The Impact of Attitudes and Reactions Towards Game-Based Assessments on Organizational Attractiveness

Jimi Erkens

s4348338

Department of Psychology, University of Groningen

PSB3E-BT15: Bachelor Thesis

Group number 30

Supervisor: dr. Samantha Adams

In collaboration with: F. Rusch, L. Sadlier & T. Holm

January 29, 2024

Abstract

Applicant's reactions and attitudes towards the recruitment process are important determinants of organizational success. Due to the increased number of internet-based job applications, organizations should not only use effective and reliable ways of assessment, but also attract the most talented individuals for the company. One modern and promising tool in the recruitment process is game-based assessment. It is a reliable way to filter out unqualified candidates and to increase applicant’s levels of motivation and enjoyment. Nevertheless, further research on this new selection test is needed. Thus, this paper examined whether organizational attractiveness would be positively influenced by perceived fairness of the recruitment process when game-based assessments and non-gamified assessments are used. Furthermore, the mediating effect of satisfaction derived from the recruitment process on the relationship between perceived fairness and organizational attractiveness was examined. An experimental design with participants randomly assigned to one of two groups examined participants (*N*=338) attitudes towards the gamified and traditional assessment. This paper found a significant effect of perceived fairness on organizational attractiveness in both conditions. Furthermore, process satisfaction significantly influenced organizational attractiveness and mediated the relationship between perceived fairness and organizational attractiveness. Nevertheless, the outcomes showed that the traditional assessment had a stronger effect compared to the game-based assessment.

Keywords: Game-based assessment, gamification, organizational attractiveness, organizational justice framework, perceived fairness, process satisfaction

The Impact of Attitudes and Reactions Towards Game-Based Assessments on Organizational Attractiveness

In today's rapidly evolving job market, the development and improvement of job recruitment methods is essential for the success of organizations worldwide (Chapman et al., 2005). Securing top-tier talent with minimal costs and effort is the main goal of the recruitment process. In the hiring stage, companies examine the potential performance of applicants, and job candidates gather information about the organization they are applying for (Dalal et al., 2021). The recruitment process is challenging and notably important for the organization's performance since applicants' reactions and attitudes towards the selection method can significantly affect their opinions towards the organization (Georgiou & Nikolaou, 2020). As the competition for talented employees grows (Michaels et al., 2001), organizations must find selection techniques that are not only reliable and valid, but also appeal to candidates and make the company attractive (McCarthy et al., 2017). An applicant's attitude towards the recruitment process determines their perception of how well they would suit the respective position. Positive experiences predict higher job attraction and acceptance intentions (Chapman et al., 2005). Negative perceptions, however, can directly affect one's view on the organization and impact the intention to recommend the company to others (Hausknecht et al., 2004).

Furthermore, as a consequence of the emergence of online job applications, organizations attract a larger volume of candidates and job seekers apply for more positions in a shorter time frame. Thus, as the number of candidates increases companies face the issue of selecting the most suitable individual (Sylva & Mol, 2009). Since traditional selection methods, such as job-interviews or personality and psychological assessments, are expensive and resource-intensive (Nikolaou, 2021), organizations need to find cost-efficient and

simultaneously reliable and valid ways to assess the talent of applicants to filter out unqualified individuals.

In response to the evolving job market and the increasing competition between organizations to hire top-tier talent, companies have the option to use innovative selection techniques rather than traditional paper and pen assessments. One modern and new recruitment method is the use of game-based assessment (GBA) (Georgiou & Nikolaou, 2020). This assessment technique aims to enhance the engagement of applicants in the selection process, considering the design of the assessment and the inherent perception that individuals view games as enjoyable (Hamari et al., 2014). Although previous studies argue that GBA can be perceived as a pleasurable and new approach to selection (Collmus et al., 2016), additional research is required to examine the applicability and effectiveness of this new method.

As selection techniques can have a significant influence on organizational attractiveness, they might be a crucial factor when it comes to organizational success (Chapman et al., 2005). Georgiou and Nikolaou (2020) discovered that candidate's process satisfaction and perceived fairness can be important determinants of organizational attractiveness. Since there is limited support for this finding, this study examined candidates' responses and attitudes in selection using GBA and a traditional assessment, while focusing particularly on the effect of perceived fairness and process satisfaction on organizational attractiveness. This research aims to contribute to the existing literature by adapting established theories on candidates' responses to recruitment techniques and applying them to GBA and non-gamified assessments. Therefore, this research examined the following research question: *To what extent do applicants' perceptions of fairness and process satisfaction influence organizational attractiveness when game-based assessments are used compared to non-gamified assessments?*

Gamification and Game-Based Assessment

Gamification refers to the incorporation of game-based elements in non-game settings (Deterding et al., 2011). In other words, elements typically found in games are utilized and applied in non-game contexts, for instance, in the selection test (Georgiou & Nikolaou, 2020). For example, avatars, progress bars or leaderboards that indicate the test progression are common game elements used. The primary aim of gamification is to increase the motivation, engagement and enjoyment of candidates during the test (Nikolaou & Georgiou, 2018). Additionally, in gamification, already existing assessment methods are used and changed by adding game concepts (Landers & Sanchez, 2022). On the other hand, GBA uses game concepts to create an assessment that does not rely on pre-existing methods (Landers & Sanchez, 2022). Gamification is an assessment redesign strategy, while GBA represents an assessment method (Landers & Sanchez, 2022). It is essential to understand that gamification and GBA are distinct concepts, since this study focuses particularly on the latter. Ignoring the differences between gamification and GBA can lead to low-quality research and inaccurate assessment (Landers & Sanchez, 2022).

The concept GBA can be viewed as a game-like simulation, in which job applicants need to master skills and actions that represent potential work tasks (Landers & Sanchez, 2022). GBA's can measure a wide range of constructs, such as cognitive ability, personality, or other established indicators of work performance (Ellison et al., 2020). Additionally, GBA is a reliable and valid selection technique that provides several advantages compared to traditional recruitment methods (Georgiou et al., 2019; Nikolaou et al., 2019). For example, response faking is reduced because socially desirable behaviors are less clearly recognized in a game. As a consequence, the information about applicants and the prediction of job performance is more accurate (Armstrong et al., 2016a as cited in Woods et al., 2020).

Consequently, GBA brings a more holistic and promising approach that improves the presentation of an institution and the candidate's experience in the hiring process.

Organizational Justice Framework

Gilliland (1993) proposed the organizational justice framework that explains applicant attitudes and reactions during and after the selection procedure. It is one of the most relevant models in the context of attitudes in the workplace and GBA (Truxillo et al., 2016). In particular, the model examines how candidates form perceptions of fairness in the workplace and respectively in the selection process. Gilliland (1993) differentiates between distributive justice and procedural justice. Distributive justice describes a comparison of one's contributions and the achieved outcome. If there is an imbalance between effort and results, negative feelings, such as dissatisfaction, occur. For example, the allocation of rewards or the staffing decision can be perceived as fair or unfair. Procedural justice, on the other hand, refers to perceived fairness of the selection procedure. For instance, perceived predictive validity or the possibility of faking responses are potent predictors of procedural justice. According to Gilliland (1993), selection practices have a significant influence on perceived procedural and distributive fairness. This directly influences other factors, such as applicants' attitudes which are related to job acceptance intentions, or the motivation to recommend the job to others (McCarthy et al., 2017). The organizational justice framework (Gilliland, 1993) will guide the evaluation of attitudes and reactions toward GBA throughout this study.

Organizational Attractiveness

Gilliland (1993) emphasizes the importance of applicants' reactions towards the recruitment process. Organizational attractiveness refers to individuals' thoughts and opinions about a specific company as a possible employment opportunity (Highhouse et al., 2003). According to signaling theory, individuals obtain information about the organization throughout the hiring process in the form of 'signals'. These signs or cues allow the applicant

to get an impression about the company's characteristics and values (Spence, 1973). Previous research found that positive signs towards a selection technique are associated with a favorable company image (Georgiou & Nikolaou, 2020; Hausknecht et al., 2004). Considering that games are perceived as pleasurable and fun (Hamari et al., 2014), individuals might view the use of game-based assessment as a modern and engaging way of testing. As a consequence, they might perceive companies that use modern assessment methods, as opposed to traditional tests, as more attractive and interesting (Georgiou & Nikolaou, 2020).

Fishbein and Ajzen (1975) argue that the attitudes people develop towards an institution can affect their behavioral intentions. For example, a positive perception about a recruitment procedure not only leads to organizational attractiveness, it might also result in positive recruitment outcomes (Chapman et al., 2005). The desire to accept the job, the intention to recommend the job to others or the intention to pursue the job increases (McCarthy et al., 2017). Thus, highly attractive organizations can select the most suitable candidate for employment and simultaneously have good chances that the individual agrees to the proposal. Therefore, hiring managers need to reduce negative reactions in recruiting so that the organizational outcomes are not adversely affected. Nevertheless, research on GBA indicates that reactions towards a new recruitment strategy are not always positive. For instance, candidates who have limited experience with technological assessments, might develop a negative opinion towards the hiring procedure and the company (Nikolaou et al., 2015). Furthermore, participants in a study by Georgiou (2021) viewed the gamified assessment as less job-related than the traditional assessment. Thus, further research is needed to understand the predictors of organizational attractiveness in the hiring process using GBA.

Perceived Fairness

In the recruitment process, perceptions of fairness are influenced by several variables (Ellison et al., 2020). Components, such as ease of test faking and face and predictive validity

of the selection technique contribute to feelings of fairness (Georgiou, 2021). The opportunity to perform and perceptions of consistency play a significant role, as well (Ellison et al., 2020). The organizational justice framework (Gilliland, 1993) argues that job relatedness, which refers to the degree to which the test content reflects the actual job and predicts future work performance (Bertolino & Steiner, 2007), is the most important determinant of perceived fairness in the workplace. Gilliland (1993) argues in proposition 19 of the framework that procedural justice is notably associated with an individual's job acceptance, recommendation decisions, and organizational consequences, such as future work satisfaction and performance. Hausknecht et al. (2004) and Nikolaou and Georgiou (2018) support the effect on attitudes towards the organization and argue that positive perceptions of fairness lead to organizational attractiveness. Furthermore, perceived fairness in recruitment by providing feedback, information and support led to positive organizational outcomes and increased organizational attractiveness (Langer et al., 2018). Lastly, proposition 26 of the organizational justice theory claims that perceptions of fairness during the selection can result in future job satisfaction and better performance at work (Gilliland, 1993).

This paper aims to contribute to the existing literature by assessing candidates' fairness perceptions and the influence of it on organizational attractiveness in the context of GBA. Based on the previous findings it is predicted that organizational attractiveness is positively affected by perceived fairness throughout the recruitment process. Additionally, it is predicted that participants in the gamified condition indicate a stronger association compared to subjects who completed the traditional assessment.

Hypothesis 1. Organizational attractiveness will be positively influenced by the perceived fairness of the recruitment process when game-based assessments and non-gamified assessments are used. The effect is stronger in the game-based assessment group compared to the traditional assessment group.

Process Satisfaction

In the context of online application procedures, it was found that self-efficacy and user friendliness are key determinants for process satisfaction (Sylva & Mol, 2009). According to the organizational justice framework, satisfaction in the recruitment process is partly determined by the opportunity to get information about the company throughout the assessment in order to make job acceptance decisions (Gilliland, 1993). Past research showed that satisfaction in the recruitment process can also be an important predictor of organizational attractiveness (Georgiou & Nikolaou, 2020) since positive evaluations towards the selection technique can directly lead to a good institutional image (Chapman et al., 2005). To illustrate, if candidates are satisfied with the selection approach because they acknowledge the value of GBA, one's level of organizational attractiveness might increase. Georgiou and Nikolaou (2020), for example, found that the use of game elements in a Situational Judgment Test increased candidates' level of process satisfaction. Participants who took the gamified test described the assessment as more satisfying than subjects who completed a text-based Situational Judgment Test. The positive evaluation towards the selection method can directly lead to a good institutional image (Chapman et al., 2005).

Nevertheless, besides the study of Georgiou and Nikolaou (2020), research on the influence of process satisfaction in the context of GBA is rare. This paper predicts that process satisfaction is an important predictor of workplace attraction. It is argued that high levels of process satisfaction positively affect organizational attractiveness. Furthermore, it is hypothesized that there is a stronger effect in the game-based assessment group compared to the group that completes the traditional assessment.

Hypothesis 2. Organizational attractiveness will be positively influenced by satisfaction derived from the recruitment process when game-based assessments and non-

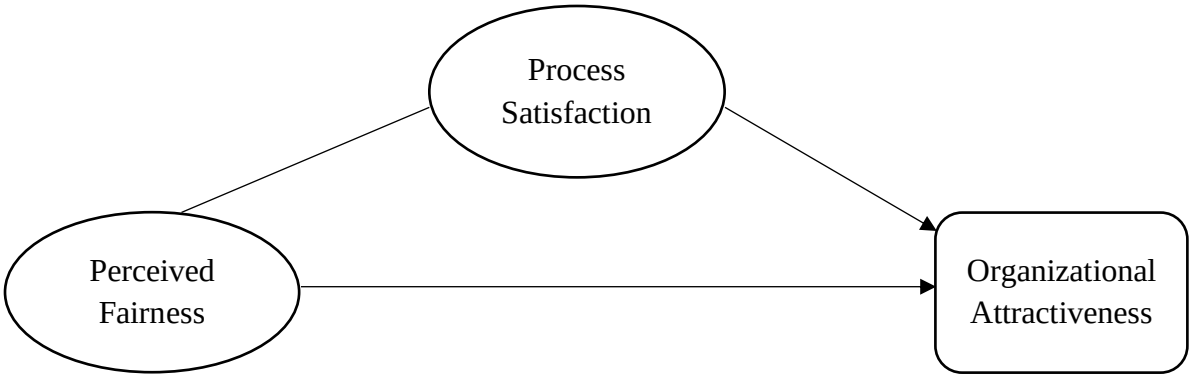
gamified assessments are used. The effect is stronger in the game-based assessment group compared to the traditional assessment group.

Thirdly, this research proposes a mediation effect of process satisfaction on the relationship between perceived fairness in recruitment and organizational attractiveness. Fairness in recruiting is determined by the satisfaction or violation of ten procedural rules which are proposed in the organizational justice framework (Gilliland, 1993). Hence, process satisfaction may be a relevant component when it comes to the relationship between perceived fairness and organizational attractiveness. However, this relationship is particularly in the context of GBA unexamined. Therefore, this paper argues that process satisfaction mediates the effect of perceived fairness on organizational attractiveness and predicts a stronger effect in the game-based assessment group compared to the group that completes the traditional assessment.

Hypothesis 3. Process satisfaction mediates the influence of perceived fairness of the recruitment process on organizational attractiveness. The effect is stronger in the game-based assessment group compared to the traditional assessment group.

Figure 1

Research Model



Method

Participants

In this research, data were obtained from 383 participants. In total, 45 cases were deleted. Three cases were deleted since participants did not give their consent to publish their information and 42 participants were removed from the data due to incomplete responses, response bias and fence sitting. Hence, the effective sample size used for the data analysis was 338 (*N*=338).

Since the Gamified Set Shifting Task (GSST) was only available in German, only German-speaking adults took part in the study. The mean age of the subjects was 31.44 (*SD*=10.88). Within the sample, 171 participants (50.6%) identified as female, 162 (47.9%) as male, three (0.9%) as non-binary, and two subjects (0.6%) decided not to disclose their gender. In addition, participants' level of education was examined. 117 subjects (34.6%) indicated having a bachelor's degree, 109 (32.2%) a master's degree, 57 (16.9%) completed highschool and 23 (6.8%) finished a professional education.

Subjects were invited with the help of personal networks (e.g., LinkedIn, Instagram, WhatsApp) and the online recruiting tool 'Prolific'. Subjects that were recruited through 'Prolific' were compensated with 7.28 euro per hour.

Procedure

This research incorporates a comparative design, in which reactions and attitudes towards the use of the Wisconsin Card Sorting Test (WCST) and the GSST were analyzed and compared. The GSST represents the GBA. Participants received a link that led them to the study on Qualtrics. Firstly, participants were informed about the procedure and asked for consent to take part in the experiment. Afterwards, subjects were asked to imagine a scenario in which they are applying for a Marketing Director position at a company and have been invited to participate in a selection assessment. Then, participants were randomly assigned to

either complete the digital version of the WCST (Stoet, 2017; www.psytoolkit.org) or the GSST (Hommel et al., 2022). After finishing the tasks, subjects had to fill out a survey about their demographics and their attitudes towards the assessment. Once the questionnaire was completed, participants were debriefed about the purpose of the study. Lastly, subjects were asked if they still consent to the use of their responses.

Materials and Apparatus

Participants were either exposed to a digital version of the Wisconsin Card Sorting Task (WCST) (Stoet, 2017; www.psytoolkit.org) or an adapted, gamified version of it, called GSST (Hommel et al., 2022). 155 participants completed the gamified task, while 183 subjects finished the WCST. In the WCST, individuals had to categorize a set of cards based on particular rules and adjust their approach when the rules change unexpectedly. In comparison, in the GBA, instead of matching cards, participants had to match items and select a suitable person out of target groups. After a short introduction of the task by a fictive marketing manager, the five target avatars were shown. The market items were displayed one at a time. Afterwards, participants received a virtual budget of $10,000 and were told to increase the organization's profit by correctly allocating the items to the avatars. Correct allocations are awarded with an increase in budget of $500, while wrong decisions decrease the account balance by $500. In the study, performance graphs and account balances are shown in order to indicate the candidate's process. The primary aim of the WCST and the GBA is to assess cognitive flexibility, problem-solving skills, and decision-making abilities (Hommel et al., 2022). Secondly, data and demographical information from the subjects was collected through a questionnaire on Qualtrics.

Measures

The language used in the survey was German. Thus, all English items were translated to German. For all variables, a five-point Likert scale (1 = strongly disagree, 5 = strongly agree) was used. In total, the survey included 13 items.

Organizational Attractiveness

The dependent variable organizational attractiveness was measured with a five-item scale developed by Highhouse et al. (2003). A sample item for the variable organizational attractiveness is: *"A job at this company is very appealing to me"*. In the original study, the variable organizational attractiveness had a cronbach's alpha of .88 (Highhouse et al., 2003). In this research, the scale item of organizational attractiveness (α = .48) had reasonable internal consistency (Taber, 2018).

Perceived Fairness

Perceived fairness was assessed with a scale containing four items by Kluger and Rothstein (1993). A sample item is: *"Most people would say that this test is fair"*. A study by Georgiou and Nikolaou (2020) found a cronbach's alpha of .68. In this paper, the scale items of perceived fairness showed higher internal consistency compared to previous research (α=.74).

Process Satisfaction

The mediator process satisfaction was examined with a one-item scale based on the research of Sylva and Mol (2009). The item used for examining process satisfaction was: *"Overall, I was satisfied with this application process"*. Internal reliability for the variable process satisfaction was not calculated since it consists of only one item.

Data Analysis

The statistical software SPSS was used for the analysis of data. Firstly, the data was cleaned according to data exclusion criteria, and outliers were removed. Afterwards,

descriptive statistics and correlations were examined. Furthermore, Cronbach's Alpha was calculated for each variable. Since we analyze the data by using a simple linear regression, the assumptions of homoscedasticity, linearity, multicollinearity, and normality were checked.

Results

Preliminary Analysis

For the preliminary analysis, the correlations between all variables were calculated first in order to get information about the strength of the relationships. In Table 1a and Table 1b the correlations between variables and the descriptive statistics for the predictor variables perceived fairness and process satisfaction as well as for the outcome variable organizational attractiveness are summarized.

Table 1a

Descriptive Statistics and Correlations of the WCST

Variable	N	M (SD)	1	2	3
1.Organizational Attractiveness	183	3.23 (.85)			
2.Process Satisfaction	183	2.75 (1.14)	.431**		
3.Perceived Fairness	183	3.01 (.75)	.423**	.620**	

Note. Range: Likert scale 1-5; Correlation is significant at the .01 level (2-tailed); $p < .001$**

Table 1b

Descriptive Statistics and Correlations of the GBA

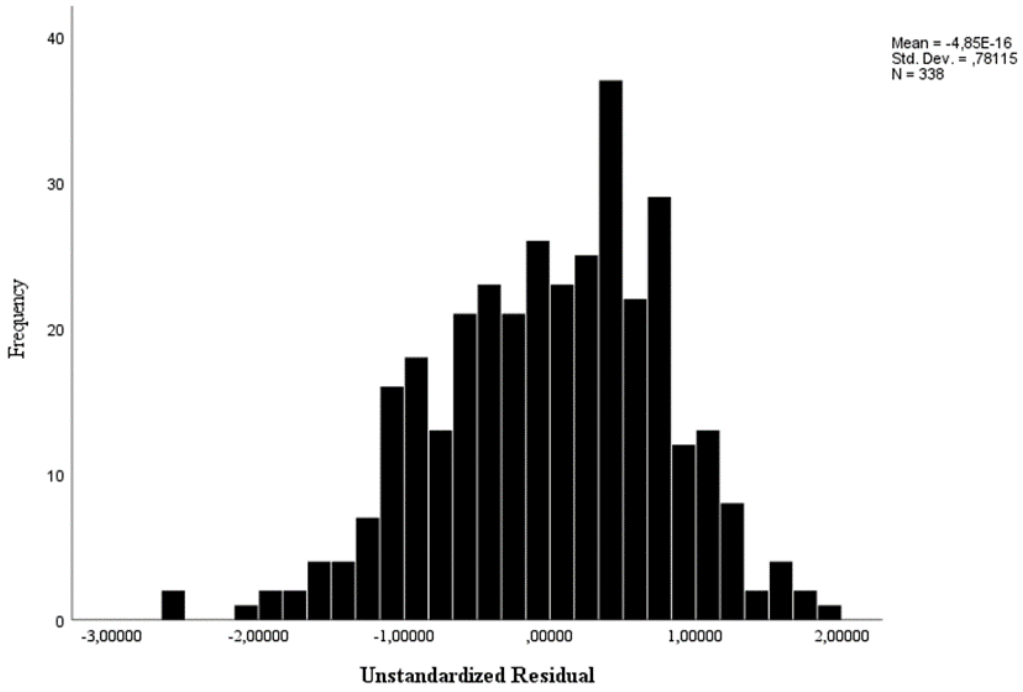
Variable	N	M (SD)	1	2	3
1.Organizational Attractiveness	155	2.84 (.87)			
2.Process Satisfaction	155	2.32 (1.01)	.320**		
3.Perceived Fairness	155	2.44 (.72)	.291**	.426**	

Note. Range: Likert scale 1-5; Correlation is significant at the .01 level (2-tailed); $p < .001$**

Firstly, one item had to be reverse-coded. Furthermore, individual item scores were combined to a composite single score so that the data analysis is simplified. The assumption of normality and the presence of outliers were checked with the help of a histogram. This assumption requires that the distribution of the dependent variable is approximately normal. As seen in Figure 2, the histogram exhibits an approximately bell-shaped and symmetrical curve, indicating a normal distribution.

Figure 2

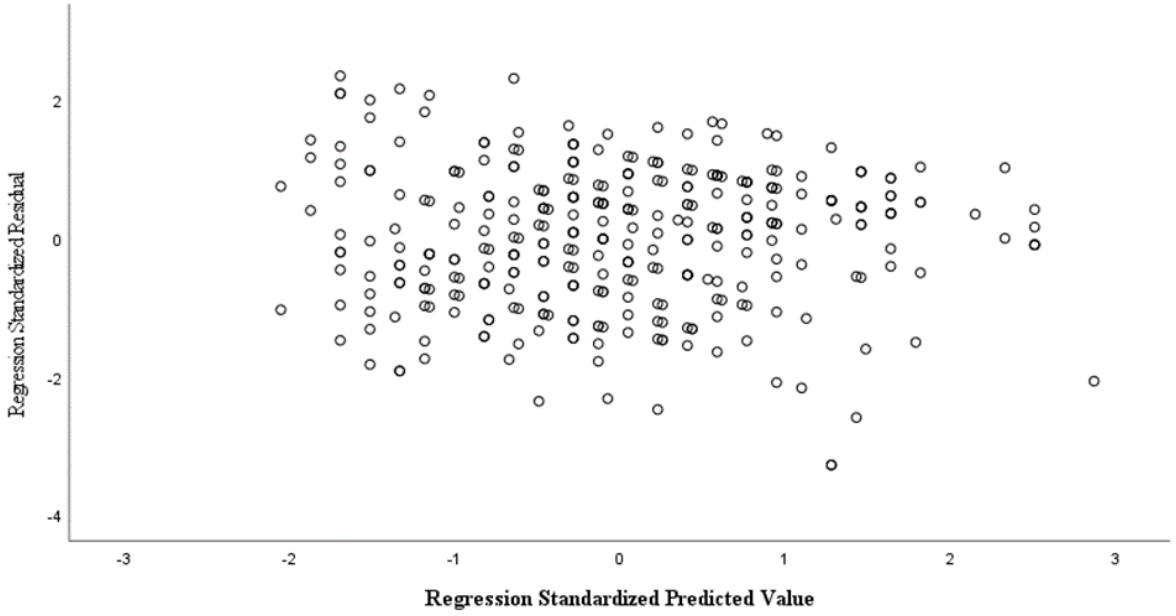
Histogram: Normality Assumption



Next, violations of homoscedasticity were checked. As shown in Figure 3, there is a constant variance of the residuals and no clear violation was observed. Therefore, the assumption of homoscedasticity is not violated.

Figure 3

Scatterplot: Homoscedasticity



Thirdly, the assumption of linearity was examined. Hence, it was examined whether there is a linear relationship between perceived fairness and process satisfaction and the dependent variable organizational attractiveness. Indeed, a positive relationship between the predictor and outcome variable was present (Appendix B).

Lastly, multicollinearity, which occurs when both independent variables have a high correlation between each other, was controlled with the help of the Variance Inflation Factor (VIF). The VIF measures the strength of the correlation between independent variables. If the VIF is larger than 5, multicollinearity is present (James et al., 2014). The data of this study has a VIF of 1.465. Therefore, the multicollinearity assumption is not violated. The main data analysis can be conducted since the assumptions of homoscedasticity, linearity, multicollinearity, and normality were not violated.

Main Analysis

Before conducting the hypothesis testing, it was examined whether there are differences between the two assessments. Table 2a and Table 2b show that there are significant differences between both conditions.

Table 2a

ANOVA: Perceived Fairness

	SS	*df*	*Mean Square*	*F*	*p*
GBA	21.08	14	1.506	2.2	.01
WCST	33.19	15	2.213	3.74	<.001

Note. dependent variable: organizational attractiveness; SS = Sum of Squares

Table 2b

ANOVA: Process Satisfaction

	SS	*df*	*Mean Square*	*F*	*p*
GBA	12.13	4	3.03	4.34	.002
WCST	28.25	4	7.062	12.12	<.001

Note. dependent variable: organizational attractiveness; SS = Sum of Squares

The first hypothesis predicted that perceived fairness of the recruitment process will positively influence organizational attractiveness when GBAs and traditional assessments are used. The influence of perceived fairness on organizational attractiveness when using GBA and when using the non-gamified assessment was compared. Perceived fairness was suggested higher for the WSCT (*M*=3.01, *SD*=.75) and lower for the GBA (*M*=2.44, *SD*=.72). Further analysis showed that the non-gamified test had a more significant influence on organizational attractiveness (*ß* = .423, *SE* = .076, *t* = 6.289, *p* = <.001, 95% CI = [.329, .629]), in comparison to the gamified version (*ß* = .291, *SE* = .093, *t* = 3.762, *p* = <.001, 95% CI = [.167, .535]). In the WCST, approximately 17.9% of the variance in the outcome variable can be explained by perceived fairness (R^2 = .179). In the GBA, around 8.5% of the variance in organizational attractiveness is explained by the predictor variable (R^2 =.085). Hence, it can be concluded that perceived fairness appears to have a stronger effect on organizational attractiveness when the WCST was used. Therefore, hypothesis 1 is not

supported. Although organizational attractiveness is positively influenced by perceived fairness of the recruitment process when both the WCST and the GBA was used, the influence of the WCST was stronger.

Table 3

Linear Regression Analysis: Perceived Fairness

	N	*M (SD)*	*ß*	*SE*	*t*	*p*	95% CI LB	95% CI UB
WCST	183	3.01 (.75)	.423	.076	6.289	<.001	.329	.629
GBA	155	2.44 (.72)	.291	.056	3.762	<.001	.167	.535

Note. dependent variable: organizational attractiveness

Hypothesis 2 predicted that process satisfaction in the recruitment process will positively influence organizational attractiveness when both GBAs and non-gamified assessments are used. Participants were more satisfied with the process of the non-gamified version (*M*= 2.75, *SD*=1.14), in comparison to the GBA (*M*=2.32, *SD*=1.01). The WCST explains around 38.5% of the variance in organizational attractiveness (R^2 =.385), while the GBA explains around 18.1% of the variance (R^2 =.181). Although process satisfaction does have a positive influence on organizational attractiveness when the traditional and new assessment was used, the hypothesis is not supported, since the effect of the non-gamified assessment was again, stronger.

Table 4

Linear Regression Analysis: Process Satisfaction

	N	*M (SD)*	*ß*	*SE*	*t*	*p*	95% CI LB	95% CI UB
WCST	183	2.75 (1.14)	.431	.050	6.433	<.001	.223	.421
GBA	155	2.32 (1.01)	.32	.066	4.174	<.001	.146	.408

Note. dependent variable: organizational attractiveness

Lastly, hypothesis 3, which argues that process satisfaction mediates the influence of perceived fairness on organizational attractiveness in the recruitment process when GBAs and traditional assessments are used, was examined. To investigate this mediator effect in both conditions seperately, the Sobel test was used. This is a statistical test for the analysis of a mediating relationship on a predictor and outcome variable (Sobel, 1982). Next to the Sobel test, an online calculator was used for the analysis (Preacher & Leonardelli, 2001). In the traditional assessment, the mediator process satisfaction had a significant influence on the relationship between perceived fairness and organizational attractiveness. The outcomes of the Sobel test give evidence that the indirect influence is reliably greater than zero ($z > 3.16$) and the low p-value ($p < 0.01$) indicates that the results are statistically significant. In the GBA, the test statistic was 2.58 ($z > 2.58$) and the p-value was found to be statistically significant, as well ($p < 0.01$). Thus, it can be suggested that process satisfaction had a significant influence on the relationship between perceived fairness and organizational attractiveness in the traditional and gamified condition. However, the analysis suggests that the mediating effect of process satisfaction was stronger in the non-gamified assessment. Thus, the third hypothesis is rejected, as well.

It is also important to mention that participants who completed the traditional assessment indicated higher levels of organizational attractiveness compared to subjects who

did the gamified assessment. The WCST made the company more attractive (M = 3.23, SD = .85) in comparison to the GBA (M = 2.83, SD = .87). This also undermines that process satisfaction and perceived fairness had an important effect on organizational attractiveness because the feelings of fairness and satisfaction were higher for the WCST, as well. Finally, the explained variance was computed for each assessment method to get to know how well the predictor variables explain the proportion of variance in the regression model. The results show that a significant percentage of variability in organizational attractiveness is explained by perceived fairness and process satisfaction. The results imply that the non-gamified test provides a better explanation of the variability in organizational attractiveness, in comparison to the GBA.

Table 5

Model Summary

	R^2	*Adj.* R^2	*SE*	*F*	*df1*	*df2*	*p*
WCST	.226	.217	.75	26.216	2	180	<.001
GBA	.131	.120	.82	11.507	2	152	<.001

Note. Model is significant at p < .05 level

Discussion

The present study compared attitudes and reactions of job applicants towards two different selection techniques. The WCST represented a traditional assessment method, while the GSST (Hommel et al., 2022) is a GBA. By utilizing the organizational justice framework (Gilliland, 1993), this study aimed to compare the novel selection method GBA with a traditional test. In particular, the goal of this research was to examine to what extent candidates' perceptions of fairness and process satisfaction during and after the recruitment process influence the attractiveness of an organization.

The first hypothesis was based on the organizational justice framework, which argues that fairness perceptions are an important determinant of organizational attractiveness (Gilliland, 1993). Previous research supports the organizational justice theory and provides evidence for a positive relationship between perceived fairness and organizational attractiveness (Hausknecht et al., 2004; Nikolaou & Georgiou, 2018). A significant effect of fairness perceptions on organizational attractiveness was present for both selection tests. However, the first hypothesis was not supported since the non-gamified test had a stronger effect than the GBA, indicating that applicant's reactions and attitudes towards the WCST were more positive. Specifically, participants rated the WCST as fairer than the GBA. This challenges past research from Georgiou and Nikolaou (2020).

This paper also examined the influence of satisfaction derived from the selection process on organizational attractiveness when the GBA and the WCST was used. Since past research found that self-efficacy and user friendliness are keys for satisfaction in the recruitment process (Sylva & Mol, 2009) it was proposed that process satisfaction positively influences organizational attractiveness. Additionally, the organizational justice framework (Gilliland, 1993) claimed that process satisfaction is higher, when individuals have the possibility to get information about the company. Consistent with the findings of Georgiou and Nikolaou (2020), organizational attractiveness was positively influenced by the perceived fairness of the recruitment process when the WCST and the GBA were used. Not in line with their research, however, is the fact that the non-gamified test had a stronger effect when compared to the GBA, indicating that participants were more satisfied with the process in the traditional assessment.

Lastly, significant evidence was found for a mediation effect of process satisfaction on the relationship between perceived fairness and organizational attractiveness when GBAs and non-gamified assessments were used. The data supports the idea that process satisfaction is a

relevant factor for the relationship between fairness perceptions and organizational attractiveness. Nevertheless, the mediating effect was stronger in the non-gamified assessment.

Although previous research found that GBAs provide a pleasurable experience for job candidates (Hamari et al., 2014), participants in the current study evaluated the traditional test more positively than the gamified one because subjects indicated higher levels of fairness, satisfaction and attractiveness for the non-gamified assessment. The outcomes are in contrast to the findings of Georgiou and Nikolaou (2020), who argued that the incorporation of game elements increases process satisfaction. Furthermore, the GBA was not perceived as more reliable which again differs from conclusions drawn by Georgiou and Nikoloaou (2020). In comparison, the outcomes support research by Georgiou (2021) where subjects perceived gamified assessments as less job-related in comparison to traditional assessments. After evaluating past research and the data of the present study it can be said that further research is needed to understand under which conditions GBAs increase perceptions of fairness, satisfaction and attractiveness. It might be the case that the utilization of GBA helps to achieve the primary aim of gamification, which is the increase of enjoyment, motivation, and engagement (Nikolaou & Georgiou (2018). However, when it comes to fairness perceptions and process satisfaction, the current study found out that the utilization of GBA may result in slightly more negative opinions towards the company than when using a non-gamified assessment. Attitudes and reactions towards the selection, however, are very important, considering that high levels of organizational attractiveness tend to result in positive recruitment outcomes, while negative perceptions obviously result in negative consequences (Chapman et al., 2005). For instance, candidate’s intentions to accept the job offer or to pursue the job might be reduced. Furthermore, people might not recommend the job to others

(McCarthy et al., 2017). Thus, organizations should aim for positive recruitment experiences for organizational success.

A potential reason for the unfavorable evaluation of the GBA might be applicant's limited experience with technological assessments (Nikolaou et al., 2015). Job applicants might have been inexperienced with the modern assessment technique and might have preferred a simpler test design. Another possible cause could be the challenging nature of the GBA and the resulting lack of success in the game. However, it is important to note that these are only suggestions. Further research incorporating qualitative responses from participants should clarify why the traditional assessment scored higher on levels of perceived fairness and process satisfaction in comparison to the GBA.

Practical Implications

The presented results support the relevance of perceived fairness and process satisfaction in the recruitment process. This research not only adds significant evidence in the context of non-gamified assessments, but also extends the literature about the recruitment process involving GBA. This study supports one of the most widely used theories in organizational psychology (Truxillo et al., 2016), namely the organizational justice framework (Gilliland, 1993), and emphasizes the influence of perceived fairness on organizational attractiveness when gamified and non-gamified assessments are used. Additionally, it can be said that the rules of the organizational justice framework (Gilliland, 1993) remain not only relevant for traditional assessments, but also for GBA. Based on the organizational justice framework, perceived fairness can be increased in several ways. For instance, applicants should perceive the assessment as job-related (Gilliland, 1993). By explaining the purpose and idea behind the test, applicants get an insight and understand what skills are being assessed (Hausknecht et al., 2004). This can increase feelings of job relatedness. Furthermore, candidates should have the opportunity to perform in the assessment

(Gilliland, 1993; Ellison et al, 2020). Hence, the difficulty of the GBA should not exceed a certain level so that dissatisfaction does not arise (Gilliland, 1993). Additionally, Gilliland (1993) argues that standardized tests and equal scoring systems improve candidate's feelings of fairness.

In addition, the study found that process satisfaction positively impacts organizational attractiveness when gamified and non-gamified assessments are used, indicating that satisfaction derived from the recruitment process is a relevant component when it comes to the attractiveness of a company. Furthermore, process satisfaction is an important mediator of the relationship between perceived fairness and organizational attractiveness. Therefore, organizations should aim to improve job applicant's feelings of process satisfaction in GBA. The organizational justice framework (Gilliland, 1993) states that applicants are more satisfied with the recruitment process when it is possible to receive information about the organization throughout the assessment. Considering that games are perceived as pleasurable and fun (Hamari et al., 2014), individuals might view the use of GBA as a modern and engaging way of testing. Hence, candidates might view the company as innovative, modern, and creative, as well (Georgiou & Nikolaou, 2020). Sylva and Mol (2009) found out that user friendliness and self-efficiency are other good predictors for process satisfaction. In the context of GBA, a simple game design, positive feedback and realistic achievable goals might improve self-efficacy and satisfaction during and after the assessment.

To sum up, reactions and attitudes of job applicants towards GBA are highly relevant, if the organization aims to increase organizational attractiveness (Georgiou & Nikolaou, 2020). In this paper, it is suggested that focusing on an improvement of individual's process satisfaction and fairness perceptions when GBAs are used, improves applicant's attitudes towards the company. Both predictors should be prioritized when creating an assessment test so that the most qualified and suitable candidate is attracted to the organization.

Strengths and Limitations

The present study had several strengths and limitations that should be noted. Firstly, the setup of the research design allows for straightforward replication. Researchers can accurately replicate the study and add potential new measures to the research project. Unfortunately, the study did not allow for a direct comparison between the WCST and the GBA since subjects completed only one of the assessments (Hommel et al., 2021). Thus, participants did not have a direct comparison. Specifically, subjects who are inexperienced with the selection process, might have had problems to classify and evaluate the test. For instance, participants might not have been aware what features contributed to the development of their attitudes. Another limitiation is that participants did not apply for a job in real life. Instead, participants were faced a hypothetical situation and were told to imagine a recruitment process for a Marketing Director position at a hypothetical company. Hence, this was a low stakes scenario, which potentially negatively influenced the effort of subjects. This, in turn, could have impacted their motivation during the test and thus, their accuracy in responding to the questionnaire. Low motivation might explain the fact that 42 participants were removed from the data due to incomplete responses, response bias and fence sitting.

Another issue concerning the construct validity of this research is the fact that the predictor variable process satisfaction consisted only of one item. A single item may not fully represent the complexity of the variable. Multiple items representing a variety of indicators of the variable might increase the reliability and validity of the item and make the construct more robust. Moreover, the dependent variable did not have high internal consistency ($\alpha = .48$). Overall, it can be said that the reliability of the two measures mentioned can be improved. However, it is worth noting that the items of perceived fairness are closely related to each other ($\alpha = .74$), showing that the items accurately measure one single construct.

Finally, it is worth mentioning some methodological aspects related to the external validity of this research. The sample consisted of only German-speaking adults because the questionnaire and both selection tests were in German. This enabled a more nuanced examination of participants reactions during and after the assessment because language-related issues are reduced. Furthermore, the findings can be accurately applied to this one specific population. However, the data consists mainly of young participants. To illustrate, 64.2% of participants are between 18 and 30 years old. This reduces the external validity because the sample does not represent different age groups present in recruitment. However, GBAs are most appropriate for entry- level positions where younger people, who have grown up with games, are likely to apply. The effect of potential experiences with GBA could have been particularly interesting, considering that younger individuals often have more positive perceptions towards technological games compared to their older counterparts (Ellison et al., 2020). Overall, age and experience with gamification might have influenced the attitudes of applicants towards the GBA and the WCST.

Future Research

Adequate assessment and selection tests are needed in order to attract and select the most suitable and qualified workers for the company. This research compared a gamified with a non-gamified assessment. While previous research concluded that GBA increases applicants' feelings of fairness and satisfaction in the recruitment process (Georgiou & Nikolaou, 2020), the results of this study show that GBAs are a complex methodology and not always an ideal solution. Hence, continuing research on the reactions and attitudes towards traditional and modern selection tests is essential so that recruitment managers and organizational psychologists understand under which circumstances job applicants perceive GBAs more positively. Firstly, future research could establish a study design in which participants have to complete both assessments so that participants have a direct comparison.

This might help individuals to evaluate their attitudes towards both assessments in a more accurate way. Furthermore, the simulated environment of the study might have influenced applicants' attitudes and reactions towards the GBA and the traditional assessment. The majority of research examining the effect of GBA has used hypothetical selection scenarios (Ellison et al., 2020; Georgiou & Nikolaou, 2020; Hommel et al., 2021). Future research could examine applicants' attitudes in a real-life setting. This could provide insights into whether candidates' reactions in a high-stake situation are comparable with attitudes in a hypothetical low-stake situation. Another interesting research method in the context of GBA, would be the use of a longitudinal design. Here, job applicants' attitudes towards the recruitment process can be examined over a period of time. Hence, it could be possible to examine potential outcomes, such as job acceptance or recommendation intentions.

Lastly, this research focused on the WCST and the Gamified Set Shifting Task. The latter included a performance graph, account balances and avatars. It is important to note that different game elements might evoke different perceptions and attitudes (Hommel et al., 2021). Therefore, one should consider that the findings cannot be generalized to different settings. Future research can systematically change game elements and investigate candidates' perceptions on fairness, satisfaction and attractiveness.

Conclusion

The present study found that perceived fairness and process satisfaction have a significant influence on organizational attractiveness when gamified assessments and non-gamified assessments were used. Furthermore, significant evidence was found that process satisfaction mediates the influence of perceived fairness of the recruitment process on organizational attractiveness. The effects were found to be stronger in the traditional assessment. Subjects rated the traditional assessment as fairer and indicated that they were more satisfied with the process when the traditional assessment was compared to the GBA.

Overall, the study shows that process satisfaction and perceived fairness of the recruitment process should be prioritized by organizations so that the most qualified and talented workers are attracted to the organization.

References

Bertolino, M., & Steiner, D. D. (2007). Fairness reactions to selection methods: An Italian study. *International Journal of Selection and Assessment, 15*(2), 197–205. https://doi-org.proxy-ub.rug.nl/10.1111/j.1468-2389.2007.00381.x

Chapman, D. S., Uggerslev, K. L., Carroll, S. A., Piasentin, K. A., & Jones, D. A. (2005). Applicant Attraction to Organizations and Job Choice: A Meta-Analytic Review of the Correlates of Recruiting Outcomes. *Journal of Applied Psychology, 90*(5), 928–944. https://doi-org.proxy-ub.rug.nl/10.1037/0021-9010.90.5.928

Collmus, A. B., Armstrong, M. B., & Landers, R. N. (2016). Game-thinking within social media to recruit and select job candidates. In R. N. Landers, & G. B. Schmidt (Eds.), Social media in employee selection and recruitment: Theory, practice, and current challenges (pp. 103–124). Springer International Publishing.

Dalal, D. K., Zhu, X. (Susan), Rangel, B., Boyce, A. S., & Lobene, E. (2021). Improving applicant reactions to forced-choice personality measurement: Interventions to reduce threats to test takers' self-concepts. *Journal of Business and Psychology, 36*(1), 55–70. https://doi-org.proxy-ub.rug.nl/10.1007/s10869-019-09655-6

Deterding, S., Sicart, M., Nacke, L., O'Hara, K., & Dixon, D. (2011). Gamification. using game-design elements in non-gaming contexts. In CHI'11 extended abstracts on human factors in computing systems (pp. 2425-2428).

Ellison, L. J., Johnson, T. M., Tomczak, D., Siemsen, A., & Gonzalez, M. F. (2020). Game on! Exploring reactions to game-based selection assessments. *Journal of Managerial Psychology, 35*(4), 241–254. https://doi-org.proxy-ub.rug.nl/10.1108/JMP-09-2018-0414

Fishbein, M., & Ajzen, I. (1975). Intention and Behavior: An introduction to theory and research. Addison-Wesley.

Georgiou, K., Gouras, A., & Nikolaou, I. (2019). Gamification in employee selection: The development of a gamified assessment. *International Journal of Selection and Assessment*, 27(2), 91–103. https://doi-org.proxy-ub.rug.nl/10.1111/ijsa.12240

Georgiou, K., & Nikolaou, I. (2020). Are applicants in favor of traditional or gamified assessment methods? Exploring applicant reactions towards a gamified selection method. *Computers in Human Behavior*, 109. https://doi-org.proxy-ub.rug.nl/10.1016/j.chb.2020.106356

Georgiou, K. (2021). Can explanations improve applicant reactions towards gamified assessment methods? *International Journal of Selection and Assessment*, 29(2), 253–268. https://doi-org.proxy-ub.rug.nl/10.1111/ijsa.12329

Gilliland, S. W. (1993). The perceived fairness of selection systems: An organizational justice perspective. *The Academy of Management Review*, 18(4), 694–734. https://doi-org.proxy-ub.rug.nl/10.2307/258595

Hamari, J., Koivisto, J. & Sarsa, H. (2014), Does gamification work? A literature review of empirical studies on gamification, 2014 Proceedings of the Hawaii International Conference on Systems Sciences, Hawaii, USA.

Hausknecht, J. P., Day, D. V., & Thomas, S. C. (2004). Applicant reactions to selection procedures: An updated model and meta-analysis. *Personnel Psychology*, 57(3), 639–683. https://doi-org.proxy-ub.rug.nl/10.1111/j.1744-6570.2004.00003.x

Hausknecht, J. P. (2014). Applicant reactions. In K. Y. T. Yu & D. M. Cable (Eds.), *The Oxford handbook of recruitment*. (pp. 35–46). Oxford University Press.

Hayes, A. F. (2018). *Introduction to mediation, modmeration, and conditional process analysis: A regression-based approach* (2nd ed.). Guilford Publications.

Highhouse, S., Lievens, F., & Sinar, E. F. (2003). Measuring Attraction to Organizations. *Educational and Psychological Measurement*, 63(6), 986–1001. https://doi-org.proxy-ub.rug.nl/10.1177/0013164403258403

Hommel, B. E., Ruppel, R., & Zacher, H. (2021). Assessment of cognitive flexibility in personnel selection: Validity and acceptance of a gamified version of the wisconsin card sorting test. *International Journal of Selection and Assessment*. https://doi-org.proxy-ub.rug.nl/10.1111/ijsa.12362

IBM Corp. (2020). IBM SPSS Statistics for Windows, Version 27.0. (Computer software. IBM Corp.

Kluger, A. N., & Rothstein, H. R. (1993). The influence of selection test type on applicant reactions to employment testing. Journal of Business and Psychology, 8(1), 3–25. https://doi-org.proxy-ub.rug.nl/10.1007/BF02230391

James, G., Witten, D., Hastie, T., & Tibshirani, R. (2014). *An introduction to statistical learning:* With applications in R. Springer.

Landers, R. N., & Sanchez, D. R. (2022). Game-based, gamified, and gamefully designed assessments for employee selection: Definitions, distinctions, design, and validation. *International Journal of Selection and Assessment*. https://doi-org.proxy-ub.rug.nl/10.1111/ijsa.12376

Langer, M., König, C. J., & Fitili, A. (2018). Information as a double-edged sword: The role of computer experience and information on applicant reactions towards novel technologies for personnel selection. *Computers in Human Behavior*, 81, 19–30. https://doi-org.proxy-ub.rug.nl/10.1016/j.chb.2017.11.036

McCarthy, J. M., Bauer, T. N., Truxillo, D. M., Anderson, N. R., Costa, A. C., & Ahmed, S. M. (2017). Applicant perspectives during selection: A review addressing “So what?,”

'What's new?,' and "Where to next?" *Journal of Management*, 43(6), 1693–1725. https://doi-org.proxy-ub.rug.nl/10.1177/0149206316681846

Michaels, E., Handfield-Jones, H., & Axelrod, B. (2001). The war for talent. Boston: Harvard Business School Press.

Nikolaou, I. (2021). What is the role of technology in recruitment and selection? *The Spanish Journal of Psychology*, 24. https://doi-org.proxy-ub.rug.nl/10.1017/SJP.2021.6

Nikolaou, I., Georgiou, K., & Kotsasarlidou, V. (2019). Exploring the relationship of a gamified assessment with performance. *The Spanish Journal of Psychology*, 22, Article E6. https://doi.org/10.1017/sjp.2019.5

Nikolaou, I., & Georgiou, K. (2018). Fairness reactions to the employment interview. *Journal of Work and Organizational Psychology*, 34(2), 103–111. https://doi-org.proxy-ub.rug.nl/10.5093/jwop2018a13

Nikolaou, loannis, Bauer, T. N., & Truxillo, D. M. (2015). Applicant reactions to selection methods: An overview of recent research and suggestions for the future. In I. Nikolaou & J. K. Oostrom (Eds.), *Employee recruitment, selection, and assessment: Contemporary issues for theory and practice*. (pp. 80–96). Routledge/Taylor & Francis Group.

Preacher, K. J., & Leonardelli, G. J. (2001). Calculation for the Sobel Test. Retrieved from https://quantpsy.org/sobel/sobel.htm

Schleicher, D. J., Venkataramani, V., Morgeson, F. P., & Campion, M. A. (2006). So you didn't get the jobNow what do you think? Examining opportunity-to-perform fairness perceptions. *Personnel Psychology*, 59(3), 559–590. https://doi-org.proxy-ub.rug.nl/10.1111/j.1744-6570.2006.00047.x

Silic, M., Marzi, G., Caputo, A., & Bal, P. M. (2020). The effects of a gamified human resource management system on job satisfaction and engagement. *Human Resource*

Management Journal, 30(2), 260–277. https://doi-org.proxy-ub.rug.nl/10.1111/1748-8583.12272

Sobel, M. E. (1982). Asymptotic Confidence Intervals for Indirect Effects in Structural Equation Models. *Sociological Methodology*, 13, 290. https://doi.org/10.2307/270723

Spence, M. (1973). Job Market Signaling. *Quarterly Journal of Economics*, 87(3), 355-374 ttps://doi.org/10.2307/1882010

Stoet, G. (2017). PsyToolkit: A novel web-based method for running online questionnaires and reaction-time experiments. *Teaching of Psychology*, 44, 24-31. Retrieved from https://psytoolkit.org/

Sylva, H., & Mol, S. T. (2009). E-recruitment: A study into applicant perceptions of an online application system. *International Journal of Selection and Assessment*, 17(3), 311–323. https://doi-org.proxy-ub.rug.nl/10.1111/j.1468-2389.2009.00473.x

Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. Research in science education, 48, 1273-1296.

Truxillo, D. M., Bauer, T. N., McCarthy, J. M., Anderson, N., & Ahmed, S. M. (2018). Applicant perspectives on employee selection systems. In D. S. Ones, N. Anderson, C. Viswesvaran, & H. K. Sinangil (Eds.), *The SAGE handbook of industrial, work & organizational psychology: Personnel psychology and employee performance*., Vol. 1, 2nd ed. (pp. 508–532).

Woods, S. A., Ahmed, S., Nikolaou, I., Costa, A. C., & Anderson, N. R. (2020). Personnel selection in the digital age: A review of validity and applicant reactions, and future research challenges. *European Journal of Work and Organizational Psychology*, 29(1), 64–77. https://doi-org.proxy-ub.rug.nl/10.1080/1359432X.2019.1681401

Appendix A

Questionnaire items

Organizational Attractiveness (adopted by Highhouse et al., 2003)

1. This place would be a good place for me to work.
2. I would not be interested in this company except as a last resort.
3. This company is attractive to me as a place to work.
4. I am interested in learning more about this company.
5. A job at this company is very appealing to me.

Perceived Fairness (adopted by Kluger & Rothstein, 1993)

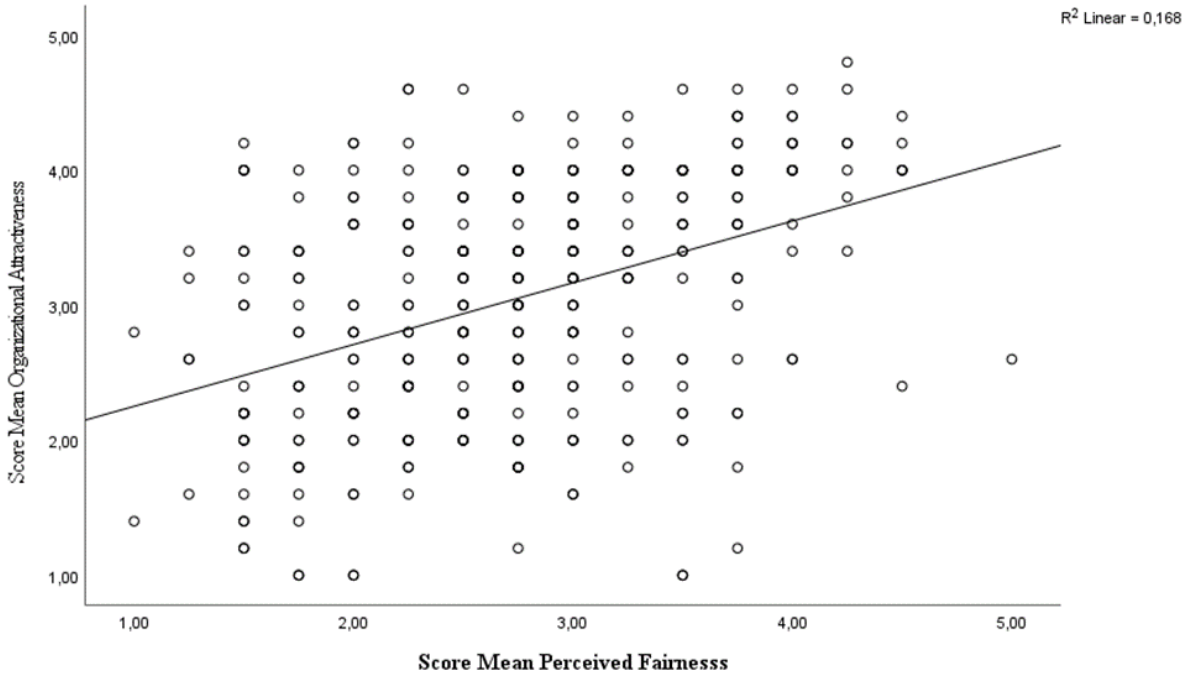
1. Most people would say that this test was fair.
2. I think this test was fair.
3. I think this test can predict whether i can be a successful employee.
4. I see the connection between this test and work performance.

Process Satisfaction (adopted by Sylva & Mol, 2009)

1. Overall, I was satisfied with this application process.

Appendix B

Partial regression plot for checking the assumption of linearity: perceived fairness



Partial regression plot for checking the assumption of linearity: process satisfaction