ORIGINAL ARTICLES

MEASURING AND EVALUATING JAPANESE PEOPLE’S NERVOUSNESS IN SPEAKING ENGLISH

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Abstract: In this study, we measured and evaluated the nervousness of Japanese native speakers in speaking English with non-Japanese from different countries. Questionnaires were given to the participants, and an experiment measuring the participants’ physiological responses of nervousness was conducted. The experimental data was observed and analyzed by paired t-tests and fuzzy sets mathematical theory. We discovered that most of the Japanese participants (subjects), in spite of their English level, feel more nervous when talking to “typical” Caucasian native English speakers, than when talking to Chinese or Koreans, with whom they share similar East Asian physiological and psychological characteristics. This shows that East Asian people who have a good command of English can be regarded as viable English teaching resources in Japan, as their presence in the class decreases nervousness among the students.

Keywords: Nervousness, English speaking, Physiological response measurement, Fuzzy sets

1. INTRODUCTION

The emotions of human beings have been studied for decades, but there are very few studies on nervousness of people in speaking foreign languages [1][2][3]. In order to find out the degree of nervousness in people speaking foreign languages, particularly with partners from different countries, in this study we measured Japanese peoples’ physiological reactions related to nervousness when speaking English with non-Japanese by monitoring their blood pressure and pulse rates in an English conversation environment. We conducted self-rating questionnaires on two other occasions, questioning participants on how nervous they feel when they talk with typical looking (Caucasian) native-speaking English non-Japanese and any differences in nervousness levels in talking to non-Japanese with different origins.

Considering various cultural reasons and the typical Japanese English speakers’ fear of making mistakes, it was assumed that Japanese people would feel more nervous when they spoke with Caucasian native English speakers, than when they spoke English with East Asian people such as Chinese or Koreans with whom they share similar physiological and psychological characteristics. We also assumed that degree of nervousness may vary with the ages, but not with gender. If the assumptions were true, by verifying and quantifying those emotional readings, then it would be possible to consider East Asian people, like Chinese or Koreans with a good command of English, to be viable English teaching resources in Japan, or even more ideal English conversation partners for Japanese English learners, because Japanese learners of English would not, in theory, feel as nervous with them.

In spite of gender or individual differences, when a person feels nervous, it will manifest as a physiological response, to some degree or another. For example, blood pressure rises, heart/pulse rate increases, shortness of breath or hyperventilation increases, perspiration of the palms, armpits and feet accelerates, brain wave frequencies and the normal vibration of the voice are inhibited, and the body temperature also rises [4][5]. In addition to these, facial expressions and electrodermal activity (EDA) will also change. Psychologists and medical scientists have developed many kinds of ways to measure and assess human emotions, including nervousness, which include: Semantic Differential Method (SD), a method of emotional self-rating; ECG (electrocardiography) to measure HR (heart rate), i.e., pulse rate, and PPG (photoplethysmograph) to measure finger pulse amplitude; EEG electroencephalography) to measure brain wave or fMRI (Functional magnetic resonance imaging) to measure brain activity; EGG (electrogastrogram) to measure and record stomach
It is not easy to accurately and quantitatively measure nervousness in human beings, as it is a short-term psychophysical response and very environment-dependent. In addition, most of the physiological measuring instruments (like fMRI and ECG) put unavoidable physical and mental burdens on the participants, which affect the emotions, which, in turn, decrease the reliability of the data. Therefore, in this study, we used two simple methods to measure and evaluate nervousness in Japanese participants when they speak English with non-Japanese: questionnaires, and measurement of blood pressure and pulse rate. We used these methods for the simple reason that both the questionnaire and the experiment were easy to conduct in a natural and "real" world setting without strict limitations. In addition, blood pressure and pulse are representative indexes of nervousness [6]. In the experiment we used an advanced model digital manometer, and it was not only easy to operate, but also very exact and precise. The main advantage in using these measurement methods was that they did not put as much pressure or burden on participants.

It should be remembered that each person has his or her own unique way of responding to nervousness, i.e. their blood pressure may increase but have no pulse rate change; additionally, there is not always an agreement between the psychological activity and the physiological expressions [1][2]. Therefore, it is not possible to completely trust data gathered solely from physiological measurements. We also conducted questionnaires among participants (n=82). The number of people completing the questionnaire was 4.5 times as many as the participants (n=18) in the physiological measurement. It was reasoned that if both sets of data are consistent, then it would be possible to draw a more accurate conclusion.

As human beings emotions are always somewhat vague or 'fuzzy,' in this study we therefore used fuzzy sets theory to observe and evaluate the experimental data generated. Fuzzy sets theory proposes making a membership function operator over the range of real numbers [0.0, 1.0]. The theory is an alternative to traditional notions of set membership. Natural language abounds with vague and imprecise concepts, such as "Daisuke is very nervous when he speaks English" are difficult to translate into more precise language without losing some of their semantic value, but can be more accurate using membership function in fuzzy sets. Therefore, the fuzzy sets theory is often used to analyze psychological phenomena [7].

2. EXPERIMENTAL DESIGN

Participants: 1) Five Japanese university students, 3 males and 2 females, with an average age of 22.15, and whose average TOIEC score was 550 points were the participants of this experiment. Everyone had basic English listening and speaking abilities, but none of them had many chances to talk to non-Japanese in English. 2) Two non-Japanese acted as English speaking partners with the Japanese participants. One was a 33 year old male Chinese student who majored in English in China and had a TOIEC score of 865 points. He was fluent in English. The second individual was a veteran English professor, a 57 year old American male. Neither was familiar to the Japanese participants. Further, a Japanese student, who was a friend of all of the experiment participants, served as a coordinator and experiment operator. Place: A university lab with a light, relaxed and active atmosphere. Time: 1:30-3:30 P.M on a day in July just after final exams. Students were very relaxed. The experimental time interval was 20 minutes so that the first session did not affect the psychological or physiological responses to the second experiment. Experimental instrument: Standard digital manometer. Manufacturer: Panasonic, Japan; Model: EW3110; hi-sensor automatic pressure based on fuzzy control technology. The normal measurement time of this digital manometer is 30 seconds [8]. 30 seconds is
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short enough so that before the participants really feel uncomfortable about the measurement, the measurement is already done. **Procedure:** 1) On the day before the real experiment, the Japanese coordinator measured the pulse rate and blood pressure of each Japanese participant three times at 20 minute intervals in the very ordinary and relaxed atmosphere of their own labs. The average baseline ‘normal’ values of pulse rate and blood pressure of the participants could be established. 2) On the day of the experiment, the coordinator just simply told the Japanese participants that he would measure how his/her blood pressure changes from the normal values when they speak foreign languages. When the experiment started, the coordinator placed the inflatable cuff of the manometer around the arm 2-3 cm above the elbow [8] of the first participant while the remaining participants stayed in a separate room. 3) When this was accomplished and the subject was relaxed, the coordinator led the Chinese participant into the lab. The Chinese participant started to talk to the Japanese participant in English. Only simple greetings, self-introductions, hobbies, and plans for the coming summer vacation were talked about so that every Japanese participant could easily understand and respond in English. 4) The duration of the experiment was defined as 15-20 minutes. The blood pressure and pulse rate measurements were taken at the first 5th minute, the 10th minute, and at the 15th minute while the conversation continued. 5) Steps 2-4 were repeated twenty minutes later when the participants were almost free from the effects of the last experiment. This second time, however, the American spoke with the Japanese participants. 6) Subsequently the same experiment was conducted on another day with another group of Japanese adults (13 people, 8 males and 5 females, with average age of 40.2), in a private English conversation class. The non-Japanese conversation partners for this experiment were a 23 year old pleasant looking Australian female, who was an assistant language teacher, and a serious looking 33 years old male Korean English speaker, who was an invited researcher in an academic institute.

3. DATA RESULTS FROM THE EXPERIMENT

3.1 Observed through the statistical method

We selected the average data of the 5th, 10th, and 15th minute in the experiment, for observation, because if the participants had to dramatically adjust to the conversation environment due to the conversation content in the first 5 minutes, and in the last 5 minutes, they could become too excited, too nervous, or too “calm.” We used the paired t-Test to analyze the experimental data since the sample size was small.

![Figure 1: Mean of systolic blood pressure data](image1)

**Figure 1:** Mean of systolic blood pressure data

\[ t = -1.81 \]

![Figure 2: Mean of pulse rate data](image2)

**Figure 2:** Mean of pulse rate data.

\[ t = 0.605 \]
3.2 Observed through fuzzy sets theory

In our experiment, in comparing blood pressure with pulse rates, we found that blood pressure changed more dramatically than did the pulse. So here we observed systolic blood pressure data instead of pulse rates using fuzzy sets theory. The difference between the blood pressure rates while speaking English and the normal value blood pressure can be regarded as the criteria of nervousness. The bigger the difference, the more nervous the speaker. As “nervous” is a fuzzy concept, we used membership function to express nervousness.

In this case, we needed to design a category membership function [9-11]. Let us define the difference range from 0 to 30, and select related parameters: 2, 8, and 15. The parameter 2 means that if the participant’s blood pressure increases by 2 mmHg, we do not consider that he is really nervous, and if a participant’s blood pressure increases by 8+2=10 mmHg, then we consider that he has a certain amount of nervousness. Finally, the parameter 15 means that if his blood pressure increase reaches 15 mmHg, then he is regarded as being nervous. Therefore the membership function for “nervous” is:

\[
F(x) = \begin{cases} 
0 & 0 \leq x \leq 2 \\
\frac{(x - 2)^2}{128} & 2 \leq x \leq 10 \\
1 - \frac{(x - 15)^2}{50} & 10 \leq x \leq 15 \\
1 & 15 \leq x \leq 30 
\end{cases}
\]

Where \( F(x) \) is the membership function, \( x \) is the value of blood pressure difference. \( \forall x \in [0,30] \).

Using the above membership function, we can extrapolate a graph. (See Figure 3) A value of 0 on the vertical axis means not nervous at all, while 1 means nervous. Based on this graph, let us observe Japanese subject A’s data. When A was talking to the Chinese English speaker, the systolic blood pressure difference from his normal value was 5 mmHg, the nervousness degree (confidence) is less than 0.1 but greater than 0, which can be translated into natural language as “Mr. A does not feel nervous when he talks to Chinese people in English.” [12] Now let us observe his systolic blood pressure when he was talking to the American. This time the difference from his normal value was 18 mmHg, the nervousness degree (confidence) is 1.0. Translating the nervousness degree into natural language, it would be “Mr. A does feel nervous when he talks with Americans in English.”

Figure 3: Fuzzy membership function for “nervous.”

In the same way, we observed the data from Participants B, C, D and E with the above membership function. The results were similar to A: they did not feel so much nervous talking with a Chinese person in English, but with an American they felt nervous. In a same way, we observed the data from the experiment conducted with another adult group, when the non-Japanese used were a Korean and an Australian. The results were similar: the blood pressure and pulse rate were further from the normal value when talking to Caucasian native speakers of English than when talking to an East Asian.
4. DATA FROM QUESTIONNAIRES

We conducted a survey among two groups of Japanese people, n=60 and n=22 respectively. One group (n=60) are representative of young students with a middle level of English, the other group (n=22) are representative of adults, who are housewives, company people, and teachers, etc, with higher levels of English ability.

Questions:

1) Have you talked to non-Japanese including native English speakers and East Asian people like Chinese or Koreans in English? Note: If you have, then answer questions 3) and 4) according to your experiences. If you have not, then please answer according to how you imagine you would feel.
2) When you talk to non-Japanese in English, no matter where they are from, do you feel nervous? a: very b: a little c: not at all
3) When you talk to someone in English, with whom do you feel MORE nervous? a: Speaking with East Asian people, such as Chinese or Koreans. b: Speaking with native English speakers, such as Americans or Australians.
4) Make a self-rating by scoring your degree of nervousness using the following scale. (See Table 1)

Table 1: Nervousness self-rating.

<table>
<thead>
<tr>
<th>Nervousness</th>
<th>Situation</th>
<th>Not at all</th>
<th>A little</th>
<th>A moderate amount</th>
<th>Very</th>
<th>Extremely</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Speaking with</td>
<td>=1</td>
<td>=2</td>
<td>=3</td>
<td>=4</td>
<td>=5</td>
</tr>
<tr>
<td></td>
<td>Caucasian native English speakers</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Speaking with Chinese or Koreans</td>
<td></td>
<td></td>
<td></td>
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</tr>
</tbody>
</table>

Participants:

1) A nursing school, grade 1, 60 students. Average age: 22.24 years of age. Average number of years of learning English: 6.4 years.
2) A private English class, 22 people. Average age: 42.30 years of age. Average number of years of learning English: 7.21 years.

Results:

As these two groups differ from each other in age and English levels, here we analyzed the results separately.

Figure 4: Question: “Do you feel nervous when speaking English with non-Japanese?”

Figure 5: Question: “To whom do you think you will feel more nervous talking?”

Younger group in the nursing school (n=60):
1) 42% of them indicated that they felt very nervous when they spoke English with non-Japanese, while 50% felt a little nervous. Only 8% did not think they
felt or would feel nervous. 2) 56% thought or “imagined” they would feel more nervous when they talk to Caucasians, while only 22% of them thought they would feel more nervous when speaking with Chinese or Koreans in English, and 22% of them gave some other answer. The average degree of nervousness score in speaking with Chinese or Koreans was 2.4, while the degree of nervousness score in speaking with native English speakers was 4.2.

Older group in the private English class (n=22):
1) 48% of the participants answered that they feel very nervous when they speak English with non-Japanese, 52% felt a little nervous, no one answered that they did not feel nervous. 2) 64% thought or imagined that they would feel more nervous when talking to Caucasian native English speakers, while only 34% of them thought they would feel more nervous when speaking with Chinese and Koreans. Two percent gave some other answers. The average degree of nervousness score in speaking with Chinese or Koreans was 2.0, while the average degree of nervousness score in speaking with native English speakers was 3.3.

5. FINDINGS

Although both systolic blood pressure and pulse rate data analysis in the physiological experiment with the participants of 5 Japanese university students produced no statistical significance (t=-1.81, df=4, p<0.01 and t=-0.605, df=4, p<0.01), this could be due to the small sample size and that one participant had a slightly higher blood pressure and pulse rate value. In the same experiment with another group of participants (n=13), the statistical difference was significant (t=-3.59, df=12, p<0.01).

From the data results we observed, we found that 1) regardless of the age or English level, and also regardless of whether the non-Japanese English speaking partner was male or female, pleasant looking or not, most of the Japanese participants (96% in our sample size) felt a degree of nervousness when speaking English with non-Japanese. Further, the number of people who feel more nervous when talking to Caucasian native English speakers in English are two or more times higher than those who talk to Chinese and Koreans in English (56% versus 22% in the younger group, 64% versus 34% in the elder group, $\chi^2(2)=10.9, p<0.01$). 2) From the Figure 4 and 5, we understand that a bigger percentage of Japanese speakers of English in older group who felt nervous in speaking English with non-Japanese and more nervous when talking to Caucasian native speakers of English than talking to Chinese or Koreans, than those in younger group. However, the degree of nervousness in the two groups was different: the nervous degree in older group is lower than younger people (2.0 versus 2.4 in speaking with Chinese or Koreans, 3.2 versus 4.2 in speaking with native English speakers. The difference of the degree of nervousness is 3.2 - 2.0 = 1.2 versus 4.2 - 2.4 = 1.8). 3) The experiment showed that blood pressure rose and pulse rates increased as soon as Japanese people started to talk with non-Japanese in English. However, the emotional arousal was stronger when they talked with Caucasian native English speakers than in talking to Chinese or Koreans. The difference of mean values and the standard deviation of each index we monitored in the experiment clearly showed that Japanese people feel more nervous when talking to Caucasian native English speakers than when talking to Chinese or Koreans. 4) With the passage of time in the conversation, nervousness decreased or increased due to the conversational situation. Some participants got more nervous, some became calm, while some did not change much in terms of measurable degrees of nervousness. In our case, it seems that the younger group had more dramatic changes in nervousness than those in the older group. We need to conduct further experiments to verify this trend.
6. DISCUSSION

The above findings could result from any or all of the following reasons and generally accepted assumptions: 1) Japanese culture is a culture based on shame. Generally, as a nation, Japanese are shy. To be laughed at or to be rejected for some reason, especially in front of others, is a source of shame for the Japanese [13]. 2) East Asian countries, especially, China, Japan, and Korea, share a common cultural foundation in Confucianism. This cultural bridge makes Japanese people feel less nervous when they talk to East Asian people in English. 3) When Japanese speakers of English make mistakes in pronunciation or English grammar, those mistakes might not be caught by a non-native English speaker. 4) Different physical characteristics from oneself create some psychological resistance or nervousness in speech communication [14].

In order to verify the above assumptions, half a year after the experiment in Section 2 and questionnaire in Section 4 were completed, the authors conducted another questionnaire in a nursing school (a different group of students from the participants in Section 4). The results exactly confirmed these assumptions.

Among the 52 participants (11 males and 41 females, whose average age was 23.24 years), 39 answered that they felt nervous when speaking English with non-Japanese speakers. The reasons of nervousness given include: 1) No confidence in speaking English; fear that poor pronunciation and grammar would not convey meanings 2) Afraid of being laughed at by other people. 3) Non-Japanese are “foreigners”. Sincere they are “foreigners” they would think and behave differently from Japanese. If English can not convey real meanings, some misunderstandings would be invited.

Of the 39 people who answered that they felt nervous in speaking English, 26 said that they felt more nervous talking to Caucasian native speakers than when talking to Chinese or Korean speakers of English. Their reasons for this include: 1) Native speakers are usually “big,” their eyes are usually blue and hair colors are different from Japanese; 2) A native speaker’s body languages are so different from Japanese. Some body languages look too exaggerated. 3) Caucasian native speakers’ English seems to contain more difficult words which make their conversation harder to understand than English spoken by Chinese, Koreans and Japanese themselves. 4) While speaking to Chinese, Koreans and some other East Asian people, because Chinese or Koreans have similar-looking faces and the same physical characteristics, Japanese speakers of English would feel at ease, peaceful and intimate. 5) What is more, since Chinese or Koreans are not native speakers of English, they might feel more nervous and make more English mistakes in speaking than Japanese do. 6) Some questionnaire participants even felt that they can use Kanji (Chinese characters) to aid communication when English cannot convey meanings to Chinese. 7) Further, since the Korean language has a very similar grammatical structure to the Japanese language, participants “feel” or “imagine” that it would be easier to communicate with Koreans. In short, these feelings or “imagination” psychologically decrease the nervousness in English conversation [15].

7. CONCLUSION

In this study, the data results from questionnaire and experiment are consistent. Both showed that Japanese people indeed feel more nervous in speaking English with Caucasian native speakers of English than with East Asian people such as Chinese or Koreans. Additionally, it was found that the degree of nervousness was smaller among older English learners than younger ones. The reasons for this phenomenon could be due to some cultural, regional, historical, or any of several other psychological reasons, which were partly verified by the questionnaire conducted in Section 6. It will be important to more closely identify
these triggers in future studies, for example, if the age of the non-Japanese English speakers, and a Caucasian who is not native speaker of English, affect nervousness of Japanese people. The findings of this research indicate that English language educators should be aware of the nervousness among their students and try to find methods to decrease the nervousness levels of their students. One of the solutions at the institutional level could be to invite Chinese or Koreans, or any other people similar to them, who have a good command of English to join Japan’s English educational processes, either as teachers, assistant teachers, or partners of English conversation practice, because the presence of these people would help decrease the tension among the students. In addition, on a more personal level, native English speakers who are teaching English in Japan, should also think of having East Asian people like Chinese or Koreans assist them in their classes in order to decrease the nervousness among their Japanese students. It might be possible to include Japanese or even Japanese-Americans, for example, although a different problem then exists. Specifically, if a Japanese English teacher appears in an English conversation class, Japanese students tend to feel too relaxed, and they rely more on being able to use Japanese in the classroom. This reaction is somewhat lessened when using Chinese and Korean teachers because the students still see them as “non-Japanese” who might not understand Japanese at all [16], and thus will try to stay in the target language (English) a greater percentage of the time.

REFERENCES
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