDS

working

Hands Down
quietly

quick
APPENDIX 3:
DATA COLLECTION SHEETS

Accuracy of self-recording

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<th>Date:</th>
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<tr>
<td>Time:</td>
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Target Behaviours

Study 1

Name: Date:

Time: Intervention Day:

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Hand-flapping: Number of verbal prompts  Number of physical prompts
### Study 2

**Name:**

**Time:**

**Date:**

**Intervention Day:**

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**Latency:** Number of prompts (V, M, or P) to start task

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219
### Study 3

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**Time:**

**Date:**

**Intervention Day:**

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**Number of inappropriate vocalizations:**

**Category 1**

**Category 2**
Self-monitoring procedure

DATE: ________________  PARTICIPANT: ________________

SESSION: ________________

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APPENDIX 4

CONSISTENCY OF IMPLEMENTATION

Observer:  
Date:  
Session:  
Time:  

Outline of procedure

<table>
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<tr>
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<tr>
<td>Training:</td>
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<tr>
<td>1.  Researcher played videotape to child in training.</td>
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<td>2.  Videotape showed the child acting appropriately.</td>
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<td>3.  Researcher held up enlarged COMPCs as the video was played.</td>
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<td>4.  Researcher praised the child for the appropriate behaviour on the videotape.</td>
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<td>5.  Researcher explained self-monitoring procedure to the child.</td>
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<td>6.  Researcher set timer for 30 seconds.</td>
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<td>7.  Researcher gave prompt, “Show me working.......Ready, steady, go”.</td>
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<td>8.  Researcher prompted child immediately at each step of the self-monitoring procedure.</td>
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<td>9.  Researcher ensured the child:</td>
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<td>♦ Pushed the stop button</td>
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<td>♦ Completed self-recording Sheet 1</td>
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<td>♦ Completed self-recording Sheet 2</td>
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<tr>
<td>♦ Self-reinforced by giving himself a sticker on his card.</td>
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Classroom self-monitoring:

1.  Researcher recorded off-task behaviour for 30 seconds.  
2.  Researcher returned to child’s desk and reminded him of the self-monitoring procedure.  
3.  Researcher set the timer for 30 seconds and gave child prompt (as above).  
4.  Researcher allowed three seconds before prompting child to push stop button if the child had not already done this.  
5.  Researcher gave child up to two verbal prompts if needed.  
6.  Researcher allowed three seconds before prompting child to complete self-monitoring Sheet 1 if child had not already done this.  
7.  Researcher allowed three seconds before prompting child to complete self-monitoring Sheet 2 if child had not already done this.  
9.  Researcher allowed three seconds before prompting the child to self-reinforce by putting a sticker on his card if he had not already done this.  
10. Researcher recorded responses at each step in the self-monitoring procedure (i.e. steps 4-9).  
11. Self-monitoring procedure was repeated three times in five minutes.  
12. Researcher then recorded off-task behaviour for thirty seconds again.  
13. Steps 1-12 were repeated eight times.  

Comments:
APPENDIX 5

Figure 4.5: Number of seconds of off-task behaviour per 30-second interval with trend lines and envelopes added.