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Teaching Children With Mild to Moderate Intellectual Disabilities to Select and Produce Facial Expressions of Emotion Using Modelling and Feedback

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Teaching children with mild to moderate intellectual disabilities to

select and produce facial expressions of emotion using modelling

and feedback.

By

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at The Faculty of Education, Edith Cowan University

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Abstract

The ability to produce facial expressions accurately is essential for effective communication of thoughts and feelings. Children need to <u>select</u> the facial expression to produce in a given situation, while considering the social context, and <u>produce</u> it accurately. This is especially important for children with intellectual disabilities who often experience difficulties in verbal communication.

The purpose of this study was to investigate ways of teaching children with mild to moderate intellectual disabilities to select and produce facial expressions appropriate to various situations. The theoretical framework of this study suggests that providing facial modelling and mirror feedback to children will increase the accuracy with which children with intellectual disabilities select and produce facial expressions of emotion. Forty children were presented with six vignettes, and were asked to respond by selecting and producing an appropriate facial expression. A 2 (modelling: present or absent) x 2 (mirror: present or absent) x 3 (facial expression: happiness, disgust and surprise) design was used, in which mirror and modelling were between-subjects variables, and facial expression was a within-subjects variable.

Effects of the modelling, but not the mirror, produced significant increases in children's selection and production of facial expressions. Happiness was found to be the easiest expression to produce. Disgust was found to be more difficult than happiness, while surprise was more difficult than disgust to produce. Both surprise and disgust were improved significantly by the modelling, and it was concluded that modelling is an effective and inexpensive technique for teaching social skills in the classroom.

Declaration

I certify that this thesis does not incorporate without acknowledgment any material previously submitted for a degree or diploma in any institution of higher education; and that to the best of my knowledge and belief it does not contain any material previously published or written by another person except where due reference is made to the text.

Signature

Date 30 · 11 · 97

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Chapter 1

Introduction

Background

The development of good social skills has been recognised as an important part

of education for a long time. Social skills "consist of several behavioural components,

the most important of which are involved in the expression of a person's feelings,

thoughts and desires" (McAlpine, Singh, Kendall, & Ellis, 1992, p.544). The abilities to

perceive social stimuli accurately and react appropriately to the stimuli are essential for

quality social interactions are to occur. Children with well developed social skills can

"successfully interact with peers, teachers and others; accurately recognise and

sensitively respond to emotions expressed by others; or express desires and preferences

in socially desirable ways" (Lerner, 1997, p.543).

Effective communication is an important component of social skills. When

communicating, information is available through a variety of sources, including verbal

and non-verbal communication, and the use of auditory and visual modes of

communication. Each has its own advantages and disadvantages, and each is best used to

convey certain types of messages, but the most effective communication occurs when

different channels are used in combination (Ekman & Friesen, 1975). The face appears

to be the most skilled non-verbal communicator, and messages of emotion in particular

are conveyed with the most precision through the face (Ekman, Friesen, & Ellsworth,

1972). Communication of emotions is an essential social skill, and inability to display

appropriate facial expressions to communicate emotions may limit a child's overall social development and the development of positive interpersonal relationships (Krantz, McClannahan, & Poulson, 1996). For this reason, children not only need to develop general social skills, but specific skills associated with expressing their feelings and thoughts.

Facial expressions form a basic mechanism for communicating emotion in social interactions (Darwin in Stewart & Singh, 1995). It is important to be able to both to interpret the facial messages of others and to produce facial expressions which convey the emotions being felt by the individual. Weaknesses in these skills will lead to errors in communication and incorrect interpretation of messages. Despite the importance of the skills of producing and recognising facial expressions, little is known about how these skills develop, other than the fact that the ability to recognise the facial expressions of others and the ability to produce facial expressions appear to be related skills (Field & Walden, 1982). Because children are rarely taught how to produce facial expressions to convey their emotions, and because the majority of children learn this skill in their early years of development, it can be assumed that these skills are developed without explicit training through natural interactions and in natural settings (Smith, Finn, & Dowdy, 1993).

The development of the skills associated with producing facial expressions of emotion appear to be universal across cultures. Ekman and Oster (1979) reviewed several studies investigating the role of culture in the development of facial expressions, and found that people label the expressions of the primary emotions (happiness, disgust,

fear, surprise, anger, and sadness) in the same way regardless of culture, and also that members of different cultures show the same facial expressions when experiencing the same emotions. The only differences that were present were culture-specific rules dictating when an emotion should and should not be displayed. For example, in Japanese culture, people are taught to withhold expressions when a person in authority is present.

Significance

The cognitive abilities of children with intellectual disabilities are usually the focus of their education programmes, but their social functioning needs to be considered as well as their cognitive abilities as being influential in their long-term quality of life (Wilczenski, 1991). Despite being continually surrounded by people expressing emotions and interacting socially, some children fail to develop competent social skills. Children with intellectual disabilities often display deficits in social skills (American Psychiatric Association, 1994). For this reason it is essential that they are explicitly taught the skills they need in order to allow them to develop quality social relationships. Children with intellectual disabilities are provided with the same models of expressions as other people, but they lack the skills necessary to learn from these models. If children are to learn to produce facial expressions which accurately convey their thoughts and feelings, they need to be taught how to do this. Training in social skills is an essential part of any educational programme for children with intellectual disabilities (Stephens, 1977). Without explicit teaching, children with intellectual disabilities may never develop appropriate social skills, and as a result will have trouble communicating

effectively and developing positive interpersonal interactions. Deficits in social skills are often considered to be one of the most disabling problems a person can have. "In terms of total life functioning, a social problem may be far more disabling than an academic condition" (Lerner, 1997. p.540).

Children with intellectual disabilities have a particular need for being able to produce and interpret facial expressions accurately when communicating with others. Because most children with intellectual disabilities "have language problems, they must rely more heavily on non-verbal cues for communication" (Maurer & Newbrough, 1987, p.511). Children with intellectual disabilities have problems communicating their thoughts and feelings verbally and understanding the verbal communications of others. A weakness in non-verbal communication results in the child being very limited in his or her communication abilities, which in turn may influence overall lifetime opportunities and quality of life. Weaknesses in all forms of communication also limit opportunities for further learning as explanations which the child will understand are difficult to provide. Because the face is such a strong communicator of feelings, teaching the skills necessary to produce accurate facial expressions will increase the child's abilities to convey feelings and communicate effectively.

Facial expression and social skills become even more significant for the child with intellectual disabilities when we consider the current trend towards mainstreaming and full interaction in the community are considered (McAlpine, Singh, Kendall, & Ellis, 1992). Previously children with intellectual disabilities have been removed from mainstream settings and placed in what has been referred to in the past as

'institutionalised settings'. In these settings children had all of their needs provided and a deficit in social skills was less likely to influence quality of life a great deal. Now, however, children are encouraged to be active members of the community and develop independence. In order to develop independence, especially in adolescence and adulthood, effective communication and social skills are essential. A quality life in any community demands well developed social skills for appropriate social interactions to occur (Matson & McCartney, 1981).

Another problem arising from people with intellectual disabilities being mainstreamed is the problem of discrimination. This is a common problem for people with disabilities, but it is considered that if people are able to "minimise their difference in behaviour and appearance" they will be able to minimise the discrimination they receive (Grossman, 1983, p.119). While people with intellectual disabilities do not necessarily appear to be different physically, if they have poor social skills they will appear to be different from the mainstream children. Grossman (1983) states that people with intellectual disabilities who are able to develop acceptable social skills are more likely to be able to make good adjustments to the community environment. Siperstein and Leffert (1997) agreed with this statement in a study involving students in Years 4 to 6. It was found that students with intellectual disabilities who showed more sociable behaviours were more likely to be accepted by their peers than students showing fewer socially acceptable behaviours.

Theoretically, the use of modelling and feedback have been shown to be effective techniques in increasing student learning for many years. These techniques have been

used before in successfully teaching children with intellectual disabilities, however their use in teaching social skills has been limited. Specific studies showing effective use of the techniques for children with disabilities will be discussed in detail in the next chapter. However, modelling and feedback are techniques that are extremely useful for children with intellectual disabilities, due to the fact that they do not require the child to have knowledge of anything other than what they are seeing and doing at the time of instruction. Modelling in particular is useful for the child with intellectual disabilities as it is considered to be a natural way for humans to acquire behaviours without specific direction being necessary, and it is an innate skill present in everybody (Ballard & Glynn, 1986).

Purpose

The purpose of this study is to investigate ways of teaching children to select and produce appropriate facial expressions in various situations. Specifically, it examines whether the use of mirrors for immediate feedback and providing models of various expressions are useful in training children with mild to moderate intellectual disabilities (a) to select the correct emotion to display when placed in various social situations, and (b) to produce the facial expressions accurately.

Definitions

Most of the terms referred to in this study are a part of everyday language. However there are a few which need to be clearly understood in order to interpret the content of the thesis accurately. These terms include:

- Intellectual disability - or "mental retardation" as it has been called in the past and in American journals, refers to significantly below average intellectual functioning. This below average intelligence is also accompanied "by significant limitations in adaptive functioning in at least two of the following skill areas: communication, self-care, home living, social/interpersonal skills, use of community resources, self-direction, functioning academic skills, work, leisure, health and safety" (American Psychiatric Association, 1994, p. 39). A large percentage of people with intellectual disabilities will suffer from a low level of social/interpersonal skills. More specifically, the skills which are often poorly developed include the ability to "make appropriate requests, eye contact, and related verbal and motoric responses" (Matson & McCartney, 1981, p.230). These deficits are particularly noticeable during childhood and adolescence (Grossman, 1983).

- Recognition - involves looking at a face with a particular expression and identifying which emotion is being conveyed through the expression. In the past this skill has been tested either by (a) choosing a face showing a given expression from a set of photos showing different expressions, or (b) labelling the expression shown on a particular face.

- Selection - involves identifying which emotion to express in response to a given situation. The social context of the situation as well as the events causing the emotion need to be considered. For example, if presented with the situation "it is your birthday and you are having a party," it is likely that a person would *select* the emotion of happiness to display.

- Production - involves a person manipulating parts of the face to create an expression that accurately conveys the emotion that the person wishes to communicate. Incorrect movements in the face can lead to the wrong emotions being communicated.

Overview

The following chapter will present a review of the previous literature in which topics related to this study have been investigated. This will incorporate examining what has been found about the deficits of children with intellectual disabilities in their social abilities, techniques that have been found to be useful for teaching these skills to children with intellectual disabilities, and an outline of the theoretical framework and research questions which form the focus of the study. A description of the method to be used for this study will then be provided, followed by the results and a summary of the findings. These results will then be discussed in the final chapter along with any issues which need to be considered in interpreting the results, possible explanations for the results, and practical application of the results of this study in the classroom.

Chapter 2

Literature Review

Many studies have been conducted to investigate facial expressions of emotion. In the early 1970's researchers such as Ekman, Friesen, and Ellsworth conducted numerous studies focusing on the human face, eventually leading to a system for coding facial movements related to specific muscle groups. These early studies focused on identifying whether a deficit existed in the abilities of people with intellectual disabilities, and other disabilities to use the face effectively as a mode of communication. The 1980's showed fewer studies being conducted in the field, but the topic of facial expressions related to emotion became popular again in the 1990's, with authors such as Singh, McAlpine, Ellis, and Kendall dominating the research. These more recent studies have focused on identifying methods of teaching children with different disabilities, including intellectual disabilities, to use facial expressions effectively in interpersonal communications.

When investigating facial expressions, researchers often focus on only one area, such as recognition of the emotion associated with an expression, production of an expression related to the emotion being conveyed, or socially appropriate selection of facial expressions. Recognition involves looking at a face with a particular expression and identifying which emotion is being conveyed through the expression. The facial expression may be on a photo, a live model, or even a drawing of a face. When involved in interpersonal communication, accuracy in this skill is essential for a full

understanding of what is being communicated. Production of facial expressions is the opposite of recognition. It requires the communicator to move different aspects of the face to create an expression that accurately conveys the emotion which the person wishes to communicate. This skill is also essential for accurate communication of thoughts and feelings.

Many studies have focused on the recognition aspect of facial expression, with production being an area less frequently investigated. Interest in this area has often focused on people with intellectual disabilities, as the ability to produce and recognise facial expressions is a social skill in which people with intellectual disabilities appear to have some deficits. This chapter will examine first some of the studies which have investigated the abilities of people with intellectual disabilities to recognise facial expressions, using techniques involving identification of the expressions from photographs. Discrimination of the different expressions is a key factor in accurate recognition, and the use of photos allows for several expressions to be seen at once. Following this, studies involving the production of facial expressions will be examined. These often involved techniques requiring children to pose expressions in response to a request. These studies have findings relevant to this study, but studies requiring children to respond to a given situation are more natural, and will be discussed in some detail. Studies investigating the selection of facial expressions will be discussed, but there is very little research in this area so it will be brief.

The fourth section of the literature review will examine studies which investigate different methods for teaching children with intellectual disabilities social skills,

focusing on the use of modelling and feedback in particular. Both modelling and feedback have a long theoretical history regarding their effectiveness in education. This theoretical background will be outlined, along with some studies that have successfully used the techniques to teach a variety of skills, including social skills and skills related to the manipulation of facial features. Information from all of the areas discussed will then be integrated and summarised in a theoretical framework, before the direct relevance of these studies for the present study is finally discussed, and the research questions will be stated.

Recognition of facial expressions

A deficit in recognition of facial expressions by people with intellectual disabilities has been shown by several authors over the years. Adams and Markham (1991) investigated this deficit. They conducted a study involving 49 children and adolescents with mild to moderate intellectual disabilities, and 61 children and adolescents matched with them on mental age. This involved obtaining a standard intelligence score for each person involved in the study, and matching students with intellectual disabilities with non-disabled students who received a similar score on the intelligence test. Chronological age is not considered in this matching process. Therefore the participants with intellectual disabilities were older than the participants of average intelligence. This design permits a comparison of participants with intellectual disabilities and younger, average participants of the same mental age.

Children were shown a series of photos showing different faces and were asked to identify the face showing a given emotion. The participants were not given stories to help in understanding the emotion, but were simply asked "Can you show me the person who was _____ when their photo was taken?" In a second task, the participants were shown a set of three photos and told that the people in two of the photos were "feeling the same". The participants were asked to match together two photos in the set of three that showed the same emotion.

Results showed that there were no significant differences between primary school children with intellectual disabilities and younger, average children who were matched with them on mental age. However, differences were found between the high school aged students with intellectual disabilities and the younger, average high school students matched with them on mental age. However, when interpreting these results, consideration of the probability of choosing the correct photo needs to be considered. Because only three photos were presented to each child, and each child had to select two of the three photos, the selection of the correct photos could often occur by chance.

Adams and Markham also compared students with and without intellectual disabilities when they were matched on chronological age. This comparison was done to test the theory that the ability to recognise facial expressions is learned by simple exposure over time to facial expressions. If this theory is correct, it would be expected that all students of the same age would have the same ability to recognise facial expressions, as they would have had the same amount of time to develop their skills. This was found not to be so. Average students performed better at the task than students

with intellectual disabilities of the same age. However, the theory does not take into consideration the deficits that children with intellectual disabilities have in interpreting and constructing knowledge and skills from the models they are exposed to in their everyday environment. Therefore the results showed that people with intellectual disabilities do have a deficit, not only in the ability to recognise facial expressions of emotion, but also in the ability to learn the skill, because without such a deficit, children of the same age should have the same abilities, based upon a similar time of exposure to models.

A recent study showing the deficit of people with intellectual disabilities to recognise facial expressions was conducted by McAlpine, Singh, Kendall, and Ellis (1992). The study involved a group of 80 adults and children with mild to moderate intellectual disabilities, and a control group of 80 children and adults of average intelligence who were matched by mental age with the first group.

Each participant was shown a set of six photos of faces, with each face depicting a different emotion. After being told a short story about a person and told how that person would feel, the participants were asked to identify the photo showing the facial expression appropriate to the emotion being conveyed through the story. The participants were not required to name the emotion being conveyed, as this was told to the participants by the instructor, but simply to recognise the photograph which showed the stated emotion. The results showed that participants with intellectual disabilities were significantly less accurate in their recognition of facial expressions than the control group matched on mental age. This result was consistent across both adults and children.

This difference across all ages is in contrast to the lack of difference for the primary school-aged children found by Adams and Markham (1991). Possible reasons for this are the smaller number of students used in Adams and Markham's study, and also the fact that mental age scores were not available for all students in the earlier study.

Adams and Markham (1991) and McAlpine et al (1992) established that people with intellectual disabilities have a deficit in accurately recognising facial expressions of emotion. Several other studies have used similar techniques involving the presentation of photographs and asking participants to identify a given emotion. Maurer and Newbrough (1987) studied the abilities of adults with intellectual disabilities to recognise the facial expressions of children with intellectual disabilities. Hobson, Ouston, and Lee (1989) investigated the relationship between participants' ability to recognise photos of different expressions and their ability to recognise voices conveying different expressions. McAlpine, Singh, Ellis, Kendall, and Hampton (1992) studied adults with moderate and severe intellectual disabilities and their ability to recognise facial expressions from photographs. All found that people with intellectual disabilities have a deficit in recognising facial expressions accurately when compared to people without intellectual disabilities.

McAlpine, Kendall, and Singh (1991) investigated the nature of this deficit. This was an extensive study involving 501 adults with and without intellectual disabilities. It used a similar method to that used by McAlpine, Singh, Kendall, and Ellis (1992). Participants were read a story, told the emotion felt by the person in the story, and then asked to choose the photo displaying the stated emotion. Results showed that the deficit

of people with intellectual disabilities to recognise emotions compared to people without disabilities of the same chronological age was consistent through all ages. This agreed with the findings of Adams and Markham (1991). Not only were people with intellectual disabilities less able to recognise emotions accurately, but they were also able to recognise a smaller range of emotions than the non-disabled participants. For example, participants with intellectual disabilities were able to recognise happiness on 85% of occasions, sadness on 50% of occasions, with fear, anger, disgust, and surprise being recognised accurately less than 50% of the time.

As well as identifying that a deficit was present in the abilities of children with intellectual disabilities to recognise facial expressions, the same group of authors conducted further investigations. McAlpine, Singh, Ellis, Kendall, and Hampton (1992), also found that adults with intellectual disabilities can be taught to recognise facial expressions more accurately by teaching them how different areas of the face should move for each emotion, and using a directed rehearsal technique.

While it is clear that there is a deficit in the ability of children with intellectual disabilities to recognise facial expressions, it has not been made clear by any of the authors discussed so far what influence this deficit has on different aspects of life for the person with intellectual disabilities. Braverman, Fein, Lucci, and Waterhouse (1989) investigated the relationship between the ability to recognise facial expressions and the general social functioning in children. Recognition abilities were identified by asking participants to identify photos of faces showing a particular emotion. Participants also were given a socialisation test measuring interpersonal relationships, play and leisure

time, and coping skills. Results showed a strong correlation between children's ability to recognise facial expression and their scores on the socialisation tests, indicating that there is a relationship between the ability to recognise facial expressions and quality of social interactions.

Simon, Rosen, Grossman, and Pratowski (1995) also investigated whether there was a relationship between ability to recognise facial expressions and general social functioning (including interpersonal skills and quality of life), for adults with mild to moderate intellectual disabilities. Techniques used were similar to those used by Braverman, et al. (1989). The authors found that the ability to recognise facial expressions, quality of life, and social skills were independent of one another for adults. This is in contrast with the results of Braverman, et al. (1989). Perhaps this difference between children and adults is due to the fact that children are still developing verbal communication skills and therefore rely more heavily on non-verbal communication for accurate interpretation of information being communicated. This can be said to be especially true for people with intellectual disabilities, who often have difficulties in understanding complex verbal language (Maurer & Newbrough, 1987).

Production of facial expressions

Fewer studies have examined the ability of people with intellectual disabilities to produce facial expressions of emotion than to recognise them. However, the accurate production of facial expressions is just as important as recognition, because both skills are essential for effective and accurate communication. Recognition is important in the

accurate reception and interpretation of another person's communication, and production is important in accurately expressing one's own thoughts and feelings.

Odom and Lemond (1972) investigated whether or not there is a lag between the development of recognition and production skills. The participants were a group of 64 children without intellectual disabilities, aged between 5 and 10 years. When presented with a series of photos, the children were asked to match two photos which showed the same expression and to choose photos displaying a particular facial expression. These two tasks were designed to test recognition abilities. The researchers asked the children to imitate photos and react to given situations in order to test production skills. The results clearly showed that there was a lag between the recognition and production of facial expressions for children aged between 5 and 10 years, with recognition developing much sooner than production. It was also shown that production skills lagged behind recognition skills regardless of age, with the gap between the two skills not decreasing as the child got older. This would suggest that if there is a deficit in recognition abilities, production skills which fall even lower than the recognition skills must also be poor, indicating a deficit in this area as well.

Another study designed to investigate the relationship between recognition and production skills also investigated ways of teaching young children to produce facial expressions accurately. Field and Walden (1982) studied 34 pre-school children without any disabilities. Each child was placed into one of four groups. Each group received an intervention to help them produce accurate facial expressions. These were: (a) a label for the expression, for example "happy" or "disgust", (b) a photographic model of the

expression to be shown, (c) a photograph and a mirror, or (d) a combination of a photograph and a label. The results showed that the children were more accurate in producing facial expressions of emotion than in recognising facial expressions of emotion. It was also found that the children who were shown a photograph of the expressions were more accurate in producing facial expressions than the children who did not receive a photograph to imitate. It was also found that children in the first group, who were given only a label, were able to produce the expressions less accurately than the other groups. The effects caused by the mirror alone were not clear, as this variable was used only in conjunction with the photographic models.

This is contrary to the findings of Odom and Lemond (1972), who found that children aged between 5 and 10 years were able to recognise facial expressions of emotion before they could produce them. A possible reason for the discrepancy is the fact that Odom and Lemond (1972) used adult photographs as models for imitation, whereas Field and Walden (1982) used photos of children. It would be expected that children could relate more closely to photos of other children, and might find them easier models to imitate as the children's faces more closely resemble their own. Therefore it is not clear which skill lags behind. However, it is clear from both the studies that children with intellectual disabilities have deficits in their abilities both to produce and to recognise facial expressions.

Although no clear relationship between recognition and production of facial expressions has been concluded, other studies have investigated whether people with intellectual disabilities have a deficit in producing facial expressions, which would

coincide with the deficit in recognising facial expressions. A study by Wilczenski (1991) focused on the production of four facial expressions, based upon the emotions of happiness, sadness, fear, and anger. The purpose of the study was to determine whether adults with intellectual disabilities could accurately produce facial expressions of emotion. The participants were 52 adults with mild to moderate disabilities. Each adult was presented with a story, told how the person in the story would feel, and then asked to produce a facial expression to show the emotion stated. For example, for the emotion of happiness, the participant would be told, "It's your birthday and you are happy. Make a happy face." The accuracy of the production of expressions was decided by adults without intellectual disabilities. They were required to look at photographs of the expressions of the people with intellectual disabilities and judge which emotion was being expressed. If 6 out of 8 raters agreed that the expression matched the emotion asked for, it was considered to be an accurate representation of the emotion. Results showed that no participants were able to produce all four emotions accurately, indicating that adults with intellectual disabilities have trouble producing facial expressions of emotions without any aids. However, no comparisons were made between adults without intellectual disabilities.

While the previous studies clearly show that children with intellectual disabilities have a deficit in both recognising and producing facial expressions of emotion, the question remains as how to best teach them these skills. Techniques that Field and Walden found to be successful for children without intellectual disabilities (for example,

the use of a photographic model) may or may not work for children with intellectual disabilities.

Stewart and Singh (1995) investigated which techniques would be effective for teaching children with intellectual disabilities to produce facial expressions more accurately. The purpose of their study was to teach children with intellectual disabilities to recognise and produce different emotions conveyed through facial expressions. The study involved six boys. All had mild to moderate intellectual disabilities. Recognition and production were taught using a directed rehearsal technique. The child was given the opportunity to select a photograph showing the emotion being asked for, and received praise if the correct photo was selected. If an incorrect photo was chosen, the experimenter pointed to the correct photo and stated the emotion being expressed, then pointed to each feature of the face showing the emotion. The participant was then asked to trace the features as demonstrated by the experimenter, and this was repeated four times, with prompts being provided by the experimenter as necessary. The directed rehearsal technique led to increased accuracy of recognition, while having no effect on the boys' abilities to produce facial expressions.

Stewart and Singh (1995) used a more complex approach to develop the skill of production. Directed rehearsal (in which the student was shown a photograph and then the same procedures as those used in the recognition activities were followed), practice, photographic models of adults, a mirror, and teacher modelling were all used in combination. The students were also read a story and were asked to produce a face which showed the emotion conveyed in the story. The target emotion was told to the children if

they made an incorrect selection. The use of the various aids led to a significant increase in the production skills of all of the children involved. However, because all of the aids were used together as a package, it can not be concluded which one was the most useful for teaching the skill of facial expression production. It may be that only one of the aids was producing the increases in ability, while the others were having no effect, but this cannot be determined unless further studies are conducted in which each aid is used separately. The fact that there was no control group also makes it difficult to identify the extent to which changes in ability could be attributed to the techniques provided by the experimenter, and the extent to which maturation or other factors may have influenced the abilities of the children.

The studies show that children with intellectual disabilities have a deficit in their ability to produce facial expressions, and they show that these children can be taught to produce facial expressions more accurately. By providing each instructional technique in isolation, it will be possible to determine which is the most effective technique for teaching children to produce facial expressions more accurately. In particular, the use of modelling and providing mirror feedback have been shown to be successful when used together, but we do not know which technique is producing the results. There is much literature to show that both modelling and feedback are effective educational strategies for teaching a variety of skills. The theories behind these techniques will be discussed later in this chapter.

Previous studies have used a variety of techniques to investigate the abilities of students with intellectual disabilities to produce facial expressions of emotion. Decisions

have to be made as to whether to get the children to pose expressions or record them in spontaneous situations, and which emotions should be taught.

The issue of posing is an important one, as we rarely pose expressions when participating in natural social interactions. Expressions are usually spontaneous in this situation, and are likely to be based more on the actual feelings being experienced rather than what a person thinks he or she should look like (Ekman, Roper, & Hager, 1980). Therefore, it seems strange that we should teach children how to accurately pose facial expressions, and not teach them how to produce facial expressions based upon what they are feeling. All of the previous studies which have investigated children's abilities to produce facial expressions have required the children to pose facial expressions without eliciting the emotions themselves.

Zuckerman, DeFrank, Hall, and Rosenthal (1976) investigated whether there is a difference between facial expressions which are posed and those which occur spontaneously in social interactions. A group of 60 university students posed given expressions, and then watched videos which elicited a variety of emotions. Reactions to the video, and posed expressions were later observed by a separate group, who identified the emotion being expressed and the intensity of the emotion. It was found that the posed expressions were much more intense than the spontaneous expressions, but both were able to be identified easily as the correct emotion being expressed.

Perhaps when teaching children with intellectual disabilities to produce facial expressions, this added intensity of expression from posing is useful, as it allows the components of the face for each emotion to be clearly identified. It is also possible that

when the skills are generalised into more natural settings, some of the intensity would be lost.

In all of the studies described above, participants were told which emotion they were required to produce, sometimes with a story being provided to help in understanding the emotion. This type of interaction rarely occurs in natural social situations. In the majority of cases the child is required to select the emotion for him or herself based upon the events that take place and the context in which they occur. A child is rarely told how he or she is expected to feel when engaged in social interactions.

Results of previous studies have shown that children with intellectual disabilities can be taught to produce facial expressions accurately when asked, but no previous study has investigated whether children with intellectual disabilities can accurately select which emotion to display in the first place.

Another issue arising from the previous studies is the issue of which expressions should be taught to the children. Several studies have found that there is a clear difference in the difficulties children have in producing and recognising each of the six primary facial expressions. McAlpine, Singh, Kendall, and Ellis (1992) found that children with intellectual disabilities were able to produce happiness accurately 80% of the time, disgust, sadness, and anger 46% of the time, and fear and surprise only 38% of the time. Results in other studies (McAlpine, Kendall, & Singh, 1991; Wilczenski, 1991; Field & Walden, 1982; Ekman, Roper, & Hager, 1980) have consistently agreed with the general findings that happiness appears to be the easiest expression to produce, sadness,

anger and disgust are of medium difficulty, and surprise and fear appear to be the most difficult emotions to produce.

The studies examined clearly show that children with intellectual disabilities have a deficit in producing facial expressions of emotions, and some expressions appear to be more difficult to produce than others. In particular, happiness has been found to be easy, sadness, anger and disgust are more difficult to produce, and surprise and fear are the most difficult expressions to produce. Previous studies have found that children with intellectual disabilities can be taught to produce facial expressions more accurately, but because several methods have been used in combination, it is not clear which methods are successful for teaching these skills. No studies have investigated which techniques are useful for teaching the skill of selection, and so no conclusions can be made in this area.

Modelling

Modelling is a natural way for humans to acquire a wide variety of behaviours. It occurs without specific direction being required as the child develops and interacts with his or her surroundings (Ballard & Glynn, 1986). Much social learning in particular is fostered through exposure to modelling in the natural environment as the child develops (Bandura, 1969). The development of children's ability to recognise and produce facial expressions is thought to be influenced by modelling and imitation (Walbott, 1991). It is considered that the ability to imitate facial movements first emerges at about 8 to 12 months of age. This is slightly later than the imitation of other bodily movements such as

hand gestures, which begin to emerge at about 6 months of age (Meltzoff & Moore, 1993). Once the skill of imitation has developed, it is used throughout life to acquire new skills and develop existing skills. Therefore, the person is influenced by the type of people they are surrounded by in terms of what actions and behaviours are modelled. Facial expressions, however, are thought to be universal, and therefore the different people acting as models should not influence the way in which these skills are learned.

However, children with intellectual disabilities have a deficit in their ability to learn the skills required to produce facial expressions. Much of children's learning of these skills occurs through implicit modelling, in which there is no direct teaching. Children with intellectual disabilities do not acquire skills through implicit modelling as much as children without intellectual disabilities. However, explicit modelling has been shown to be effective, although it has only been used in combination with other teaching techniques. Therefore it might be useful to model and teach explicitly the skills necessary for accurate production of facial expressions.

"Modelling is a teaching technique that can be used to teach a wide variety of knowledge and skills" (Smith, Finn, & Dowdy, 1993, p.388). Modelling involves a particular behaviour or skill being demonstrated to the learner, often in conjunction with the consequences of the particular behaviour. For example, if a person sees a model performing a behaviour and being rewarded for the behaviour, the person is more likely to attempt to copy the behaviour to try and receive the same rewards. The observation of the model can have three different effects, as suggested by Bandura and Walters (1963):

1. The observer may acquire new responses that did not previously exist in his repertory. For example, a child learns to walk by observing others.

2. Observation of models may strengthen or weaken inhibitory responses. For example, shyness might be promoted in a child after observing negative consequences of another's interactions.

3. The observation of a model sometimes elicits previously learned matching responses (that is, it acts as a releaser of previously learned responses). For example, seeing a friend say "no" to a stranger may remind the child to say "no" in similar circumstances.

(p.60).

Skills can be modelled using both live demonstrations or symbolic models (eg. role playing with dolls) (Smith, Finn, & Dowdy, 1993). The learner will often imitate the modelled behaviour, allowing new responses to be learned, or existing responses to be strengthened. Observations of behaviour provide much clearer examples of behaviour and lead to greater accuracy of acquisition than can be obtained by verbal explanations (Bandura & Walters, 1963). However, it should be noted that modelling can lead not only to the development and strengthening of desired behaviours, but also to the development of deviant or undesirable responses (Bandura & Walters, 1963).

There is some debate as to why people imitate models and why it is a successful mode of learning. Theories range from the view that imitation is an innate and instinctive process which we are born with, to the view that imitation is strongly linked with theories of operant conditioning (Miller & Dollard cited by Bandura & Walters, 1963).

This later theory implies that children may imitate behaviours simply to receive reinforcement, or conversely, they may choose not to imitate a behaviour to avoid observed aversive consequences. Mowrer was an early theorist who focused on the importance of positive feedback as a crucial component involved in imitative learning (Bandura & Walters, 1963).

In order for modelling to be an effective mode of learning, several processes are essential, including "the need for the observer to attend to relevant stimuli and to encode new information; the need to practice new behaviours, especially where complex motor responses are involved; and the need to experience reinforcement for new responses" (Bandura cited by Ballard & Glynn, 1986, p.16). If the learner is to acquire behaviours accurately, it is essential that the observed behaviours are modelled accurately. Reinforcement and feedback also appear to be major issues, and will be considered in the next section of this chapter.

Several studies have found modelling to be an effective technique for teaching a variety of skills to children with and without intellectual disabilities. Walbott (1991) conducted a study investigating how frequently imitative behaviour occurs when adults without intellectual disabilities are shown photos of specific facial expressions, and whether imitative behaviour helps in the decoding of facial expressions. That is, if people try to produce an expression being shown to them, does it help them to recognise the emotion being expressed by the other person more accurately? Participants were shown a series of photographs displaying a variety of facial expressions, and the participants' reactions to each photograph were video-taped. People not involved in the

study then judged the emotions being expressed in the photographs, as well as the expression being shown by the participants as they looked at each photograph. It was found that the expressions shown in the photographs and in the participants' reaction to each photograph corresponded above chance. That is, people frequently imitated the expressions shown in the photographs without being directed to do so. From this it was concluded that imitation appears to occur naturally when adults are presented with a still photograph. While this study made no reference to live models, it seems likely that people's responses to facial expressions are likely to be similar.

Also focusing on imitation, a study by Meltzoff and Moore (1993) investigated how imitation of models is used in the development of non-verbal gestures in infants. They found that infants appear to be able to imitate static facial expressions just as well as dynamic gestures despite the fact that the infant cannot see his or her own attempts to imitate a face. If a child can see his or her own attempts at imitation, any errors can be quickly seen and corrected. However, imitation of the face means that visual feedback of one's own actions is eliminated. The authors also found that the child's accuracy of imitation, and the frequency with which they chose to imitate did not vary significantly in relation to familiarity with the person modelling the expressions. This is an important finding for the present study as the children involved will not have met the researcher before the modelling activities are presented.

Facial imitation is unique in that observers "must match an act they see another person perform with one of their own that they cannot see" (Meltzoff & Moore, 1993, p.). Feedback has already being mentioned as a component which may be useful for

increasing the effectiveness of modelling. The need for feedback becomes even more

necessary when one is looking at the modelling and imitation of facial expressions, as

the learner cannot see his or her own responses. The mirror is one aid that can be used to

provide feedback. '

Feedback

Feedback is considered important for learning, as learning can only occur on a

limited basis if the learner has no knowledge of the results of his or her performance

(Huffman, 1978). If children know when they have performed a task successfully and

they have acquired a skill, they stop experimenting with the skill and go ʿ to using it in

its appropriate form. However, if children do not know when they have succeeded, they

will continue to experiment, and may in fact learn the incorrect way to perform a skill.

Like modelling, feedback has been closely related to theories of operant

conditioning. Huffman (1978) states that any learning requires knowledge of the results.

If one is motivated to perform a behaviour by the perceived consequences, one must be

made aware of a successful attempt of the behaviour in order to receive the

reinforcement. Reinforcement, when consistently given, is almost a form of feedback, in

that provision of the reinforcer is telling the participant that he or she has performed a

skill successfully.

Feedback does not have to be provided only by the teacher. Feedback can occur

when the child is able to observe his or her own actions and make self-evaluations on the

behaviour (Kern-Dunlap, Dunlap, Clarke, Childs, White, & Stewart, 1992). Children can

decide for themselves whether they have succeeded in performing a skill, and make adjustments to their performance based upon the perceived accuracy. Self-evaluation can be even more accurate if a model of the skill is provided at the same time, providing an accurate and specific example for the child to base his or her judgements on.

Video feedback is a common form of providing accurate feedback to students to develop various skills. It has been found to be particularly useful for teaching children appropriate social skills. Kern-Dunlap et al. (1992) evaluated the effects of providing video feedback to students aged between 11 and 13 years with emotional and behavioural problems. The study involved video-taping the children while they were participating in activity sessions in the regular classroom setting. The children were shown the video immediately at the end of the activity session, and they were asked to describe their social interactions using positive and negative terms, thereby encouraging self-evaluation. It was found that the use of the video feedback technique led to reduced levels of negative peer interactions for all of the students. A possible explanation for this is that without the feedback the children were unaware of their behaviours because they could not see themselves from a third person's point of view. When the children saw how they were behaving they were able to produce more desirable behaviours.

As already mentioned, children cannot see their own attempts to produce various facial expressions. The use of a mirror allows for self-evaluations similar to those made using the video feedback technique, with the focus being on the face. When looking in a mirror, the child can immediately evaluate whether the facial expression being produced by the face displays the emotion the child is trying to convey. If the child is not happy

with the expression, he or she can alter his expression and see immediately whether the changes are effective in altering the meaning conveyed through the facial expression being produced.

Murphy (1987) outlines several properties of a mirror that make it worth using for providing feedback which also encourages self-evaluation. The mirror:

- "reflects accurately and objectively" so there is no loss of accuracy or confusion which may occur when a person is trying to provide feedback verbally;

- "provides immediate feedback," allowing for adjustments in the behaviour also to be immediate; and

- tends to promote self-analysis, leading to improvements in the behaviour or skill being developed.

(Murphy, 1987, p.104-105).

In the medical field, Huffman (1978) used mirror feedback to develop skills in three adults with brain damage. As a result of their conditions, all of the adults had very limited lip control. The purpose of the study was to determine whether these people could be taught to have increased functional lip control. Two techniques were used: providing training with a mirror for direct visual feedback, and providing feedback using electromyography (EMG). EMG feedback involved the subject being provided with audio and visual displays of the potential movements of the muscle groups being focused on. It was found that the EMG technique was the most effective for increasing the level of lip control, but the group receiving the mirror feedback also made significant

gains in their levels of lip control. Some changes in the ability to control movements were seen in the group using the mirror, and it is likely that this would occur to an even greater degree for people not suffering physical disabilities.

The studies which use mirrors to provide feedback in education are few, probably because their use is largely limited to the development of facial functions. As mentioned earlier, Stewart and Singh (1995) used a mirror to provide feedback in conjunction with several other training techniques to teach children how to produce facial expressions of emotion accurately. It was found that the technique used in conjunction with others was effective for increasing the children's ability to accurately produce facial expressions, but it was not clear whether the mirror alone would be an effective teaching technique if it was used without the other aids.

Theoretical framework

Modelling and feedback have been shown to be techniques that lead to positive results in the development of social skills. Theories have outlined the advantages of both techniques in all areas of education, including the early development of Bandura's theory of modelling in the early 1960's, and the close links of both techniques to the Skinnerian theory of operant conditioning. Because of the many perceived advantages of these theories and their previous successful uses, the theory of the effectiveness of modelling and feedback in education will be applied to develop the skills of children both to produce facial expressions, and to select appropriate facial expressions for a variety of

social situations. Figure 1 summarises the techniques to be used and the desired responses to be elicited.

The theoretical framework treats the mirror and modelling aids separately. Modelling is shown in Figure 1 to consist of both modelled facial expressions and verbal assistance provided by the instructor. These aspects of modelling used in conjunction are designed to assist the child to produce a response to the vignettes in the form of a facial expressions of a specific emotion. It is thought that these modelling techniques will lead to increased accuracy in selection and production ability in comparison to groups not receiving modelling.

The use of feedback follows a similar path. Feedback consists of the use of a mirror. This will assist the child to produce a response, again in the form of a facial expression, and it is thought that the use of the mirror will lead to increased accuracy in selection and production of the facial expressions, when compared to groups not receiving feedback.

Finally, when the two techniques are used in conjunction, both the mirror and modelling will help in developing a response, and it is thought that the two aids together will lead to the greatest increases in the accuracy of selection and production of facial expressions.

Figure 1

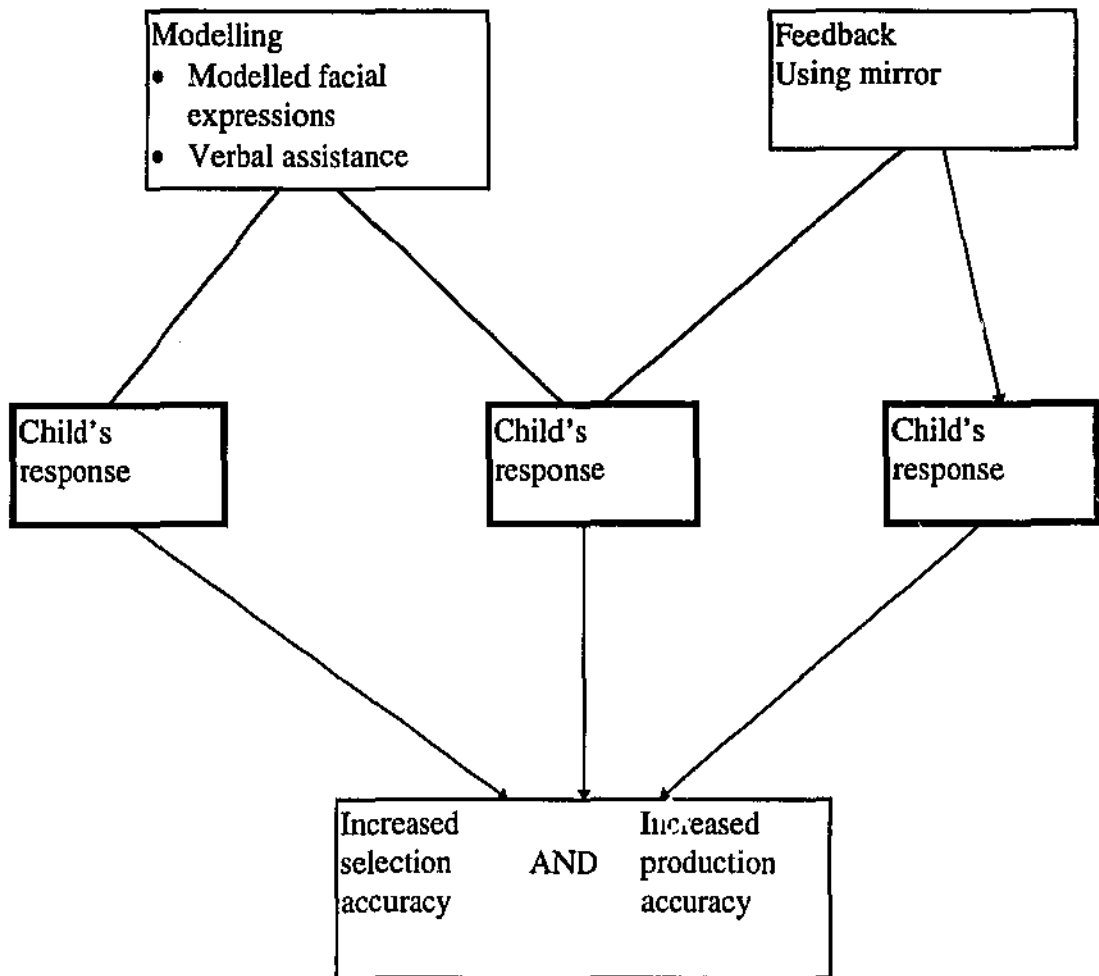Theoretical framework

Summary

From the studies described, it is evident that children with intellectual disabilities

have deficits in their ability to recognise and produce facial expressions. It is clear that

children with and without intellectual disabilities can be taught the skills required for

accurate production of facial expressions, but it is not clear which techniques are most

effective for teaching such skills, as previous studies have used several techniques in combination.

It is also clear that some emotions are more easily expressed than others. In particular, happiness and sadness have been consistently found to be the easiest to produce, disgust and anger have been found to be of moderate difficulty, and surprise and fear have been shown to be difficult to produce. However, it is not clear which aids are the most effective for teaching children to produce each emotion more accurately, and whether there are differences in the effectiveness of the different aids for the different emotions.

Previous studies have required children to produce expressions upon request in situations which rarely occur in natural settings. No studies have required children to select the facial expression independently without assistance, based upon a given situation. Responding to vignettes as opposed to requests for facial expressions provides the child with an understanding of the feelings underlying the facial expressions and is therefore more natural. No study has investigated the accuracy of children's production of expression in natural expressions based upon spontaneous feelings.

The present study

As a result of this literature review, the present study will use the techniques of modelling and a mirror to provide feedback to teach children how to select and produce facial expressions. The advantages of modelling have been made clear, and the mirror has advantages related to the problems associated with not being able to see one's own

face when imitating an expressions. It is thought that if children are provided with a target facial expression using modelling they will be able to look into the mirror to see how accurately they are producing the expressions, and then make self-evaluations to make their production more accurate.

Because of the relationships found between the difficulty of the emotions, one emotion from each of the difficulty levels was selected (one easy, one medium, one difficult) to see if similar results could be found, and also to see if the effectiveness of the teaching techniques was related to the difficulty of the emotion. The decision about which emotion would be selected from each difficulty level was based upon ethical issues, in that it was considered important not to elicit negative feelings (such as fear) or socially undesirable emotions (such as anger) in the children. Therefore the three emotions selected were happiness, disgust, and surprise.

This literature review has outlined studies which have investigated both the recognition and production abilities of children with intellectual disabilities. Recognition is an area that has been investigated in some detail, but the areas of production and selection have been investigated to a much lesser extent. While it is clear that children with intellectual disabilities have a deficit in their ability to produce facial expressions, it has not been made clear which methods are best for teaching this skill, and no studies have investigated the ability of children with intellectual disabilities to select appropriate facial expressions. Because of the inconclusive finding in the areas of selection and production, this study will focus on these two areas, and how best to teach children with

intellectual disabilities the skills necessary for accurate selection and production of facial expressions.

Related to the findings of artificial versus spontaneous expressions is the issue of how to record children's responses during the testing procedure. A camera requires the child to hold the expression for an unnatural length of time while his or her photograph is taken, making the production of the expression much more artificial than if the camera were not present. A person rarely holds the same facial expression for more than a few seconds when engaged in natural social interactions (Ekman & Friesen, 1975). For this reason it was decided to use a video camera to record responses. The video records the expressions throughout the session, meaning the child does not have to wait for the camera to be ready to produce the expression. The video-camera is also less intrusive than a still-shot camera, as the child often forgets that the camera is in the room and any problems related to shyness or embarrassment are overcome.

As a result of the findings of previous studies, this study will require children to produce expressions that are not completely posed but not completely spontaneous. Previous studies have always provided the participants with the label for an expression to produce, with the child not being given any contextual information to help them understand the emotion behind the expression. In this study however, the children will be involved in stories that will elicit emotion, so facial expressions will be based upon the emotions, not on a label given by the researcher. At the same time however, this is not entirely spontaneous as the children will be told when to show the expression, but it is closer to natural interactions than the situations used in previous studies.

Research questions

Therefore, the following research questions have been developed:

1. Do children with mild to moderate intellectual disabilities <u>select</u> and <u>produce</u> facial expressions more accurately when a mirror is used to give feedback than when no mirror is used?

2. Do children with mild to moderate intellectual disabilities <u>select</u> and <u>produce</u> facial expressions more accurately when a model is provided than when no model is provided?

3. To what extent do the use of a model and a mirror influence children's <u>selection</u> and <u>production</u> of the three facial expressions: happiness, disgust, and surprise?

Chapter 3

Method

Participants

The participants in the study were 40 children, ranging in age from 6;8 to 10;11 ($\underline{M}$= 8;9, $\underline{SD}$= 0;12). There were 23 males and 17 females. The children were all attending Education Support Centres, and came from various socioeconomic backgrounds. However, most of the six Centres were located in middle class areas, with only one being located in a lower socioeconomic area.

The centres indicated that all of the children had been diagnosed as having mild to moderate intellectual disabilities. The mean standard score on the Peabody Picture Vocabulary Test - Revised (PPVT-R) (Dunn & Dunn, 1981) for the 40 children was 60.45, with a range of 40 to 79. The participants were randomly assigned to the four groups. The mean ages, Peabody standard scores, and number of males and females in each group are shown in Table 1.

As well as the intellectual disabilities, some of the children had physical disabilities. However, children were carefully selected to ensure that no child had a physical disability (such as Cerebral Palsy) that would inhibit their ability to produce facial expressions accurately. The conditions being used could not help a child to overcome these physical problems, and would therefore influence the results of the testing.

Table 1

Age, PPVT-R scores, and number of males and females in each group.

Group	Age M (SD)	PPVT-R standard score M (SD)	Number of males	Number of females
Modelling / mirror	8;5 (1;0)	57.7 (13.2)	5	5
Modelling/ no mirror	9;4 (1;2)	59.9 (12.6)	5	5
No modelling/mirror	8;9 (1;0)	56.3 (13.9)	7	3
No modelling/no mirror	9;3 (1;0)	55.5 (10.5)	6	4

Design

A 2 (modelling) x 2 (mirror) x 3 (facial expression) factorial design was used for the study and is illustrated in Table 2. The first two independent variables were between-subjects independent variables, related to the type of aids used in the training sessions. These were whether or not a mirror was present during the training session, and whether or not teacher modelling of the facial expressions was present during the training session. This resulted in four groups being established, each with a different combination of aids. The third independent variable was a within-subjects independent variable, and referred to the type of facial expression being produced. Each child was required to produce facial expressions corresponding to three emotions: happiness, surprise and disgust.

Table 2

2 (modelling) x 2 (mirror) x 3 (expression) design.

	Modelling	No modelling
Mirror	Group 1	Group 3
	Happiness, disgust, surprise	Happiness, disgust, surprise
No mirror	Group 2	Group 4
	Happiness, disgust, surprise	Happiness, disgust, surprise

There were two dependent variables: selection of facial expression and production of facial expression. Selection was concerned with whether or not the children accurately chose the correct emotion in response to a given situation. Production was the extent to which the children accurately displayed the emotion in their facial expression, as measured by the Facial Action Coding System (Ekman & Friesen, 1978).

Materials

Each session spent with each child consisted of a training phase and a testing phase. Different materials were used in each phase, as outlined below.

Before the training phase, general verbal ability levels of each child were obtained by administering the Peabody Picture Vocabulary Test - Revised (PPVT-R), Form L (Dunn & Dunn, 1981). This was converted to a standard score to compare the

level of vocabulary development, to ensure that any differences in results were not attributable to differences in general verbal ability.

During the training phase, materials used included a hand held mirror, approximately 25 cm x 15 cm in size, and a series of brief vignettes, included in Appendix A along with the correct emotion to be elicited by each vignette.

Accurate selection of emotions for each scenario was based upon a survey conducted prior to the intervention. Twenty volunteers aged between 7 and 20 were presented with the individual vignettes used in both the intervention and testing stages of the study, along with eight other vignettes. Each person was asked how he or she would feel if the vignette was really happening to them, and the results were recorded. Vignettes which had at least 18 out of 20 people select the same emotion were used in the study. If less than 18 people selected the same emotion, the vignette was not considered to elicit one emotion strongly, and was therefore not included in the study. Scoring of the results for the selection variable was based upon the emotion agreed upon by the volunteers.

The testing phase involved the use of a video camera, tripod, and blank videotape; two hand puppets with neutral facial expressions; and a script for the puppets, involving a series of short vignettes (outlined in Appendix B).

To maintain accuracy and consistency of the scoring of the children's facial expressions, a coding system of facial components was used to analyse children's facial expressions produced during the testing phase. The Facial Action Coding System (FACS) was developed by Ekman and Friesen in 1978. This tool breaks the face down

into small components and movements, which can be identified as present or absent for each of the six major emotions. For example, the position of the eyebrows forms one region, the mouth another, and so on. Breaking the face into smaller components allows each expression to be scored on a scale of 0 to 6, with 0 indicating that no aspect of the face shows the emotion, 1 indicating that only one component of the face is being demonstrated, and 6 indicating an accurate production of the expression, with all six facial components for the particular emotion being displayed. The components of each expression used in the present study - happiness, disgust and surprise - are included in Table 3.

Reliability was also obtained during analysis by having a second observer randomly score a sample of the children. These scores were compared, and resulted in inter-observer reliability of 98% for selection of the correct emotion, and a correlation coefficient of .97 for the FACS score for each emotion.

Procedure

Sessions were conducted with the children in a quiet room in the Education Support Centre (usually the conference room), with the researcher and child working on a one-to-one basis. The child and the researcher were seated next to each other, on adjoining corners of a desk. The sessions lasted for about half an hour, and were broken into an intervention phase and a testing phase. Before either phase began, the Peabody Picture Vocabulary Teat - Revised (Dunn & Dunn, 1981) was administered to all children according to the procedure outlined in the manual.

Table 3

Breakdown of facial components for each expression

Emotion	Facial components
Happiness	1. corners of lips are drawn back and up
	2. lips stretched and thinned in centre
	3. a wrinkle runs from the nose to the outer lip corners
	4. cheeks are raised
	5. lower eyelid is raised but not tense
	6. wrinkles go out from the outer corners of the eyes.
Disgust	1. upper lip is raised
	2. nose is wrinkled
	3. lower lip is raised or lowered, and slightly forward
	4. cheeks are raised
	5. lower eyelid is wrinkled
	6. eyebrow is down/relaxed.
Surprise	1. eyebrows are raised
	2. eyes are opened wide
	3. mouth open- jaw naturally dropped
	4. wrinkles across forehead
	5. cheeks are neutral
	6. skin below the brow is stretched.

<u>Intervention.</u>

Initially, an understanding of each of the different emotions was established with each child. This was done by asking each child to state what kinds of things made them feel each of the six basic emotions (happy, sad, angry, disgusted, surprised, and afraid). For example, the researcher asked "What kinds of things make you feel happy?", or "What is something that might make you scared?" All of the emotions were presented to ensure that the children were not prompted to use only the three emotions being focused on during the testing phase. However, synonyms were often used for children who did not know the original word being presented. For example, many of the children did not understand the word "disgust", but accurately responded to terms such as "yucky" and "gross". All children accurately stated at least one appropriate situation for each of the six emotions, showing that they were all familiar with the emotions being presented.

After an understanding of each of the six emotions was established, the researcher gave the children the following instructions: "I am going to tell you some short stories, and we're going to pretend that the things that happen in the stories are really happening to us. I want you to think about how you would feel if these things did really happen to you, and then I'd like you to show me how you would feel using your face. I'll show you what I mean. Let's pretend that I get home from school and my Mum tells me that my puppy is very sick and he's in the hospital. I'd feel sad if my puppy was sick, and my face would look like this." (Researcher demonstrates a sad face). "Now it's your turn." The children were then presented with six short vignettes (outlined in

Appendix A) which placed them in a variety of different situations. The vignettes were presented in the same order to each child.

Immediately after each vignette, children were asked to select an emotion which they would feel if placed in the given situation. After being asked how they felt, the children who received <u>modelling</u> were provided with a more appropriate choice and a reason for the choice if the selected emotion was not the most appropriate. The child was then asked if he or she wanted to change the first choice. For example, in reference to scenario 6, the researcher would say, "I would feel gross if someone dropped an egg on my head because there would be slime running down my face. Do you think you would feel gross, or do you still think you would be happy?" If the child selected the correct emotion, the researcher still provided feedback. For example, if the child correctly selected disgust for scenario 6, the researcher would say, "Yes, I would feel disgusted if someone dropped an egg on my head." The groups who did not receive modelling were given no feedback regarding the accuracy of their selection, but only general praise and encouragement.

After a selection had been made by the children, they were required to show the appropriate face. Children in the <u>modelling</u> groups were asked to show the facial expression to match their selection, and then the researcher showed the appropriate face, matching all of the criteria on the FACS scale. Each child was then asked to show the expression again, and to try to make it like the researcher's. If a child had particular trouble with a facial expression, verbal assistance was given, such as "wrinkle your nose,

like this (demonstrate)". However, only about 25% of the children receiving modelling required this verbal assistance.

Following the selection of the emotion for each vignette the groups with the mirror were simply asked to look into the mirror when they showed a face which matched the emotion selected. All of the groups were then asked to display the emotion even more, for example, "Can you look even happier?" The children were presented with the mirror immediately after the vignette, and kept it until an expression was displayed.

The group receiving both mirror and modelling had the opportunity to look into the mirror while trying to imitate the researcher's expression. The final group received no aids, and was simply asked to show the selected expression using their face. No other instructions were presented.

All of the groups were given up to one minute to respond, with the instructions being repeated once during that time if necessary. If a response was not displayed within one minute, the next vignette was presented. All groups received praise during this phase of the intervention, each time a facial expression was produced in response to a vignette.

Testing.

This phase of the session was videotaped using a portable video-camera, to allow for later scoring of the children's expressions. Video-taping was chosen because it allowed for a more accurate and detailed analysis of each child's facial expression, as each expression could be paused in a still shot. The method also provided minimum distraction to the child, as the video-camera was present during the intervention phase

(although not turned on) to allow the children to become comfortable with the camera. The video-camera was located next to the researcher, so that the child's face would be viewed from the front. The children were told that the camera was there to film the puppets telling a story, but they would also be seen on the tape.

This phase took place immediately after the intervention phase. No aids were provided at this stage for any of the groups, and the testing phase procedure was identical for all groups. The children were simply presented with the following instructions:

"I have two puppets who are going to tell you a story. I want you to think about how you'd feel if the stories were happening to you. The puppets are going to stop and ask you how you would feel, and I want you to make a face to show them how you would feel, just like we were doing with the practice stories. You need to listen carefully to make sure you make the right face."

After these instructions were given, the instructor began to present the puppet play (see Appendix B for script). The instructor provided the voice for the puppets, but kept a neutral facial expression at all times. All children received the same story by the puppets. It was broken into small vignettes which elicited different emotions, similar to the individual situations presented in the intervention stage, and they always ended with the puppets saying "Show us how you would feel", or a similar phrase. A 30-second response time was allowed before the next vignette was presented, and the question "How would you feel if that happened to you?" was repeated if the child had not responded after about 20 seconds had elapsed.

Ethical Considerations

Several ethical factors were considered when designing the study to minimise the chance of any problems arising. The emotions focused on in the study were selected as they were not likely to elicit negative feelings or undesired behaviours, as might occur with the emotions of fear, sadness, or anger. The vignettes used to represent each of the emotions were also carefully selected to minimise the chance of eliciting negative feelings that might be associated with each child's background.

Parental consent was obtained in writing from all of the children involved before the sessions were conducted (see Appendix C), and confidentiality of each child's and school's identity has been maintained. All of the children enjoyed the sessions, and treated the production of facial expressions as a game, and showed no signs of distress or reluctance during the collection of data.

Chapter 4

Results

The results are divided into two major sections. The first section examines

children's <u>selection</u> of the correct emotions, and the second section examines their

<u>production</u> of the emotions. Within each section, data will be analysed to show which of

the teaching aids (modelling or mirror) affected student ability, and whether each of the

emotions produced different results.

<u>Selection</u>

In order to determine whether the children could select facial expressions

appropriate to a given situation, the children were presented with six individual trials

requiring them to respond to a short vignette. This involved two trials being given for

each of the emotions of happiness, disgust, and surprise. The emotion was considered to

be correct if the student showed more features (as judged by the FACS) of the desired

emotion than any other. If the correct emotion was selected, the child received a score of

one. The emotion was considered to be incorrect if the child showed more features of a

different emotion than the desired emotion, as judged by the FACS. If the child selected

the incorrect emotion, a score of 0 was obtained. This resulted in a possible score of 2

for each emotion.

The mean scores and standard deviations for each group and each emotion are

shown in Figure 2. This shows the levels of each group's total score for selection of each

of the three emotions. Students who received both modelling and mirror, and the mirror

only scored highly for all of the emotions. Groups not receiving modelling (that is, those

receiving mirror only or no aids) achieved low scores for the emotions of disgust and

surprise. All groups appeared to achieve high scores for the emotion of happiness.
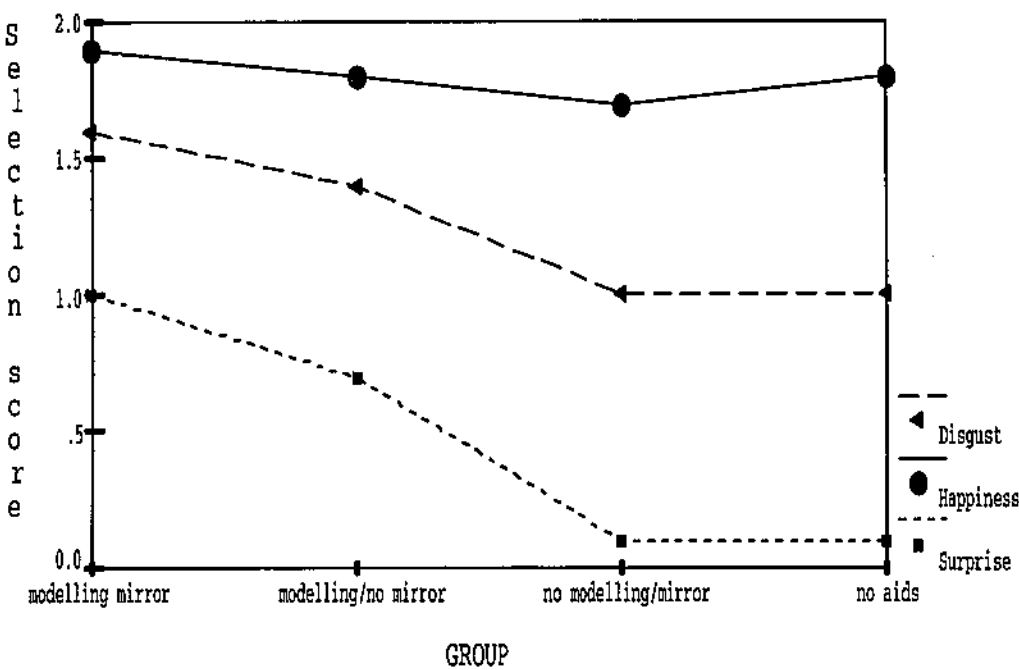
Figure 2

Mean scores for each group's selection of the emotions of happiness, disgust, and

surprise.

Because data were limited to a 2-point scale, it was not considered appropriate to

apply parametric tests to them. Therefore, a Wilcoxon-Mann-Whitney test was

performed for each emotion to determine whether there were any differences between

having modelling and not having modelling, and between having a mirror and not having

a mirror. The results of these tests are shown in Table 4.

Table 4

Significance of modelling in relation to selection of each of the facial expressions tested.

	Happiness		Disgust		Surprise	
	Z	p	Z	p	Z	p
Effect of modelling	.47	.64	2.05	.04	4.12	<.001
Effect of mirror	.33	.74	.41	.68	.12	.90

Analysis of the results in Table 4 showed some of the facial expressions resulted in an aid being significant, while others resulted in the same aid not being significant. Use of the mirror was not found to produce significant increases in selection accuracy for any of the facial expressions tested. Modelling however, had a significant effect on the ability to select surprise and disgust, but that there was no significant effect for happiness. Examination of Figure 2 suggests that no significant gains were made for happiness due to a ceiling effect. That is, students in all groups were already receiving very high scores for happiness before any aids were provided, leaving little room for them to improve. However, the use of modelling improved children's selection of facial expressions in the case of disgust and surprise.

Tests were also conducted to determine whether the facial expression itself affected the ability of the children to select the correct facial expressions, regardless of the aids provided. A non-parametric repeated measures ANOVA -- the Friedman 2-way ANOVA by ranks -- showed that the emotion being focused on was significant in

determining accuracy of selection (χ^2[2, $\underline{N}$ = 40] = 53.07, p<.001). This means that the different emotions were of different difficulties, some were easier to select than others. Figure 2 clearly shows that although significant differences are present between the two groups receiving modelling, both groups more accurately selected the emotion of happiness, with scores decreasing for disgust and surprise.

In summary, it is clear that the mirror was not effective for producing improvements in children's accuracy of selection, while modelling did produce significant effects for selection of the expressions of disgust and surprise, while not producing any significant improvements for the expressions of happiness.

Production

As described above, children responded to two vignettes for each of the three facial expressions, in order to test their ability to produce facial expressions. Children were given a score for each expression related to the accuracy of their expression. One point was given for each of the components of the desired expression which the child displayed. Each expression consisted of six components, based upon the FACS, as outlined in the method, resulting in a possible mean score of six for each emotion. The mean FACS score for each group is shown in Table 5.

Table 5

Mean scores and standard deviations for each group's accuracy of production.

Group	Happiness (Mean, SD)	Disgust (Mean, SD)	Surprise (Mean, SD)
Modelling/mirror	5.10 (0.88)	4.10 (1.41)	2.45 (1.17)
Modelling/no mirror	4.75 (1.21)	3.00 (1.87)	1.70 (1.29)
No modelling/mirror	4.50 (1.84)	1.55 (1.64)	0.20 (0.63)
No modelling/no mirror	3.95 (1.83)	1.30 (1.16)	0.25 (0.79)

Table 5 shows that generally high scores were achieved for happiness and generally low scores were achieved for surprise. The scores also appear to be much lower for the groups who did not receive modelling than for the groups that did receive modelling, especially for surprise and disgust. To determine whether these differences were significant, a 2 (modelling) x 2(mirror) x 3 (facial expression) ANOVA was conducted. The results of the ANOVA are shown in Table 6.

The difference between the groups receiving modelling and the groups not receiving modelling was found to be significant. In particular the use of modelling was found to lead to significant gains in students' ability to produce facial expressions accurately. No significant gains were made by the students receiving the mirror treatment. This means that modelling was an effective technique for increasing the students' accuracy of production, while the mirror made no significant difference to the production of facial expressions. No significant interaction between the two methods of

instruction was found. The mirror had no significant effect in both of the groups in which it was used, and it can be assumed that the modelling alone was responsible for the significant gains made by the group receiving both mirror and modelling.

Table 6

Results of the 2 (modelling) x 2 (mirror) x 3 (facial expression) ANOVA.

Effect	df	F	p
Modelling	1, 36	27.91	<.001
Mirror	1, 36	2.78	.10
Facial expression	2, 72	78.68	<.001
Modelling x Mirror	1, 36	.67	.42
Modelling x Facial expression	2, 72	3.77	.03
Mirror x Facial expression	2, 72	.18	.83
Modelling x Mirror x Facial expression	2, 72	.58	.56

As can be seen in Table 6, the ability of the students to produce accurate expressions was influenced not only by the aids which they received, but also by the expression which was being produced. Tests of within-subjects effects showed that differences between the expressions were significant. That is, children were more able to produce some of the expressions, than others. The presence of an interaction between the

modelling and facial expression (as will be discussed shortly), help to confirm this argument.

Comparisons were conducted to determine which expressions were different in terms of accuracy of production. Significant differences were found between happiness and disgust, and between surprise and disgust. Tests showed that children were more accurately able to produce the expression of happiness than disgust (F [1, 36] = 52.79, p <.001), and that they were more accurately able to produce disgust than surprise (F [1, 36] = 71.56, p <.001). The fact that these differences occur for the overall sample suggests that happiness is an easier expression to produce than disgust, and disgust easier than surprise.

It was also found that there was a significant interaction between modelling and facial expression, as shown in Table 6. That is, modelling appears to have a greater influence for some of the emotions, and a lesser influence for others. Comparisons showed significantly greater differences between modelling and no modelling groups for disgust than for happiness(F [1, 36] = 6.15, p = .018), but no significantly greater differences between modelling and no modelling groups for surprise than disgust (F [1, 36] = .31, p = .58).

The finding of a significant interaction is of particular importance, as it clearly shows that the modelling had an effect on the children's ability to produce facial expressions, and also that some expressions were able to be improved more than others. Figure 3 illustrates this interaction by showing the FACS scores of the groups receiving modelling as compared with those not receiving modelling. In order to show the

interaction more clearly, the mirror conditions have been combined since there was no significant difference between them. This figure shows that greater gains were observed in children's abilities to produce disgust than happiness when they receive modelling, but similar levels of gain are shown between disgust and surprise. As with selection, it is possible that the failure to obtain increases for happiness was due to a ceiling effect, as high scores before intervention left a smaller margin for improvement in happiness than in disgust and surprise. It is possible that higher levels of improvement may have been observed if initial scores for happiness had been lower.
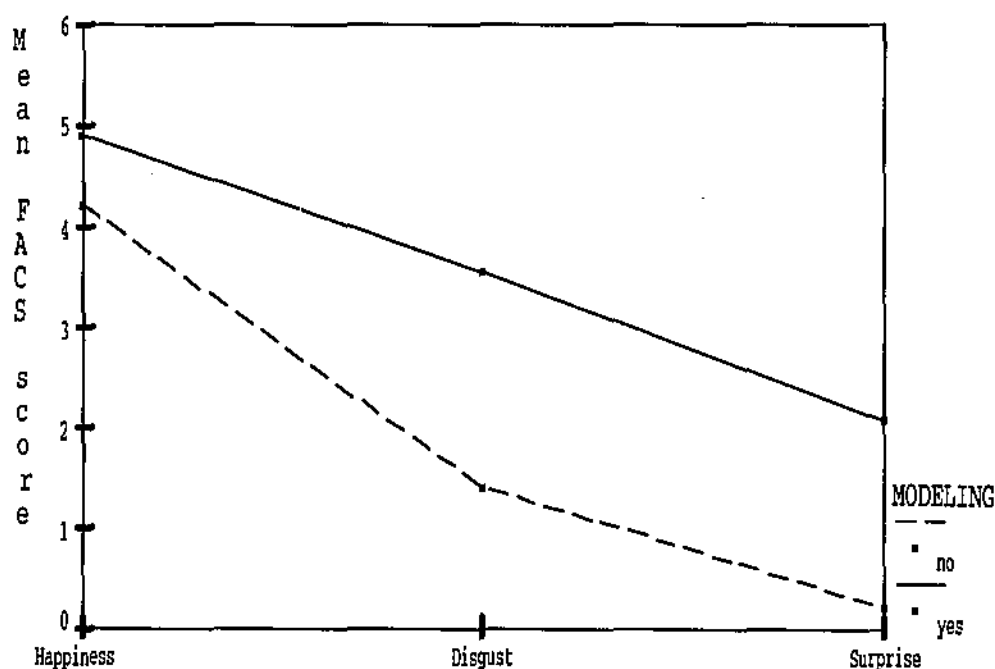
Figure 3

Mean FACS scores for each group receiving modelling and no modelling.

No interaction was found between mirror and facial expression, probably due to the minimal effect the mirror had on production ability, and likewise, no interaction was found between all three variables used in the ANOVA (mirror, modelling, and facial expression.

In summary, the results show that the mirror had no significant effect on selection or production, regardless of the emotion involved. Modelling had a significant effect on both selection and production of facial expressions, although this effect was present for the facial expressions of disgust and surprise and not for happiness. When looking at production alone, an interaction was present between the modelling and the emotion being selected, with happiness increasing less than the emotions of surprise and disgust.

Chapter 5

Discussion

This chapter discusses the results of the study and their implications for future research and for classroom practice. The discussion of the results will be broken into a discussion of the effects of modelling and a discussion of the effects of the mirror. Applications of the study to natural situations and generalisation will then be discussed, followed by a discussion of what future research could be developed as a result of this study's findings to further enhance the use of modelling, and to make the study more natural and able to be generalised. Finally, implications for the classroom will be discussed, stating what the findings of the study mean in terms of classroom teaching.

Effects of modelling

The first research question asked whether children with mild to moderate intellectual disabilities select and produce facial expressions more accurately when a model is provided than when no model is provided. The results showed that modelling had a significant effect on the children's' ability both to select and to produce facial expressions. Because children were able to imitate an accurate production of the required facial expression, their own accuracy of production increased. The significant improvements displayed by the modelling are consistent with the theory of modelling developed by Bandura, who expressed modelling to be "one of the fundamental means by which new modes of behaviour are acquired" (1969, p. 118). Bandura stated that if a person could see a behaviour, that person is likely to copy the behaviour and acquire new

skills as a result. This is likely to occur especially if the behaviour is modelled accurately, as the production of facial expressions was in this study. Because the children in the study could see exactly what their face was supposed to look like when expressing a certain emotion, they were able to imitate the expression and therefore display more accurate facial expressions than the groups who were not exposed to the same model.

The findings are also consistent with the findings of Field and Walden (1980) who used models provided as photographs, and found that the photographic models elicited the greatest increases in production accuracy when compared to other techniques used. The findings are also consistent with those of Stewart and Singh (1995) who used instructor modelling in conjunction with directed rehearsal and photographic models, and found that the aids used in combination produced increased production abilities. Because Stewart and Singh (1995) used modelling in combination with other teaching aids, it was not clear which aid was in fact having an effect on the children's abilities. For example, when modelling was used in combination with directed rehearsal, children's accuracy in production increased, but it was not possible to state whether the modelling or the directed rehearsal caused the increases in student ability. From the present study, however, it is evident that modelling alone was sufficient in producing the changes in student's abilities. Therefore, in the study by Stewart and Singh it is possible that the models used (including both photographs and instructor modelling) may have caused the increases in student ability, with the other aids having no effect. It is clear from the present study and other studies that modelling (live and photographic) affects

production, but it is not clear to what extent directed rehearsal had an additional influence.

The theoretical framework of the study showed that modelling consisted of both instructor facial modelling and verbal instructions. It is worth considering the likely effects of each of these two aspects of the modelling intervention. First of all, in regard to selection of the correct facial expression, it is likely that the instructions had the greatest influence on accuracy, because the instructions suggested the possible expressions (for example, "I think I would feel happy"). On the other hand the physical modelling emphasised the instructions only by production of the expression. In order to score highly for selection of the facial expressions, no skills in production were necessary. The use of verbal instructions in modelling was also found to be important by McAlpine, Singh, Ellis, Kendall, and Hampton, who taught children to recognise facial expressions more accurately through explicit verbal instructions when a photograph was present.

However, with regard to the second dependent variable which was how well children produce the facial expressions, the instructions were only provided to a minority of the children (about 25%). These were the children who were having particular difficulties with producing the facial expression accurately, and this intervention was designed to help them acquire the facial movements necessary for each expression. It is not likely that the assistance given only to a small percentage of the children would have produced significant effects on the whole group's ability to produce facial expressions, whereas the whole group received facial modelling. Therefore it is likely that the

physical modelling itself had the greatest influences in increasing children's ability to produce facial expressions accurately.

When theories of modelling were examined, it was stated that modelling was thought to be an implicit mechanism which most people use as a way of learning. It was also suggested that the deficits in the ability of people with intellectual disabilities to produce appropriate facial expressions may be due to deficits in their ability to learn from implicit modelling. The results of this study show that if children with intellectual disabilities are exposed to explicit modelling, they can be taught to produce facial expressions more accurately.

Because the results of the study showed modelling to be a significant teaching method for facial expressions, it is possible that the method would also be useful for teaching other social skills. Like facial expressions, social skills in general are better taught through actions and practice than by means of complex explanations in words, especially for children with intellectual disabilities. This is also important when we consider how the children will generalise the skills which they are taught. Generalisation is more likely to occur if children are taught skills in situations similar to those in which the skills will be used, and also when the skills are taught in a way similar to the way in which they will be used. Teaching children to produce expressions using words may teach children to explain these expressions in words, but not necessarily generalise this skill into actual productions of the expression. When children are involved in natural social interactions, they will be required to produce facial expressions, not describe them in words. Modelling teaches through actions not words, and is therefore more likely to

be generalised into natural situations. Several studies have investigated the possibilities of using modelling to teach a variety of social skills, such as maintaining eye contact, and developing socially acceptable behaviours (Ballard and Glynn, 1986: Koegal and Frea, 1993).

Effects of modelling on different emotions

The third research question asked to what extent the use of a model and a mirror influences children's selection and production of the three facial expressions of happiness, disgust, and surprise. It was found that modelling was effective for improving production accuracy for the facial expressions of disgust and surprise, while having no significant effect on the ability to produce the facial expression happiness. It is likely, however, that no significant improvements were made for happiness due to a ceiling effect, in which the children's scores were quite high before any modelling was received, resulting in very little room for improvement.

The fact that scores on the FACS scale were generally high for the emotion of happiness, lower for disgust, and even lower for surprise, whether or not modelling was received indicates that the emotions are of different difficulties to produce. This in agreement to the findings of several previous studies, including Ekman, Roper, and Hager (1980), McAlpine, Kendall, and Singh (1991), and McAlpine, Singh, Kendall, and Ellis (1992). All of these authors found that participants were able to produce happiness more accurately than disgust, and able to produce disgust more accurately than surprise.

From these consistent results, it is clear that happiness is an easier emotion to produce than disgust, and disgust is an easier emotion to produce than surprise.

There are several possible explanations for this. The first is that the facial movements involved for happiness are easier for the child to make than the facial movements involved in disgust or surprise. The main facial movement for happiness is the movement of the mouth, with the cheeks raising naturally with the smiling action. The brow remains neutral, while the eyes close slightly forming "crows feet" wrinkles. All of these actions seem quite simple in comparison to the complex movements involved in the production of disgust, which include wrinkling the nose, pushing the lips up and forward, and pushing the brow downwards, all at the same time. However, this theory is questionable when the components of surprise, the most difficult of the three emotions to produce are considered. The facial movements involved in surprise seem to be less complex than those involved in disgust, with opening of the mouth and widening of the eyes being the two major components, while the cheeks and brow remain neutral. Children in this study were able to open their mouth, but often had trouble opening the eyes wide at the same time. However, it is highly likely that children in this study obtained generally low scores for producing surprise as a direct result of their very low accuracy in selecting surprise, as this automatically resulted in a FACS score of zero. In this study, 95% of children scored zero for the first surprise vignette, and 55% scored zero for the second surprise vignette, indicating that low scores were due to poor skills in selecting the correct emotion rather than failure to produce the expression accurately once they had selected it.

A second explanation is offered by Gray, Fraser, and Leudar (1983), who state that confusion with the expression of surprise is likely to be lexical rather than perceptual. Gray et al. state that especially in children, the term "surprised" is often considered in terms of a happy surprise, and is therefore often confused with happiness. This explanation was given in terms of production accuracy, but would also explain the low selection scores achieved in this study for surprise. If children were considering surprise to be a happy emotion, they would have been less likely to select surprise for the vignettes presented, as these were neutral and contained no element of happiness.

A final possible explanation is the extent to which children see the different facial expressions modelled in their everyday life. It is likely that happiness is an expression seen very frequently, and probably more often than disgust or surprise. Disgust is probably modelled occasionally, but surprise is rarely seen in isolation. Rather it is more often produced in natural situations as a blend with another emotion (Ekman & Friesen, 1975). For example, people often experience a happy surprise, such as a birthday party, or a fearful surprise, such as when they see a spider, or are startled by an unexpected person. As a result of the natural imitation of models, the greater exposure to happiness would have provided more opportunities to acquire the skills necessary for accurate production. The much rarer exposure to the modelling of surprise in isolation would help to explain the great difficulties children seem to have in its production.

The amount of exposure children have to the different emotions is possibly also related to what is considered to be acceptable in our society. Smiling and displaying happiness is not only considered to be acceptable in a wide variety of situations, but it is

also often a desired emotion. For example, people often smile when they greet people, when they show approval or acceptance of others, or simply when they are having a good time. Therefore happiness is displayed frequently. Disgust is less socially acceptable, and is not often shown in public. The rules of social interactions generally result in disgust only being displayed in private settings, except in extreme situations. For example, when at home, a person may express their dislike of a certain food in order to communicate that they would not like the item to be purchased again. However, when in public, the expression of dislike for a food is often suppressed as a result of what is socially accepted. Likewise, surprise is not an emotion which people seek to encounter, and while it is socially acceptable to display surprise, there are limited situations which elicit such a response. It is also likely that surprise is displayed in milder forms, so all of the FACS features are not displayed. People often raise the eyebrows to show surprise without opening the mouth at all, or when the mouth is opened it may only be a slight movement.

The improvements in student's selection abilities are also possibly influenced by their lack of exposure to the different emotions. Perhaps because they rarely saw surprise in the natural community, children did not think of it as a reaction to the situations provided. However, when the researcher expressed the emotion as a possibility, children were reminded of the emotion, and decided that it was appropriate to the situation being considered. As stated by Bandura (1969), modelling not only teaches new behaviours, but reminds people of behaviours and knowledge which already exists. All children

expressed an understanding of the emotion of surprise, but perhaps did not consider it until reminded of its existence.

In summary, modelling was found to produce significant improvements in children's ability to select and produce facial expressions. It was found to have a greater effect for surprise and disgust than for happiness, but it is likely that this is due to a ceiling effect. It was found that happiness was easier to produce than disgust, and disgust was easier to produce than surprise, which is in agreement with the findings of several other studies.

Effects of the mirror

The second research question asked whether children with mild to moderate intellectual disabilities select and produce facial expressions more accurately when a mirror is present than when no mirror is present. No significant changes were found as a result of using the mirror to provide feedback to children. This indicates that it is not a successful form of feedback for improving children's abilities to select and produce facial expressions accurately. This appears at first sight to be contrary to the findings of Field and Walden (1980), and Stewart and Singh (1995), who both found the mirror to produce increases in participants' abilities to produce facial expressions accurately. However, as already mentioned, in those studies the mirror was always used in conjunction with some form of modelling, and so while it may seem that the mirror was having an effect, it is quite possible that all observed improvements were in fact due to the modelling that was provided rather than the mirror. No previous studies have used a

mirror as a form of feedback to improve accuracy in selection, and the lack of improvements indicate that the technique is not useful in eliciting improvements in this area.

There were no differences in the effect of the mirror between the different emotions. While the emotions were shown to be of different difficulties to produce, no significant improvements were made for any emotion. There is no evidence in this study that the mirror is useful for teaching children to select and produce facial expressions for any of the emotions taught in this study. Further tests would need to be conducted to determine whether it would produce improvements for the other key emotions of sadness, anger, and fear. However, results of this study suggest that this is not likely.

While feedback has been considered to be important in the acquisition of new skills, this study shows that the mirror was not an appropriate form of feedback for teaching skills related to selection and production of facial expressions. The finding that the mirror was not providing appropriate feedback appears to disagree with the theory that feedback is necessary for acquisition of new skills, because improvements were possible without the mirror feedback when modelling was received. However, while the modelling was producing improvements, it is also possible that some other form of feedback was being provided to the child. Praise was given to all children on all attempts at production, but the effects of this are unlikely to produce changes because all attempts, whether accurate or not, were praised. Therefore it is likely that the children were receiving other forms of feedback that were not identified in the study. For example, in all of the children, afferent fibres would be providing feedback about

muscular movements, resulting in the child feeling the muscle movements in their face. People do not need a mirror to know if their eyebrows are raised or if their mouth is open or closed. They can feel it quite clearly even if they are not aware how their face looks to another person. Maybe this is sufficient without any visual feedback. The lack of significant effects for the mirror indicate that knowing how one looks to another person does not influence the expression produced by a person, and it is likely that the feelings in the face are a much stronger form of feedback. Therefore it is not possible to conclude that feedback was not a factor in eliciting improvements in children's abilities, only that the mirror was not an effective form of feedback.

Application to natural situations

There are several factors that need to be considered when interpreting the results and how relevant they are to the natural social interactions that the child will encounter. The first consideration relates to how genuine the facial expressions are when they are produced. For example, when engaged in natural experiences, expressions are likely to be produced naturally, often without thought, based upon the emotions being felt. However, if children practise often enough, eventually the movements will become automatic. The skills of manipulating the face are likely to become natural movements not requiring thought, and these movements, if practised enough, will improve the skills which the child originally possessed. These new movements will therefore be more accurate, leading to fewer misunderstandings in communication.

It is also important to consider which emotions are appropriate to produce in each individual social situation. It is not always appropriate to display how one feels, and so it is necessary to communicate a different emotion. For example, a common reaction to brussel sprouts might be disgust. However appropriate this may be at home, at a formal dinner it would not be appropriate to scrunch up the nose and show a disgusted face. There are many instances where it is not always appropriate to display one's real feelings, and children need to be aware of these. This study did not provide children with enough information in the vignettes to decide whether or not it would be appropriate to display the emotion felt, but children do need to be made aware of these "social rules". Therefore it is important to be aware of the rules of communication which most people develop simply through being involved in the community. Making this knowledge explicitly clear is especially important for children with intellectual disabilities who do not always pick up these rules from social models. However, these rules are an implicit part of society, and failure to abide by them may lead to a lack of acceptance or a failure to communicate effectively.

A behavioural approach was the focus of the present study, with no cognitive instructions being provided. While it was shown that behavioural training techniques can be effective in teaching children to more accurately select and produce facial expressions, the possible benefits of providing cognitive instructions was not investigated. It is possible that more difficult expressions to produce (such as surprise) may be made easier to produce if the children developed a cognitive understanding of the meaning of the emotion and the social context in which it occurs. While some

understanding of each of the emotions investigated was established in all of the participants, the depth of this understanding was not known. Therefore it is possible that the more accurately produced expressions were those about which the children had developed the greatest cognitive understanding.

The present study provides a teaching setting which is somewhat more natural than those used in previous studies. By providing children with vignettes, they were able to imagine what it would feel like in such a situation, and react accordingly. In previous studies, children were simply told which facial expression to produce, and then produced an expression without necessarily thinking about how they would really feel or about the context in which such emotions might arise. Teaching children in real contexts is likely to lead to greater generalisation of the skills taught. Children who were able to produce facial expressions more accurately after the intervention were likely to be able to remember some of the features of the face to move when they felt a certain emotion. However, generalisation was likely still to be limited, as the interaction between the researcher and the children was not a completely natural social interaction. Full generalisation is likely only to occur if teaching occurs in an entirely natural situation, and with real social interactions. Full generalisation is promoted if instruction is given in a variety of situations which are as close as possible to the real situations in which the skills will be used, and if the amount of prompts given for behaviours and the amount of praise/reinforcement provided are gradually decreased as the child acquires the skills being taught (Wolery, Bailey, & Sugai, 1988).

Limitations of the study and implications for future research

There are several limitations of the present study which suggest possible areas for future research. A major limitation of the study was that it only involved one short session with each child. While this shows how quickly modelling can be effective, it fails to show any long term effects of the intervention. For example, it is not possible to say whether the children maintained the skills they were taught after the session, and it is not clear whether the skills would have been generalised into natural social interactions. After such a short intervention, it is unlikely that generalisation would have occurred, but further investigations need to be conducted to determine whether generalisation of the skills required for selection and production of facial expressions could be taught, and to determine whether the skills are maintained after instruction is no longer provided.

Interpretation of the results is also limited by the lack of investigation into the interpretations of the verbal instructions made by the children. It is possible that differences in abilities to produce and select facial expressions was affected by the verbal abilities of the children. However, the use of randomly selected groups and the Peabody Picture Vocabulary Test aimed to minimise the occurrence of verbal differences as opposed to differences in the ability to select and produce facial expressions. These precautions minimised the chances of children within a certain ability group being assigned to any particular group, but they do not provide any information as to the level of understanding demonstrated by the children. Therefore it is not clear in this study whether differences between individuals were due to differences in the degree to which

the instructions were understood, or differences in the abilities to select and produce facial expressions.

The findings of this study show one method suitable for teaching children to select and produce different emotions. However, there may be techniques which enhance the effectiveness of teaching children to select and produce facial expressions, and these need to be investigated. Certainly modelling is an effective technique, and so perhaps it is logical to investigate ways of making the modelling technique more effective. For example, this study used the adult researcher as a model to children. Perhaps a more effective technique would be to use models of the same age who have well developed selection and production skills. It is possible that this will produce better results. This suggestion is based upon the study by Field and Walden (1980), who found that when using photographic models, photos of children produced better results than photos of adults. It is likely that this finding will also be true when using live models, as the use of peers can be used effectively for promoting generalisation. Peers are people whom the child would naturally interact with in a social manner, and teaching can be taken out of the classroom and into the real social situations in which interactions occur. If models are carefully selected, modelling may even become an ongoing strategy, in which there is not necessarily an allocated teaching time.

This study has moved away from artificial to natural situations in which children respond to vignettes which elicit different emotions. However, a limitation of this study is the lack of real interactions present in the intervention, and the lack of information provided regarding the social setting of the vignettes. When considering the children's

generalisation, and also the emotion involved in producing a facial expression, teaching

of the skills of production and selection should be carried out in an environment which is

as natural as possible. While it is perhaps not possible to teach the skills in an entirely

natural environment, it may be possible to move another step closer, allowing the

children to consider the effects of the context of a situation, and whether it would be

socially appropriate to produce a selected expressions. The use of role play and drama

may be one technique for doing this, while also incorporating the use of peer models. For

example, children may be able to act out vignettes like those used in this study, requiring

the children to interact with other children, and requiring all participants to respond to

the different events which may occur. Drama has been successfully used to teach social

skills in the past. Bieber-Schut (1991) used drama to teach social skills to visually

impaired adolescents, and Goodwin (1985) found drama to significantly improve the

social skills of young people with intellectual disabilities. This technique may also have

uses in teaching children with intellectual disabilities to consider the social situation and

how appropriate it is to produce the real emotions being felt. If children are actually

involved in a social situation by acting it out with other people, it will be easier for them

to determine whether it would be socially acceptable to display an emotion, and errors in

this judgement may also be corrected by the responses of the other participants.

While it was found that the mirror was not an effective form of feedback for

teaching selection and production of facial expressions, it is possible that greater

improvements could occur if appropriate feedback was provided, which may include

verbal feedback of what the child is doing right and wrong. For example, "you are

wrinkling your nose really well", or "you need to practice raising your eyebrows".

McAlpine, Singh, Ellis Kendall, and Hampton (1992) provided children with

information about how to move individual parts of the face to produce an expression.

However, this was used as a form of instruction, and no feedback regarding the facial

movements was provided to the children as to whether they had produced the expression

accurately or not after they had attempted to follow the instructions. Perhaps the use of

other forms of feedback to improve the selection and production of facial expressions

could be an area for further investigation. While it would be difficult to examine the

effect of feedback provided through feelings in the face, other forms of feedback which

could be effective may include video taping children's actions and letting them evaluate

their own actions, or having peers provide direct feedback as to what alterations the child

needs to make to the face to make a more accurate production of the facial expression.

Implications for classroom practice

As a result of this study, it is evident that modelling is a technique which will

lead to improvements in children's abilities to select and produce facial expressions.

Within the classroom, this technique can be used with ease as it does not require large

amounts of resources, only the teacher and possibly another student. While the

researcher and the children in this study worked on a one-to-one basis, it is likely that the

modelling technique could be used effectively with small groups of children, so large

time resources are not necessary. Improvements are also seen very quickly. This study

involved only one 15-minute training session before significant improvements were

observed. However, no maintenance of the skills was measured at a later stage, and so it is possible that several of these sessions will be required if the skills are to be maintained and generalised. Generalisation will also involve providing modelling in a variety of social contexts and providing a variety of situations, but time is still minimal when compared to other possible teaching techniques.

Children with intellectual disabilities often have poor social skills and limited accuracy in the selection and production of facial expressions. Modelling has been shown to be useful in improving these skills, and could possibly be transferred into the training of other social skills, such as teaching children to maintain eye contact, or to initiate interactions, as mentioned earlier. While development of skills is the key consideration when selecting a teaching technique, the modelling technique has the advantage of being enjoyable for the child. For example the use of puppets in this study can be used in the classroom situation, and other interesting techniques and situations can be adapted to meet each individual child's interests

Conclusions

This study has clearly shown that modelling is an effective technique for teaching children with intellectual disabilities to select and produce moderate and very difficult facial expressions. If people are to achieve their full potential in life, it is essential that they can communicate effectively in a wide variety of social situations. Children with intellectual disabilities are not an exception and need to be able to communicate their feelings effectively. They often will not be able to do this unless explicit instruction is supplied. The fact that children with intellectual disabilities have poor skills in

accurately producing and selecting facial expressions shows that they do not learn as well as average children from the models they see everyday in the community, and so they need to be directly taught the skills necessary for effective communication.

It is often the teacher's responsibility to provide children with the skills they will need to succeed in life, therefore teachers need to know how best to teach children the skills necessary for effective communication. With the restraints on time and resources in the classroom, modelling is a technique that the teacher can use and know that it is likely to be successful. The technique can be used easily in the classroom, and is particularly desirable due to the small resources necessary. Modelling is a technique that can be fun for all of its participants, with variety and interest easily provided, but most importantly, it has been shown to work.

References

Adams, K., & Markham, R. (1991). Recognition of affective facial expressions by children and adults with and without mental retardation. American Journal on Mental Retardation, 96, 21-28.

American Psychiatric Association. (1994). Diagnostic and statistical manual of mental disorders. (4th ed.). Washington D. C.: American Psychiatric Association.

Ballard, K. D., & Glynn, T. (1986). Videotape modelling in behaviour therapy: An outline of principles and potential. Behaviour Change, 3, 16-25.

Bandura, A. (1969). Principles of behaviour modification. New York: Holt, Rinehart, and Winston.

Bandura, A., & Walters, R. (1963). Social learning and personality development. New York: Holt, Rinehart, and Winston.

Bieber-Schut, R. (1991). The use of drama to help visually impaired adolescents aquire social skills. Journal of Visual Impairment and Blindness, 85, 340-341.

Braverman, M., Fein, D., Lucci, D., & Waterhouse, L. (1989). Affect comprehension in children with pervasive developmental disorders. Journal of Autism and Developmental Disorders, 19, 301-315.

Dunn, L. M., & Dunn, L. M. (1981). Peabody Picture Vocabulary Test (PPVT) - Revised: Manual for forms L & M. Circle Pines, Minn.: American Guidance Service.

Ekman, P., & Friesen, W. V. (1975). <u>Unmasking the face.</u> Englewood Cliffs: Prentice Hall.

Ekman, P., & Friesen, W. V. (1978). <u>Facial action coding system (FACS): A technique for the measurement of facial action.</u> Palo Alto: Consulting Psychologists Press.

Ekman, P., Friesen, W. V., & Ellsworth, P. (1972). <u>Emotion in the human face.</u> New York: Pergamon Press.

Ekman, R., Roper, G., & Hager, J. C. (1980). Deliberate facial movement. <u>Child Development, 51,</u> 886-891.

Field, T. M., & Walden, T. A. (1982). Production and discrimination of facial expressions by preschool children. <u>Child Development, 53,</u> 1299-1311.

Goodwin, D. A. (1985). An investigation of the efficacy of creative drama as a method for teaching social skills to mentally retarded youth and adults. <u>Children's Theatre Review, 34,</u> 23-26.

Gray, J. M., Fraser, W. L., & Leudar, I. (1983). Recognition of emotion from facial expression in mental handicap. <u>British Journal of Psychiatry, 142,</u> 556-571.

Grossman, H. J. (ed.). (1983). <u>Classification in mental retardation.</u> Washington, D. C.: American Association on Mental Deficiency.

Hobson, R. P., Ouston, J., & Lee, A. (1989). Recognition of emotion by mentally retarded adolescents and young adults. <u>American Journal on Mental Retardation, 93,</u> 434-443.

Huffman, A. L. (1978). Biofeedback treatment of orafacial dysfunction: A preliminary study. <u>Journal of Occupational Therapy, 32,</u> 149-154.

Kern-Dunlap, L., Dunlap, C., Clarke, S., Childs, K. E., White, R. L., & Stewart, M. P. (1992). Effects of a videotape feedback package on the peer interactions on children with serious behavioural and emotional challenges. Journal of Applied Behaviour Analysis, 25, 355-364.

Krantz, P. J., McClannahan, L. E., & Poulson, C. L. (1996). Training and generalisation of behaviour in youth with autism. Journal of Applied Behaviour Analysis, 29, 291-304.

Koegal, R. L., & Frea, W. D. (1993). Treatment of social behaviour in autism through the modification of pivotal social skills. Journal of Applied Behaviour Analysis, 26, 369-377.

Lerner, J. (1997). Learning disabilities: Theories, diagnosis, and teaching strategies. New York: Houghton Mifflin.

Matson, J. L., & McCartney, J. R. (Eds.). (1981). Handbook of behaviour modification with the mentally retarded. New York: Plenum Press.

Maurer, H., & Newbrough, J. R. (1987). Facial expressions of mentally retarded and non-retarded children: II recognition by non-retarded adults with varying experience with mental retardation. American Journal of Mental Deficiency, 91, 511-515.

McAlpine, C., Kendall, K. A., & Singh, N. N. (1991). Recognition of facial expressions of emotion by persons with mental retardation. American Journal on Mental Retardation, 96, 29-36.

McAlpine, C., Singh, N. N., Kendall, K. A., & Ellis, C. R. (1992). Recognition of facial

expressions of emotion by persons with mental retardation. Behaviour

Modification, 16, 543-558.

McAlpine, C., Singh, N. N., Ellis, C. R., Kendall, K. A., & Hampton, C. (1992).

Enhancing the ability of adults with mental retardation to recognise facial

expressions of emotions. Behaviour Modification, 16, 559-573.

Meltzoff, A. N., & Moore, K. (1993). Early imitation within a functional framework:

The importance of person identity, movement, and development. Annual Progress

in Child Psychiatry and Development, 5-31.

Murphy, S. E. (1987). Mirroring instructional technique: A process evaluation model.

Training and Development Journal, 41, 104-107.

Odom, R. D., & Lemond, C. M. (1972). Developmental differences in the perception and

production of facial expressions. Child Development, 43, 350-369.

Simon, E. W., Rosen, M., Grossman, E., & Pratowski, E. (1995). The relationships

among facial emotion recognition, social skills, and quality of life. Research in

Developmental Disabilities, 16, 383-391.

Siperstein, G. N., & Leffert, J. S. (1997). Comparison of socially accepted and rejected

children with mental retardation. American Journal on Mental Retardation, 101,

339-351.

Stephens, T. M. (1977). Teaching skills to children with learning and behaviour

disorders. Columbus: Charles E. Merrill Publishing Co.

Stewart, C. A., & Singh, N. N. (1995). Enhancing the recognition and production of facial expressions of emotion by children with mental retardation. Research in Developmental Disabilities, 16, 365-382.

Smith, T. Finn, D. M., & Dowdy, C. A. (1993). Teaching students with mild disabilities. Fort Worth: Harcourt Brace Jovanovich College Publishers.

Walbott, H. G. (1991). Recognition of emotion from facial expression via imitation: Some direct evidence for an old theory. British Journal of Social Psychology, 30, 207-219.

Wilczenski, F. L. (1991). Facial emotional expressions of adults with mental retardation. Education and Training in Mental Retardation, 26, 319-324.

Wolery, M., Bailey, D. B., & Sugai, G. M. (1988). Effective teaching: Principles and procedures of applied behaviour analysis with exceptional students. Boston: Allyn & Bacon.

Zuckerman, M., DeFrank, R. S., Hall, J. A., & Rosenthal. R. (1976). Encoding and decoding of spontaneous and posed facial expressions. Journal of Personality and Social Psychology, 34, 966-977.

Appendix A

Vignettes presented to the children during the intervention phase of the study.

Vignettes were presented in the same order to each child. The desired emotion to be elicited is included in brackets.

1. You are eating your lunch. You bite into your sandwich and it is full of flies. How do you feel? (disgust)

2. How do you feel when the teacher tells you that you are a very good boy/girl? (happiness)

3. You are in the swimming pool. Your friend is not wearing a hat, but he/she goes under the water and comes up wearing a hat. How do you feel? (surprise)

4. What is something you really like to do? How do you feel when you get to _____? (insert activity). (happiness)

5. It's a very hot day. Your teacher comes to school wearing a big, warm jumper. How would you feel about that? (surprise)

   Your Mum drops an egg and it lands on your head. How would you feel? (disgust)

Appendix B

Puppet play script presented to the children during the testing phase.

1. Hi! My name's Frank and this is Dudley. We're here today to tell you about some of the things that we have done. The only problem is that we've had lots of things happen to us where we are not quite sure how we feel.

2. Yeah! We'd like you to help us by showing us how you would feel if the same things happened to you. We'll ask you to show us how you'd feel, but you can only show us how you're feeling by using your face.

1. Let's have a practice. Can you show us how you feel about being here today? *(wait for response and praise)*.

2. Great! Well we're really excited to be here. Well I think I might start by telling you one of my stories. One day, when I was little, I went to the zoo. I was allowed to play with all of the friendly animals.

1. How would you feel if you were allowed to play with the friendly animals at the zoo?

Great! I remember one day when I was at school. I bit into a piece of chocolate cake and it was full of mud! How would you feel if that happened to you?

2.   Hey I've got one! One day when I got home from school my brother was breaking all of the plates in the house. Show me how you would feel if someone was breaking all of the plates in your house.

1.   Well one day when I was little, I was sick all over Dudley.

2.   Show me how you would feel if someone was sick all over you.

1.   Well I guess you didn't mind, 'cause remember all of the fun games we played the next day?

2.   Yeah. Can you show us how you feel when you get to play fun games with your friends?

1.   And when we were playing in the sandpit, a fish jumped out of the sand. How would you feel if you saw a fish swimming in a sandpit?

2.   Well that was great fun.

1.   Yeah, thanks for helping us!

Appendix C

Consent letter sent to parents of the children involved in the study.

12th June, 1997

Dear parent or guardian,

During the next few weeks I will be conducting some activities to find out how children
with intellectual disabilities produce facial expressions. This is a social skill which is
essential if children are to communicate effectively. If we are better able to understand
how to teach children social skills, we can teach them to communicate more effectively
and develop more positive social relationships.

I am writing to ask for your consent in including your child in these activities, If you
agree, your child will be taken out of the classroom for approximately 20 minutes, to a
quiet room in the school. They will be provided with several short stories and a puppet
play which they will be asked to respond to using facial expressions. Children generally
enjoy these sessions and treat them as games. Your child's response to each story will be
video-taped. Nobody other than myself will view the tapes, and no names will be
included, not even the name of the school.

If you agree to your child participating in the activity sessions, please complete and
return the consent form below as soon as possible. If you have any questions regarding
the activity sessions, I can be contacted on 9367 4787.

Yours Faithfully

Miss Tracey Rayworth
Bachelor of Education (Honours)
Edith Cowan University

I have read the information above and any questions I may have had have been answered
sufficiently. I, _____ consent to my child, _____
participating in the activity session, realising that I may withdraw at any time.

_____   _____
Signature   Date