Relationship between the impressions that interview applicants intend to convey and that interviewers form: Subjective assessment and gaze measurement

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Abstract. Previous analytical studies of interviews have focused only on the impressions that the interviewer forms from the applicant's behavior and have not investigated the relationship between the impressions that the applicant intends to convey through their behavior and the impressions that the interviewer forms of the applicant. Such studies have also not investigated which of the applicant's body parts the interviewer focuses on during the interview. In this study, we developed stimulus video sequences in which subjects simulated applicants and performed behaviors to convey a good or bad impression. We also measured the subjective assessment and gaze of participants simulating interviewers. The results of the subjective assessment showed that, in many cases, the impression that the applicant intended to convey and the impression that the interviewer formed tended to be the same. The results of the gaze measurement showed that the interviewer's gaze was mainly focused on the face when they formed a good impression of the applicant, whereas their gaze was focused on both the face and different body parts when they formed a bad impression.

Keywords: Interviewer · Applicant · Impression · Subjective assessment · Gaze measurement.

1 Introduction

The impression that an interviewer forms of an applicant plays an important role in the decision-making process during interviews conducted for recruitment and entrance examinations. Figure 1 shows an example of an interview situation. It is well known that the impression that an interviewer forms is greatly influenced by the applicant's behaviors, which comprise part of the nonverbal information generated by the applicant [4]. Examples of behaviors that applicants exhibit during interviews include making facial expressions, looking at the interviewer, touching their body parts, and crossing their hands and feet. We investigated

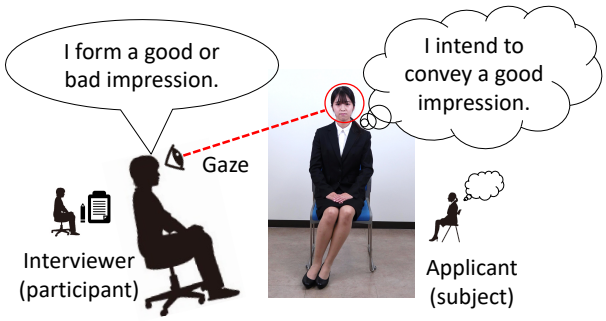


Fig. 1. Situation of an interview. We assumed a situation in which an interviewer talks to an applicant during a job interview.

how the behaviors performed by an applicant to convey a desired impression during an interview affect the impression that an interviewer forms.

Many analytical studies have been conducted to investigate the impression that an interviewer forms from an applicant's behavior during an interview. McGovern et al. [3] found that applicants who expressed more behaviors, such as facial expressions, received better subjective ratings from interviewers. DeGroot et al. [2] found that visual cues from the applicant's behavior have a substantial effect on the personality attributions made by interviewers. However, these analytical studies focused only on the impression that the interviewer forms from the applicant's behaviors. Furthermore, these analytical studies did not investigate which body part of an applicant an interviewer focuses on when an applicant performs specific behaviors. Exploring the relationship between the impression that an applicant intends to convey to an interviewer through their behavior and the impression that an interviewer forms could transform our understanding of interview dynamics.

In this paper, our primary focus is on the behaviors of applicants during interviews, which we investigated in two investigations, I1 and I2.

- I1: We clarified the relationship between the impression that an applicant intends to convey to an interviewer and the impression that an interviewer forms of an applicant.
- I2: We clarified which body part attracted the interviewer's gaze when an interviewer formed a good or bad impression of an applicant.

In investigations I1 and I2, we asked participants to simulate an interviewer, and to watch a stimulus video sequence acquired of a subject simulating an applicant. We conducted subjective assessment for I1 and gaze measurement for I2. The results of the subjective assessment showed that the impressions that the applicants intended to convey to the interviewers and the impressions that the interviewers formed from the applicants tended to be similar for many of the participants who simulated interviewers. The results of the gaze measurement

showed that when the interviewers formed a good impression, their gaze tended to be focused on the applicant's head, and when they formed a bad impression, their gaze tended to be distributed to those parts of the applicant's body linked to behaviors, in addition to the face.

2 Hypotheses

We describe here the study hypotheses and conditions. In most interviews, a one-to-one conversation occurs between the interviewer and the applicant in a seated position. The conversation alternates between the interviewer talking to the applicant and the applicant talking to the interviewer. In these investigations, we focused on a situation in which the interviewer talks to the applicant, which means that the applicant mostly listens to the interviewer. In this situation, the applicant performs various behaviors using their whole body to convey a good impression to the interviewer.

We set up a condition in which the interviewer was seated in a position where they could see the applicant's whole body. In investigation I1, we evaluated the following hypotheses using the situation in which the interviewer talks to the applicant:

- H1-1: An interviewer will form a good impression of an applicant who intends to convey a good impression to the interviewer.
- H1-2: An interviewer will form a bad impression of an applicant who intends to convey a bad impression to an interviewer.

In investigation I2, we evaluated the following hypothesis:

- H2: The body part that attracts the interviewer's gazes will change depending on whether an interviewer forms a good or bad impression of an applicant.

First, we obtained stimulus video sequences of the behavior of a subject who was simulating an applicant listening to an interviewer in the above-mentioned situation. Section 3 describes how we obtained the stimulus video sequences. Second, a participant simulating an interviewer talking to the applicant assessed the impression of the subject simulating the applicant in the stimulus video sequence. We also simultaneously measured the eye gaze of the participant while performing the subjective assessment. Section 4 describes the design of the subjective assessment and gaze measurement. Finally, Section 5 describes the results of the subjective assessment of hypotheses H1-1 and H1-2 and the results of the gaze measurement of H2.

3 Acquisition of stimulus video sequences

3.1 Tasks

We obtained stimulus video sequences for the subjective assessments by filming the applicant performing various behaviors using their whole body in a situation

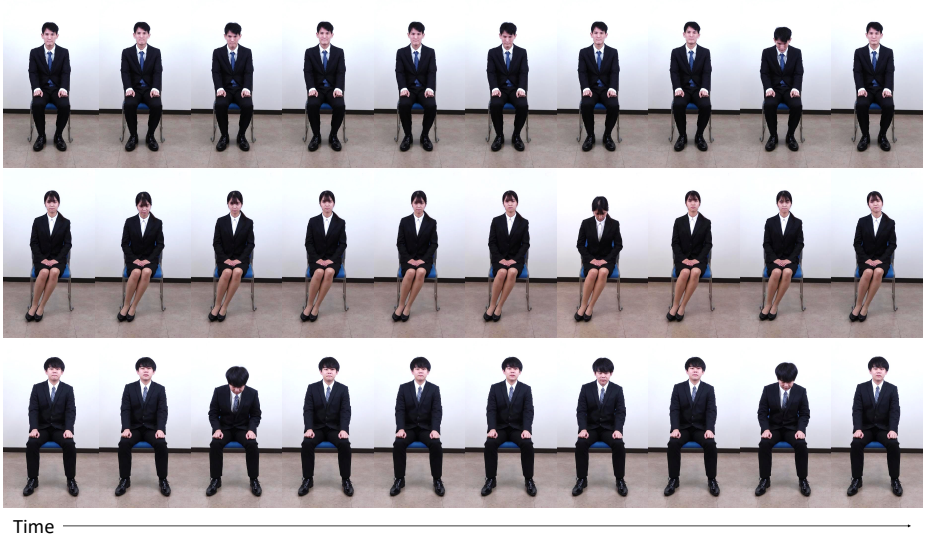


Fig. 2. S_g: Applicants intend to convey a good impression.

where the applicant was listening to the interviewer, as described in Section 2. We gave subjects simulating the applicants the following two tasks during the recording of the stimulus video sequences.

- TS1: When you listen to the interviewer, you should perform behaviors that convey a good impression to the interviewer.
- TS2: When you listen to the interviewer, you should perform behaviors that convey a bad impression to the interviewer.

In a normal interview, the applicant intends to convey a good impression to the interviewer; thus, we designed task TS1. In task TS2, the applicant intends to convey a bad impression to the interviewer. We designed this task to compare the different impressions that the interviewer forms of the applicant depending on what impression the applicant intends to convey to the interviewer through their own behaviors.

Twenty-two subjects (Japanese university students, men: 12, women: 10, average age: 22.4 ± 2.7) simulating the applicants participated in the development of the stimulus video sequences. We gave each subject tasks TS1 and TS2, and filmed them to obtain individual stimulus video sequences. Per subject, we obtained four stimulus video sequences of good impressions (TS1) and four of bad impressions (TS2). Hereafter, we refer to the stimulus video sequences acquired for TS1 as S_g and the stimulus video sequences acquired for TS2 as S_b. Figure 2 shows examples of the stimulus video sequences of S_g, and Figure 3 shows examples of the stimulus video sequences of S_b. In total, we obtained 88 stimulus video sequences S_g and 88 stimulus video sequences S_b. Each stimulus video

Fig. 3. S_b: Applicants intend to convey a bad impression.

sequence lasted for 30 seconds. Before recording the stimulus video sequences, we provided subjects with a comprehensive explanation of the disadvantages of the data acquisition and obtained their written consent for participation.

3.2 Instructions to the subject simulating the applicant

We aimed to include naturally occurring behaviors in the stimulus video sequences rather than asking the subjects simulating the applicants to perform predetermined behaviors. Therefore, rather than giving the subjects specific instructions on which behaviors to perform and when, we provided only a general explanation of tasks TS1 and TS2 and allowed the subjects to choose which behaviors to perform. Some subjects were confused about what behavior to perform in task TS2, which conveys a bad impression, so we provided examples of good and bad behaviors prior to the recording of the stimulus video sequences. However, we informed the subjects that they did not have to perform the same behaviors they had seen in the examples. At the beginning of tasks TS1 and TS2, we instructed the subjects to sit with their backs straight and not to lean against the back of the chair.

3.3 Acquisition conditions

We used a conference room 5.32 m long and 5.62 m wide to record the stimulus video sequences. One chair (length: 0.45 m, width: 0.425 m, height: 0.45 m), two lights, one long desk (length: 0.60 m, width: 1.80 m, height: 0.70 m), one laptop

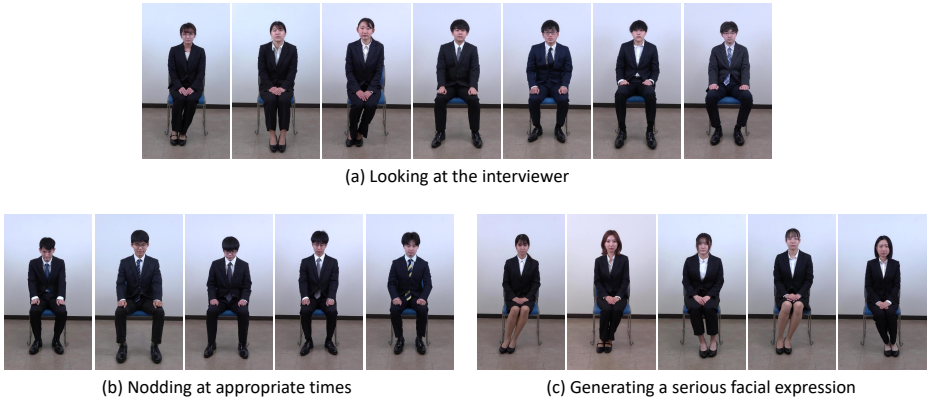


Fig. 4. Examples of behaviors in the stimulus video sequence S_g in which a subject simulating an applicant intended to convey a good impression.

computer, one camera, and one tripod were used. We used a camera (SONY HANDYCAM FDR-AX55) with a resolution of 1920 × 1080 pixels. The height of the camera lens was adjusted to 1.20 m using a tripod so that it was close to the eye level of the seated interviewer. We placed the chair on which the subject simulating an applicant was seated 2.50 m from the camera position. The subject directly faced the camera. To simulate an interviewer talking to the applicant, a speaker attached to a laptop computer played an audio recording of the process of checking the applicant's resume. We used voice reading software[1]. We placed a laptop computer with attached speakers on a desk near the camera, assuming the interviewer's sitting position.

3.4 Examples of behaviors performed by subjects simulating applicants

We presented behaviors spontaneously performed by the subjects simulating applicants during the recording of the stimulus video sequences. The subjects' behaviors that intended to convey a good impression to the interviewer included (a) looking at the interviewer, (b) nodding at appropriate times and (c) generating a serious facial expression. Figure 4 shows examples of these behaviors in the stimulus video sequences S_g. Contrastingly, the subjects' behaviors that intended to convey a bad impression to the interviewer included (d) touching a body part, (e) generating a bored expression, (f) crossing hands and legs, and (g) changing the position of the feet. Figure 5 shows examples of these behaviors in the stimulus video sequences S_b.

[1] https://ondoku3.com/ja/

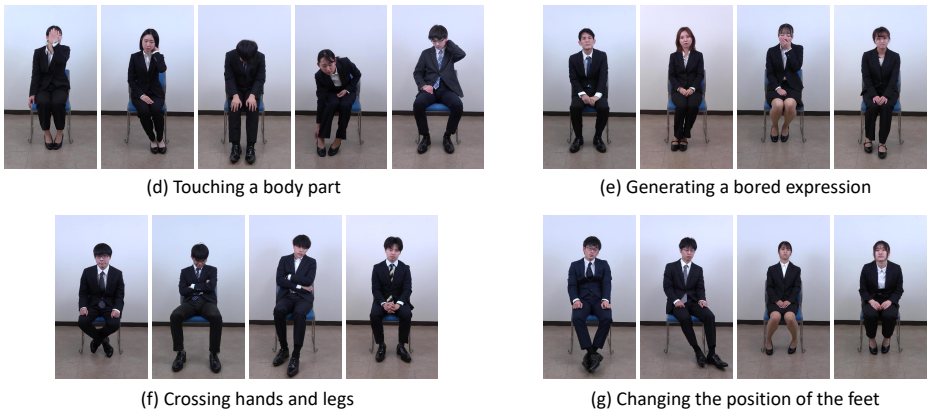


Fig. 5. Examples of behaviors in the stimulus video sequence S_b in which a subject simulating an applicant intended to convey a bad impression.

4 Design of subjective assessment and gaze measurement

4.1 Overview

We outline here the method by which we obtained subjective assessments from the participants simulating interviewers and measured the gaze of these participants. We obtained subjective assessments from the participants using the stimulus video sequences collected in Section 3 in the situation in which the applicant listened to the voice recording. Specifically, to evaluate hypotheses H1-1 and H1-2 of investigation I1, participants generated subjective scores for the stimulus video sequences S_g in which subjects intended to convey a good impression and S_b in which subjects intended to convey a bad impression, respectively. We simultaneously measured the participants' gaze while observing the stimulus video sequences. Specifically, to evaluate hypothesis H2 of investigation I2, we investigated where the participants' gaze was focused while observing the stimulus video sequences S_g and while observing the stimulus video sequences S_b, respectively. The details of the subjective assessment method and gaze measurement method are described below.

4.2 Questions for participants simulating the interviewers

During the subjective assessment and gaze measurement, we asked the participants simulating the interviewers the following questions while they were observing the subject simulating the applicant in the stimulus video sequence.

- Q1: Are you forming a good impression of the applicant?
- Q2: Are you forming a bad impression of the applicant?

For each question, participants chose one of five possible subjective scores (5: yes, 4: probably yes, 3: neutral, 2: probably no, 1: no). Before the subjective assessment and gaze measurement, we asked participants to imagine being in charge of an interview for recruitment or entrance examinations.

4.3 Experimental conditions

Eight participants (Japanese university students, men: 8, mean age: 22.0 ± 1.2 years) simulated the interviewers and participated in the subjective assessment and gaze measurement. We provided participants with a comprehensive explanation of the disadvantages of the subjective assessment and the gaze measurement and obtained their written consent for participation.

To avoid participant fatigue, we limited the time for observing the stimulus video sequences to 30 minutes or less. Because it would have taken too long to observe all the stimulus video sequences obtained as described in Section 3, we selected 18 of the 88 stimulus video sequences S_g. Specifically, we randomly selected three men and three women in S_g and also randomly selected three stimulus video sequences from each subject. Hereafter, we refer to the selected stimulus video sequences in which applicants intended to convey a good impression as $\tilde{S}_g$. We selected 18 of the 88 stimulus video sequences S_b using the same random sampling method. In the following, we refer to the selected stimulus video sequences in which applicants intended to convey a bad impression as $\tilde{S}_b$.

The following is a detailed description of the settings for the subjective assessment and gaze measurement. A head-mounted display (VIVE Pro Eye) was used for participants to observe the stimulus video sequences. The aim was to make participants feel like the subject was in front of them. A participant wearing a head-mounted display was seated on a chair. We placed the controller in the hands of the participants to allow them to give their subjective score. The participants' eye height varied from person to person, ranging from approximately 110 cm to 120 cm above the floor. We placed a base station for head tracking 80 cm away from the participant's position. A 16 m $\times$ 9 m virtual display was set up in the virtual space; the distance from the participants' eyes to the virtual display was 9 m. We used an eye tracker installed in the head-mounted display to measure the participants' gaze. The sampling rate of the eye tracking was 90 Hz. To visualize eye gaze, we used a standard heat map.

4.4 Procedures of subjective assessment and gaze measurement

This section describes the procedures for simultaneously performing subjective assessment and gaze measurement. First, as a preliminary step, we explained to the participants the questions Q1 and Q2 and the method of generating a subjective score described in Section 4.2. We used the following procedures for the subjective assessment and gaze measurement.

- P_1: We displayed a white cross on a virtual display for 2 seconds and asked participants to gaze at it.

- P_2: We randomly selected one stimulus video sequence from the 18 stimulus video sequences $\tilde{S}_g$ and 18 $\tilde{S}_b$ described in Section 4.3 without duplication.
- P_3: We displayed the stimulus video sequence selected in the procedure P_2 on a virtual display. The duration of all stimulus video sequences was 30 seconds.
- P_4: We measured the participants' gaze while they were observing the displayed stimulus video sequence in the procedure P_3.
- P_5: We asked the participants questions Q1 and Q2 in random order and asked them to give their subjective score for each question.
- P_6: We repeated procedures P_1 through P_5 until all subjective scoring was complete, for a total of 36 stimulus video sequences described in the procedure P_2.

In the procedure P_3, the position of the stimulus video sequence on the display was randomized to avoid center bias [1]. In the procedure P_5, we asked participants to input their subjective scores using a hand-held voting controller.

5 Experimental results

5.1 Results of subjective assessment

Figure 6 shows the distribution of subjective scores for each question generated by the participants simulating interviewers. When the subjects simulating applicants intended to convey a good impression to the participants simulating interviewers, the participants tended to form a good impression of the subjects. When the subjects intended to convey a bad impression to the participants, the participants tended to form a bad impression of the subjects. We believe that these results support hypotheses H1-1 and H1-2.

The behaviors performed by the applicants to convey a good impression and that made the interviewers form a good impression were nodding at appropriate times and generating a serious facial expression. The behaviors performed by the applicants to convey a good impression but that did not make the interviewers form a good impression were nodding occasionally and generating a tough facial expression.

The behaviors performed by the applicants to convey a bad impression and that made the interviewers form a bad impression were touching body parts and crossing hands and feet. The behaviors performed by the applicants to convey a bad impression but that did not make the interviewers form a bad impression were looking at the interviewer and nodding sometimes.

5.2 Results of gaze measurement

Figure 4 shows the visualization of the body parts on which the interviewers' gaze was focused while observing the stimulus video sequences at each time point. In the figure, the red color in the heat map represents regions where the gaze was focused. When the interviewers formed a good impression, their gaze

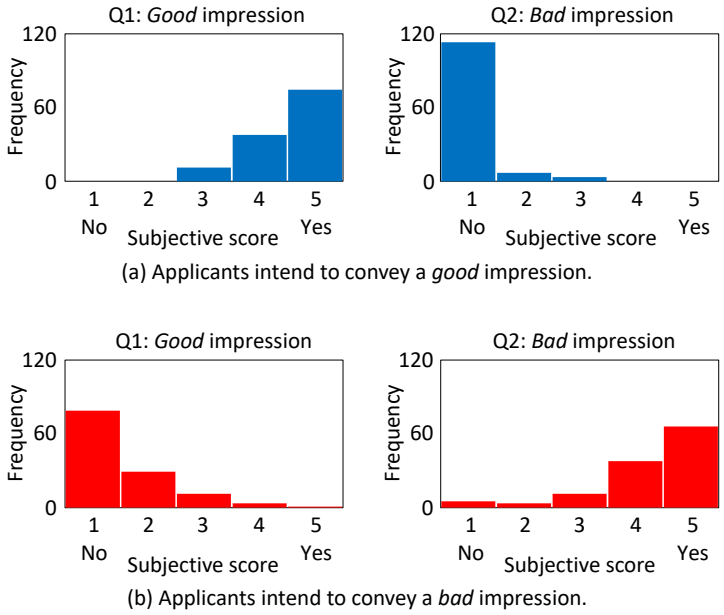


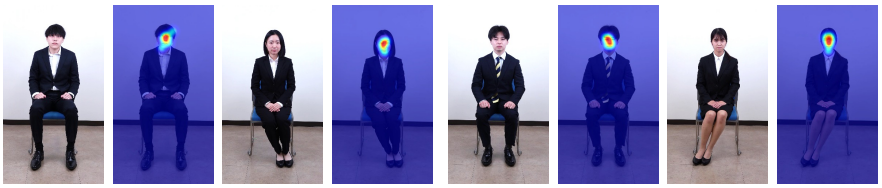
Fig. 6. Subjective scores rated by participants simulating the interviewers for each question. (a) $\tilde{S}_g$: Applicants intend to convey a good impression. (b) $\tilde{S}_b$: Applicants intend to convey a bad impression.

tended to be focused on the applicant's head. Contrastingly, when they formed a bad impression, the focus of their gaze tended to be distributed to the parts of the applicant's body linked to the behaviors performed, in addition to the applicant's face. We believe that these results support hypothesis H2.

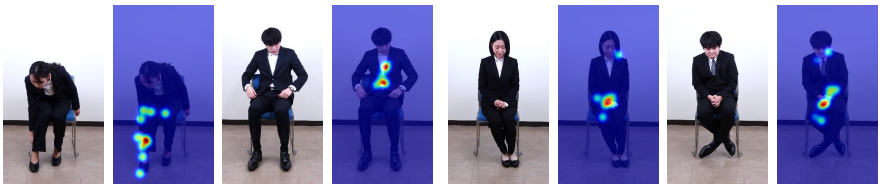
6 Conclusions

In this study, we investigated the relationship between the impression that an applicant intends to convey to an interviewer through their behaviors and the impression that the interviewer forms from the applicant's behaviors during an interview, using subjective assessment and gaze measurement. The subjective assessment confirmed that the applicant's impression and the interviewer's impression were very similar. The gaze measurement confirmed that the body parts that attract the gaze may differ according to whether the applicant intends to convey a good or bad impression.

In future work, we plan to investigate how the subjective score changes at each time point of the stimulus video sequences. We aim to expand this work by carrying out subjective assessments and gaze measurement using a wider range of subjects and participants.



(a) Applicants intend to convey a *good* impression and interviewers form a *good* impression.



(b) Applicants intend to convey a *bad* impression and interviewers form a *bad* impression.

Fig. 7. Visualization of the body parts where the interviewer's gaze was focused.

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