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Development and validation of videotaped role plays of the six basic facial expressions of emotion

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Facial expressions of emotion are a cornerstone of appropriate social interaction. Current research shows that populations with different psychopathologies, such as schizophrenics, delinquents, seriously emotionally disturbed children, and the mentally retarded, are deficient in their ability to accurately recognize facial expressions of emotion in others during interpersonal interaction. Individuals with such deficits need social skills training specifically in this area if they are to function successfully in the community. This paper reports the development and validation of a series of role plays of the six basic facial expressions of emotion that can be used for initial and posttraining assessments, or as generalization probes during assessment and training if another modality is used for presenting the facial expressions.

The ability to recognize facial expressions of emotion is often taken for granted, because most people are relatively proficient at differentiating between the six basic emotions. However, although people can discriminate facial expressions of emotion in vivo, there is some question about whether they can perform as successfully given posed photographs, or *role plays*. In fact, some early researchers suggested that the human face did not provide accurate information about emotion, regardless of whether the expression is posed or spontaneously evoked (Bruner & Tagiuri, 1954). However, in a review of the early studies carried out to investigate whether or not facial expressions provide accurate information about emotions, Ekman (1982) concluded not only that the negative results were attributable to methodological weaknesses, but also, when taken together, that they showed accuracy levels to be greater than chance for both spontaneous and posed facial expressions of emotion.

Recent research has shown that people can accurately decode spontaneous facial expressions of emotion that are elicited by everyday life events (Hiatt, Campos, & Emde, 1979; Izard, Huebner, Risser, McGinness, & Dougherty, 1980; Stenberg, Campos, & Emde, 1983). Furthermore, support for Ekman's (1982) claim that accurate judgments of facial expressions of emotion are possible comes from a number of studies which show that people's ability to identify facial expressions of emotion is indeed better than chance (Anderson & Buller, 1981; Carlson, Gantz, & Masters, 1983; Field & Walden, 1982; Harrigan, 1984; Knudsen & Muzekari, 1980; Reichenbach & Masters, 1983).

Research has established that facial expressions are a reliable clue for determining a person's emotional state, and that movement of specific facial muscles denotes particular emotions (Boucher & Carlson, 1980; Ekman & Friesen, 1971). Furthermore, a number of cross-cultural studies have shown that the six basic facial expressions of emotion are universal (Boucher & Carlson, 1980; Ducci, Arcuri, Georgis, & Sineshaw, 1982; Ekman & Friesen, 1971).

A number of systems have been developed for measuring facial movements that are involved in the facial expression of emotion (Ekman, Friesen, & Tomkins, 1971; Izard, 1982; Izard & Dougherty, 1982). However, these systems do not differentiate between spontaneous and posed facial expressions, even though we know from naturalistic studies exactly which facial movements are associated with each of the six basic emotions (Ekman, 1982). In discussing posed facial expressions of emotion as stimulus material, Ekman (1982) raised a number of questions relating to the generality of the expressions that

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need to be addressed, including: (1) Are the findings relevant to spontaneous facial behavior (generality across settings and eliciting circumstances)? (2) Do the results depend on the few specially gifted actors (generality across persons)? (3) Are the findings attributable to those rare moments when someone emits a decipherable pose (generality across time)? (4) Is exact judgment the privilege of only those who are specially trained as observers (generality across observers)? (p. 15).

Whether posed or spontaneous, facial expressions are difficult for many individuals to decode, including those with schizophrenia (Walker, Marwit, & Emory, 1980; Walker, McGuire, & Bettes, 1984), emotional problems (Zabel, 1979), autism (Hobson, 1986; Tantum, Monaghan, Nicholson, & Stirling, 1989), and mental retardation (Gray, Fraser, & Leudar, 1983; McAlpine, Kendall, & Singh, in press). The ability to perceive, process, and react appropriately to facial expressions of emotion is a social skill that is important in interpersonal interaction. Since social skill deficits have been linked to psychiatric problems (Bellack, Morrison, Mueser, & Wade, 1989) and constitute a determining variable in the diagnosis of mental retardation (Grossman, 1983), it would seem essential that people with such deficits be taught systematically to decode facial expressions of emotion. Furthermore, this skill would need to be taught in such a manner as to ensure generalization to the community and to everyday experiences.

The aim in the present study was to develop and validate a series of 24 role plays depicting the six basic facial expressions of emotion (sadness, happiness, surprise, anger, fear, and disgust). These role plays were developed and validated so that they could be used in initial and post-training assessments in programs designed to teach decoding skills to individuals who show deficits in their ability to recognize facial expressions of emotion.

METHOD

Subjects

Six females and 4 males (mean age = 28 years; range = 23-35 years) participated in the development of the videotaped role plays of the six basic facial expressions of emotion. An additional 5 males and 14 females (mean age = 26 years; range = 18-44 years) participated in the validation study. None of the subjects in the validation study had participated in the development of the videotaped role plays.

Settings

All validation test sessions were conducted in either a small lecture theater or an office. In both settings, the subjects sat directly in front of the video monitor at a distance of 7 ft.

Development of the Role Plays

The 10 subjects recruited as performers produced 120 videotaped role plays depicting the six basic facial expressions of emotion. The role-playing sessions were conducted in the homes of the subjects or in the home of one experimenter (C.M.). The subjects varied in their occupations, with 5 having had limited experience in role-playing. No subject had any acting experience.

All performers were videotaped individually in 30-min sessions, during which time each subject was required to produce the facial expression of each emotion twice. To produce the first emotion, subjects were either given the choice of remembering an experience in which they felt the target emotion or given a standard emotion-evoking situation. The subjects typically chose their own experiences. After completing the first role play for an emotion, the participants filled out a questionnaire, the results of which provided the basis for selecting role plays for the validation study. They were asked if they had expressed a single emotion, and then they were asked to rate a number of questions on a 1- to 7-point scale, including how well the expressions were portrayed, the technique that they used to generate the expressions, the intensity of the facial expressions, and the language used. Following this, they were required to produce the emotion again, but, this time, they were shown six pictures of the emotion prior to the second role play, and the distinguishing features of the emotion were pointed out to them. The pictures were the normed photographs developed by Ekman and Friesen (1975) and used in earlier studies by the authors (McAlpine et al., in press; McAlpine, Singh, & Kendall, 1990). Having completed the role play, subjects filled out the questionnaire once again. This procedure was repeated for the remaining five emotions.

Role plays were selected for the validation study if the participants thought a single emotion was portrayed, and if the role plays had been rated 5 or higher on the questions relating to "how well" and "how intense" the emotions were felt. Of the 120 role plays, 65 met these criteria and were selected for the validation study.

Design

A randomized Latin square design was used, in which 18 subjects were randomly assigned to one of three groups. Each group of 6 subjects saw the videotaped role plays under three different conditions (A, B, C), counterbalanced across groups. The conditions were presented a week apart. Condition A (face only) consisted of viewing the videotapes without language (i.e., picture only); Condition B was the language-only condition (i.e., there was no picture); and Condition C (the face and language condition) included both language and picture.

Procedure

Subjects in the validation study were tested individually, except that, on some occasions, 2 subjects were tested simultaneously in the language-only condition. The purpose of the study was briefly explained to them. They were told that the videotaped role plays were to be evaluated in order to determine the "best" illustrations of the target facial expressions of emotion, and that the role plays were to be used in future studies as part of a generalization test procedure in training persons with mental retardation to recognize facial expressions of emotion. In addition, they were requested to pay particular attention to blends of emotion (i.e., two or more emotions occurring simultaneously).

The subjects were shown the videotaped role plays, which were approximately 15-30 sec in duration. After each role play, the videotape was stopped and the subjects were required to select from a list of the six basic emotions the emotion portrayed in the videotaped role play. In addition, space was provided for the subjects to record their own choice of a label for an emotion, if necessary, and to state whether a single emotion or a blend of emotions was expressed.

The subjects also rated a number of questions on a 7-point scale. These questions were related to the strength of the emotion, to how well the emotion was expressed, to how typical of everyday life the role play was, and to what extent factors other than facial expressions and language influenced the subject's judgment. The questionnaire was the same as that used for the performers. Depending on which of the three conditions the subjects viewed, sessions took approximately 30-60 min.

RESULTS

Even though subjects were counterbalanced across conditions in an attempt to avoid confounding the results, many subjects reported remembering the role plays from previous sessions conducted a week before, suggesting carry-over effects between the three conditions. An analysis of sequence effects was considered of little value, be-

cause the reliability of the role plays had not been established. To minimize carry-over effects, only the results from the subjects' first encounter with the videotaped role plays were used; that is, ratings of the first condition by each group were used and data analyses were based on the ratings of one group of subjects for each condition.

Agreement on the portrayal of a single facial expression of emotion across the three conditions ranged from 84% to 100%, with the exception of two role plays on which there was only 79% agreement among the judges. Of those rated as portraying a single emotion, four role plays of each of the six basic facial expressions of emotion that received the highest agreement scores were chosen. All further analyses were based on the subjects' ratings of these 24 role plays. The mean percent agreement scores across raters on the four different role plays of each of the six emotions in each condition is presented in Table 1.

Condition A: Facial cues. When the subjects were presented with the videotaped role plays without language cues, sadness was judged to be portrayed the best, closely followed by disgust, surprise, and happiness. Fear and anger were rated lower than the other four emotions. Surprise and disgust were rated higher on the intensity scale, followed by fear, anger, happiness, and sadness.

Condition B: Language cues. Ratings related to questions on how influential language was in deciding which emotion was portrayed and ratings of the intensity of language are presented in Table 1. Language was rated more important in decisions concerning disgust and fear, and the language used in the role plays portraying fear was rated as more intense in relation to sadness, anger, and surprise. The language used in the role plays portraying happiness and disgust was rated the least intense relative to the emotions of fear, sadness, anger, and suprise.

Condition C: Facial and language cues. When both picture and language cues were shown on the videotaped role plays, disgust was judged to be portrayed the best, followed by sadness, fear, anger, surprise, and happiness. All emotions, except happiness, were rated high on the intensity scale. Factors other than facial expressions and language may have influenced the subjects' ratings but, as is shown in Table 1, these factors appeared to have only a minor impact. Overall, the role plays were rated as being typical of everyday life situations, with fear being rated as the least typical.

Table 1
Mean Percent Agreement on Four Role Plays of Each of Six Emotions

	Questions			
Emotion	How Well	How Intense	Other Factors	Everyday Life
	Condition A (Face Only)			
Sadness	88.9	80.7		
Happiness	80.7	81.1		
Surprise	81.1	89.3		
Anger	74.6	81.8		
Fear	75.0	83.9		
Disgust	81.4	88.2		
	Condition B (Language Only)			
Sadness	53.2	50.0		
Happiness	55.7	44.3		
Surprise	51.8	48.6		
Anger	55.0	49.6		
Fear	60.7	53.9		
Disgust	62.1	43.9		
	Condition C (Face and Language)			
Sadness	77.5	70.0	33.9	69.3
Happiness	60.7	54.3	23.6	77.9
Surprise	72.5	67.5	24.3	69.9
Anger	72.9	73.6	27.5	74.3
Fear	76.4	73.9	38.9	52.5
Disgust	83.9	69.3	29.3	73.6

Note—In the language-only condition (B), the question was posed in terms of "how influential," rather than "how well."

DISCUSSION

A series of role plays depicting the six basic facial expressions of emotion were developed and validated as being typical of everyday life situations. High levels of agreement on the posed emotions were obtained on four sets of the six basic facial expressions of emotion. The role plays were construed in such a way as to ensure generality, both across persons displaying the emotions and across observers.

These results provide empirical support for the notion that posed facial expressions of emotion can be accurately recognized by untrained observers (Ekman, 1982; Izard, 1971). Furthermore, the subjects in this study were able to portray the six basic facial expressions of emotion upon request. The subjects used different techniques to generate the facial expressions, including deliberately expressing a face to fit a memory of the expression, and then imagining a past emotional experience to recreate the feelings from which the expression flowed. Frequently, however, subjects used a combination of these two techniques. Although no claims can be made as to whether subjects actually experienced "emotion," because this was not measured, some subjects did spontaneously state that they felt the target emotion they were portraying. This claim highlights the need to question subjects with respect to whether the emotion was "posed" or whether the person subjectively "felt" the target emotion, because the changes in the muscle movements correlated with the facial expressions are different between posed and felt emotions (Ekman, 1985).

Surprisingly, happiness was rated as the least well portrayed emotion and as the least intense emotion. The low rating of happiness on the intensity scale may, in part, explain why it was rated as the least well portrayed emotion. It is likely that the subjects equated intensity with how well the emotion was portrayed. Future validation studies must control for this bias in the testing procedure.

In addition, future validation studies should involve much longer periods between the viewings of role plays under each of the three conditions if ratings are to be made by the same subjects. Clearly, in the present study, 1 week was not long enough because the subjects typically reported not only remembering role plays from the previous week, but also being influenced by them in their ratings of the role plays under the second and third conditions.

In summary, this paper reported the development and empirical validation of a set of 24 role plays, four of each of the six basic facial expressions of emotion. These role plays can be used in studies aimed at establishing the current level of proficiency of different groups of individuals (e.g., brain-injured, learning-disabled) in recognizing facial expressions of emotion, or in baseline and intervention assessments aimed at increasing the ability of individuals to accurately recognize the facial expressions of others during social interactions.

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