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## Interview anxiety narrative validation for a virtual reality-based study

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### Abstract

When conducting a Virtual Reality-based study one important feature that needs to be assured is valid is the narrative context. Our objective was to validate a job interview anxiety provoking narrative. One experiment with a between-subject design was conducted. Participants were instructed to read a job interview-context narrative and then self-report the level of anxiety experienced. Results indicated that the narrative describing the individual's parents' economic and financial difficulties as well as an ambiguous description of the organization's physical characteristics elicited significantly higher levels of state anxiety. Research findings suggests the potential influence the narrative may have on interview anxiety and, most importantly, evidence the validity of instruments necessary for a Virtual Reality-based methodology.

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### 1. Introduction

Empirical evidence has verified that anxiety is an inherent part of the interview process and in today's fast paced and stressful work environment it also has the potential of interfering with the ultimate goal of the interview: to recruit the most suitable person for the job and organizational fit [1]. Through an interactional theoretical

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perspective, anxiety is defined as an aversive and emotional state that is associated to future probable, uncertain, and threat-related events [2]. State anxiety, which is the current level of anxiety experienced, is the outcome of an interaction between one's personality trait and a situational stress. In the context of job interviews the interviewee frequently experiences state anxiety, recently described as interview anxiety, as such a situation is highly stressful, evaluative and future threat-related [3], [4].

Surprisingly, the interviewee's viewpoint and more specifically interview anxiety have been overlooked for the past decades. Recent reviews have called for a new shift in the way job interviews are analyzed and support the deserved attention of applicant's reactions [5], [6]. Studies have demonstrated the negative outcomes of anxiety in interviews for the interviewee as well as for the organization. Already, negative correlations have been established between interviewee anxiety and performance interview rated by the interviewer [7]–[9]. Cook, Vance and Spector [9] verified that individuals with high trait anxiety levels received significantly lower performance ratings, were less likely to get a second interview and a subsequent job offer than individuals with low trait anxiety. Anxiety leads interviewee's to be more inhibited and display a less favorable self-presentational style. For example, one's rigidity, inhibition, vocal disruption, trembling and self-touch activity are behavioral indicators that allow others (e.g., interviewers) to perceive their anxiety [10]. All these indicators of anxiety lead the interviewer to believe the applicant is less competent, less qualified, and has less initiative as well as motivation than all the other competing applicants [9], [11].

One factor we believe influences the entire interview and in specific the interviewee's state is the organization's physical environment. The physical environments in organizations are the material and stimuli (e.g., furnishings, buildings, ambient conditions) and their arrangements (e.g., open-space, team-work space) that individuals interact with in organizational life [12]. Individuals that encounter an organization for the first time are strongly influenced by easily observable attributes. Scholars assert individuals are more influenced by the physical objects than the actual occupant [12], [13].

Keniger, Gaston, Irvine, and Fuller [14] recently reviewed the empirical evidence regarding the benefits of interacting with nature. These benefits consisted of concerning physical health, cognitive performance, psychological well-being, and social dimensions. In relation to physical health, examples of physiological benefits are: reduced cortisol levels, headaches, blood pressure; faster healing; perceived health/well-being; reduced occurrence of illness and stress reduction. Benefits of cognitive performance are relative to reduced mental fatigue, improved ability to learn tasks, attentional restoration and improved productivity, especially in creative tasks. Regarding the positive effect of psychological well-being, the presence of increased self-esteem, improved mood, reduced anger/frustration, and reduced anxiety, among others. The social benefits has been less explored nevertheless scholars have affirmed an occurrence of facilitated social interaction, cohesion, support and empowerment alongside better interracial relations and reduced crime and violence rates see [14] for full review. Furthermore, the benefits previously described are present across contexts such as work offices [15], hospital waiting and patient rooms [16] and outdoors too (forest versus urban settings) [17], [18]. Natural environments (e.g., lakes, mountains) among various countries are in fact mentioned as a favorite place revealing the human being's innate connection and relatedness to nature [19], [20].

In organizational contexts it is not typically possible to work near a natural environment (e.g., forest, park, sea), however recent studies have indicated the possibility of introducing nature-like surroundings in the physical workspace. Elsbach and Pratt [12] consider nature-like ambient surroundings of work settings to mimic nature. For instance, nature-like ambient surroundings may have natural sunlight, natural materials such as wood for furniture décor, nature-like colors, artwork of natural scenes or the presence of plants.

In this context, we will present the first phase of a larger study to investigate the influence of physical environments on interview anxiety using a Virtual Reality (VR) – based methodology. For this paper, the validation of a narrative context will be presented as well as a discussion regarding the following phases.

A narrative context contextualizes the virtual experience and generates actions that are based and controlled by the subject's needs, motives, and goals [21]. "Narratives are stories that users can inhabit from a first-person perspective. They create meaning for the individual's experiences, influencing the way people will appraise them, and change the individual's emotional states, modifying the way people evaluate their experience" [22, p. 100]. They are responsible for mental immersions, in which users can be deeply engaged and involved in the experience, increasing their sense of presence [22]. The scarce studies that are beginning to simulate job interviews in VR and

evaluate anxiety have not yet presented a validated narrative model [23], [24]. Thus, the present experiment aims to validate an anxious eliciting job interview simulation narrative. Anxiety is an emotional state that is heightened when an individual feels greatly preoccupied with risk and uncertainty. In the context of job interviews, anxiety tends to bias preference for low-risk/low reward options (e.g., average salary and high job security) [25]. Accordingly, our suggestion is that a job interview narrative with information relative to one's parents economic and financial difficulties and an ambiguous and threatening description of the organization's physical characteristics (experimental narrative) will create higher levels of uncertainty and risk of failing, respectively. These feelings will consequently lead to high levels of state anxiety (dependent variable). In order to guarantee the effectiveness of this narrative, it will be compared to a job interview narrative describing the mere process of getting ready and seeing a neighbor before the interview where level of uncertainty and risk of failure are not made salient (control narrative). We expect the control narrative to not elicit predispositions of risk and uncertainty. For this study, our hypothesis is that the experimental narrative will induce higher levels of state anxiety than the control narrative, and that this difference will not differ between gender, number of job or internship interviews experienced and anxiety as a trait characteristic (control variables).

## 2. Methodology

### 2.1.1. Participants

Thirty-four university students (19 females) from the University of Lisbon and ISCTE-IUL participated voluntarily. They were aged between 18 and 46 ( $M = 24.12$ ,  $SD = 6.90$ ) and had on average experienced 4.79 ( $SD = 9.04$ ) job or internship interviews. Participants were randomly assigned to two groups; the experimental condition or the control condition. In the experimental condition the participants ( $N = 18$ ; 8 females and 10 males) were aged between 18 and 46 ( $M = 26.56$ ,  $SD = 8.1$ ) and had on average experienced 6.83 ( $SD = 11.75$ ) job or internship interviews. In the control condition, the participants ( $N = 16$ ; 11 females and 5 males) were aged between 18 and 34 ( $M = 21.38$ ;  $SD = 3.88$ ) and had on average experienced 2.33 ( $SD = 2.72$ ) job or internship interviews. Some of the participants gained partial credit in a psychology course.

### 2.1.2. Materials and procedure

The dependent variable of this study was the anxiety state of participants, which was assessed by the State-Trait Anxiety Inventory (STAI) Y-Form [26]. The STAI indicates the self-reported state and trait anxiety levels. It is aimed at individuals with at least a sixth grade reading level and there is no time limit for the questionnaire. The instrument is divided in two separate self-report scales to measure the two distinct anxiety concepts: state anxiety and trait anxiety. The state anxiety subscale asks individuals to report how they feel now, in the present moment. It is used to indicate transitory emotional states like feelings of apprehension, tension, nervousness and worry. The trait anxiety subscale asks individuals to report how they usually feel. This subscale indicates individuals with high levels of neurotic anxiety [27]. Each subscale consists of twenty statements (e.g., "I feel calm" and "I feel nervous and agitated" are examples of statements of the state anxiety scale and trait anxiety scale, respectively). All statements are responded in a four-point likert scale (i.e., 1 = nothing/almost never to 4 = very/almost always). The scores range from 20 to 80, the higher the scores the higher the levels of anxiety. The Portuguese version of STAI-Y-Form was used for the present study. It was previously validated [28] and Cronbach's alpha ranges between 0.89 and 0.93 [29]. The state anxiety subscale was used to validate the narratives as we intended to understand the transitory emotional state caused by the narratives, similarly to other studies which have validated narratives for VR see [22]. As a control variable, the same participants completed the trait anxiety subscale in order to confirm the participants' trait characteristics did not influence the narrative validation.

A between-subject design was used. In a classroom setting the participants were randomly assigned to one of the two groups; the experimental or control condition. After all participants had signed an informed consent form, the experimental condition received the experimental narrative that consisted of four paragraphs. The first paragraph described the parents' economic and financial difficulties. The second defined the company, the high salary and the

great opportunities they could offer as well as who they were going to be interviewed by. The third paragraph was a description of the journey to the organization on the interview day and an ambiguous and threatening description of the organization's physical characteristics and atmosphere. The final paragraph located the individual in the waiting room, where he/she would await to be called by the interviewer. The control condition received the control narrative. This narrative did not include any background information about the participant's parents (i.e. first paragraph of the experimental condition) nor did it include a description regarding the Bworker building and atmosphere (i.e., the third paragraph). For the control narrative, the description of the Bworker building and atmosphere was replaced with a description of a neutral conversation with his neighbor in a coffee shop before the interview. See Appendix A.

Once participants had read their corresponding narrative, they were asked to turn the page and answer the state anxiety subscale. At the end, demographic information was solicited such as age, gender, occupation and number of job interviews experienced. Moreover, approximately one month after in a classroom setting the same participants were requested to answer the trait anxiety subscale so that no association would be made to the narratives. After all the data was collected, a debriefing regarding the investigation's aim was given.

### 2.1.3. Results and discussion

Results are related to state anxiety scores between conditions, interaction with state anxiety scores and gender and, interaction with state anxiety and numbers of interviews experienced are also analyzed. As a control, trait anxiety scores between conditions were analyzed to ensure the absence of differences between participants in the experimental and control conditions. All tests of significance were conducted with an alpha level of .05.

A Shapiro-Wilk's test ( $p > 0.05$ ) and a visual inspection of their histograms, normal Q-Q plots and box plots showed that the state and trait anxiety scores were approximately normally distributed for the experimental and control conditions. Data regarding state anxiety scores between conditions revealed the experimental condition (i.e., experimental narrative) scored higher levels of state anxiety ( $M = 47.11$ ;  $SD = 12.53$ ) comparatively to the control condition (i.e., control narrative) ( $M = 36.18$ ;  $SD = 6.57$ ). An independent sample t-test was conducted to compare the effect of the narratives on state anxiety between conditions and the effect revealed significance ( $t(32) = 9.97$ ,  $p = .003$ ).

A further analysis was conducted considering gender, number of job interviews and trait anxiety scores to control the effect of the narratives. A univariate between subjects ANOVA was conducted to compare the effect of gender and experience in job interviews on state anxiety scores, in the experimental and control conditions. The effect did not reach significance between gender and state anxiety scores ( $F(1,10) = .032$ ,  $p = .86$ ) nor between the number of job/internship interviews and state anxiety scores ( $F(2,10) = 1.2$ ,  $p = .34$ ).

Additionally, participant's trait anxiety was analyzed, as they should not differ between conditions ( $n = 14$  for the experimental and  $n = 11$  for the control condition). The average scores of trait anxiety in the experimental control ( $M = 36.21$ ,  $SD = 8.17$ ) were not significantly statistically higher than in the control condition ( $M = 34.18$ ,  $SD = 5.91$ ) ( $t(22.89) = -.72$ ,  $p = .48$ ).

The purpose of this study was to validate an anxious eliciting job interview simulation narrative. We tested two job interview narratives where we hypothesized the experimental narrative would provoke more anxiety comparatively to the control narrative, due to implicit heightened levels of insecurity and risk portrayed in the narrative. Our results confirm the initial hypotheses that the experimental narrative would provoke higher levels of anxiety, regardless of gender, number of interviews experienced and trait anxiety levels. These results indicate the experimental narrative context may be used in a VR-based methodology in order to prime higher levels of anxiety specifically in job interview simulations. As such, the experimental narrative will be used in our further studies; however, we do encourage a replication of these results, as we believe the narrative warrants greater representativeness.

## 3. Conclusion

This paper explored the validation of a narrative for a Virtual Reality (VR)-based study, which is of paramount importance for any study using VR. The narrative context which literature has extensively confirmed has a great impact on the participant's level of immersion and presence in a VR scenario [21], [22]. Note that immersion is

understood as the illusion of being in a place even though it is acknowledged it is not real and presence is the sense of being in one environment although physically located in another. Our experiment successfully validated an anxiety provoking narrative context specific to a job interview context. This narrative context induced high levels of uncertainty and risk of failure provoking significant state anxiety levels among participants regardless of gender, number of job interviews experienced and trait anxiety

Given the findings of this work, human-environment interactions in social organizational contexts are encouraged to be further understood through a Virtual Reality-based methodological approach. Our future studies will evaluate the influence nature-like surroundings has on interview anxiety using the scenario (i.e., narrative context) validated in the present paper. By using VR to study this human-environment interaction the manipulation and control of variables are facilitated and thus it is possible to specifically control the environment with a decreased number of parasite variables. Through this methodological approach we are able to register motor responses specific to the variations of social and contextual cues - an interaction that lacks empirical evidence in the domain of job selection interviews. It has been evidenced by Villani et al. [24] that the contextual and social cues of the environment can enhance interview anxiety in augmented reality more than in a real simulation. Also, Kwon et al. [23] studied the graphical realism of virtual agents needed in job interview VR simulations and verified the level of realism did not affect the presence of participant's anxiety in interviews.

Considering these aspects and our positive validation research findings, VR may be assumed as a suitable and encouraging venue for job interview simulations. The following steps of our research therefore consist on manipulating the office environment in VR-based job interview simulations in order to evaluate the influence nature-like surroundings has on interview anxiety. Such findings will seek to improve the interviewer-interviewee analysis and optimize interview-training programs.

## **Appendix A. Narratives**

### *A.1. Narrative of the experimental condition*

You're parents used to work in a factory but it went bankrupt and closed shortly after. They have been unemployed for the past 6 months and they still haven't received their wages from their last 4 months at the factory. Their social security unemployment allowance isn't enough to cover all the bills, including grandma's medication. They're starting to despair. Finding a new job now with their age seems highly unlikely. No one is hiring and all the other industrial factories close to home are near bankruptcy too. The food at home comes from a non-governmental association aimed to help families with financial difficulties so it's free but the bills still need to be paid. You feel that the only hope they have is you.

One month ago you applied for a job at Bworker, a multinational Human Resources consultancy firm that could bring prospering opportunities in the future. The Bworker Group is located in 38 countries of the 5 continents and is listed in the London Stock Exchange. In Portugal, Bworker employs more than 28 000 people per day and believe that the real value of the organization is the people. Now they've called you for an interview with Mr. Vilar. The interview is at this moment in time your only obstacle separating you from working in the area you've always wanted and, on top of that, with an above average salary. If you got the job you could finally help your parents. You know that you're likely not going to find another opportunity like this.

The day of the interview has arrived. You wake up and rapidly get dressed, leaving 15 minutes earlier because your scared you'll get stuck in traffic. Once you get off the bus you immediately see the big company: Bworker! The building is big and modern, it has huge mirrored windows and their logo is seen from miles afar. All the employees hurriedly pass by you going in and out of Bworker. They're all wearing suit and tie and have an extremely serious appearance. You walk towards the revolving glass door trying to escape from the rushing people and when you enter the building you immediately see a different world. Beside the door is the Security Guard, tall and intimidating, who looks at you doubting you're in the right place. You hear phones ringing, the high heels tip tap from the ladies who pass by and the forced laughter of who is most probably trying to sell their client their best offers. You hadn't prepared for this environment and get frightened. Are you ready? Without thinking anymore you head to the reception desk.

You let the receptionist know that you're here for an interview with Mr. Vilar. She asks you to wait for a few moments while she confirms the interview on the system. After, she takes you into a waiting room and asks you to wait there until you are called for the interview. She warns you that when called, you can go straight to Mr. Vilar's office.

### *A.2. Narrative of the control condition*

One month ago you applied for a job at Bworker, a multinational Human Resources consultancy firm that could bring prospering opportunities in the future. The Bworker Group is located in 38 countries of the 5 continents and is listed in the London Stock Exchange. In Portugal, Bworker employs more than 28 000 people per day and believe that the real value of the organization is the people. Now they've called you for an interview with Mr. Vilar. The interview is at this moment in time your only obstacle separating you from working in the area you've always wanted and, on top of that, with an above average salary. If you got the job you could finally help your parents. You know that you're likely not going to find another opportunity like this.

The day of the interview has arrived. You wake up and rapidly get dressed. You leave home earlier to avoid being late. While waiting for the bus you realize it's running late. Finally the bus arrives and you get on. When you arrive at the premise, you get off the bus and immediately see Bworker. However, you're early so you decide to go and have some coffee in the coffee shop nearby. While contemplating the view and scanning through today's newspaper, you suddenly hear a familiar voice. It was John, your neighbor, asking for a coffee at the counter. You decide to call him and he comes to greet you. You talk about the news in your building and the construction works that are going on for some time. John then asks what brought you there, to which you replied that you were just having a coffee before going to a job interview because you arrived early. He wished you good luck for the interview and you then realize it's time to go. You say goodbye to each other and leave. Arriving at Bworker, you walk towards the door trying to escape from the rushing people. When you enter, your sight lies straight away upon the uniformed Security Guard who is very attentive. You greet him with a good day and, without further a due, you head to the reception desk that is straight in front of you.

You let the receptionist know that you're here for an interview with Mr. Vilar. She asks you to wait for a few moments while she confirms the interview on the system. After, she takes you into a waiting room and asks you to wait there until you are called for the interview. She warns you that when called, you can go straight to Mr. Vilar's office.

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