

Effect Analysis of Facemask on Emotions' Communication between Japanese people

Yoko Nishihara, Azumi Inoue, and Junjie Shan
Ritsumeikan University

Introduction

Facemasks caused problems in communication

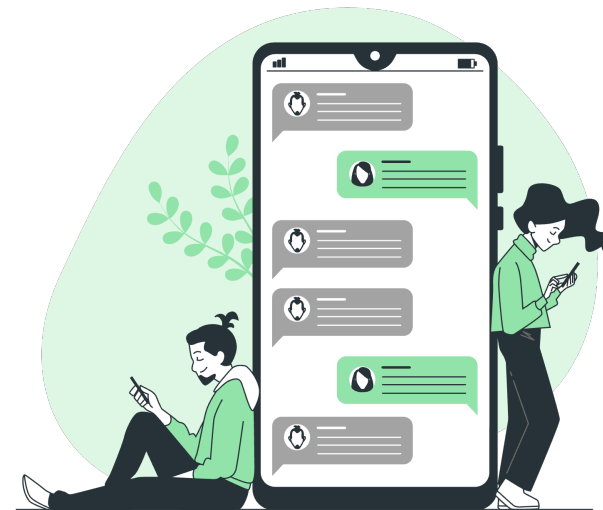
- Covid-19 has restricted people's activities.
- In Japan, wearing a facemask has become mandatory both indoors and outdoors.
- **Speaking with a facemask caused problems in people's communication.**
 - Most common complaints include trouble hearing others and **grasping their emotions.**



Previous work:

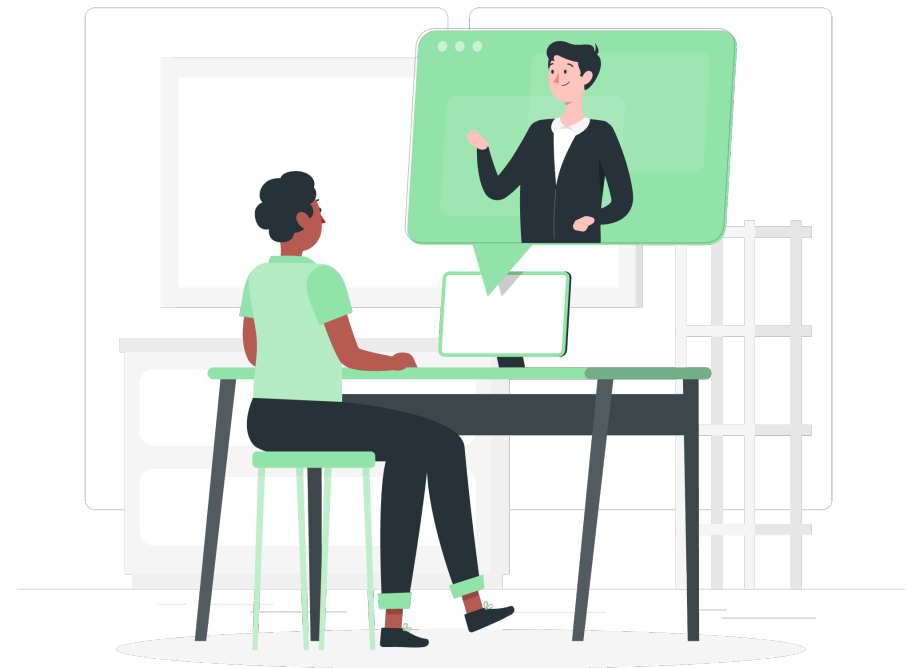
Emotions in communication(1/3)

- Conveying emotions correctly is the foundation of good relationships.
 - If few cues are given, it is more challenging to grasp people's emotions precisely.
- Emotion recognition has more trouble in text-based communication (e-mail and text-chatting) than in-person [Dey et al. 2020, Hancock et al. 2007].



Previous work: Emotions in communication(2/3)

- Conveying emotions correctly is the foundation of good relationships.
- Video conference systems were heavily used as a communication tool during the Covid-19 epidemic.
 - The video conference systems were expected to achieve people's communication.
- **Emotion recognition on video conference systems was complex due to various reasons [Tausif2020].**



Previous work: Emotions in communication(3/3)

- Some existing studies have shown the extent to which emotions can be read from masked facial expression images and videos[Carbon et al. 2020, Kastendieck et al. 2022].
- Few studies examined the effect of facemask, **taking into account the relationship between speakers.**



Objective of this paper

- **We wish to explore the effect of facemask on emotions' communication, taking into account the relationship between speakers.**
- We explored two types of relationships through participant experiments: **first-time meetings and friends.**

First-time meeting



Friends



Experimental procedures(1)

- (0) The experimenter prepared **10 types of emotions** for participants to choose.
- (1) The experimenter makes every **two participants a pair**.
- (2) In the pair, **one participant picks out an emotion** on his/her own and talks about his/her own episode with the emotion in Japanese.
- (3) The other participant conducts (2).
- (4) Repeat (2) and (3) 2~3 times.
- (5) The experimenter, as an observer, **makes a subjective assessment of the degree of the emotion conveyed**.

Experimental procedures(2)

- (1) The experimenter makes every two participants a pair.
- The pairs were divided into four groups.

Relationship \ facemask	Without a facemask	With a facemask
First-meeting	12 pairs	12 pairs
Friends	6 pairs	6 pairs

- In total, 36 pairs (72 participants) joined the experiments.

Experimental procedures(3)

- (2) In the pair, one participant picks out an emotion...
- (3) The other participant conducts (2).
- The 10 types of emotions below were chosen by referring to the definition by [Ekman 1992, Plutick 2001]:
 - **Joy, Like, Happy, Peaceful, Excited, Surprise, Anger, Fear, Disgust, and Sad.**
- The below shows the example of emotion's communication.



listener



speaker

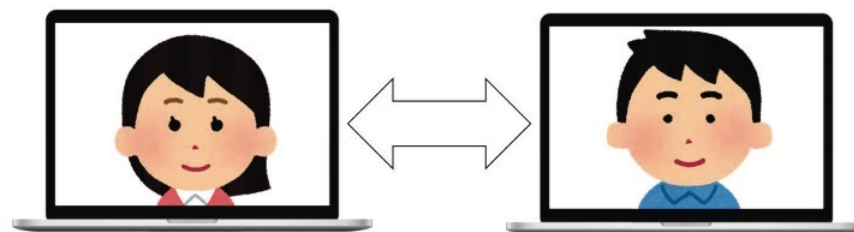
I went to a company's recruitment exam. I was told the exam was a group work, but it was a group interview. I could not show my ability enough. I also failed the SPI test. I probably failed that company

(Emotion: angry)

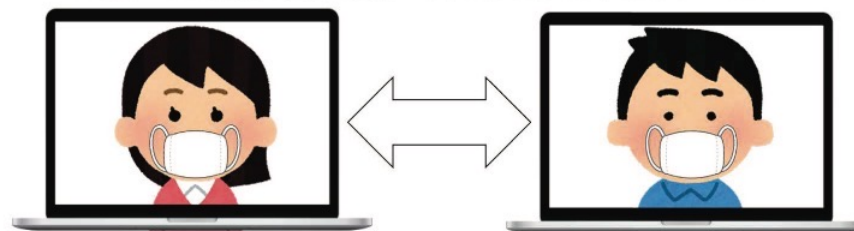
Experimental procedures(4)

- The participants used a video conference system (Zoom) in the experiments.
 - This is because during the time that the experiment was conducted, we were mandatory to wear facemasks when taking offline face-to-face talk.
- The participants were asked to sit in front of the camera and show their upper body.
- The duration of the total session was 10-15 minutes.

In Japanese without facemask via video-conference software



In Japanese **with facemask** via video-conference software



Experimental procedures(5)

Relationship \ facemask	Without a facemask	With a facemask
First-meeting	12 pairs	12 pairs
Friends	6 pairs	6 pairs

- (5) The experimenter, as an observer, makes a subjective assessment of the degree of the emotion conveyed.
- The experimenter viewed the video of their communication (recorded by the video conference system) and rated how well each participant conveyed his/her emotion on a scale of 1 to 10.
 - 10 denotes that the emotion was totally conveyed.
 - 1 denotes not.
- The scores were averaged per relationship and facemask condition.

Results

- Though we obtained experimental results, the distribution of selected emotions was not consistent in four groups.
 - Because conveying emotions was freely chosen by the participants.
- Therefore, we would try to find a tendency from the experimental results.

Effect of a facemask in emotions' communication

- Table 2 and 3 show the average score with/without a facemask.

Table 2. Experimental results in **friends**. The score was the average given by an experimenter who evaluated each communication as a listener. The score was between 1 to 10.

	Gr. A: w/o facemask	Gr. B: w/ facemask	Difference
Joy	6	7.2	-1.2
Like	7.9	4	3.9
Happy	7.3	6.9	0.4
Peaceful	9.3	5.7	3.6
Excited	7.5	5.9	1.6
Suprise	8.3	5.3	3.0
Anger	6.3	6	0.3
Fear	6.3	6	0.3
Disgust	6.2	7.5	-1.3
Sad	6.6	5	1.6
Average	7.31	5.95	1.22

Table 3. Experimental results in **first-meeting**. The score was the average given by an experimenter who evaluated each communication as a listener. The score was between 1 to 10.

	Gr. A: w/o facemask	Gr. B: w/ facemask	Difference
Joy	6.3	5.7	0.6
Like	6.1	7.6	-1.5
Happy	7.9	5.2	2.7
Peaceful	6.7	10	-3.3
Excited	3.3	10	-6.7
Surprise	10	7	3.0
Anger	7.9	5	2.9
Fear	4	6.5	-2.5
Disgust	9.6	6.9	2.7
Sad	6.6	6.4	0.2
Average	6.84	6.84	-0.19

- **Friends w/o facemask > First-meeting > Friends w/ facemask**
- The results might indicate that **it was more difficult for friends to communicate their emotions when wearing facemasks.**

Distribution of selected emotions in the experiments

- Table 4 shows the numbers of selected emotions and its rates.

Table 4. Number and rate of selected emotions by participants

Emotion	first-meeting		friends	
	number of selected	rate	number of selected	rate
Joy	24	16%	26	18%
Like	22	15%	19	13%
Happy	15	10%	17	11%
Peaceful	7	5%	3	2%
Excited	13	9%	3	2%
Surprise	10	7%	5	3%
Anger	13	9%	8	5%
Fear	9	6%	10	6%
Disgust	22	15%	12	8%
Sad	8	5%	39	27%

- The emotions Joy, Like, and Happy were often selected in both groups.
 - The communication conveying those emotions will keep a positive atmosphere.

Examples of episode speeches (joy, like, and happy)

- Joy
 - “I have a neighbor who lives alone. I enjoy playing with about 7 people at her house until morning. Lately, we play board games more than video games. **That’s really fun.**”
- Like
 - “I have a cat. I wake up and it comes to me. **I like her so much.**”
- Happy
 - “I went to Hokkaido during summer vacation. I ate sushi, meat and Mongolian mutton barbecue. I enjoyed fishing and caught a very big fish. **I feel so happy.**”
- Their selection of emotion might influence on the conveyance of emotions.

Distribution of selected emotions in the experiments

- Table 4 shows the numbers and rates of selected emotions.

Table 4. Number and rate of selected emotions by participants

Emotion	first-meeting		friends	
	number of selected	rate	number of selected	rate
Joy	24	16%	26	18%
Like	22	15%	19	13%
Happy	15	10%	17	11%
Peaceful	7	5%	3	2%
Excited	13	9%	3	2%
Surprise	10	7%	5	3%
Anger	13	9%	8	5%
Fear	9	6%	10	6%
Disgust	22	15%	12	8%
Sad	8	5%	39	27%

- The emotion Disgust was often selected by the participants of first-meeting.
 - The participants were in job-hunting (their common topic).
 - They were trying to make a connection with the first-meeting people by gaining "empathy" from them.

Distribution of selected emotions in the experiments

- Table 4 shows the numbers and rates of selected emotions.

Table 4. Number and rate of selected emotions by participants

Emotion	first-meeting		friends	
	number of selected	rate	number of selected	rate
Joy	24	16%	26	18%
Like	22	15%	19	13%
Happy	15	10%	17	11%
Peaceful	7	5%	3	2%
Excited	13	9%	3	2%
Surprise	10	7%	5	3%
Anger	13	9%	8	5%
Fear	9	6%	10	6%
Disgust	22	15%	12	8%
Sad	8	5%	39	27%

- The emotion Sad was often selected by the participants of friends.
 - The participants were in job-hunting.
 - They were likely to share their depression with friends than strangers.

Examples of episode speech (disgust and sad)

- Disgust (first-meeting)
 - “I'm starting to look for a job. I submitted a couple of my curriculum vitae. I have nothing to put on the curriculum vitae. **I feel disgust myself so much** for not having done anything.”
- Sad (friends)
 - “My friends around me are getting job offers. But I don't get one. **I am sad.**”
- Even if the same topic, the emotions differ depending on their relationships. That might influence on the conveyance of emotions.

Conclusions

- This paper reported the experimental results with participants to explore the effect of facemasks on emotions' communication between Japanese people.
 - 36 pairs, 72 participants
 - 10 emotions
 - First-meeting and friends pairs
- The results showed that the effect of emotion conveyance would reduce for friend-pairs if they wore facemasks.

Future work

- We try to conduct experiments with participants again.
 - As face-to-face communication not via video conference system
 - The distribution of emotions should be similar in both groups for the purpose of quantitative analysis.