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ORIGINAL PAPER

Here's Looking at You: Does Eye Contact in Video Interviews Affect How Applicants are Perceived and Evaluated?

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Abstract
Synchronous as well as asynchronous video interviews have become increasingly common as a supplement to or replacement for face-to-face interviews for selection purposes. Recent research suggests that impairments of eye contact in video interviews might contribute to lower interview performance ratings in these interviews because establishing eye contact in them is only possible by looking into the camera, which, however, impedes the perception of the conversation partner's emotions and reactions. Therefore, we experimentally tested the effect of eye contact in two studies using asynchronous video interviews. Results showed that a vertical deviation of eye contact led neither to lower interview performance ratings nor to more negative perceptions of applicants' warmth and competence whereas a horizontal deviation of eye contact negatively affected perceptions of the hirability of applicants. Furthermore, deviations in eye contact led to lower perceived social presence which turned out to be a mediator for lower performance ratings. Taken together, results show that restrictions in eye contact are no immediate driving factors for lower interview performance ratings but that communication quality might still suffer from decreased social presence which can ultimately lead to negative outcomes for interviewees.

Keywords Video interviews · Synchronous video interviews · Personnel selection · Technology-mediated communication · Eye contact

Here's Looking at You: Does Eye Contact in Video Interviews Affect How Applicants are Perceived and Evaluated?

Job interviews are among the most commonly used selection instruments in personnel selection, and it is hard to imagine hiring an applicant without some type of interview (Huffcutt & Culbertson, 2011; Ryan & Ployhart, 2014). However, globalization and international competition have led to a demand and necessity for digitalized selection procedures so that selection instruments should now be faster, more cost-effective, and location-independent, and so that the applicant pool can be expanded (Chapman & Webster, 2003). Furthermore, contact restrictions during the Covid-19 pandemic globally determined both personal and professional life and led to job interviews necessarily being conducted remotely using webcams and microphones (video interviews), which have subsequently become increasingly common.

The use of synchronous video interviews (i.e., videoconference interviews via Zoom, Microsoft Teams) and asynchronous video interviews (AVIs) and has been steadily increasing in recent years (Daniel et al., 2022; Gibson et al., 2021). However, previous research has found that interviewees' performance is evaluated differently in face-to-face (FTF) interviews than in video interviews (Blacksmith et al., 2016; Castro & Gramzow, 2015), which means that the interview medium can affect applicants' chances of being hired. With regard to synchronous video interviews, for example, both older studies (see the meta-analysis from Blacksmith et al., 2016) as well as more recent ones (e.g., Basch et al., 2021b; Melchers et al., 2021) found that interviewees' performance is usually rated lower in comparison to FTF interviews. This could put "video applicants" at a disadvantage when competing with "face-to-face applicants" when the different forms of interviews are used for the same application process (Blacksmith et al., 2016).

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Previous research looking into potential reasons for the differences in interview performance ratings has repeatedly suggested that impaired eye contact is a relevant factor that might contribute to lower ratings of interviewees in synchronous video interviews (Blacksmith et al., 2016; Sears et al., 2013). Specifically, impaired eye contact might affect perceptions of social presence during synchronous video interviews, which in turn might be accompanied by a limitation in the use of impression management tactics that together ultimately influence interview performance ratings negatively (Basch et al., 2021b). Unfortunately, establishing an impression of eye contact for one's interaction partner in synchronous video interviews is only possible by looking directly into the camera. This, however, interferes with the possibility to look into the eyes of the interaction partner so as to perceive the interaction partner's emotions and reactions and to react accordingly. Furthermore, people can use very different camera positions for video interactions so that the resulting deviation from direct eye contact can come in various forms which might affect interviewers' perceptions of the applicants to different degrees. In AVIs, however, deviations in eye contact might be even more obvious since the lack of an interaction partner actually makes it possible for interviewees to establish the impression of full eye contact by looking directly into the camera. However, the self-view in AVIs (at least when interviewees look at it) or the respective setup with external monitors, tablets, etc. could be factors also leading to deviations in eye contact. In line with this, self-view has been found to draw mental resources (Horn & Behrend, 2017) and to be distracting (Döring et al., 2022).

Despite the repeated suggestion that impairments of eye contact contribute to lower interview performance ratings in synchronous video interviews (Blacksmith et al., 2016; Sears et al., 2013), we are not aware of any research that has tested this assertion. Thus, so far it rests on plausibility considerations or on evidence from correlational studies with synchronous video interviews (Basch et al., 2021b), from general studies on interaction via videoconference (e.g., Fullwood, 2007), or from studies that considered interview performance and eye contact in FTF interviews (e.g., Burgoon et al., 1985; Burnett & Motowidlo, 1998; Libby & Yaklevich, 1973; Parsons & Liden, 1984; Tessler & Sushelsky, 1978). Therefore, to test this suggestion and to gain a deeper insight into the role that eye contact may play in causing differences in performance ratings, we conducted two experimental studies. In these studies, we used recorded video interviews and used a setting resembling the evaluation situation in AVIs to consider the effects of varying eye contact on ratings of interviewees' performances, hirability, perceived social presence, and the perception of the interviewees in general.

Background

Video Interviews

In this study, we refer to "video interviews" as all interviews that use an external webcam to conduct (synchronous video interviews, also known as videoconference interviews) or record the interview (asynchronous video interviews). Especially, synchronous video interviews have become particularly common owing to the Covid-19 pandemic and the contact restrictions that resulted from it (e.g., Daniel et al., 2022). Of the various ways in which job interviews can be conducted, synchronous video interviews are also often viewed as the primary alternative to FTF interviews (Basch et al., 2021b) and are frequently offered to applicants as an alternative especially when these would have to travel far (e.g., Arthur et al., 2021; Pathak et al., 2021). In this regard, the Covid-19 pandemic has both improved awareness of providers for videoconferencing technologies and prompted technological developments in recent years that have improved the quality of the conversation. With the help of high-resolution webcams, high-quality microphones, and high-speed Internet, it is now possible to create a synchronous conversational situation that comes relatively close to FTF interviews—mainly differing in the spatial separation of the conversation partners.

AVIs are another form of video interviews. These interviews are also conducted via the Internet and they are mainly used to pre-select applicants (Basch et al., 2022; Lukacik et al., 2022). In AVIs, applicants are shown questions on the screen and record their answers using a webcam and microphone. The applicants usually have a certain amount of time to prepare and answer each question (Dunlop et al., 2022). The term "asynchronous" already indicates that there is no direct interaction between an interviewer and an applicant and that the actual interview is separated in time from the evaluation of the applicant. Both applicants and interviewers can decide for themselves when to conduct or evaluate such an AVI.

The advantages of video interviews became evident because they allowed job interviews to be conducted during times of contact restrictions during the Covid-19 pandemic. Furthermore, organizations and applicants appreciated the time and cost savings that resulted from the use of video interviews in general (see, for example, the review by Daniel et al., 2022). These interviews eliminate the need for applicants to travel, which also allows for more flexible scheduling (Basch & Melchers, 2021), and they contribute to a reduction of the ecological footprint (Behrend & Thompson, 2013; Daniel et al., 2022). Moreover, AVIs offer organizations and applicants additional

advantages: The independence of time zones and office hours means that a larger pool of applicants can be interviewed (Brenner et al., 2016; Daniel et al., 2022). Applicants can also decide for themselves when they want to complete the interviews and can, therefore, better integrate them into their daily routine and personal preferences (Lukacik et al., 2022). Another advantage of AVIs is that they are highly standardized and conducted in the same way with all applicants, which is beneficial for interview reliability and validity (Huffcutt et al., 2014; Schmidt & Zimmerman, 2004).

Differences Between FTF and Video Interviews

There are several factors that differ between FTF interviews and video interviews and that might contribute to differences in ratings of interviewees' performances and hirability. Some of these are related to the differences of the communication channels, others to technical issues, or even to biases that can only occur in video interviews and not in FTF interviews. First, it is important to consider differences in communication quality when investigating interviews conducted via different media (Roulin et al., 2021). For example, according to media richness theory (Daft & Lengel, 1986), it can be assumed that communication is less ambiguous when more channels of information transmission are used. In FTF interviews, for example, all channels can be used: verbal, nonverbal (gestures, facial expressions), as well as paraverbal (voice pitch, speech rate) information, which reduces the uncertainty of the communication partners according to media richness theory. As previously stated, synchronous video interviews are a common alternative to FTF interviews (Arthur et al., 2021; Pathak et al., 2021), because the same channels of information transmission are used as in FTF interviews. Nevertheless, the information in synchronous video interviews is less rich, and eye contact is one aspect of nonverbal behavior that might be impaired in synchronous interviews: As noted above, establishing an impression of eye contact for one's interaction partner is only possible by looking directly into the camera, which involves neglecting the interaction partner's facial expressions and reactions. Furthermore, for AVIs, establishing mutual and synchronous eye contact is not possible because of the missing synchronous interaction and, therefore, a missing conversation partner.

In addition to media richness theory, it might be helpful to consider social presence theory (Short et al., 1976) as a further theoretical basis for the role of eye contact in video-mediated communication. According to social presence theory, the technological barrier in video-mediated communication can impair the feeling of the presence of one's communication partner. Specifically, the perception of one's communication partners via a technical medium (screen, telephone) is not based on the actual presence of these other persons themselves, but only on a technical representation of reality. This perception is called social presence (Biocca et al., 2003). Accordingly, FTF interviews offer the greatest degree of social presence, followed by synchronous video interviews, and finally by AVIs in which no presence of the conversation partner can be perceived. However, from the interviewers' perspective, perceived eye contact of applicants might affect perceptions of the applicants both in synchronous video interviews and AVIs.

Interview Performance in Video Interviews

As mentioned above, interview performance ratings differ between FTF and video interviews: Both a meta-analysis of older studies from the first decade of this century (Blacksmith et al., 2016) and more recent studies (Basch et al., 2021b; Melchers et al., 2021; Sears et al., 2013) have confirmed that interviewees are rated lower in synchronous video interviews compared to FTF interviews (but see Langer et al., 2024, for an exception). In contrast to this, there are a few studies that suggest that ratings are higher in AVIs compared to FTF interviews (Castro & Gramzow, 2015) or to synchronous video interviews (Langer et al., 2017). However, these higher ratings can probably be attributed to the provision of preparation time in AVIs. In synchronous video interviews, preparation time is usually not allowed, but a large scale study from Dunlop et al. (2022) among AVI users found that the average preparation time in AVIs is 30 s. Recent studies found that the provision of preparation time can influence interview performance positively (Basch et al., 2021a) at least, when applicants decide to use this preparation time when given the opportunity (Roulin et al., 2023c). In contrast, when no preparation time is provided in AVIs, ratings between FTF interviews and AVIs disappear (Cheban & Scherbaum, 2023).

In addition to preparation time, which might improve the quality of applicants' answers, there is also evidence that biasing information can also influence interview performance ratings. Specifically, it has been found that information in the background of video interviews (Basch et al., 2024; Powell et al., 2023; Roulin et al., 2023a; Scott & Roulin, 2024) can lead to biased interview performance ratings. Thus, if eye contact affects interviewers' perceptions of applicants, then this might also bias interview performance ratings.

Finally, there is also evidence that social presence (Short et al., 1976) is impaired in video interviews and these impairments are also related to the potential use of impression management in video interviews (Basch et al., 2020; Basch et al., 2021b). This is another aspect where eye contact could become relevant.

The Potential Role of Eye Contact in Video Interviews

Eye contact is defined as the gaze that is directed at another person's eyes, and mutual eye contact is when two people simultaneously make eye contact with each other (Bohannon et al., 2013). Mutual eye contact is considered important for mutual understanding. If this cannot be established or can be established only in a distorted manner, this is detrimental to the quality of communication, and related constructs such as trust and impression formation (Bohannon et al., 2013), or attentional focus (Fullwood & Doherty-Sneddon, 2006).

In the context of FTF interviews, it has long been known that higher levels of eye contact are related to more positive perceptions of interviewees (e.g., Burgoon et al., 1985; Burnett & Motowidlo, 1998; Libby & Yaklevich, 1973; Parsons & Liden, 1984; Tessler & Sushelsky, 1978). In video interviews, however, eye contact is usually distorted because of the camera position. Normally, cameras are positioned above the screen either when an external webcam is used or when the camera is integrated within a laptop. In each case, this leads to a vertical deviation of eye contact. The difference between looking into a camera positioned on top of one's screen vs. looking at the face of one's conversation partner is usually around 15° (Jaklič et al., 2017). However, the deviation also depends on the distance between the eyes and the screen. From a mathematical perspective and given the tangent function, the degree of the deviation decreases with longer distances from the screen to the eyes. If there is a distance of 60 cm between eyes and screen and a distance of 20 cm between the conversation partner's face on the screen and the lens of the webcam, this would lead to a deviation of 18°. However, increasing the distance from the eyes to the screen to 80 cm would result in a deviation of 14° and, therefore, to a decrease of 4°. Furthermore, sometimes external webcams can be positioned to the left or to the right of the screen, for example, when they are placed on a second screen or when a second device with a camera is used in a videoconference. This can lead to a case when people use a (bigger) screen for notes or the window of the videoconference program but have their laptop or a free-standing video camera off to the side. Using these setups leads to a horizontal deviation of eye contact.

The camera positions above the screen (i.e., a vertically deviating position) and next to the main screen (i.e., a horizontally deviating position) make it difficult to establish eye contact in synchronous video interviews because one can either create the impression of direct eye contact for one's interaction partner by directly looking into the camera, or one can look into the face of the person on the screen and, therefore, not into the camera, which leads to a rather tilted gaze (Bohannon et al., 2013). This might impair important social processes in job interviews such as building mutual sympathy (Melchers et al., 2015) because direct eye contact provides a sense of togetherness and is therefore also an attribute of social presence (Bondareva et al., 2006). In line with this, Fauville et al. (2022) found that screenshots of people from videoconferences that represented direct eye contact were rated higher on likeability, social presence, and interpersonal attraction in comparison to deviations from direct eye contact. However, previous research also revealed that people are even more sensitive to horizontal deviations from direct eye contact than to vertical deviations (see the review by Bohannon et al., 2013) so that the former might lead to stronger impairments in synchronous video interviews. Eventually, all of these effects might contribute to rating differences between synchronous video interviews and FTF interviews.

To the best of our knowledge, there are no studies investigating the role of eye contact in AVIs. However, even without having an immediate interlocutor, deviations from direct eye contact might also occur in AVIs when applicants tend to look at the screen where they might see relevant information such as the interview question, the timer showing them the remaining time for their answer, or their self-view. All this would have the effect that they look at the screen and not directly at the camera.

In line with the assumed relevance of eye contact, a recent study that compared interview performance ratings and interviewees' perceptions of synchronous video interviews vs. FTF interviews found that the perceived quality of eye contact was rated lower both by interviewers and by interviewees in synchronous video interviews (Basch et al., 2021b). Additionally, the quality of eye contact was related to lower levels of impression management and ultimately to lower interview performance ratings for the interviewees in the synchronous video interview. Furthermore, all the interviews in that study were recorded and rated by a second rater at a later time which is similar to the rating situation in an AVI. Interestingly, the second rating for the FTF interviews was significantly lower than the first rating from the interview (see Van Iddekinge et al., 2006, for a similar finding). One possible explanation could be that the interviewees were filmed from a horizontally deviating position (from behind the interviewer's right shoulder) which may have impaired the perception of eye contact for the second ratings.

Taken together, both of the different theoretical assumptions presented above as well as the findings from previous research lead to the following prediction:

> **Hypothesis 1**: Interviewees will receive lower interview performance ratings when their gaze deviates from direct eye contact.

As described above, perceptions of social presence might be impaired in video-mediated communication given that

eye contact is a determining factor for the feeling of social presence in videoconferences (Bondareva et al., 2006). Thus, impaired eye contact might blur the impression of the "mediated others" (Biocca & Harms, 2002, p. 30). Accordingly, we assume:

Hypothesis 2a: Deviation of gaze will lead to lower levels of perceived social presence.

In addition, Basch, Melchers et al. (2021b) found that perceived social presence in synchronous video interviews was related to interview performance ratings. As a consequence, we assume that deviations of direct eye contact will lead to lower perceived social presence which in turn affects interview performance ratings. Thus, we assume:

Hypothesis 2b: The relationship between eye contact and interview performance ratings is mediated by perceived social presence.

Apart from interview performance and social presence, there are also other aspects in the perception of interviewees that might be related to eye contact (Fauville et al., 2022). One of these aspects is the perceived competence and warmth of a person: According to the stereotype content model (Fiske et al., 2002), competence and warmth are two dimensions that influence how people classify others into categories. Competent people are seen as intelligent, ambitious, self-confident, and have a high social status. Seeking and also maintaining eye contact is associated with higher self-confidence, whereas non-confident people would seek to avoid eye contact (Kleck & Nuessle, 1968). Therefore, seeking and maintaining eye contact might be associated with a higher perceived competence of an interviewee. In line with this, Fullwood (2007) found that individuals who solved a simple task together perceived the other person as less intelligent in a video-mediated condition compared to FTF condition and this was also attributed to eye contact. Similarly, Sears et al. (2013) found higher levels of perceived competence for people being interviewed FTF compared to synchronously via videoconference. Accordingly, we assume:

Hypothesis 3a: Direct eye contact will lead to higher levels of perceived competence compared to deviations of direct eye contact.

When individuals are perceived as warm, they are seen as kind-hearted and likeable. As for competence, one of the aspects that might influence perceived warmth is eye contact given that it contributes to a feeling of proximity. Accordingly, the study by Fullwood (2007) found that collaboration partners were seen not only as less intelligent, but also as less likeable in the video-mediated condition. Similarly, Sears et al. (2013) found that participants in the synchronous video interviews were rated not only as less competent, but also as less personable and trustworthy. Furthermore, Storck and Sproull (1995) found that video-mediated communication resulted in conversation partners being perceived as less positive and less friendly. And in the context of job interviews, Imada and Hakel (1977) found that eye contact in simulated interviews led to higher perceptions of sympathy for the applicants. Based on this, we predict:

Hypothesis 3b: Direct eye contact will lead to higher levels of perceived warmth compared to deviations of direct eye contact.

As mentioned before, eye contact can be vertically (e.g., when the camera is positioned on the top of the screen) but also horizontally deviated (e.g., when an external monitor and the camera from an external device or a free-standing camera is used from a side position). Horizontal eye contact deviation appears to occur less frequently than vertical deviation, but is still relatively common in video-mediated communication.[1] Given the aforementioned assumption that a horizontal deviation represents a more salient deviation than a vertical deviation, we also want to investigate whether the effects predicted in Hypotheses 1 to 3 are stronger for a horizontal deviation:

Research Question 1: Does a horizontal deviation of eye contact lead to stronger effects compared to a vertical deviation?

The Present Studies

To test the different hypotheses and the assumed causal effect of eye contact on perceptions and evaluations of interviewees in job interviews, we conducted two experiments. In both experiments, we tested Hypotheses 1, 2a, and 2b and examined the effects of a vertical deviation from direct eye contact to examine the common situation in which a camera is positioned on top of a computer screen. In Study 2, we additionally tested the effects of a horizontal deviation from direct gaze. This resembles the situation in which a camera is positioned adjacent to the screen by using the camera of

[1] The results of a survey with 106 participants conducted in addition to the present studies found that 79% of the participants have experienced direct eye contact of their interlocutors in videoconferences, while 94% have experienced vertically deviating eye contact, and 73% have already experienced the situation with horizontally deviating eye contact. Furthermore, participants indicated that the percentage of videoconferences in which at least one of the interlocuters uses direct eye contact is approximately 42%, 72% for vertically deviating eye contact, and 27% for horizontally deviating eye contact, respectively.

an additional device (e.g., laptop, tablet) or a freestanding camera. Furthermore, Study 2 also evaluated the effects of eye contact on perceptions of competence and warmth (Hypotheses 3a and 3b). For both studies, we used videos in which interviewees were answering questions in a video interview which resembles the evaluation situation in AVIs.

Study 1

Method

Sample

Participants were recruited via posts in social media (Facebook, Xing, LinkedIn, Instagram) or via personal contacts. Additionally, the study was promoted on www.surveycircle.com. Participation in the study took approximately 10 min. There was no monetary incentive for the participation in the study. However, psychology students could take part in the study to partially fulfill a course requirement.

To determine the required sample size, we conducted a power analysis using G*Power (Faul et al., 2007). On the basis of previous studies that often found medium-sized differences between performance ratings in synchronous video interviews vs. FTF interviews (e.g., Basch et al., 2021b; Blacksmith et al., 2016), we also assumed a medium-sized difference ($d = 0.50$) that we wanted to test with a power of 0.80 in a two-tailed test. This analysis showed that an N of 128 would be necessary to achieve the desired power. However, as we ended up with a final sample of 250 individuals for Study 1, our actual power was considerably larger (0.98) to detect a medium-sized difference.

The participants' mean age was $M = 27.79$ years ($SD = 11.14$) and 62% identified as females and 38% as males. Most of the participants were students (66%), followed by working individuals (26%). Of the participants, 72.5% had previous experience with interviews (22.5% as an interviewer, 70.9% as an interviewee). All participants were asked to complete the study only on a laptop or on a desktop computer. However, 23 participants indicated that they had completed the study on a smartphone or a tablet. In the following analyses, no difference was found between people completing the study on a mobile device or a stationary device and their exclusion did not change the results qualitatively. Therefore, we decided to keep these 23 participants in the sample.

Procedure

The study was administered online. After providing informed consent and completing questions on demographics, participants were asked about their previous experience with interviews. After this, participants were told to imagine that they were working as a recruiter in the HR department of a global organization and that they should watch and evaluate the responses of one applicant applying for a job at the organization. Then, participants were randomly assigned to one of two experimental conditions, which differed in the eye contact shown by an applicant. In both conditions, participants were shown the interview responses of a female applicant to one past-behavior question and four situational interview questions. The questions were all taken from Ingold et al. (2015), and the quality of the responses to these questions should reflect neither overly poor nor overly good answers. All the responses were recorded using two identical cameras that were arranged so that one camera mirrored direct eye contact and the other camera was fixed at an angle of 15° deviation above the first camera (a more detailed description of the set-up and example photos can be found in Appendix 1). Directly after each interview response, participants were asked to rate the quality of the interviewee's answer for the respective question using a descriptively anchored rating scale (see below). Furthermore, we collected two additional measures of interview performance. Specifically, after completing the evaluations of all the five interview responses, participants additionally rated the applicant's overall performance and hirability. The rationale for this was that the two latter measures might be more susceptible to biases because they do not offer a common evaluative standard (Campion et al., 1997). Finally, participants were asked to evaluate the perceived social presence.

Measures

Interview Performance Ratings As mentioned above, different measures of interview performance were used. First, participants rated the answer to each question on a descriptively anchored rating scale from 1 = *very weak answer* to 5 = *very good answer*. These scales provided participants with descriptive rating anchors for poor, medium, and good answers. This resembles the situation in highly structured interviews (Huffcutt et al., 2013, 2014). Together with the interview questions, these scales were taken from Ingold et al. (2015). For the subsequent analyses, we took the average rating across all five questions. Secondly, participants provided a subjective overall interview performance rating by answering the item: "How would you rate the applicant's overall performance based on the quality of her responses?". The corresponding scale also ranged from 1 = *very weak performance* to 5 = *very good performance*. Finally, on a scale from 1 = *very unlikely* to 5 = *very likely*, participants rated the hirability of the applicant, which was measured with the single item: "How likely would you be to hire the applicant based on the quality of her responses?". The second and the

third option are commonly used in applied settings but also in other studies (Fiechter et al., 2018; Roulin et al., 2023a) and resemble the situation in less structured interviews (Huffcutt et al., 2013, 2014).

Social Presence Four items from Tang et al. (2013) were used to measure perceived social presence. Participants were asked how they would rate their perception of the applicant on 5-point bipolar adjective scales concerning the following adjective pairs: insensitive-sensitive; cold-warm; passive-active, impersonal-personal. Reliability analyses revealed that Cronbach's alpha increased from .68 to .76, when the item passive-active was excluded from the scale. Therefore, the 3-item scale was used for the following analyses.

Results

Descriptive information and correlations for all study variables from Study 1 are shown in Table 1 and the means, standard deviations, and effect sizes for comparisons of the two experimental conditions are shown in Table 2. The experimental groups did not differ regarding age, sex, or previous interview experience, all $ts < 1.19$, all $ps > .23$.

Hypothesis 1 stated that interview performance would be rated higher when there was direct eye contact compared to when gaze deviated from direct eye contact. However, as can be seen in Table 2, these differences were all rather small (*d*s ranged from 0.10 to 0.12) so that even one-tailed *t*-tests did not find any significant difference for any of the interview performance variables (the average interview performance rating across all five interview questions and the single-item measures of overall performance and hirability), all $ts < 1$, all $ps > .36$. Therefore, Hypothesis 1 was not supported.

Hypothesis 2a assumed that a deviation of direct eye contact leads to lower levels of perceived social presence. The corresponding results were similar to Hypothesis 1, so that a one-tailed *t*-test found no significant difference, $t(248) = 1.07$, $p = .29$. Therefore, Hypothesis 2a was also not supported.

Hypothesis 2b assumed that the relationship between eye contact and interview performance would be mediated by perceived social presence. We used the PROCESS macro from Hayes (2018) to investigate this assumption. However, in line with the non-significant differences in Hypotheses 1 and 2a, the mediation path also failed to reach significance, indirect effect = −0.003 [−0.03; 0.005]. Accordingly, Hypothesis 2b was also not supported.

Discussion

In contrast to our expectations and to previous suggestions in the literature (Basch et al., 2021b; Blacksmith et al., 2016; Sears et al., 2013), Study 1 found no support for the prediction that applicants in video interviews

Table 1 Means, Standard Deviations, and Intercorrelations for the Study Variables from Study 1

Variable	*M*	*SD*	1	2	3	4	5	6	7
1. Age	27.80	11.17							
2. Sex	0.38	0.38	.17**						
3. Interviewer experience	0.23	0.42	.02	.001					
4. Condition	0.49	0.50	.02	−.04	−.02				
5. Mean interview performance	3.72	0.46	−.01	−.02	−.03	−.05			
6. Overall interview rating	4.04	0.61	−.10	−.11	−.03	−.06	.52**		
7. Hirability	3.93	0.79	−.14*	−.12	−.09	−.05	.45**	.67**	
8. Social presence	3.11	0.81	−.01	.09	−.02	−.07	.06	.17**	.27**

$N = 249$. Sex was coded 0 = female, 1 = male. Condition was coded 0 = direct eye contact, 1 = vertically deviating eye contact. Interviewer experience was coded 0 = no experience, 1 = experience

*$p < .05$, **$p < .01$

Table 2 Means, Standard Deviations, Effect Sizes, and *p*-Values for the Study Variables from Study 1

	Direct eye contact ($n = 128$)		Vertically deviating eye contact ($n = 122$)		Cohen's *d*	*p*-value
	M	(*SD*)	*M*	(*SD*)		
Mean interview performance	3.74	(0.44)	3.70	(0.48)	0.10	.21
Overall interview rating	4.07	(0.58)	4.00	(0.64)	0.12	.18
Hirability	3.97	(0.81)	3.89	(0.77)	0.10	.28
Social presence	3.17	(0.83)	3.06	(0.79)	0.14	.14

The *p*-values represent the results of one-tailed ttests

receive lower interview performance ratings when their gaze deviates from direct eye contact and, therefore, when they show the typical gaze in a video interview. Furthermore, in addition to the different measures of interview performance, there was no significant difference for perceived social presence.

However, although we used a camera set-up that was suggested by Jaklič et al. (2017) with a deviation of 15° to normal gaze, a potential limitation of our study is that we had not included a measure for the perceived quality of eye contact. Thus, it could be that participants perceived the deviating gaze as direct eye contact, because they were actually not aware of what a direct gaze would look like. Furthermore, another limitation of Study 1 was that we only considered vertically deviating eye contact.

Study 2

In order to avoid the limitations of Study 1, we conducted a second study for which we included additional items to measure the perceived quality of eye contact. Additionally, we included measures of competence and warmth (Fiske et al., 2002) as further dependent variables for the perception of applicants that go beyond mere interview performance. Furthermore, we also included a third experimental condition, in which the applicant was filmed from a horizontally deviating position in order to imitate a camera set-up when people use their laptop or an additional device that is placed beside the usual screen on the side of their desk. According to the assumption that a vertical deviation of 15° can lead to less social presence and decreased perception of the interaction partner (Jaklič et al., 2017), we assumed that a horizontal deviation could increase the feeling of impaired or even absent eye contact (Bohannon et al., 2013). Therefore, we expected even stronger effects for this condition (see also Research Question 1).

In addition to the inclusion of a measure of eye contact and a third experimental condition, we tried to strengthen our experimental treatment by asking participants to rate the responses of two candidates, of which the first one always showed direct eye contact. This was done to set a default for what direct eye contact actually looks like.

Method

Sample

To determine the required sample size, we conducted another power analysis for which we again assumed a medium-sized difference ($f = 0.25$) that we wanted to test with a power of 0.80 in a two-tailed test. This analysis revealed an N of 159.

The sample consisted of 198 individuals so that our actual power was again larger than we had anticipated. Participants (mean age $M = 28.75$ years, $SD = 10.69$ years; 68.7% females; 61.1% students, $M = 18.21$ working hours per week) were recruited via posts in different groups on social media like Facebook, LinkedIn, or Xing, or were approached directly with emails containing the link to the online study. Of the participants, 59.6% had a university degree and 56.6% had experience with synchronous video interviews ($M = 3.36$, $SD = 5.94$). On a range from 1 = *never* to 5 = *multiple times per day*, the mean for the question "how often do you use videoconference programs in your everyday life" was $M = 2.82$, $SD = 1.04$. The participation in the study took approximately 20 min and was compensated with 5 Euros.

Procedure

First, participants completed an online questionnaire containing demographic questions and questions concerning their experience with videoconferences, synchronous video interviews, and potential experience as an interviewer. Then, participants were told to imagine that they were working as a recruiter in the HR department of a global organization and that they should watch and rate the responses of two applicants applying for a job at the organization. Each of the applicants answered the same five interview questions (these were the same questions as in Study 1). The interview responses of both applicants differed in content. However, again both applicants provided answers designed to reflect neither overly good nor overly poor responses.

The first applicant always showed direct eye contact by looking directly into the camera. After rating the first applicant, participants were randomly assigned to one of three experimental conditions for rating the second applicant who either (a) looked directly into the camera, (b) had a vertical deviation of 15° compared to direct eye contact, or (c) was displayed from a horizontally deviating position. The second condition was comparable to Study 1 and represented the usual situation in which a webcam is place on top of one's screen and the third condition represented a situation in which someone looks at the main screen but where an integrated webcam from a laptop standing next to the screen or an alternative second device is used. Example photos and the information concerning the exact distances between the cameras can be found in Appendix 2.

Table 3 Means, Standard Deviations, and Intercorrelations for the Study Variables from Study 2

Variable	*M*	*SD*	1	2	3	4	5	6	7	8	9	10	11
1. Age	28.81	10.73											
2. Sex	0.31	0.46	.18**										
3. Interviewer experience	0.82	0.39	−.19**	−.03									
4. Videoconference use	2.83	1.03	−.10	.02	−.13								
5. Condition	1.01	0.82	−.03	.02	.09	−.04							
6. Mean interview performance	3.70	0.45	.02	−.23**	.08	−.10	−.08						
7. Overall interview rating	3.73	0.75	−.06	−.20**	.03	−.05	−.09	.47**					
8. Hirability	3.45	0.89	−.14	−.20**	.03	−.03	−.13	.43**	.71**				
9. Competence	3.55	0.68	−.07	−.13	.07	−.04	−.05	.46**	.68**	.61**			
10. Warmth	3.78	0.68	−.11	−.11	−.04	−.07	−.05	.14*	.31**	.31**	.33**		
11. Social presence	3.27	0.64	.02	−.14*	.02	−.04	−.31**	.32**	.37**	.39**	.43**	.29**	
12. Quality of eye contact	2.85	1.43	.05	−.02	−.08	−.03	−.79**	.13	.16*	.18*	.20**	.18*	.49**

$N = 198$. Sex was coded 0 = female, 1 = male. Condition was coded 0 = direct eye contact, 1 = vertically deviating eye contact, 2 = horizontally deviating eye contact. Interviewer experience was coded 0 = no experience, 1 = experience

*$p < .05$, **$p < .01$

For both applicants, participants had to rate the quality of the interview responses in the same way as in Study 1. Additionally, participants were asked to rate warmth, competence, and perceived quality of eye contact for each applicant. Additionally, in both conditions, participants were asked a direct question: whether the applicant looked straight into the camera.

Measures

Unless indicated otherwise, all items were rated on 5-point rating scales ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Measures for which no German version was available were translated to German for the present study and were checked by backtranslation.

Perceived Quality of Eye Contact Perceived quality of eye contact was measured with one item from Basch, Melchers, et al. (2021b; "I found it easy to keep eye contact with the interviewee") that was supplemented with three newly developed items (mean α = .89). The items can be found in the online supplement.

Interview Performance Ratings The same measures and items as in Study 1 were used.

Social Presence Given the problem with one of the four items from Tang et al. (2013), we decided to use an alternative measure of social presence. For this measure, we developed six items ourselves that were based on considerations according to social presence theory (Short et al., 1976). An example item was "In this interview, I had the feeling that I could entirely perceive the applicant" (mean α = .79).[2] The items can be found in the online supplement.

Competence and Warmth The perceived competence (e.g., "I perceive this person as self-confident") and warmth (e.g., "I perceive this person as friendly") of the applicants were measured with four items each from Fiske et al. (2002). The mean for Cronbach's alpha was .84 for competence and .82 for warmth across the two applicants.

Results

Preliminary Analyses

The means, standard deviations, and correlations for all study variables from Study 2 are shown in Table 3. Additionally, separate means, standard deviations, and effect sizes for the three experimental groups can be found in Table 4.

First, we investigated the effects of our experimental manipulation on perceived quality of eye contact. An ANOVA revealed a significant effect, $F(2, 196) = 183.42$, $p < .001$. Subsequent *t*-tests for the comparison of the different experimental conditions found significant differences

[2] However, to validate this new measure, we also administered the items from Tang et al. (2013) to our participants and the two measures had a correlation of $r = .55$. Furthermore, the qualitative pattern of the results and the corresponding conclusions were the same. The subsequent results were based on the self-developed measure. To further analyze the dimensionality of our measures of social presence and perceived quality of eye contact, we conducted several confirmatory factor analyses. The results supporting the dimensionality can be found in the online supplement.

Table 4 Means, Standard Deviations, and Effect Sizes for the Comparison of the Dependent Variables from Study 2

	Direct eye contact ($n = 64$)		Vertically deviating eye contact ($n = 67$)		Horizontally deviating eye contact ($n = 67$)		Cohen's *d*		
	M	(*SD*)	*M*	(*SD*)	*M*	(*SD*)	Direct vs. vertically deviating eye contact	Direct vs. horizontally deviating eye contact	Vertically deviating eye contact vs. horizontally deviating eye contact
Quality of eye contact	4.09	(0.80)	3.19	(1.09)	1.32	(0.56)	0.94**	4.03**	2.16**
Mean interview performance	3.75	(0.48)	3.70	(0.47)	3.67	(0.42)	0.11	0.18	0.07
Overall interview rating	3.81	(0.71)	3.73	(0.71)	3.66	(0.48)	0.11	0.25	0.12
Hirability	3.53	(0.80)	3.58	(0.93)	3.25	(0.91)	−0.06	0.33*	0.36*
Social presence	3.51	(0.59)	3.29	(0.65)	3.01	(0.59)	0.35*	0.85**	0.45*
Competence	3.57	(0.66)	3.57	(0.74)	3.50	(0.64)	0.00	0.11	0.10
Warmth	3.81	(0.64)	3.80	(0.77)	3.73	(0.62)	0.01	0.13	0.10

p-values refer to one-tailed *t*-tests

*$p < .05$, **$p < .001$

between all three conditions, all $ts > 5.30$, all $ps < .001$, with rather large effect sizes (see also Table 4). Furthermore, the quality of eye contact was best in the condition with direct eye contact, and worst in the condition with the camera in the horizontally deviating position. Ratings of the quality of eye contact in the condition with vertically deviating eye contact were between the two other conditions. Additionally, for the first applicant who always established straight eye contact, 98% of the participants stated that the applicant looked directly into the camera. For applicant 2, the numbers were 97% in the condition with direct eye contact, 65% for the condition with vertically deviating eye contact, and 3% for the condition with horizontally deviating eye contact. Taken together, we see this as evidence that our experimental manipulation worked as intended.

Test of Hypotheses

Hypothesis 1, which stated that deviations from a direct gaze will lead to lower interview performance ratings, was tested with separate ANOVAs for each interview performance variable. However, this ANOVA was significant neither for the mean rating across all the separate interview responses, $F(2, 196) = 0.56$, $p = .57$, nor for the overall performance rating, $F(2, 196) = 0.72$, $p = .49$. Furthermore, for hirability the ANOVA fell short of significance, $F(2, 196) = 2.60$, $p = .08$, but one-tailed post-hoc Scheffé tests revealed significant differences for the comparison between direct eye contact vs. horizontally deviating eye contact, $t(129) = 1.85$, $p = .03$, $d = 0.33$, and for vertically deviating eye contact vs. horizontally deviating eye contact, $t(131) = 2.02$, $p = .02$, $d = 0.36$. Thus, the overall pattern of results suggests that seeing applicants from a horizontally deviating position might somewhat impair interview ratings which provides at least limited support for Hypothesis 1 and answers Research Question 1.

Hypothesis 2a assumed that perceived social presence will be lower in conditions with a deviating gaze compared to direct eye contact. This hypothesis was supported by the results from an ANOVA, which revealed a significant effect, $F(2, 196) = 10.92$, $p < .001$, and by post-hoc tests with the Scheffé procedure. These tests revealed significant differences between direct eye contact vs. vertically deviating eye contact, $t(128) = 1.97$, $p = .03$, $d = 0.35$, between direct eye contact vs. horizontally deviating eye contact, $t(128) = 4.81$, $p < .001$, $d = 0.85$, as well as for the comparison between vertically deviating eye contact and horizontally deviating eye contact, $t(131) = 2.63$, $p = .01$, $d = 0.45$. Thus, concerning Research Question 1, the horizontal deviation led to the strongest impairment of perceived social presence with a large effect size, whereas the vertical deviation led to a small-to-moderate effect size.

Next, Hypothesis 2b predicted that the relationship between eye contact and interview performance ratings would be mediated by social presence. To formally test this prediction, we again conducted mediation analyses using the PROCESS macro from Hayes (2018). This time, the mediation path was in line with our hypothesis and turned out to be significant for each interview performance measure (i.e., the mean rating across all the separate interview responses, the overall performance rating, and the hirability rating, see Table 5).

Next, we conducted further ANOVAs to test Hypotheses 3a and b, which stated that there would be differences in the perceived competence and warmth of the applicant

Table 5 Mediation Analyses for the Indirect Effects of Eye Contact via Social Presence on All the Dependent Variables in Study 2

Model	IE_{med}	SE_{Boot}	95% CI
Eye contact → social presence → interview performance rating	−0.06	0.02	[−0.10, −0.03]
Eye contact → social presence → overall performance rating	−0.11	0.03	[−0.19, −0.06]
Eye contact → social presence → hirability	−0.13	0.04	[−0.23, −0.06]

$N = 197$

IE_{med} = completely standardized indirect effect of the mediation, SE_{Boot} = standard error of the bootstrapped effect sizes

depending on the eye contact. Contrary to our predictions, both ANOVAs proved to be non-significant, both Fs < 1.

General Discussion

The present studies investigated the role of eye contact for perceptions and evaluations of interviewees in video interviews. Three key results emerged from these studies. First, both studies clearly found that vertical deviations from direct eye contact that occur, for example, when a webcam is positioned above interviewees' main screen, have only negligible effects on ratings of interviewees' performance. This is in contrast both to predictions from several relevant theories (Daft & Lengel, 1986; Short et al., 1976), to repeated suggestions in the literature (Basch et al., 2021b; Blacksmith et al., 2016), and to recent evidence concerning perceptions of conversation partners that were only shown via screenshots (Fauville et al., 2022). Secondly, using a webcam that is positioned on the side of interviewees' main screen leading to a horizontally deviating gaze might impair ratings of interviewees' performances, but the corresponding effects seem small and were not found for all dependent variables. Thirdly, perceived social presence was related to interview ratings and was affected by eye contact, but the effects of eye contact were stronger when the camera was positioned horizontally deviating from the interviewees' main screen. Taken together, our results support the relevance of social presence in video interviews but suggest that differences in eye contact are not the main driver for the differences between interview ratings from FTF vs. video interviews that have repeatedly been found in the literature (Basch et al., 2021b; Blacksmith et al., 2016; Melchers et al., 2021; Sears et al., 2013).

The unexpected finding from Study 1 that vertical deviations have only negligible effects on interview performance ratings was replicated in Study 2, in which we tried to strengthen the experimental treatment, and was also extended to other variables that should be related to the perception of applicants (i.e., perceptions of competence and warmth). Thus, in contrast to theoretical predictions and repeated suggestions in the literature, it seems that a 15° deviation of gaze in a vertical direction, which is common in videoconferencing (see Jaklič et al., 2017; and our own survey conducted for this study that we mentioned in Footnote 1), is no meaningful driver of difference in interview ratings.

A potential explanation for the non-significant effects of vertical deviations of gaze in Study 1 and Study 2 is that people are generally less sensitive to vertical deviations from eye contact than to horizontal deviations (Bohannon et al., 2013). In addition, it might also be that people have become used to a vertically deviating gaze in synchronous video interactions, which is also shown by the results of our survey indicating that 94% of the participants know this situation and that it occurs in 72% of the cases in videoconferences. Alternatively, it might be that raters focused more on information from the applicants' answers then on eye contact than in the study from Fauville et al. (2022) that found effects of eye contact but in which only screenshots, but no interview answers had to be rated. Therefore, it is also possible that hiring managers and also the participants from the present study did not penalize applicants for such a deviating gaze by rating them less favorably.

In contrast to the nonsignificant results for vertical deviations of eye contact, the finding from Study 2 that applicants' perceived hirability was significantly lower when they used a horizontally deviating position for their camera, nevertheless represents important evidence for the relevance of eye contact and of the position of the webcam in video interviews. Completing a video interview with this horizontally deviating position, which is used by some individuals in videoconferencing, such as when they use the integrated webcam from a laptop in combination with an external screen, can impair applicants' chances of a job offer. However, with the exception of perceived social presence, we have to acknowledge that we did not find significant differences for the other dependent variables. Thus, it might be that the use of a single overall hirability rating—which is similar to the main decisions that recruiters have to make in a job interview—is more prone to the effects of eye contact in contrast to other ratings that are based either on descriptively anchored rating scales (such as the ratings of the individual answers) or on multiple items (such as the ratings of competence and warmth). Obviously, future research is needed to further investigate this possibility. Nevertheless,

the finding that variables based on multiple ratings and/or on descriptively anchored rating scales are less prone to potential biases is in line with previous evidence from the interview domain that better rating scales contribute to the reliability and validity of interview ratings (e.g., Campion et al., 1997; Huffcutt et al., 2013; Melchers et al., 2011).

The third key finding from the present studies is that the limited effect of eye contact on ratings and perceptions of the applicants is mediated by perceived social presence. Specifically, in Study 2, we found that differences in the perceived social presence between the different conditions of eye contact ultimately influenced the perceptions of all the dependent variables, that is, of interview performance and hirability. Thus, the more deviating eye contact is, the less social presence is perceived, which can eventually impair perceptions and evaluations of applicants. However, it is obvious that this negative effect is driven by a larger effect when the applicant was filmed from the horizontally deviating position. Nevertheless, the present findings stress the relevance of social presence (Short et al., 1976) for video interviews.

Limitations and Lines for Future Research

Although the present studies shed new light on the—surprisingly limited—role of eye contact for interview performance ratings in video interviews, they are not free of limitations. The biggest limitation is that we used video recordings for our study that, of course, did not allow synchronous interaction. Accordingly, our study design with applicants' recorded responses is most comparable to situations in which interviewees' answers must be evaluated in AVIs. Thus, the present results should generalize to similar situations in AVIs.

Apart from their use in different stages of the application process, the most important difference between synchronous video interviews and AVIs is that synchronous video interviews allow synchronous interaction whereas communication in AVIs is always asynchronous and one way (Lukacik et al., 2022). However, given that mutual eye contact is important for communication efficacy, the development of trust, and for impression formation (see the review from Bohannon et al., 2013), it is possible that deviations from direct eye contact, and seeking and maintaining direct eye contact would be perceived differently in synchronous interactions (IJsselsteijn et al., 2003). Specifically, given the fact that in synchronous video interviews both interaction partners have to look at their screen and that there is an actual two-way communication, it might be that eye contact (and deviations from it) has stronger effects in synchronous than in asynchronous interactions. Thus, the present results might underestimate the effects of eye contact for synchronous video interviews. However, previous studies that found effects of different sources of information in traditional FTF interviews also used comparable experimental setups with video recordings of the interviews (e.g., Burnett & Motowidlo, 1998), because using video recordings allows to collect data while standardizing the content of the interview responses as well as other factors as far as possible. Nevertheless, future research should further investigate the effects of deviations in eye contact in actual synchronous video interviews to evaluate the generalizability of the present results. Additionally, future research could also investigate the effect of showing a self-view in AVIs and its effect of applicants' gazing behavior. If self-view is deactivated, there is no further distraction and thus less reason not to look into the camera.

The specific camera positions that we chose represents a second potential limitation. Although a considerable percentage of our survey participants regularly experience horizontally deviating eye contact (in more than 25% of their videoconference meetings, see Footnote 1), it is unclear to what extent applicants would actually use this camera position in an actual synchronous video interview or an AVI. Therefore, our third experimental condition used in Study 2 might be extreme in the context of job interviews and it is unclear to which degree it is used by actual applicants in practice, thus limiting the external validity of our results.

A third limitation is that the rise in the use of videoconference systems as a result of the Covid-19 pandemic has probably increased familiarity with communication via videoconferencing so that people are now much more used to videoconferencing and to the vertical deviations from direct eye contact. Thus, it might be that deviations from direct eye contact would have had stronger effects before the Covid-19 pandemic than they have now. This, however, would make it possible that deviations from eye contact might impair interview ratings to a lesser degree than they did in the past. Furthermore, given that also the more recent studies on differences between FTF vs. synchronous video interviews (e.g., Basch et al., 2021b; Melchers et al., 2021) usually collected their data before the pandemic, a relevant question is whether the often-reported differences between ratings in FTF vs. synchronous video interviews will still be found. In this regard, it is interesting that a recent study from Langer et al. (2024) indeed found much smaller (and nonsignificant) differences between ratings from FTF and synchronous video interviews. Furthermore, additional indirect support for this possibility stems from recent research that found that lacking experience and related (low) performance ratings can be partly compensated by video interview training (Roulin et al., 2023b).

Concerning the role of experience, the composition of our sample is another potential limitation of our studies. Many participants in our studies were students and thus relatively young. Given the fact that computer self-efficacy (Reed et al., 2005) and attitudes towards technology (Hauk et al., 2018) and computers (Czaja & Sharit, 1998) decrease with age, it is possible that our samples were more familiar with the use of computers, of video interviews, and ultimately deviations in

eye contact. Thus, effects could be stronger in an older sample. Furthermore, given their youth, many participants had limited interviewer experience. However, a study by Maurer (2002) did not find differences in the accuracy of ratings in situational interviews between students and experts.

For the time being, our studies suggest that impairments of eye contact are not the major driver of lower interview performance ratings in video interviews; future research is needed to test the causal effects of other potential factors. However, our results suggest that perceived social presence, that is, the feeling of being able to fully perceive and interact with the conversation partner, might play an important role (see also Basch et al., 2021b). Thus, other factors beyond eye contact such as media richness (Daft & Lengel, 1986) might contribute to the effect on social presence. Furthermore, we did not manipulate the distance between the applicant's eyes and the screen. Given the differences in the deviation that varying distances create, future research could also investigate the role of different distances, and therefore, varying vertical deviations. Furthermore, there are other aspects of video interviews beyond eye contact that can contribute to differences between ratings in FTF vs. video interviews and these should be investigated further, such as video and audio quality (Fiechter et al., 2018) or biasing cues in the background (Powell et al., 2023; Roulin et al., 2023a).

Practical Implications

According to our findings, vertical deviations from eye contact have only negligible effects on the evaluation of applicants. Thus, in contrast to recommendations from previous studies (e.g., Basch et al., 2021b), seeking or maintaining eye contact is an aspect that seems less important for applicants to consider than was previously thought when they are preparing for or going through a video interview—at least when a regular camera setting with a webcam mounted above the screen is being used. Nevertheless, it might be advisable to ensure the deviation from direct eye contact does not become too strong. To do so, applicants could try to move the image of their conversation partner closer to the camera position and to sit back. By doing so, they minimize the angle of deviation, are able both to maintain nearly direct eye contact and also to see the reactions of the interviewer (Bohannon et al., 2013).

Furthermore, on the basis of the findings from Study 2, it is advisable for applicants at least to use a camera set-up that deviates only in a vertical direction because using a webcam from a horizontally deviating position can cause considerably large decreases in the perceived social presence and also the subjective perception of hirability of potential applicants.

Appendix 1

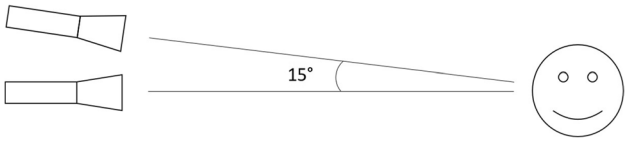

Fig. 1 Experimental set-up for Study 1

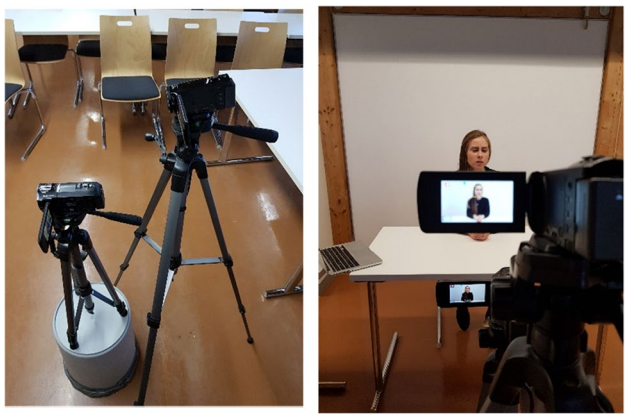

Fig. 2 Example photos of the experimental set-up in Study 1

Fig. 3 Example photos of the applicant with direct eye contact (left) and vertically deviating eye contact (right) in Study 1

Appendix 2

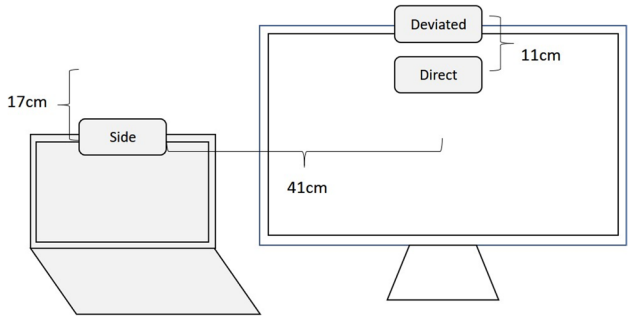

Fig. 4 Experimental set-up in Study 2

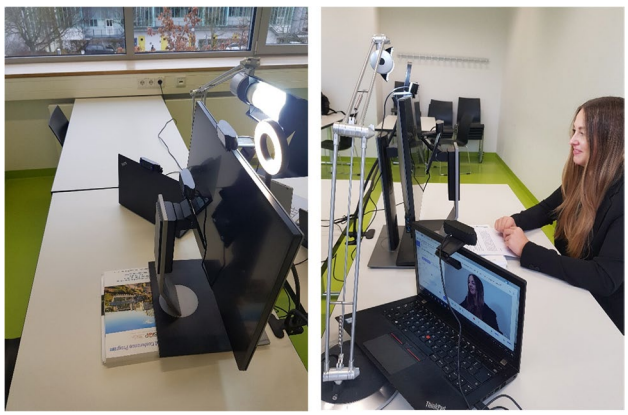

Fig. 5 Example photos for the experimental set-up of Study 2

Fig. 6 Example photos for the three different experimental conditions of applicant 2 in Study 2. From left to right: direct eye contact, vertically deviating eye contact, horizontally deviating eye contact

Supplementary Information The online version contains supplementary material available at https://doi.org/10.1007/s10869-024-09981-4.

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Author contribution Johannes M. Basch: conceptualization, methodology, validation, formal analysis, investigation, data curation, writing—original draft, writing—review and editing, visualization, project administration. Klaus G. Melchers: conceptualization, methodology, funding acquisition, supervision, writing—original draft, writing—review and editing, resources.

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Data availability The data that support the findings of these studies are available from the corresponding author upon request.

Declarations

Competing interests The authors declare no competing interests.

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