

Recognition and Understanding of Emotions in Persons with Mild to Moderate Mental Retardation

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Abstract Deficits in intellectual ability have been linked to deficits in emotion understanding and consequently social competence. Research suggests that individuals with mental retardation exhibit deficits in their ability to identify emotional states in themselves and others, relative to normal mental age matched controls and peers and display an inability to decode facial expressions of emotion. Emotional experience is elicited in part by a cognitive appraisal of a situation toward a goal. However, the ecological validity of previous studies is limited. In this study we developed new materials to investigate the emotion understanding skills of persons with mild to moderate mental retardation. Six tasks included faces displaying emotion in context, comic strips, audio, video and audio-visual material of individuals expressing emotions in context. Results indicated that the mentally retarded were able to identify emotions in context than expressions without context and emotion understanding improved with increasing contextual cues and dynamic content.

Keywords Mental retardation · Emotion understanding · Contextual cues · Dynamic content

Intellectual ability has long been considered an important aspect of emotion understanding. Research suggests that individuals with mental retardation exhibit deficits in their ability to identify emotional states in themselves and

others, relative to normal mental age matched controls and peers [1] and display an inability to decode facial expressions of emotion [2]. Emotional experience is elicited in part by a cognitive appraisal of a situation with respect to a goal. Emotions alter thought process often by directing attention toward some things and away from others. According to [3], emotional experiences are passions that happen to an individual, not actions s/he initiates. The subjective aspects of emotions are experiences that are both triggered by the thinking self and experienced by the self as happening to the self. The objective aspect of emotion consists of both learned and innate expressive displays and internal bodily responses. Both subjective and objective aspects of emotions can vary in intensity. Emotions are also expressed through body language or non verbal behavior.

Facial expressions reveal a variety of basic emotions. Even body movement and positioning can convey a certain amount of emotion information. Emotional information is thus conveyed in the form of linguistic (semantic content of spoken language) and paralinguistic (facial expressions, vocal prosody, physical gestures and body postures) cues [4]. Recognition of emotion allows individuals to make quick inferences about the probable intentions and behavior of others. Emotions prepare individuals for action and also determine a change in those actions (how much we delay, approach or avoid and how well we perform a task). Emotion is the link between the event and response and helps shape future behaviour for more efficient interaction and communication with others. According to [2] the ability to distinguish whether a person is happy, furious or surprised is a basic human skill with considerable implications for a person's personal development in the broadest sense. The ability to correctly process emotional expressions of others is a requisite for the development of social competence.

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Deficits in social competence have been officially recognized as defining characteristics of mental retardation for over 15 years (e.g. 2). Researchers have also shown that individuals with mental retardation have diminished abilities in recognizing facially expressed emotions [5]. However, investigators have not determined whether these performance deficits are in fact specific to affective cues. [1] found that subjects with mental retardation did more poorly on emotion tasks than did the control group, but their performance on the control task that required them to discriminate old from young faces did not lag as much behind the control group. [6] have argued that photographs lead to an underestimation of individual's abilities because they lack the dynamic and contextual cues present in day to day interaction. Tasks used in previous studies relied on verbal labeling of emotions despite the finding that individuals with mental retardation often have difficulties with receptive and expressive communication. In fact, the ability to identify emotion has been found in some cases to relate to the cognitive demands of the task being used. The present study therefore tested emotion understanding in mild to moderate mental retardates with stimuli in context, such as pictures, comics or audio visual presentations. It is expected that the mental retardates will be able to understand emotions in context and they will not differ from normal controls when the display of emotions is presented in an appropriate context than in isolation.

Method

Participants

Sixty participants (between the ages of 6–30 years) were selected for the experimental and control groups from scores on the Raven's Coloured Progressive Matrices. Participants for the experimental group were selected at random from Bethany Special School, Koramangala, Bangalore and participants for the control group were children of acquaintances selected at random. By taking at random is meant taking the available participant from a given setting. S/he is considered to represent the group to which s/he belongs. The ages of children selected for the control group ranged from 6 to 12 years. They were normal school going children. The chronological age of the retardates ranged from 12 to 30 years due to unavailability of sufficient numbers as among normal children. There were thirty participants in each group; thirty in the experimental group and thirty in the control group.

Subjects with mild to moderate retardation have IQs that range typically between 70 and 100. Those with IQs between 70 and 84 are considered to be moderately retarded and those with IQs between 85 and 99 are considered

to have mild retardation. In the present study children/adults who score at or below the 5th percentile for that age group, attained grade V (Intellectually impaired) were assigned to the experimental group (mild to moderate retardates). Participants score at or above the 10th percentile for that age group, attained grade IV or below were assigned to the control group (normal children). An attempt was made to take equal numbers of male and female participants in each group. Subjects with mental retardation did not suffer from autism spectrum disorders, attention deficit or any other disability or psychiatric co morbidity.

Materials and Design

The study consisted of six tasks on emotion understanding. All measures were designed for this study, with the exception of the emotion recognition task of photographs without context [7]. To develop new measures, we conducted a pilot study with non disabled individuals to ensure that the faces and situations chosen reflected the specific emotion category required.

Emotion Recognition Task

This task involved the use of six of [7] black and white pictures of faces showing the emotions of happiness, sadness, anger, fear, surprise and disgust. Three pictures showing a man's face expressing one of the six emotions and three showing a woman's face displaying the remaining emotions were chosen. The Ekman and Friesen task has universal application and validity for assessing basic emotions in any cultural setting. (See Fig. 1 for basic emotions [7].

Picture Task

This task made use of sixteen colour pictures of eight emotions expressed in context. Four basic emotions: happiness, sadness, anger, fear and four complex emotions: love, jealousy, pride and disgust. The sixteen pictures consisted of two sets; eight pictures in each set. The first set constituted pictures of basic emotions that had subtle and emphatic expression of the four emotions and the second set constituted complex emotions that had subtle and emphatic expressions of the four complex emotions.

Comic Strips

Sixteen black and white comic strips that displayed eight emotions of which four were basic emotions: happiness, sadness, fear, anger and four complex emotions: love, jealousy, pride and disgust. All of the comics had characters expressing emotions in context. The sixteen comics

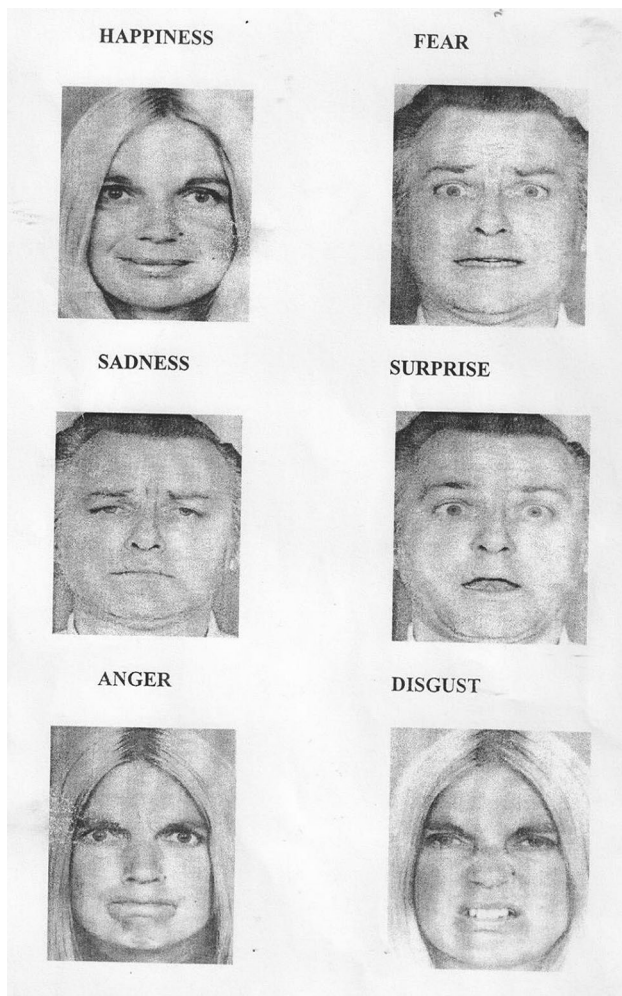


Fig. 1 Ekman and Friesen's faces for basic emotions

also consisted of two sets: eight comics in each set. The first set constituted comics with basic emotions that had subtle and emphatic expressions and the second set constituted comics with complex emotions that had subtle and emphatic expressions.

Audio Task

Four audio clips were used in this task. Each audio clip contained the recording of content and prosody appropriate to one of the four basic emotions; happiness, sadness, anger and fear in two to three sentences lasting for five minutes.

Video Task

Four video clips; each video clip was obtained from films that contained scenes in which one of the four basic emotions: happiness, sadness, anger and fear were seen to be clearly expressed. The video clips were mute to enable

testing of the subject's ability to understand emotions that are expressed in moving images.

Audio-Visual Task

Four audio-visual clips; each audio-visual clip was obtained from films that contained scenes in which one of the four basic emotions: happiness, sadness, anger and fear were seen to be clearly expressed.

Procedure

Children/adults (with and without mental retardation) were administered the coloured progressive matrices after which they were assigned to the experimental and control groups in accordance to their scores. The emotion tasks were then administered over six sessions to each participant.

Emotion Recognition and Picture Task

Persons with mild to moderate mental retardation were administered the emotion recognition task (which contained six of [7] Pictures of Facial Affect). A time limit of five minutes was allowed for each participant to respond to each picture. Their responses to each emotion was scored and recorded by the researcher and a co-rater using a four point rating scale (described below in scoring). Cohen's Kappa value (for inter-rater agreement) was found to be .90 indicating 'almost perfect' concordance for each of the tasks. This scoring method [9] was used for scoring all the tasks.

Pictures in Context; Subtle and Emphatic

There followed a short pause between the presentation of the two sets of pictures (subtle and emphatic expressions). Participants were instructed as follows: 'I am going to show you some pictures of people. I want you to tell me how the person is feeling by looking at the pictures'.

Comics in Context; Subtle and Emphatic

Participants were instructed as follows: 'I am going to show you some comics. I want you to tell me how the person is feeling by looking at the sequence of action in the scene'. A short pause was given between the presentation of the subtle and emphatic sets of comics.

Audio Task

The participants were required to listen to four audio clips. They were instructed as follows: 'You will now hear a few

audio clips. Listen carefully as I want you to tell me how the person is feeling at the end of each audio clip’.

Video and Audio-Visual Tasks

Participants were then shown four clips each for the next two tasks and told, ‘I will show you a few video clips. Watch carefully as I want you to tell me how the person is feeling at the end of each video clip’.

Scoring

[8] Observed patterns of misidentification appear to exist in those with intellectual disabilities. The understanding of each emotion, subtle and emphatic, basic and complex, was scored on a four point rating scale developed by (9). The scale measures hedonic attributes of pleasant and unpleasant sensations and states of mind. A score of 0 indicated that the participant had made no response whereas a score of 1 showed that the participant had responded, but that it was in the opposite hedonic tone as when the person says “sad” when the correct response is “happiness”. A score of 2 was given when the participant responded in the same hedonic tone, as when s/he said “sad” when the correct response was “angry”. The subject’s response was rated for hedonics and not emotion, when a score of 2 was obtained. The participant was given a score of 3 when she gave the exact response. The scale was used to score performance on all the tasks.

Table 1 Mean and SD for basic and complex emotions with subtle and emphatic expressions of happiness, sadness, anger, fear, love, jealousy, pride and disgust in the MR and Normal groups for pictures and comic stimuli

Subtle emotions	Mean MR	SD MR	Mean normal	SD normal
Happiness	3	0	3	0
Sadness	2.21	0.7	3	0
Anger	2.1	0.9	3	0
Fear	2.32	.07	3	0
Love	1.62	0.99	2.95	.31
Jealousy	1.63	0.98	2.73	0.45
Pride	1.3	0.87	2.17	0.37
Disgust	1.92	0.73	2.73	0.38
<i>Emphatic emotions</i>				
Happiness	3	0	3	0
Sadness	2.95	0.22	3	0
Anger	2.58	0.64	3	0
Fear	2.73	0.48	3	0
Love	2.18	0.57	2.97	0.13
Jealousy	1.83	0.67	2.90	0.13
Pride	1.43	0.85	2.67	0.41
Disgust	2.4	0.59	3	0

Results

A summary of significant findings is tabulated in Tables 1, 2. Table 1 displays means and standard deviations of the two groups for simple and basic emotions for both subtle and emphatic expressions. Table 2 displays means and standard deviations of the two groups in the five tasks for basic emotions.

Performance on the Picture Task

The means show that the retardates understand emphatic contexts better than subtle contexts. Though the normal group performed better than the retardates, basic emotions of happiness, sadness, anger and fear were better understood by both groups than the complex emotions of love, jealousy, pride and disgust.

In order to test the significance of difference between groups on emotion understanding of subtle and emphatic expressions of the eight emotions: happiness, sadness, anger, fear, love, jealousy, pride and disgust on the picture task, a three way analysis of variance (2 (group) × 2 (subtle and emphatic) × 8 emotions) with repeated measures on the last two factors was computed using Statistica Version 5. The results indicated that the normal subjects performed better than the retardates $F(1, 59) = 149.43$,

Table 2 Comparison of Mean and SD for basic emotions in pictures, comics, audio, video and audio–video recognition tasks for the MR and normal groups

Emotions	MR Mean	MR SD	NOR Mean	NOR SD
PICT HAP	3.00	.00	3.00	.00
PICT SAD	2.80	.41	3.00	.00
PICT ANG	2.53	.57	3.00	.00
PICT FEAR	2.83	.46	3.00	.00
COM HAP	3.00	.00	3.00	.00
COM SAD	2.97	.18	3.00	.00
COM ANG	2.60	.62	3.00	.00
COM FEAR	2.73	.58	3.00	.00
AUDIO HAP	3.00	.00	3.00	.00
AUDIO SAD	3.00	.00	3.00	.00
AUDIO ANG	2.87	.35	3.00	.00
AUDIO FEAR	2.10	1.06	2.93	.26
VIDEO HAP	3.00	.00	3.00	.00
VIDEO SAD	3.00	.00	3.00	.00
VIDEO ANG	2.66	.48	3.00	.00
VIDEO FEAR	2.33	.92	3.00	.00
A-V HAP	3.00	.00	3.00	.00
A-V SAD	3.00	.00	3.00	.00
A-V ANG	2.77	.63	3.00	.00
A-V FEAR	2.33	1.03	3.00	.00

$p < 0.01$. Performance was better for the emphatic than the subtle pictures $F(1, 59) = 49.45$, $p < 0.01$. The emotions differed $F(7, 59) = 58.97$, $p < 0.01$, indicating that the eight emotions; happiness, sadness, anger, fear, love, jealousy, pride and disgust were significantly different from each other. Post hoc test (Duncan's multiple comparison) indicated a sequence in the understanding of emotions with emphatic emotions as happiness, followed by sadness, anger and fear were better than subtle emotions in the following order: love, jealousy, pride and disgust ($p < .05$).

The interaction between group and level of pictures (subtle and emphatic) was significant $F(1,59) = 11.27$, $p < 0.01$, indicating that subjects with mental retardation understand subtle and emphatic pictures less than subjects with normal intelligence. Post hoc comparisons (Newman-Keuls test) indicated that the normal children performed better than the retardates on the emphatic than the subtle pictures ($p < .05$). Both groups performed better on the emphatic than the subtle pictures ($p < .05$). Subjects with mental retardation understand emphatic pictures better than subtle pictures ($p < .05$). The interaction between group and emotions indicates $F(7, 59) = 23.73$, $p < 0.01$ that the normal group are better at understanding the eight emotions than the retardates. Post hoc comparison (Newman-Keuls test) indicated understanding of happiness by subjects with mental retardation to be better than their understanding of sadness, anger, fear, love, jealousy, pride and disgust ($p < .05$). Further normal children were able to better differentiate between pride and happiness when expressed in the picture task as compared to the retardates though the retardates understood happiness just as well as normal children ($p < .05$). The interaction between group, level of pictures and emotions indicated $F(7,59) = 9.49$, $p < 0.01$ that subjects with mental retardation understand the pictures of eight emotions depicted at both the subtle and emphatic levels less than the normal subjects. Post hoc comparison (Newman-Keuls test) indicated that the retardates understood emphatic emotions of sadness, anger, fear, love, jealousy and disgust better than the subtle emotions ($p < .05$).

Performance on the Comics Task

Mean results indicate that just as for the picture task, the emphatic context is better understood than the subtle context in comics by both groups. Further, basic emotions are better understood than complex emotions by both the retardates and the normal groups.

A three way analysis of variance ($2 \times 2 \times 8$) with repeated measures on the last two factors indicated that normal subjects performed better than the retardates $F(1,59) = 67.38$, $p < .01$. The emphatic comics were

understood better than the subtle comics $F(1, 59) = 45.39$, $p < .01$ and the emotions differed from each other $F(7, 59) = 72.51$, $p < .01$. Post hoc test (Duncan's multiple comparison) indicated an order in the understanding of the emotions with happiness and sadness understood better than the other six emotions of anger, fear, love, jealousy, pride and disgust ($p < .05$). The interaction between group and level of comics $F(1, 59) = 9.01$, $p < .05$ indicated that the normal group are better than the retardates in the understanding of both subtle and emphatic comics. Post hoc comparison (Newman-Keuls test) indicated that the retardates performed better for the emphatic than the subtle comics ($p < .05$). The interaction between group and level of comics and emotions is also significant, $F(7,59) = 3.60$, $p < .01$, indicating that subjects with mental retardation understand the comics of eight emotions depicted at both the subtle and emphatic levels less than the subjects with normal intelligence. Post hoc comparison (Newman-Keuls test) indicated that the retardates understand the emphatic versions better than the subtle versions, just as the normal children ($p < .05$).

Comparing Performance with and Without Context on the Picture Tasks

To test the significance of difference between the groups and emotion understanding on the Pictures of Facial Affect (emotion recognition task), subtle and emphatic expressions of the pictures for five emotions: happiness, sadness, anger, fear and disgust, a three way analysis of variance (2 (group) \times 3 (facial affect, emphatic, subtle) \times 5 (happiness, sadness, anger, fear, disgust) with repeated measures on the last two factors indicated that the normal group performed better than the retardates $F(1,59) = 121.90$, $p < .001$. The main effect of pictures of facial affect, subtle pictures and emphatic pictures was significant, $F(2, 59) = 77.48$, $p < .001$. The main effect of emotions was significant, $F(4, 59) = 46.48$, $p < .01$. Post hoc test (Duncan's multiple comparison) indicated that happiness was better understood than sadness, anger, fear and disgust ($p < .05$) in this order for all pictures.

The interaction between group and type of pictures $F(2, 59) = 46.08$, $p < .01$ indicated that the normal group were better than subjects with mental retardation in understanding Pictures of Facial Affect (emotion recognition task), subtle pictures and emphatic pictures. Post hoc comparison (Newman-Keuls test) indicated that the retardates understand emphatic pictures better than subtle pictures and pictures of facial affect ($p < .05$). Further subjects with normal intelligence understand Pictures of Facial Affect better than subjects with mental retardation ($p < .05$). The interaction between group and emotions indicate $F(4,59) = 24.83$, $p < .001$, that subjects with

mental retardation understand the eight emotions of happiness, sadness, anger, fear, love, jealousy, pride and disgust less than subjects with normal intelligence. Post hoc comparison (Newman-Keuls test) showed that subjects with mental retardation understood sadness, anger, fear and love less than subjects with normal intelligence ($p < .05$).

The interaction between group and type of pictures (Pictures of Facial Affect, subtle pictures and emphatic pictures) and emotions $F(8,59) = 8.70$, $p < .01$ indicated that subjects with mental retardation understand the Pictures of Facial Affect, subtle pictures and emphatic pictures of the five emotions: happiness, sadness, anger, fear and disgust less than subjects with normal intelligence. Post hoc comparison (Newman-Keuls test) indicated that the retardates understand sadness better in the subtle picture task ($p < .05$) than when it was expressed through facial cues alone. Further the retardates understand anger, fear and disgust from the emphatic pictures better than the subtle pictures and Pictures of Facial Affect (emotion recognition task) ($p < .05$).

Comparing Performance on the Five Tasks

Table 2 presents comparison of Mean and SD for basic emotions in pictures, comics, audio, video and audio–video recognition tasks for the MR and Normal groups. The means indicate that happiness and sadness are better understood than anger or fear by the retardates on all the five tasks.

A three way analysis of variance (2 group \times 5 tasks (pictures, comics, audio, video, audio-visual) \times emotions: happiness, sadness, fear, anger, love, jealousy, pride, disgust) with repeated measures on the last two factors indicated that the retardates performed lower than the normal group $F(1, 59) = 28.58$, $p < .01$. The emotions $F(3, 59) = 22.18$, $p < .01$ differed. Post hoc test (Duncan's multiple comparison) indicated that happiness and sadness can be understood better than anger and fear ($p < .05$). Anger is understood less than happiness and sadness and better than fear which can be understood less than happiness and sadness ($p < .05$). The interaction between group and emotions indicates $F(3, 59) = 20.29$, $p < .01$ that subjects with normal intelligence are better than subjects with mental retardation in understanding the four basic emotions: happiness, sadness, anger and fear.

Post hoc comparison (Newman-Keul's test) indicates that the retardates are able to understand happiness and sadness better than anger and fear ($p < .05$). The interaction between tasks and emotions $F(12, 59) = 7.46$, $p < .01$ indicates that the picture task, comics task, audio, video and audio visual tasks differ significantly in their representation of the four basic emotions. The interaction between group and task and emotions is also significant, F

(12, 59) = 6.15, $p < .01$ indicating that subjects with mental retardation understand the four basic emotions: happiness sadness, anger and fear less than the subjects with normal intelligence on the five tasks: pictures, comics, audio, video and audio-visual.

Discussion

Research has demonstrated that subjects with mental retardation do not perform as well as control subjects on emotion recognition tasks, and not whether these performance deficits are specific to affective cues [2]. Identification studies in which few distracters and static but ecologically valid stimuli were used showed no performance differences between participants with mental retardation and typically developing children of equivalent mental ages [1], though investigators employing identification tasks with more distracters or ambiguous stimuli found relative performance deficits [10, 11]. In the present study subjects with mental retardation perform less well than normal children on subtle pictures and comics because they may not be confident in their own abilities to understand a stimulus that does not contain cues they have previously experienced.

On the whole, subjects with mental retardation showed differences from subjects with normal intelligence in the understanding of basic emotions. They did not differ from subjects with normal intelligence in the understanding of happiness and sadness, but differed in the understanding of anger and fear. [11] found that typically developing children and adults tend to make specific perceptual and/or conceptual errors when interpreting facial expressions such as identifying a surprised face as a fearful one. According to [8] similar patterns of misidentification appear to exist in those with intellectual disabilities. Children with mental retardation show specific difficulties in processing emotional expressions that are not shared by typically developing children [12]. In keeping with previous evidence, happiness was found to be the easiest emotion to identify, followed by sadness and anger [9]. [13] states that developmentally, happiness and then sadness are the first emotions to be recognized. In the picture task, when the emotions were expressed at the subtle level, subjects with mental retardation understood the complex emotions: love, jealousy, pride and disgust less than subjects with normal intelligence that also had difficulty understanding subtle pride and jealousy. In the comics task, subjects with normal intelligence found difficulty understanding subtle jealousy, pride, disgust and emphatic pride, but understood the complex emotions better than subjects with mental retardation. The normal children were able to understand disgust from the pictures of facial affect better than subjects with mental retardation.

[2] found deficits in emotion recognition in adults with mental retardation relative to both chronological age matched and mental age matched control participants without mental retardation. They speculated that subjects with mental retardation may remain insensitive to expressions of others because they probably receive biased socio-emotional feedback. Caregivers sometimes feel compelled to protect children with mental retardation from negative emotional experiences and therefore act friendly and reassuring even if the context does not warrant it. [14] found that mothers of children with mental retardation used fewer words referring to feelings than did mothers of normal children. The children themselves may also display facial expressions that impede readability by others in turn influencing emotional responses by caregivers [9]. In normal children, emotion understanding at age six was significantly related to children's reports of experiences both at home and outside [15]. Regardless of the amount of experience observing emotions in others, adults with mental retardation do less well on emotion recognition tasks than typically developing individuals, even when cognitive abilities required to do those tasks are considered [8].

In the present study subjects with mental retardation differed significantly from subjects with normal intelligence in their understanding of the four basic emotions on the five tasks; pictures, comics, audio, video and audio-visual. They found it more difficult to understand sadness in pictures, anger in pictures and comics, fear from audio, video and audio-visual content. Any difference seen between the subjects with mental retardation and subjects with normal intelligence on tasks of understanding emotions with static stimuli (pictures, comics) and dynamic stimuli (audio, video, audio-visual) is an effect of the difference in understanding emotions and not the kind of stimuli.

Research has shown an increase in accuracy of emotional recognition with the introduction of contextual and dynamic cues [16]. Previous researchers who used static, decontextualised measures may have underestimated the ability of individuals to accurately identify emotions. [17] argued that methods relying on simplified stimuli, without dynamic or temporal cues may prove to be a hindrance because they require the deployment of more inferential, cognitively based capacities. Previous studies have varied widely in the assessment of emotion recognition. Some have examined the ability of individuals to match emotions in different modalities, whereas others have examined the ability to label or point to pictures of facial expressions of emotions [9]. Particularly when the task expectations were higher (identification from story based contexts, etc.) or the emotion was more difficult to identify (anger, fear), subjects with mental retardation performed less well than

normal children [9]. Listeners were accurately able to identify sadness, anger and fear based upon prosody which included both rhythmic and intonational aspects of human speech when listening to semantically neutral sentences [18]; [4].

Vocal and facial expressions together can provide more information than can be attained from either modality alone. [19] proposed that bimodal perception occurs in three stages: evaluation, integration and decision making. First, each separable source of information is evaluated based on the prototypes of particular emotional expression. Integration involves the combination of the degree to which each source supports a given alternative (e.g., happy, sad, angry). A decision is made based on the amount of support for each alternative [4]. According to [20] most individuals show perceptual and attention biases toward visual stimuli which may explain why subjects with mental retardation have difficulties on tasks using two modalities, but perform better in the video and audio-visual tasks, than they did on other tasks; pictures, comics and audio task. Familiar and meaningful stimuli may take precedence for perceptual processing over those stimuli that are less meaningful. Thus research that employs standardized expressions of emotions may not capture some of the processes linking emotional experience to perception and behaviour [4]. Processes involved in perceiving and understanding specific aspects of the particular stimuli, may determine performance and these capacities may have more to do with aspects of intelligence than emotion recognition capacities.

In summary the recognition and understanding of emotions in mental retardates can be aided with contextual cues and dynamic content in stimuli. Though the retardates best understood happiness, followed by sadness than anger or fear, their understanding was more evident in the emphatic than subtle presentations. Subjects with mental retardation were less able to understand anger and fear than subjects with normal intelligence. Findings suggest that any difference seen between subjects with mental retardation and subjects with normal intelligence on understanding of emotions with static stimuli (pictures, comics) and dynamic stimuli (audio, video, audio-visual) is an effect of the difference in understanding emotions and not the kind of stimuli.

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