Research on the Characteristics Evaluation of Communication Skills of Persons with Developmental Disability (Part 2) – Study Based on the Trial of the Test of Emotion Recognition by Facial Expressions and/or Tone New Version –

(Research Reports No. 136) Summary

[Keywords]

Developmental disability, communication, characteristics evaluation

[Usage of this report]

It is important to objectively evaluate the characteristics of non-verbal communication to improve communication and issues with the interpersonal attitude of persons with developmental disabilities. With the new version of Test of Emotion Recognition by Facial Expressions and/or Tone, we can evaluate whether they infer emotions of others correctly from the tone and facial expressions, and moreover evaluate whether their inferences from the ambiguous emotional expressions are biased or not. So, it is expected to be utilized for understanding their characteristics and drafting support plans as well as for discussing considerations in the workplace.

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2. Research Period

FY 2014 to 2016

3. Composition of the Research Report

Chapter 2: Issues of support to persons with Developmental Disability ---based on the results of interview survey

Chapter 3: For interpretation of results and feedback

Summary

Materials

4. Background and Purpose of Research

Because it has been pointed out that the people with developmental disabilities find it difficult to judge other people's emotions from non-verbal information such as voice (tone) and facial expression (face) we can expect to obtain information that is useful for supporting communication by evaluating the characteristics associated with the emotion inference. In the research on the characteristic evaluation of non-verbal communication skills at the National Institute of Vocational Rehabilitation (2014), the following two tests "Test of Emotion Recognition by Facial Expressions and/or Tone New Version -Basic version-" (hereinafter referred to as "Basic version") and " Test of Emotion Recognition by Facial Expressions and/or Tone New Version -Expanded version-" (hereinafter referred to as "Expanded version") were used to understand the characteristics of people with disabilities. The Basic version was developed as a test to evaluate the characteristics when inferring emotions from voices and facial expressions expressed by basic emotions (happy, sad, angry and disgust,) while the Expanded version is the one to evaluate characteristics when inferring emotions from ambiguous emotional expressions (National Institute of Vocational Rehabilitation, 2000, 2012) . As a result of trying the Expanded version, since a possibility that test scores vary depending on the age of the subjects, it was clarified that we need to consider whether standard values, which are established based on test data of Neurotypical persons, should also be established by sorting by age or not.

Therefore, we studied about the reference value in the Expanded version and sorted out the reference value of the test in this research. We aimed to clarify the characteristics of people with developmental disabilities concerning the emotion inference through test trials targeted on persons with disabilities. Based on these study results, we developed software "Test of Emotion Recognition by Facial Expressions and/or Tone New Version" (It consists of the "Basic emotions assessment version" which improved the "Basic version" mentioned above and the "Pleasantness-unpleasantness level assessment version" which reconstructed the "Expanded version" mentioned above.)

5. Contents of the New Version of the Test of Emotion Recognition by Facial Expressions and/or Tone (F&T -New version-)

(1) Basic emotions assessment version

A. Test stimuli: The tones and facial expressions of four speakers (2 men and 2 women in their 20s and 40s) were used. They spoke words which didn't include emotional meaning with the emotions of "happy" "sad" "angry" "disgust".

B. Conditions: (i) Tone (presented tones only), (ii) Face (presented faces only), (iii) Tones and faces (both tones and faces were presented) .We carried out the test in order of (i) -> (ii) -> (iii). The time required for carrying out all conditions was about 24 minutes.

C. How to answer: The subjects chose one emotion that they inferred from the tones and expressions presented to them from the selections of "pleasant" "sad" "angry" and "disgust"

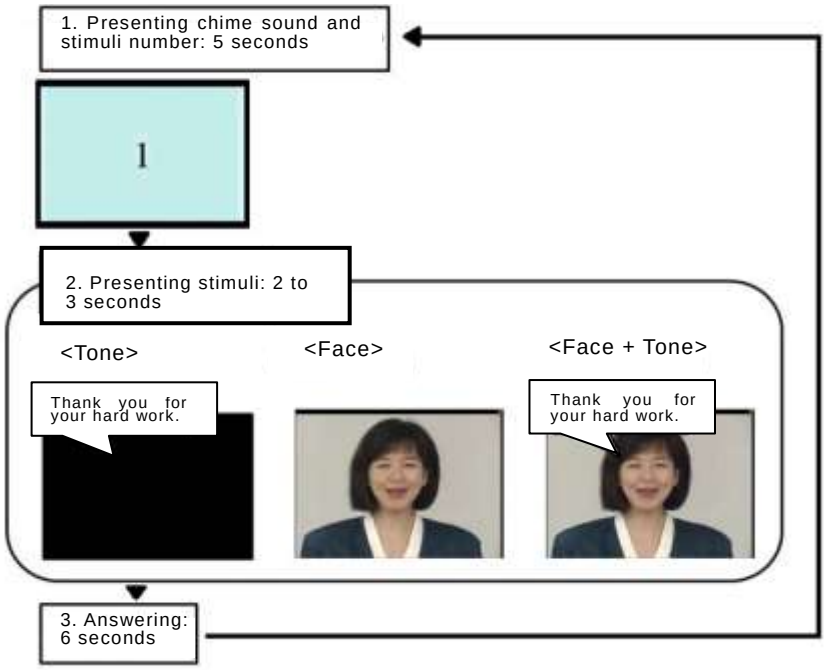

Figure 1: Flow of Basic emotions assessment version

(2) Pleasantness-unpleasantness level assessment version (The flow of the test is the same as in Figure 1 except that the response time is 5 seconds)

A. Test stimuli: Based on the results of the stimulus selection research carried out in the previous study (National Institute of Vocational Rehabilitation, 2014), stimuli satisfying the following conditions (i) and (ii) were used.

(i) As a result, we had 10 Neurotypical persons to answer the inferable emotions from the stimulus (multiple answers allowed), specific emotions were selected only for the research subjects with 50% or less (60% for the Face + Tone).

(ii) The average among the research subjects of the confidence value on the answer (3-grade rating) is 2 or less.

B. Conditions: There were three conditions the same as in the Basic emotions assessment version. The time required for carrying out all conditions was about 21 minutes.

C. How to answer: The subjects evaluated the level of pleasantness-unpleasantness of presented stimulus between the following 9 levels: "-4: very unpleasant" - "0: neither pleasant nor unpleasant" - "+4: very pleasant."

6. Method

(1) Establishment of reference value for F&T -New version- / Pleasantness-unpleasantness level assessment version

A. Subjects: 319 Neurotypical adults aged in their 20s to 50s, who are employed or have working experience (163 men / 156 women).

B. Survey period: October 2014 - August 2016.

C. Methods:

(a) F&T -New version- / Pleasantness-unpleasantness level assessment version

(b) Questionnaire survey: The level of pleasantness-unpleasantness corresponding to the emotion-words (happy, sad, angry, disgust, surprise, fear, contempt) / Frequencies of experiencing emotions in the past 3 months as of the time of survey / The correspondence between the situation in which emotions are stimulated and emotion-words / Correspondence between face pictures and emotion-words, and remarkable point for the judgment / Stresses in human relationships etc.

D. Implementation form: The test was conducted individually or in small groups / the questionnaire survey (self-administered questionnaire) was conducted on the same day as the test.

(2) Characteristics evaluation of persons with disabilities by F&T -New version-

A. Subjects: 124 adults with developmental disabilities (98 men / 26 females) using employment support institutions etc.

B. Survey period: October 2012 - August 2016.

C. Methods:

(a) F&T -New version- Basic emotions assessment version / Pleasantness-unpleasantness level assessment version

(b) Questionnaire survey: The level of pleasantness-unpleasantness corresponding to the emotion-words (happy, sad, angry, disgust, surprise, fear, contempt) / Frequencies of experiencing emotions in the past 3 months as of the time of survey / The correspondence between the situation in which emotions are stimulated and emotion-words / Correspondence between face pictures and emotion-words, and

remarkable point for the judgment / Stresses in human relationships etc.

D. Implementation form: The test was conducted individually or in small groups / the questionnaire survey (self-administered questionnaire) was conducted on the same day as the test.

(3) Identifying issues associated with the communication support of persons with developmental disabilities by interview survey

A. Subjects: 21 persons with developmental disabilities

B. Survey period: August 2013 - October 2016.

C. Study detail: F&T -New version-, work experiences and living experiences, communication issues etc.

7. Results of study

(1) Establishment of reference value for F&T -New version- Pleasantness-unpleasantness level assessment version

A. Classification of test stimuli

Based on the analysis result of the rating scale value for the stimulus, we decided to calculate the test scores by dividing them into "high unpleasant stimulus (test A)" for which the unpleasantness level was relatively high and "low unpleasant stimulus (test B)" for which he unpleasantness level was relatively low.

B. Gender difference in the test scores

With every condition except "Tone" and "Face" in test B, women assessed as more unpleasant than men.

C. Difference in age classification in the test scores

With the condition "Tone" in test A and "Face" in the test B, men under the age of 34 assessed as more unpleasant than those over the age of 35 (Figure 2).

D. Establishment of reference value

Based on the result above and findings of the research carried out at the previous study (National Institute of Vocational Rehabilitation, 2014), we established the reference values for men (3 tables: college students and graduate students / persons being employed (34 years old and under) / persons being employed (35 years old and over)) and women (2 tables: college students and graduate students / persons being employed). The reference values will be the criteria to judge "How much their inferences from the ambiguous emotional expressions are biased concerning pleasant and unpleasant". We can evaluate the "tendency of bias when people infer others' emotions" from the test result.

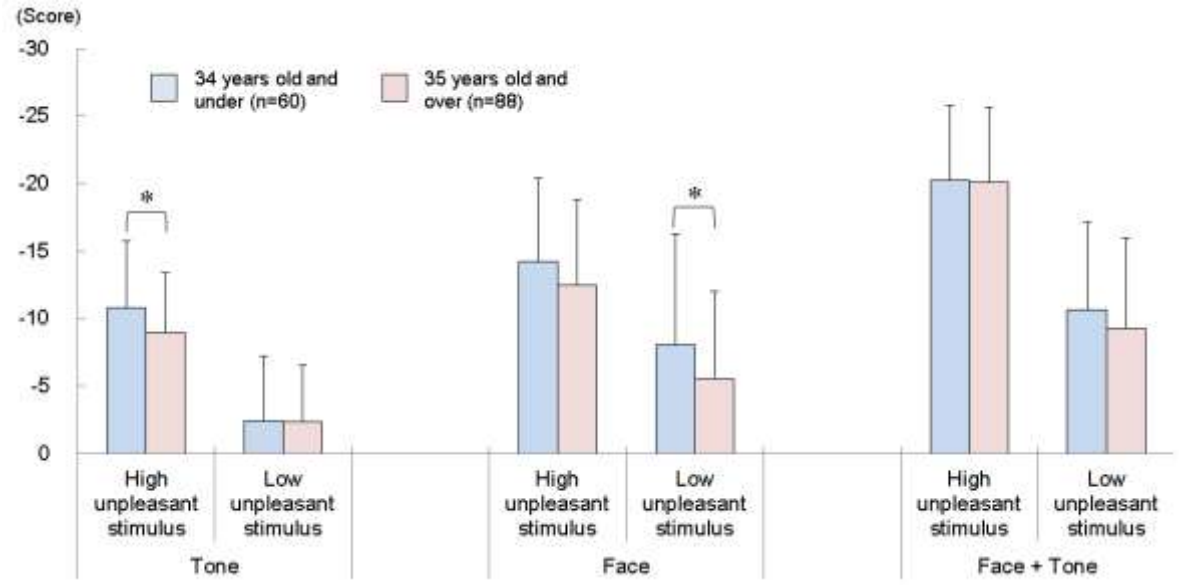

Figure 2: Scores of Pleasantness-unpleasantness level assessment version for Neurotypical men sorted by their age (*p<.05)

E. Study on test characteristics of Pleasantness-unpleasantness level assessment version

We studied on the relationship between "tendency of emotions inferences from ambiguous emotional expressions" and other recognition characteristics/frequencies of emotional experiences associated with the others' emotion recognition. As a result of the study, it was identified that although it was hardly related to the pleasantness-unpleasantness assessment for emotion-words, it was related to the frequency of emotional experiences. Specifically, the group of subjects with high frequency of "angry" and "disgust" tended to assess as unpleasant rather than the low group in test B. Also, the test score of the Pleasantness-unpleasantness level assessment version was associated with interpersonal stress. From the above, it was shown that when interpreting the results of the Pleasantness-unpleasantness level assessment version, information about the frequency of emotional experience and interpersonal stress was important.

(2) Characteristics evaluation of persons with developmental disabilities by F&T -New version-

A. Characteristics evaluation by Basic emotions assessment version

(a) Correct answer rate

With every condition, the correct answer rate of persons with developmental disabilities was lower than Neurotypical persons, so it was suggested that persons with disabilities have a difficulty in inferring emotions.

(b) Tendency of confusion

- With the condition of "Tone", "confusion between pleasant and unpleasant", which infers unpleasant emotions from pleasant expressions or pleasant emotions from

unpleasant expressions, tended to be more than that of Neurotypical persons.

- With every condition, the tendency to infer "angry" or "disgust" from the tones or faces of expressing "sad" as well as to infer "angry" from the tones of expressing "disgust" was more noticeable than that of Neurotypical persons.

(c) Communication type

In the Basic emotions assessment version, from the tendencies of correct answer rate sorted by each condition, the subjects can be classified into one of nine types. As the result of comparing to the test result from the previous study of persons with intellectual disabilities (National Institute of Vocational Rehabilitation, 2014), it was clarified that for persons with developmental disabilities there were more high-receiving type and complementary type, and less low-receiving type etc.[1]

B. Characteristics evaluation by Pleasantness-unpleasantness level assessment version

We compared the test scores (total of test A and B) between Neurotypical persons and persons with development disabilities. As a result of this, it was identified that with the condition of "Tone", persons with developmental disabilities assessed as more unpleasant than the Neurotypical persons. However, there was no statistically significant difference between "Face" and "Face + Tone" condition (Figure 3).

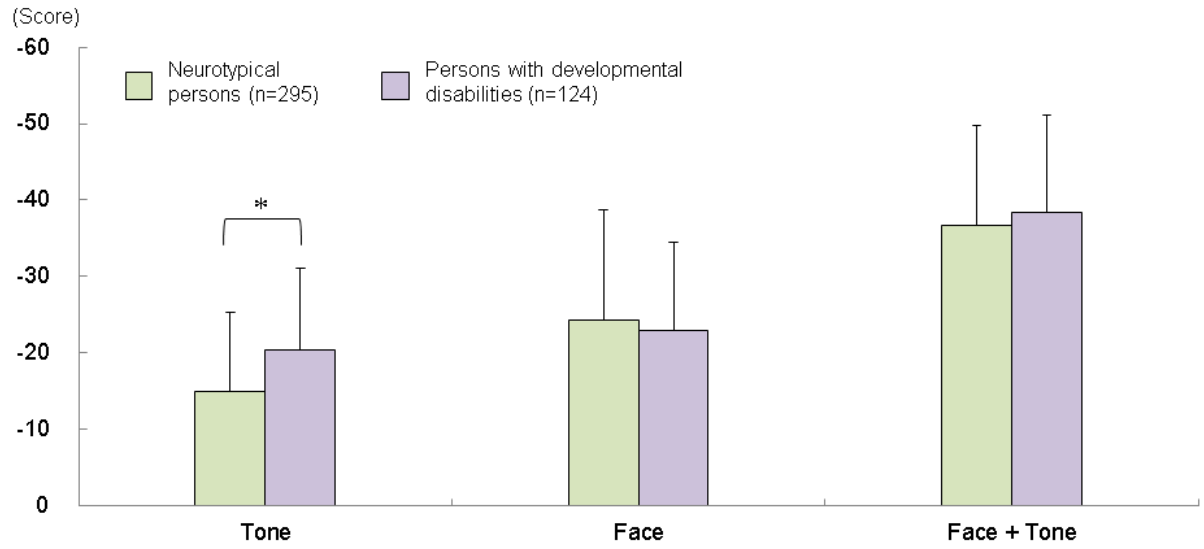

Figure 3: Pleasantness-unpleasantness level assessment version's scores for Neurotypical persons and persons with developmental disabilities (*p<.05)

1.
High-receiving type: The percentage of correct answers was more than 90% of general standard in all stimulus conditions.
Complementary type: Though the percentage of correct answers was low in "Tone" and "Face," high in "Face + Tone."
Low-receiving type: The percentage of correct answers was less than 70% of general standard in all stimulus conditions.

(3) Identifying issues related to communication support of persons with developmental disabilities by interview survey

A. Interpretation of results from F&T -New version- in a case of a person X

Person X, who was diagnosed with developmental disability by taking the opportunity to find out about his actions on interpersonal behavior in the workplace, is now on leave. While using vocational rehabilitation support as well as participating in the program, he is thinking of returning to work or changing his job. But the supporters are concerned about his problems such as speeches which do not match situations, as well as adaptability in group situations.

(a) Result of Basic emotions assessment version

With the "Face" and "Face + Tone", the correct answer rate was sufficiently high even compared with the average (Table 1). High correct answer rate with every condition means that they are the receiving type which has no major difficulty in inferring emotions in their daily life. However, confusion between 3 emotions of "sad" "angry" "disgust" was recognized with all conditions.

Table 1: Result of F&T -New version- / Basic emotions assessment version

Tone		Answered emotions				No answer
		Happy	Sad	Angry	Disgust	
Presented emotions	Happy	6				2
	Sad		8			
	Angry			7	1	
	Disgust		1		7	
	Total	6	9	7	8	2
Correct answer rate 88%						

Face		Answered emotions			
		Happy	Sad	Angry	Disgust
Presented emotions	Happy	8			
	Sad		5		3
	Angry			8	
	Disgust				8
	Total	8	5	8	11
Correct answer rate 91%					

Face & Tone		Answered emotions			
		Happy	Sad	Angry	Disgust
Presented emotions	Happy	8			
	Sad		8		
	Angry			7	1
	Disgust			1	7
	Total	8	8	8	8
Correct answer rate 94%					

(b) Result of Pleasantness-unpleasantness level assessment version

With all conditions in test A (high unpleasant stimulus) and test B (low unpleasant stimulus,) their inferences were biased toward "unpleasant." Also, this tendency was more remarkable in the test B (Figure 4).

In inferring ambiguous emotions, there was a tendency to infer the other person's emotions more seriously regardless of the condition presented. It indicates a possibility of being associated with the anxiety to the ambiguous situation, interpersonal stress and past experience of troubles etc. beside the fact that the "emotions are correctly inferred" according to the result of Basic emotions assessment version.

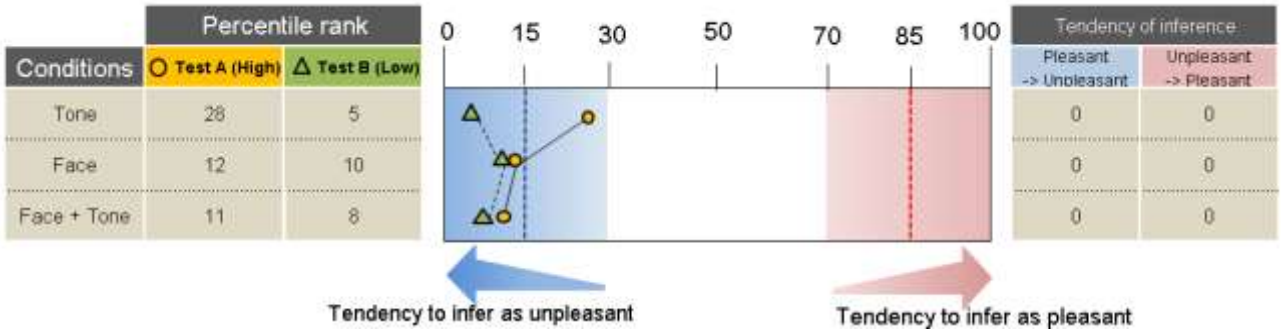

Figure 4: Result of F&T -New version- Pleasantness-unpleasantness level assessment version

(c) Interpretation of test results and consideration of communication issues

Although Person X correctly recognized others' emotions, he actually was not able to be confident about the actions he took after inferring. As we found that his stress on "communication with others" was high from the questionnaire survey, as well as there being a tendency to infer emotions of others more unpleasant than it was necessary from the test, we can assume that the communication itself in everyday life is stressful for Person X. For the future, it is expected for him to consider the possibility of improving interpersonal attitudes by sorting out the issues concerning communication methods for him to be able to go back to work.

B. Case study: Findings obtained from interview survey

(a) Because the test result does not always match with the result expected by the subjects or their supporters, it is important to evaluate the characteristics appropriately using objective indicators.

(b) Listening to the information such as occupational and stressful experiences of the subjects will not only be useful for understanding the test result, but can also be a clue as to how to work on solving the issue.

(c) When we examined the focused parts on faces together with the feedback of the test result, it was clarified that the focused parts on faces were sometimes limited to a specific part or the focus wasn’t placed on a part which was required for inferring emotions depending on each case. While there was a case in which the focused parts on faces were understood if it was specified, the person became focused just to look at the face, and there was another case in which the person felt anxious about the interpersonal situation itself. Regarding whether we should aim at improving the correct answer rate of facial emotion recognition by training etc. or whether we should consider supplemental measures verifying with words, it is necessary to consider this point based on the evaluation results.

(d) In considering how "stress" appears as a background of the bias in assessing with

Pleasantness-unpleasantness level assessment version, it was suggested that it is necessary to consider the difference in experiences such as a working experience etc.

(e) From a case in which behaviors expected in the workplace and understanding of the role is not always promoted even if they have working experiences, it was suggested that it is necessary beforehand to fully consider about the possibility of learning skills by "general training" and "self-improvement" etc.. On the other hand, in the case in which the person had a relatively long career background and had been adapted to the workplace for a certain period of time, it was suggested that the possibility of performing expected behavior and understanding a role depends on whether the person was in an environment in which he/she could adapt.

8. Related past research reports

National Institute of Vocational Rehabilitation (2000) Research Reports No.39 Study on the Nonverbal Communication Skill of Persons with Intellectual Disabilities - Development of the Test of Emotion Recognition by Facial and/or Tone Expressions and the Program of Decoding Facial Expressions -

National Institute of Vocational Rehabilitation (2012) Test of Emotion Recognition by Facial Expressions and/or Tone - Basic version - (Software installation DVD)

National Institute of Vocational Rehabilitation (2014) Research Reports No. 119 Research on the Characteristics Evaluation of Communication Skills of Persons with Developmental Disability - Development and Trial of Test of Emotion Recognition by Facial Expressions and/or Tone - Expanded version -