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Spare me the details: How the type of information about automated interviews influences applicant reactions

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Abstract

Applicants seem to react negatively to artificial intelligence-based automated systems in personnel selection. This study investigates the impact of different pieces of information to alleviate applicant reactions in an automated interview setting. In a 2 (no process information vs. process information) × 2 (no process justification vs. process justification) between-subjects design, participants (N = 124) received respective information and watched a video showing an automated interview. Testing mediation effects via different applicant reaction variables indicated that process justification is better than process information which can even impair applicant reactions. However, information did not increase organizational attractiveness compared to not receiving any information. This study sheds light on what type of information contributes to positive and negative applicant reactions to automated systems.

KEYWORDS

algorithms, applicant reactions, explainable artificial intelligence, human-computer-interaction, information, personnel selection

1 | INTRODUCTION

Artificial intelligence (AI) increasingly supports or even automates decisions in organizations. For instance, AI-based automated systems help to decide about work scheduling or to find the most suitable candidates (Ötting & Maier, 2018; Schlicker et al., 2021). However, especially in the case of personnel selection, automated systems seem to predominantly lead to negative applicant reactions that could lead to applicants withdrawing their application and thus reducing the pool of potentially suitable applicants for hiring organizations (Uggerslev et al., 2012).

In order to foster acceptance of processes, products or systems, researchers and practitioners usually agree that providing people with additional information can be an impactful way to increase acceptance (Venkatesh et al., 2003). For example, in computer science, there is a push toward explainable Artificial Intelligence (XAI), with the hope that making AI-based systems more understandable and transparent to people would increase system acceptance (Arrieta et al., 2020). Similar positions have been voiced in the area of personnel selection (Burns et al., 2008; McCarthy et al., 2017; Truxillo et al., 2009). According to the meta-analysis of Truxillo and colleagues (2009) telling applicants about what will be happening during personnel selection procedures (we call this process information) or why exactly it is a good idea to use this procedure and what is inferred by this procedure (we call this process justification) helps to improve applicant reactions. An example for process information in the case of automated systems would be to tell applicants that what they say and how they say it will be used within the automated

system's algorithmic decision process. Process justification would mean to inform applicants that the personnel selection method was designed to validly predict job performance, and a combination of these kinds of information would be to tell applicants that what they say and how they say it will be analyzed because this improves the prediction of job performance.

However, the relation between information and positive effects on applicant reactions has to be qualified. For instance, Newman et al. (2020) found that additional information regarding what will happen in an automated personnel selection situation can impair applicant reactions. Similarly, Langer and colleagues (2018) provided applicants with information regarding an automated job interview situation which improved certain applicant reactions but at the same time negatively affected others. They explained this effect by assuming that pieces of information might be beneficial for people's reactions to algorithmic decisions, whereas others might jeopardize positive effects. However, experimentally manipulating only the amount of information and not on the type of information, Langer and colleagues (2018) were unable to test this assumption. The aim of the current study is, therefore, to contribute to a better understanding regarding what kind of information may contribute to positive and negative applicant reactions to automated systems in personnel selection. This study examines two specific types of information (process information and process justification) that might have simultaneous beneficial and detrimental effects regarding people's reaction to automated systems in personnel selection.

2 | THEORY AND HYPOTHESES DEVELOPMENT

2.1 | Automation and artificial intelligence for job interviews

Researchers and practitioners in the area personnel selection show growing interest in augmenting or even automating classical versions of personnel selection methods using AI-based systems. For instance, Campion et al. (2016) show the potential of using natural language processing combined with machine learning algorithms in the screening of written application information (e.g., motivation letters). Furthermore, companies now attempt to use machine learning and deep learning approaches to automatically evaluate applicants' interview performance based on applicants' nonverbal (e.g., smiling) or verbal (e.g., which words they used) behavior (Raghavan et al., 2020). This kind of interview assessment seems to bear a lot of potential, as research shows that nonverbal and verbal behavior can predict interview performance and applicant personality (Hickman et al., 2021; Naim et al., 2018).

Using automated interviews is attractive for organizations and potentially also for applicants. Following Parasuraman et al. (2000), automated processes can automate entire interviews by (a) gathering data (record applicant responses), (b) analyze data (analyze applicant responses), (c) decide between different action and decision alternatives (decide for follow-up questions; decide about which applicants to recommend to hiring managers) and (d) implement a given action (ask appropriate follow-up questions). Therefore, automated interviews can improve efficiency (i.e., less time needed for scheduling), flexibility (i.e., applicants can conduct the interview whenever they want), as well as perceived and actual fairness of job interviews (Lee, 2018). For instance, as the evaluation of the interviews progresses without the influence of human raters, there might be less bias in performance evaluations (e.g., less racial biases, cf., Purkiss et al., 2006) (but also consider Caliskan et al., 2017, showing that algorithms may reproduce human biases).

Despite these potential advantages, applicant reactions to AI-based automated decision-making in personnel selection are predominantly negative (Acikgoz et al., 2020; Gonzalez et al., 2019; Langer et al., 2019; Lee, 2018; Newman et al., 2020). On the one hand, lack of social presence in automated personnel selection—especially in automated job interviews—can negatively affect applicant reactions (Langer et al., 2019). On the other hand, unfamiliarity and a lack of transparency of algorithmic decision-making process might also cause negative reactions (Gonzalez et al., 2019). Similar negative reactions to automated job interviews are reflected by a recent case in the American legislation, where the lack of transparency regarding automated interviews even drew the attention of the state of Illinois. On January 1, 2020, its Artificial Intelligence Video Interview Act took effect, requiring greater transparency with job applicants by employers when AI is used in applicant evaluation.[1]

2.2 | Information and its impact on selection procedures

This indicates that automating job interviews has the potential to stimulate negative applicant reactions and there seems to be a strong need to mitigate such negative reactions. A prominent and promising way how to improve applicant reactions is the provision of additional information regarding selection methods (Truxillo et al., 2009). We thus chose to provide people in the current study with information before they would experience the automated selection situation. Several reasons indicate that the provision of such information could improve applicant reactions to technology-based personnel selection procedures. First, applicant reaction theories (e.g., Gilliland, 1993) suggest that information and transparency bear the potential to positively impact applicant reactions. Second, this assumption was tested many times and has received meta-analytical support (Truxillo et al., 2009) and has also received support for novel technology-based selection methods (Basch & Melchers, 2019). Third, receiving information in advance to selection procedures might buffer potential negative reactions better than post-hoc interventions (McCarthy et al., 2017).

Qualifying the overall positive picture regarding information as a way to foster positive applicant reactions, there is research pointing toward the importance of what kind of information is presented. Lahuis and colleagues (2003) found that general information (short,

justifying information that a cognitive ability selection test is job-relevant) evoked stronger fairness perceptions than specific information (detailed information explaining the process of determining that the test is job-relevant). Furthermore, Langer et al. (2018) found that in an automated interview setting information had simultaneously positive and negative effects. They speculated about reasons for these equivocal effects of information (e.g., information makes applicants skeptical) but the design of their study did not allow for distinguishing between different kinds of information. More precisely, their participants either received nearly no information about the automated selection procedure or detailed information. The latter included information about what the automated interview tool is capable of (e.g., analyzing voice), describing the process of the interview as is (i.e., process information). Additionally, it included information about why the capabilities of the interview tool should be valuable for the selection procedure (e.g., because the analysis of applicants' voice enables to infer the personality of applicants). This information justifies the use of the interview tool with information about job relevance or empirical findings that the automated interview tool is suitable for the selection process (i.e., process justification). In a similar vein, Newman et al. (2020) unexpectedly found that information regarding what kind of applicant features are analyzed during automated job interviews (e.g., nonverbal information) can negatively affect fairness perceptions. This type of information is similar to the process information provided in Langer et al. (2018) and provides further reason to believe that certain kinds of information may impair applicant reactions in automated job interview settings.

Comparing process information and justification leads to the conclusion that process information is a neutral description of technical details, of things that will happen during the selection process, whereas process justification provides a rationale for the use of the procedure. The current study experimentally segregates the information condition used by Langer et al. (2018) into process justification and process information, which makes it possible to reveal which pieces of information are more likely to affect applicant reactions positively.

2.3 | Possible effects of different types of information on applicant reactions

Previous work on applicant reactions to automated personnel selection usually focused on a wide range of applicant reaction criterion variables, covering procedural justice, affective reactions, and privacy concerns (see Langer et al., 2018; Lee, 2018; Newman et al., 2020). Procedural justice is one of the most important criteria of applicants' positive evaluation of selection processes (cf., Gilliland, 1993) and should ultimately lead to increased organizational attractiveness (Gilliland, 1993). Affective reactions provide additional information about applicants' possible negative emotions during selection procedures beyond procedural justice perceptions. Privacy concerns are of special importance within technologically advanced selection procedures as they might cause applicants to self-select out of the selection process (cf., Bauer et al., 2006). The current study addresses the effects of information on those three perspectives.

2.3.1 | Procedural and informational justice

Transparency of a selection procedure is most directly related to receiving information regarding the selection procedure (e.g., Gilliland, 1993; McCarthy et al., 2017; Truxillo et al., 2009). Most commonly the relation between information and transparency is assumed to be: the more information the more transparent the situation (Langer et al., 2018; Truxillo et al., 2009, which not necessarily means the more information the better, see Lahuis et al., 2003).

Applicants perceive a selection situation as fair if their justice expectations are met (Colquitt et al., 2013; Gilliland, 1993). For instance, applicants might expect to be informed about what awaits them during a personnel selection situation (Ployhart & Ryan, 1998). Additionally, they may wish to understand why an organization chose a specific selection approach to screen applicants. Consequently, it appears likely that process information and process justification will both help to bolster fairness perceptions. However, applicants might expect not to be overwhelmed with too specific information (Lahuis et al., 2003). If this argument is sound, it would be detrimental to provide applicants with overly detailed information as they perceive their justice expectations (e.g., "tell me why we are doing this but spare me the details") are violated. Furthermore, by providing very detailed information, applicants might question some of the information (Lahuis et al., 2003). In a case where information just explains that a program can infer personality traits (without telling applicants how), applicants might not challenge this statement. This would suggest that process information detrimentally affects justice expectations, whereas process justification positively impacts justice expectations. In sum, we propose:

Hypothesis 1a *Participants who receive, both, process information and process justification will perceive the selection situation as more transparent than participants in the other groups.*[2]

Hypothesis 1b *Participants who receive neither process information nor process justification will perceive the selection situation as less fair than participants in the other groups.*

Hypothesis 1c *Participants who receive only process justification will perceive the selection situation as fairer than participants in both the process information and in the combined process information and process justification group.*

2.3.2 | Affective reactions

To capture affective reactions toward technologically advanced situations, Langer and König (2018) studied the concept of creepiness,

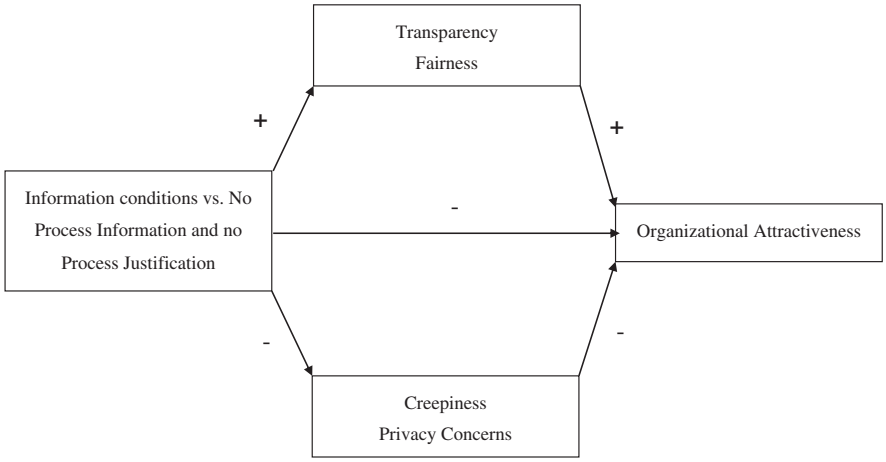

FIGURE 1 Proposed mediation effects in Hypotheses 2a and 2b

which is a negative emotional reaction paired with feelings of ambiguity toward novel technologies (e.g., interacting with a virtual interviewer; Langer & König, 2018; Tene & Polonetsky, 2015). Key factors increasing creepiness seem to be uncertainty and unpredictability (Langer & König, 2018; Tene & Polonetsky, 2015). Providing process information should make the situation more predictable and process justification should help to decrease uncertainty as it should help applicants why the organization is using a specific selection procedure. Therefore, we propose:

Hypothesis 1d *Participants who receive neither process information nor process justification will perceive the selection situation as creepier than participants in the other groups.*

Hypothesis 1e *Participants who receive, both, process information and process justification will perceive the selection situation as less creepy than participants in the other groups.*

2.3.3 | Privacy concerns

Privacy concerns are always relevant in personnel selection because applicants provide sensible information about themselves to a hiring organization. However, privacy concerns can be especially salient in technologically advanced selection procedures (Bauer et al., 2006; Langer et al., 2017). Specifically, when applicants submit their application information via technical devices, submit videos or are recorded during automated job interviews, they could be concerned about what happens to this data. For instance, they could be concerned that people other than the hiring managers will view interview recordings or even that a third party accesses sensible information about applicants (Bauer et al., 2006; Langer et al., 2017). Providing information on the procedure can be beneficial if the information relays to participants why it makes sense to use respective data (i.e., process justification). However, privacy concerns might not be alleviated if the information given is merely a description of what will happen and about what kind of information will be gathered (i.e., process information relating to the use of voice and video recordings) because applicants would still not see the usefulness of the gathered data (e.g., that voice data can be used to predict job performance). Quite the contrary, participants might become more skeptical about the provided technical details or may wonder why respective information is captured during the selection procedure. As such, we propose:

Hypothesis 1f *Participants who receive only process information will perceive more privacy concerns than participants in the other groups.*

Hypothesis 1g *Participants who receive only process justification will perceive less privacy concerns than the other groups.*[3]

2.3.4 | Effects on organizational attractiveness

Most previous research assumes that providing information should improve applicant reactions (McCarthy et al., 2017; Truxillo et al., 2009). Furthermore, Gilliland (1993) proposed that better applicant reactions should result in higher organizational attractiveness (i.e., form a positive image about the organization)—a proposal that has been empirically supported in various studies (e.g., Bauer et al., 2001; Chapman et al., 2005). It follows that providing information should improve organizational attractiveness and this effect should be mediated by creepiness, privacy concerns, transparency, and fairness. Accordingly, we propose:

Hypothesis 2a *Compared to the condition where participants receive neither process information nor process justification, there will be a positive indirect effect of the information conditions on organizational attractiveness via creepiness, privacy concerns, transparency, and fairness.*

Hypothesis 2a would support findings by Langer and colleagues (2018) who found a positive effect of information on organizational attractiveness mediated by certain applicant reactions. However, they also found that information counterbalanced this positive

effect through a direct negative effect on organizational attractiveness. They argue that participants started to think critically about the information they received and that this was not possible in the case where they did not receive any information. It is, therefore, possible that the information participants receive in the current study could evoke similar negative reactions (Figure 1 for a depicts a mediation model for Hypotheses 2a and 2b).

Hypothesis 2b *Compared to the condition where participants receive neither process information nor process justification, there will be a direct negative effect of the information conditions on organizational attractiveness.*

3 | METHOD

3.1 | Overview

We used a 2 × 2 (no process information vs. process information, no process justification vs. process justification) between-subject experimental design to test our hypotheses. After immersing participants into an application situation, they received information corresponding to their information condition, then watched a video of an automated interview, and finally responded to all the measures.

3.2 | Sample

G*Power (Faul et al., 2009) was used to predict the required sample size. Truxillo et al. (2009) and Langer et al. (2018) found moderate effects for information on applicant reaction variables; therefore, we decided to assume comparable effect sizes within the current study. For a moderate effect size of the interaction effect within a multivariate analysis of variance (MANOVA) of Wilk's $\lambda = .90$ and a power of $1\text{-}\beta = 0.80$, a sample of $N = 125$ was necessary. Due to common problems with online studies (e.g., participants not reading information carefully, technical problems) we continued to collect data until our sample consisted of $N = 142$ participants. Three participants were excluded because they indicated that their data should not be used. Two participants were excluded because they paused the experiment for more than an hour. Eight participants who read the information for less than ten seconds in the information conditions were excluded because it is not possible to read all the information in less than ten seconds (except for the condition receiving neither process information nor justification). Finally, five participants were excluded due to technical problems. The final sample consisted of $N = 124$ German students (75% female) with a mean age of 23.36 years ($SD = 14.40$) of whom 70 studied psychology, 8 were business majors, and the rest were in a range of diverse majors (e.g., medicine, communication). Regarding job interview experience, 16% had undergone six to ten interviews, 43% three to five interviews, 18% two interviews, 12% one interview, 6% had not experienced an interview before, and the rest had completed more than 10 interviews.

3.3 | Procedure and information manipulation

The design of the experiment closely followed the process of Langer and colleagues (2018). The experiment was conducted via an online survey platform. Students received course credit for participating. Participants accessed the experiment through a link and gave their informed consent before the experiment started. In the beginning, participants were randomly assigned to one of the four conditions (neither process information nor justification, process information, process justification, combined process information, and justification). Participants first received information introducing them to the situation. We took this introduction from Langer and colleagues (2018) (see Table 1).

Following, participants had to imagine being in a personnel selection situation. Following Langer and colleagues' (2018) procedure, participants had to think about typical questions in a job interview. They were also instructed to think about how to sell themselves to an interviewer, about their plans for the next five years, and about their strengths and weaknesses. Following, participants received further information depending on the experimental group they were assigned to (see Table 1). This information was adapted from Langer et al. (2018). Afterward, participants watched the same video that Langer and colleagues (2018) used (see Figure 2).

Participants heard the female applicant's responses to the virtual interviewer's questions. However, participants did not see the applicant. Altogether, the video was designed to show all the characteristics of an automated process following Parasuraman et al. (2000) (gathering of information, data analysis, decisions about actions, implementing these actions). Specifically, the interviewer asked two questions and reacted to answers provided by the applicant. Within the interaction, the applicant showed signs of nervousness in response to the second interview question. As a result, she was unable to answer the question. This was done in order to ensure that participants realize that the system is able to capture applicant behavior, interpret it, and adapt to it. We chose nervousness because applicants frequently experience nervousness in job interviews (McCarthy & Goffin, 2004). The virtual interviewer reacted by telling the applicant that it recognized nervousness but it also told the applicant that nervousness in an interview is a normal reaction and calmed the applicant. In the end, the video faded out without further information about the results of the interview and participants were directed to a questionnaire containing all measures.

3.4 | Measures

3.4.1 | Dependent and mediator variables

The Appendix A presents the items for this study. Transparency, fairness, and organizational attractiveness were measured with items that ranged from 1 (*strongly disagree*) to 5 (*strongly agree*). Privacy concerns and creepiness were measured on a scale from 1 (*strongly disagree*) to 7 (*strongly agree*).

TABLE 1 Information presented to the participants in the different information conditions

Condition	Information
Introduction for all participants	You applied for a job. Your application seems to be well received by the company, because you receive the following letter: "Thank you for your application. Your qualifications, which we gathered from your resume and cover letter, are well suited for the position. As such, we would like to invite you to interview for the position …"
No process information, no justification	In addition, the company wrote: … To offer you the opportunity to introduce yourself, we would like to invite you to an online interview. This will be the next stage of the selection process. The online interview will be conducted by a virtual character
Process information, no justification	(In addition to the information from the low information group) The virtual character is run by a computer program. The program … can analyze your facial expressions by recognizing eye movement, eye contact, and facial movement (e.g., smiling) … can analyze your gestures by recognizing hand, body, and head movement (e.g., nodding and crossing arms) … can analyze your speech and voice for example pitch, volume, speech pauses … can interpret your behavior such as social and emotional signals … can display human conversational gestures such as smiling, crossing arms, nodding, etc … can react to different facial expressions, gestures, voice characteristics, and behavior of the applicant
No process information, justification	(In addition to the information from the low information group) The virtual character is run by a computer program. The program … tries to calm the applicant by treating the applicant positively … can infer personality traits like extraversion and openness. This can be useful to assess the candidate's job fit … can recognize if a person is listening, is agreeing with the virtual character's statements, and it recognizes when the candidates have completed their response. This can help to generate appropriate follow-up questions to answers given by the applicant … uses a virtual character to communicate with applicants, because studies suggest that applicants prefer to talk to a virtual character in an automated online interview … can adapt to your individual behavior and try to react adequately
Process information, justification	(In addition to the information from the low information group) The virtual character is run by a computer program. The program … can analyze your facial expressions by recognizing eye movement, eye contact, and facial movement (e.g., smiling) … can analyze your gestures by recognizing hand, body, and head movement (e.g., nodding and crossing arms) … is able to recognize if an applicant is nervous through eye movement, facial expressions, eye contact, and gestures. *If the applicant is nervous, the computer tries to calm the applicant by treating the applicant positively* … can analyze your speech and voice for example pitch, volume, speech pauses *because such speech signals can be helpful to infer personality traits like extraversion and openness. This can be useful to assess the candidate's job fit* … can interpret your behavior such as social and emotional signals, *if a person for example is listening, is agreeing with the virtual character's statements, and it recognizes when candidates have completed their response. This can help to generate appropriate follow-up questions to answers given by the applicant* … can display human conversational gestures such as smiling, crossing arms, nodding … *because studies suggest that applicants prefer to talk to a virtual character in an automated online interview* … can react to different facial expressions, gestures, voice characteristics, and behavior of the applicant through the virtual character. *It can adapt to your individual behavior and try to react adequately*

Note: Translated from German. Italicized parts were added in this table to highlight the process justification parts in the combined process information and justification group.

The two items for *transparency* were taken from Langer and colleagues' (2018) study. We used three *fairness* items developed by Warszta (2012) and adapted them to our study. The ten *creepiness* items with the two subdimensions emotional creepiness and creepy ambiguity were taken from Langer and König (2018). Of the six items for *privacy concerns*, one was taken from Smith et al. (1996), another from Langer and colleagues (2018), two items were taken from Malhotra et al. (2004), and two more items were taken from Langer

FIGURE 2 Screenshot of the experimental video when the interviewer greeted the applicant. The virtual interviewer was present in the center of the screen for the entire video. On the right side, signal lights provided feedback on the applicant's nonverbal behavior (e.g., smile, see first signal light from the top). On the left side, the applicant's skeleton was visible, accompanied by a continuous smile analysis below [Colour figure can be viewed at wileyonlinelibrary.com]

and colleagues (2017). Twelve of the organizational attractiveness items were taken from Highhouse et al. (2003), and three items were taken from Warszta (2012).

3.4.2 | Manipulation check

To assess the manipulation of the process information condition, the following item was used: "Information I received before the interview explained what is being analyzed by the computer program (e.g., eye-contact)." To assess the manipulation of the process justification condition, the following item was used: "Information I received before the interview explained why this computer program is used (e.g., because it can evaluate personality)."

3.5 | Data analysis

To get an overview of main and interaction effects, we used a MANOVA (see Spector, 1977) covering the dependent variables from Hypotheses 1a-g (i.e., transparency, fairness, creepiness, privacy concerns). To test the specific hypotheses, we conducted analyses of variance (ANOVAs) for the dependent variables with contrast analyses. Since our hypotheses addressed specific effects between the groups in the 2 × 2 between-subject design, we chose to consider the four groups as four categories of a single independent variable "information." For instance, Hypothesis 1a proposed that participants who receive both process information and process justification will perceive the selection situation as more transparent than participants in the other groups. This can be perceived as a contrast analysis of one condition against the other three conditions.

For the mediation hypotheses (i.e., Hypotheses 2a and 2b), we used PROCESS for SPSS (Hayes, 2013). To investigate the mediation results, the information conditions were also considered as four categories of a single independent variable "information." For instance, within Hypothesis 2a we compared the participants who received neither process information nor justification with the other three information conditions. To test the mediation hypotheses, we used PROCESS with a multicategorical independent variable with four conditions (for an introduction to multicategorical mediation analysis see Hayes & Preacher, 2014). To test hypotheses with a multicategorical independent variable, it is necessary to assign codes for the comparisons of interest. We chose contrast coding to investigate the Hypotheses (see results section for coding).

We included applicant reaction variables (transparency, fairness, creepiness, privacy concerns) as mediator variables as suggested by Hayes (2013); the outcome variable of the mediation was overall organizational attractiveness. PROCESS provides a step-wise evaluation of multicategorical mediation effects (Hayes, 2013). First, it reveals the effects of the contrast variables on the mediator variables. Second, it provides an overall output in which all mediating variables are included together with the contrast variables indicating whether the mediating variables impact the outcome significantly if the contrast variables are also included in the model and vice versa. Third, PROCESS calculates bias-corrected bootstrapped estimates of the overall indirect effects coded by the contrasts and corresponding confidence intervals; if these intervals do not include zero this indicates a significant indirect effect of the respective contrast

on the outcome mediated by the significant mediator variables. This significant indirect effect can then be interpreted based on the respective contrast (e.g., if a contrast comparing the condition with neither process information nor justification to the other groups is significant, this means there is a positive indirect effect of the other three information conditions compared to the condition that neither received process information nor justification).

4 | RESULTS

4.1 | Manipulation checks

For the manipulation checks, we used contrast analyses between the groups. Participants who received neither process information nor justification stated that they received less information about "what" was happening than the other three information conditions, $t(120) = 7.83$, $p < .01$, $d = 1.55$, and less information on "why" this selection procedure was used, $t(120) = 4.29$, $p < .01$, $d = 0.86$. Furthermore, participants who received no process justification stated that they received less information on "why" the selection procedure was used, $t(120) = 4.29$, $p < .01$, $d = 1.57$. Last, participants who received no process information stated that they received less information on "what" is being analyzed during the selection procedure, $t(120) = 7.81$, $p < .01$, $d = 1.41$.

4.2 | Testing the hypotheses

Table 2 provides correlations and reliabilities of the study variables. Table 3 shows the means and standard deviations of the information conditions.

To get an overview of multivariate effects, we used a MANOVA. The MANOVA indicated that the overall effect for process justification was not significant, $F(5, 116) = 1.93$, $p = .09$, Wilk's $\lambda = 0.92$, but that there was an overall effect of process information $F(5, 116) = 2.33$, $p < .01$, Wilk's $\lambda = 0.84$. The interaction effect was not significant, $F(5, 116) = 1.93$, $p = .43$, Wilk's $\lambda = 0.96$.

Hypothesis 1a proposed that participants who receive, both, process information and process justification will perceive the selection situation as more transparent than participants in the other groups. A contrast analysis did not support this, $t(120) = -1.60$, $p = .06$, $d = -0.33$.

Hypothesis 1b stated that participants who receive neither process information nor process justification will perceive the selection situation as less fair than participants in the other groups but this was not the case $t(120) = -0.08$, $p = .47$, $d = -0.02$.

Hypothesis 1c proposed that participants who receive only process justification will perceive the selection situation as fairer than participants in both the process information and in the combined process information and process justification group. A contrast analysis supported this hypothesis, $t(120) = 2.21$, $p = .02$, $d = 0.49$. This effect was mainly driven by the low mean value in the group that only received process information (see Table 2).

Hypothesis 1d suggested that participants who receive neither process information nor process justification will perceive the selection situation as creepier than participants in the other groups. Since the mean values for creepiness were even higher in the groups that received process information or the combination of process information and process justification (see Table 2), this hypothesis was not supported, $t(120) = -0.72$, $p = .26$, $d = -0.14$. Consequently, Hypothesis 1e which stated that participants who receive, both, process information and process justification will perceive the selection situation as less creepy than participants in the other groups, was also not supported $t(120) = -1.25$, $p = .10$, $d = -0.26$.

Hypothesis 1f proposed that participants who receive only process information will perceive more privacy concerns than participants in the other groups. This was supported, $t(120) = 2.21$, $p = .02$, $d = 0.45$.

Hypothesis 1g proposed that participants who receive only process justification will perceive less privacy concerns than the other groups. This was not supported, $t(120) = 1.18$, $p = .12$, $d = 0.25$, mainly because the mean value of privacy concerns was lowest in the group that received neither process information nor process justification (see Table 2).

TABLE 2 Correlations and Cronbach's alpha for the study variables

	Scale	1.	2.	3.	4.	5.	6.	7.
1.	Transparency	*.60*						
2.	Fairness	.20*	*.91*					
3.	Emotional creepiness	−.17	−.35**	*.79*				
4.	Creepy ambiguity	−.22*	−.29**	.64**	*.74*			
5.	Privacy concerns	.03	.29**	.29**	.19*	*.87*		
6.	Organizational attractiveness	.14	.60**	−.38**	−.34*	−.31**	*.93*	
7.	Process information	−.01	−.16	.34**	.12	−.23*	−.16	–
8.	Process justification	−.08	.21*	−.14	−.06	.02	.19*	.00

Note: $N = 124$. Numbers in the diagonal represent Cronbach's alpha of the scales (in italics). Coding of Process information: 0 = no process information, 1 = process information. Coding of Process justification: 0 = no process justification, 1 = process justification.
*$p < .05$; **$p < .01$.

TABLE 3 Descriptives and results for the single ANOVAS (including partial η^2 for the dependent variables)

	Condition				ANOVA					
	No PI, no PJ	PI, no PJ	No PI, PJ	PI, PJ	Main effect no PI vs. PI		Main effect no PJ vs. PJ		Interaction	
	M	*M*	*M*	*M*						
Variable	*SD*	*SD*	*SD*	*SD*	*F*(1,116)	η_p^2	*F*(1,116)	η_p^2	*F*(1,116)	η_p^2
Transparency	2.84	3.08	2.97	2.71	0.00	.00	0.78	.00	3.34	.03
	0.86	0.73	0.72	0.73						
Fairness	2.72	2.31	3.00	2.81	3.51	.03	5.64*	.05	0.44	.00
	0.95	0.79	0.91	0.98						
Emotional creepiness	3.37	4.08	3.00	3.83	16.20**	.12	2.59	.02	0.09	.00
	1.23	0.96	0.93	1.14						
Creepy ambiguity	4.16	4.32	3.93	4.30	1.78	.02	0.39	.00	0.28	.00
	1.28	0.99	1.10	1.09						
Privacy concerns	4.38	5.07	4.49	4.85	6.61*	.05	0.07	.00	0.62	.01
	1.07	1.25	0.83	1.34						
Organizational attractiveness	2.95	2.63	3.06	2.99	3.49	.03	4.78*	.04	1.37	.01
	0.54	0.49	0.60	0.75						

Note: $n_{\text{No PI, No PJ}} = 31$, $n_{\text{PI, No PJ}} = 31$, $n_{\text{No PI, PJ}} = 31$, $n_{\text{PI, PJ}} = 31$.
Abbreviations: PI, process information; PJ, process justification.
*$p < .05$; **$p < .01$.

Tables 4 and 5 present the results of the multicategorical mediation analysis for Hypotheses 2a and 2b. The results can be interpreted as relative effects compared to the reference group(s). We chose contrast coding where Contrast 1 (C1) compares the control condition (i.e., the condition which did neither receive process information nor justification) to the other three conditions, Contrast 2 (C2) compares the process information condition to the process justification and the full information condition (i.e., the combined process information and justification condition), and Contrast 3 (C3) compares the process justification and full information condition.

Hypothesis 2a suggested that there will be a positive indirect effect of the information conditions compared to the condition where participants did not receive process information or justification on organizational attractiveness as mediated by transparency, fairness, creepiness, and privacy concerns. Results of C1 indicate that there was no positive relative indirect effect of the information conditions compared to the control condition via any of the applicant reaction variables (see Table 4). Thus, Hypothesis 2a was not supported.

Hypothesis 2b proposed that there will be a direct negative effect of the information conditions on organizational attractiveness compared to the control condition. This hypothesis was not supported as there was no relative direct effect of C1 on organizational attractiveness (see Table 4).

However, there are additional results that are noteworthy (see Tables 4 and 5). In particular, C2 for emotional creepiness indicates that process information evoked higher emotional creepiness compared to the process justification and full information group (see Table 4). Additionally, C3 for emotional creepiness implies that the combined process information and justification group evoked higher emotional creepiness than the process justification group but there was no indirect effect of emotional creepiness on organizational attractiveness (see Table 5). Additionally, we found that process justification and the combined process information and justification group were perceived as fairer than the process information group and this positively impacted organizational attractiveness. First, there was a positive effect of the full information as well as the process justification group on fairness relative to the process information group (see Table 4). Second, in the complete model (all mediators and contrasts included), fairness was the only significant variable positively influencing organizational attractiveness (see Table 4). Third, the relative indirect effect of the combined process information and justification as well as the process justification group on fairness relative to the process information group was significant (see Table 5).

5 | DISCUSSION

The aim of this study was to contribute to a better understanding regarding what type of information may lead to positive and negative applicant reactions to automated systems in personnel selection. Our results provide two main findings: (a) process information may increase privacy concerns, whereas (b) perceived fairness can be low when process information is presented but can increase when process justification is added to process information, which has the potential to impact organizational attractiveness positively. Additionally, there were three surprising findings: (c) process

TABLE 4 Regression results for the multicategorical mediation between the experimental conditions and overall organizational attractiveness

Model	R^2	Coefficient	*SE*	*p*	95% CI
Single effects					
C1 Control condition vs. Other information → Transparency		0.08	0.16	.61	[−0.23, 0.39]
C2 Process information vs. Process justification + Full information → Transparency		−0.24	0.17	.15	[−0.57, 0.09]
C3 Process justification vs. Full information → Transparency		−0.26	0.19	.19	[−0.64, 0.13]
C1 Control condition vs. Other information → Fairness		−0.01	0.19	.94	[−0.39, 0.36]
C2 Process information vs. Process justification + Full information → Fairness		0.59	0.20	<.01	[0.20, 0.99]
C3 Process justification vs. Full information → Fairness		−0.19	0.23	.40	[−0.65,0.26]
C1 Control condition vs. Other information → Emotional creepiness		0.27	0.22	.22	[−0.17, 0.71]
C2 Process information vs. Process justification + Full information → Emotional creepiness		−0.67	0.24	<.01	[−1.13, −0.20]
C3 Process justification vs. Full information → Emotional creepiness		0.83	0.27	<.01	[0.29, 1.37]
C1 Control condition vs. Other information → Creepy Ambiguity		−0.02	0.23	.92	[−0.44, 0.48]
C2 Process information vs. Process justification + Full information → Creepy ambiguity		−0.21	0.25	.40	[−0.69, 0.28]
C3 Process justification vs. Full information → Creepy ambiguity		0.37	0.28	.19	[−0.19,0.94]
C1 Control condition vs. Other information → Privacy concerns		0.42	0.24	.08	[−0.05, 0.89]
C2 Process information vs. Process justification + Full information → Privacy concerns		−0.40	0.25	.12	[−0.90, 0.10]
C3 Process justification vs. Full information → Privacy concerns		0.37	0.29	.21	[−0.21, 0.94]
Model complete	.42	–	–	–	–
Transparency → Organizational attractiveness		0.02	0.06	.76	[−0.10, 0.14]
Fairness → Organizational attractiveness		0.32	0.05	<.01	[0.21, 0.42]
Emotional creepiness → Organizational attractiveness		−0.05	0.06	.33	[−0.16, 0.06]
Creepy ambiguity → Organizational attractiveness		−0.06	0.05	.27	[−0.16, 0.05]
Privacy concerns → Organizational attractiveness		−0.06	0.04	.17	[−0.14, 0.02]
C1 Control condition vs. Other information → Organizational attractiveness		−0.02	0.10	.86	[−0.22; 0.18]
C2 Process information vs. Process justification + Full information → Organizational attractiveness		0.15	0.12	.21	[−0.08; 0.38]
C3 Process justification vs. Full information → Organizational attractiveness		0.08	0.13	.61	[−0.17; 0.34]

Note: The 95% confidence interval for the effects was obtained by the bias-corrected bootstrap with 10,000 resamples. $n = 31$ in all conditions.
CI, confidence interval; C1, Contrast 1; C2, Contrast 2; C3, Contrast 3.

information can induce negative emotional reactions, (d) providing limited information may not be detrimental, and (e) when information is presented, perceived transparency does not necessarily increase.

The first main finding indicates that the provision of process information can increase privacy concerns. Presumably, participants who received no additional information on the automated selection process did not even think about potential privacy invasions. This result partly explains Newman et al.'s (2020) and Langer et al.'s (2018) findings as it indicates that process information can negatively affect applicant reactions. Our results indicate that organizations should be careful about what type of information they offer—"wrong" kind of information might evoke privacy concerns.

TABLE 5 Results for the relative indirect effects of information conditions over the mediating variables on overall organizational attractiveness

Model	*RIE*	SE_{Boot}	95% CI
C1 Control condition vs. Other information → Transparency → Organizational attractiveness	.00	0.01	[−0.02, 0.05]
C2 Process information vs. Process justification + Full information → Transparency → Organizational attractiveness	−.01	0.02	[−0.06, 0.03]
C3 Process justification vs. Full information → Transparency → Organizational attractiveness	.01	0.02	[−0.07, 0.03]
C1 Control condition vs. Other information → Fairness → Organizational attractiveness	−.01	0.06	[−0.12; 0.12]
C2 Process information vs. Process justification + Full information → Fairness → Organizational attractiveness	.19	0.08	[0.07; 0.37]
C3 Process justification vs. Full information → Fairness → Organizational attractiveness	−.06	0.08	[−0.24; 0.08]
C1 Control condition vs. Other information → Emotional creepiness → Organizational attractiveness	−.02	0.03	[−0.11, 0.01]
C2 Process information vs. Process justification + Full information → Emotional creepiness → Organizational attractiveness	.04	0.04	[−0.02, 0.15]
C3 Process justification vs. Full information → Emotional creepiness → Organizational attractiveness	−.05	0.05	[−0.18, −0.03]
C1 Control condition vs. Other information → Creepy ambiguity → Organizational attractiveness	.00	0.02	[−0.05, 0.03]
C2 Process information vs. Process justification + Full information → Creepy ambiguity → Organizational attractiveness	.01	0.02	[−0.01, 0.08]
C3 Process justification vs. Full information → Creepy ambiguity → Organizational attractiveness	−.02	0.03	[−0.11, 0.01]
C1 Control condition vs. Other information → Privacy concerns → Organizational attractiveness	−.02	0.03	[−0.10, 0.01]
C2 Process information vs. Process justification + Full information → Privacy concerns → Organizational attractiveness	.02	0.03	[−0.01, 0.11]
C3 Process justification VS. Full information → Privacy concerns → Organizational attractiveness	−.02	0.03	[−0.13, 0.01]

Note: The 95% confidence interval for the effects was obtained by the bias-corrected bootstrap with 10,000 resamples. $n = 31$ in all conditions.

Abbreviations: CI, confidence interval; C1, contrast 1; C2, contrast 2; C3, contrast 3; RIE_{med}, relative indirect effect of the mediation; SE_{Boot}, standard error of the bootstrapped effect sizes.

The second main finding shows that fairness perceptions, one of the most important variables when examining acceptance of intelligent systems (Lee, 2018; Ötting & Maier, 2018), were impaired when applicants received process information. This is further evidence that providing process information can lead to negative consequences. However, this was only the case if the information did not contain justification about why the procedure was used. Justifying the usefulness of the selection procedure counterbalanced the negative effect of process information regarding general fairness perceptions and organizational attractiveness. In line with previous findings (Shaw et al., 2003), this suggests that justifying information can positively influence acceptance of a procedure compared to only providing process information (Lahuis et al., 2003; Truxillo et al., 2009). One explanation for this finding could also come from fairness theory (Folger & Cropanzano, 2001). According to this theory, people think about the fairness of a situation in terms of counterfactual

questions. The respective main questions are: "could this situation have been different" and "should this situation have been different." If the answer to those questions is yes, fairness evaluations can suffer. Through the provision of justifying information, it is possible to avoid "should" counterfactuals, as one gives specific reasons for a process, thus potentially preventing applicants from concluding that something should have been done differently (Shaw et al., 2003).

Rather surprisingly, including process information also induced negative emotional feelings toward automated interviews. This is additional support for the argument that providing information about what exactly will be happening during a selection procedure might not always be a good idea, even if justification about why this procedure is being used is also presented. On the one hand, this is in line with previous research (Lahuis et al., 2003; Newman et al., 2020) as specific pieces of information, including technical details about what is happening during the selection procedure, led to impaired feelings and intentions toward the organization. On the other hand, our findings contradict the results of other research that honest information about what is happening during a selection procedure increases acceptance (Truxillo et al., 2009). Considering our findings regarding privacy concerns, one explanation is that the process information provided participants with technical details they would have otherwise not been concerned with.

In line with this, our results also indicate that providing nearly no information might not have negative side effects. This means that under certain circumstances (e.g., in automated interviews) and for certain outcomes (i.e., applicant reactions), providing information might bring more risks than benefits, a result that partly contradicts previous research (Truxillo et al., 2009). Maybe, previous research on the use of information in personnel selection used classical selection methods, where there might be less reason to be skeptical about information describing, for instance, procedures within a classical face-to-face interview. In the case of automated systems in personnel selection, providing applicants with information partially means informing them about technical components (e.g., insights into the inner workings of a system; Arrieta et al., 2020). These components might be particularly unfamiliar in the area of personnel selection (Tene & Polonetsky, 2015) and unfamiliarity might evoke doubts and negative feelings about the selection procedure (Gonzalez et al., 2019). In contrast, if applicants receive no information, they might just trust that technological tools work as intended and serve a certain purpose (e.g., selecting the best applicant) (Madhavan & Wiegmann, 2007)—otherwise organizations would not use them.

Another surprising result of the current study was the lack of support for the rather straightforward hypothesis that information should affect transparency. This is especially surprising because this conflicts with general assumptions across disciplines that information will enhance transparency (Kulesza et al., 2013; Truxillo et al., 2009). However, a closer look at the results indicates that there were differences in transparency perceptions that were trending toward significance ($p = .06$ for the contrast testing the difference between the condition that received process information and process justification and the other conditions), so this finding should be interpreted cautiously. Note that the highest mean value for transparency was found for providing process information but when process justification was added, transparency dropped to the lowest mean score for all conditions. Perhaps participants in the full information condition felt overwhelmed by the amount of information they received (Kulesza et al., 2013). Consequently, organizations not only need to consider the kind of information they present to applicants but also the total amount of information (Lahuis et al., 2003).

5.1 | Limitations and main implications

There are two main limitations of this study. First, results might have been different if participants had experienced the situation firsthand. Yet, it is also important to note that laboratory and field research seem to point to more similar results than typically assumed (Vanhove & Harms, 2015) and that controlled experimental approaches are useful as a proof-of-concept (Doshi-Velez & Kim, 2017; Lee, 2018). Still, future studies could examine if the results from the current study transfer to real selection situations (which might be complicated because ethical concerns arise if real applicants are provided with different information), or at least to situations where participants really interact with an automated selection tool. Second, participants only evaluated a single automated job interview tool. There are other versions of automated tools that may evoke different reactions (e.g., versions without a virtual interviewer). Therefore, the current experiment can only be a starting point for future studies investigating the impact of information on people's reactions to different versions of automated selection tools.

The current study implies that if organizations choose to provide applicants with information about automated selection situations, they should include justification about why this selection procedure is used (see also Basch & Melchers, 2019). Therefore, emphasizing benefits for applicants, job-relatedness, and validity in screening the best applicants are viable pieces of information that can be provided to applicants. Additionally, we see implications for the field of XAI where researchers are concerned about making AI-based systems transparent and understandable to humans with the hope to increase trust in and acceptance of systems (Biran & Cotton, 2017; Miller, 2019). Following the results of the current study, it might be not enough (or even detrimental) to increase the understanding of a process underlying such a system, or of the inputs used by such a system (see also Ananny & Crawford, 2018). Instead, justification about system processes or the potential usefulness of the system may be necessary to improve acceptance. This reinforces calls for experiments in applied settings to evaluate the effects of explanation and information on people interacting with AI-based systems (Doshi-Velez & Kim, 2017).

Furthermore, our results indicate that it might be challenging to provide people affected by AI-based decision-making with information that has unequivocally beneficial effects. An (potentially controversial) implication of the current study is, therefore, to limit information when using systems in certain domains. This implication

is especially controversial in the area of AI-based personnel selection where there are already negative reactions to such approaches (Acikgoz et al., 2020; Gonzalez et al., 2019; Langer et al., 2019; Lee, 2018). Our findings warn organizations that by trying to diminish negative reactions through information, they could actually worsen them.

Further increasing complexity, a variety of recent legislation, such as the Artificial Intelligence Video Interview Act of the state of Illinois or the European General Data Protection Regulation requires organizations to provide information when people are confronted with automated decisions by AI-based systems (Goodman & Flaxman, 2017), but our study shows that this kind of information may lead to negative reactions. Thus, our results imply that it will be challenging to provide people with information that follows regulations and at the same time does not scare off users and customers. This reveals an area of tension between regulation and organizational interests. From the point of view of hiring organizations, the results of the current study might advise them to cut down on available information about AI-based automated systems. Organizations are in a dilemma then: being honest, following regulation and promote transparency, or act guided by organizational interests. Note, however, that providing people with information about AI-based systems might pay out eventually. Even if information makes people aware of details that have the potential for negative reactions (e.g., perceived fairness, privacy concerns), not providing any information might endanger a company's public image to an even larger extent. In the long run, being honest and providing transparent systems might be awarded a better public image. However, such long-term effects might be neglected (Steel & König, 2006). If so, our findings indicate that lawmakers might need to enforce certain kinds of information even though they might not benefit short-term organizational interests (Hough, 2009). More generally, this also highlights potential divergence of interests when it comes to the transparency of AI-based systems (Burrell, 2016; Kellogg et al., 2020). Where policy-makers call for transparency of automated systems, users might react negatively to certain kinds of information or the sheer amount of information which might undermine their desire for the usability of a system and organizations' desire for satisfied customers. Investigating these trade-offs of stakeholders' interests provides a fruitful direction for future research (Langer et al., 2021).

5.2 | Future research

One aim of the current study was to investigate which kind of information would have the potential to improve applicant reactions in an automated personnel selection context. Process justification can be positive but this seems restricted to certain outcomes. We thus need further insights regarding which kind of information can boost reactions to automated procedures. Future studies could try information that focuses on reducing anxiety regarding novel technologies (e.g., highlighting the possible familiarity of automated processes from other areas of everyday life; McCarthy et al., 2017). Another option would be to use other approaches to improve reactions, for instance, providing online tutorials where applicants can familiarize themselves with novel selection procedures.

Furthermore, future research could try to reveal what kind of cognitive processes are initiated through the provision of different types of information. It is not clear why participants evaluated process information as more emotional creepy and privacy concerns. In order to unravel the underlying cognitive processes, future research could apply the think-aloud technique (Van Someren et al., 1994). Perhaps this could disclose why people are more concerned with technologically advanced selection situations when they are informed about what is happening and about what kind of data is gathered during these situations.

5.3 | Conclusion

Usually, most people would agree that they want to be treated in an honest way and not have things kept from them. Findings in the current study, however, indicate that it might be wise for organizations to tailor the amount and pieces of information provided in order to not scare off potential applicants. In doubt, it may even be better for organizations to withhold certain information instead of providing too much information that might provide insights evoking negative reactions. In combination with other research finding stronger negative reactions through making automated decision-making processes more transparent (Langer et al., 2018; Newman et al., 2020), the current study highlights the importance of research that investigates the conditions under which information and explanations affect acceptance, trust, transparency, and comprehensibility of AI-based systems to find ways to account for the interests of all stakeholders when using such systems in applied domains.

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DATA AVAILABILITY STATEMENT

The data that support the findings of this study are available from the corresponding author upon request.

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ENDNOTES

[1] https://www.ilga.gov/legislation/ilcs/ilcs3.asp?ActID=4015&ChapterID=68.

[2] This study was pre-registered under http://aspredicted.org/magdy.pdf.

[3] This hypothesis was not reflected in the preregistration but theoretical considerations that we have been made aware of when revising this paper have made us conclude that it makes sense to test this hypothesis.

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APPENDIX A

Items used in the current study

Note

Creepiness	
Emotional creepiness	During this situation, I had a queasy feeling
	I had a feeling that there was something shady about this situation
	I felt uneasy during this situation
	I had an indefinable fear during this situation
	This situation somehow felt threatening
Creepy ambiguity	I did not know how to judge this situation
	During this situation, I did not know exactly what was happening to me
	During this situation, things were going on that I did not understand
	I did not know exactly how to behave in this situation
	I did not know exactly what to expect from this situation
Transparency	The online interview was transparent
	It is obvious what the online interview is measuring
Fairness	All things considered, this selection procedure was fair
	I think this interview is a fair procedure to select people for the job
	I think the interview itself was fair
Privacy concerns	I am concerned if companies are collecting too much personal information about me
	Novel technologies are threatening privacy increasingly
	In situations like the one shown in the video, it is important to me that my privacy is secure
	In situations like the one shown in the video, I am concerned about my privacy
	Situations like the one shown in the video threaten participants' privacy
	Private data that are provided in such situations could be misused

Creepiness	
Overall organizational attractiveness	For me, this company would be a good place to work
	This company is attractive to me as a place for employment
	I am interested in learning more about this company
	A job at this company would be very appealing to me
	If this company invited me for a job interview, I would go
	I would accept a job offer from this company
	I would make this company one of my first choices as an employer
	I would like to work for this company
	I would recommend this company to friends
	I have friends who would be interested in this company
	I would recommend others to apply to this company
	Employees are probably proud to say they work at this company
	This company probably has a reputation as being an excellent employer
	There are probably many who would like to work at this company
	This is a reputable company to work for

Note: Items translated from German.