



# Seeing is relieving: effects of serious storytelling with images on interview performance anxiety

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## Abstract

Serious storytelling as a media genre has the potential to accentuate the benefits of narrative interventions in health and education. To inform its application, it is necessary to identify effects of sensory inputs. Here, we focus on visual stimuli and observe their effects on an anxiety condition. We examine whether serious storytelling incorporating images, a type of basic visual stimuli, may reduce interview performance anxiety. In a double-blind randomised control trial, 69 participants with matched levels of anxiety received serious storytelling interview training and were allocated to exposure (image-based preparation) and control (standard preparation) groups. A week later, participants attended individual interviews with two independent interviewers and reported their interview anxiety. Analyses revealed a positive relationship between generalised anxiety and some dimensions of interview anxiety, but serious storytelling with images predicted a reduction in interview performance anxiety (effect size at the median value of covariates on a visual analogue scale with the range 0–100: -36.7, 95% CI [-54.7, -2.5]). Low participation burden in the brief intervention was confirmed through a deductive thematic analysis. The images were analysed based on format type and origin to inform further inquiries. This study yielded empirical findings with implications of media and technology development for serious storytelling. Seeing images of experiences during interview preparation was associated with a relief of interviewees' anxiety towards interview performance, but further studies are necessary to consolidate the evidence for visual narrative applications in health and education.

**Keywords** Serious storytelling · Visual narrative intervention · Image · Interview anxiety · Performance anxiety · Minimal intervention

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## 1 Introduction

In *Multimedia Tools and Application*, Lugmayr, Sutinen, Shonen, Sedano, Hlavacs and Montero gave the first definition of serious storytelling [46] as a media genre of narration which ‘progresses as a sequence of patterns impressive in quality, relates to a serious context, and is a matter of thoughtful process’. Since the first definition, serious storytelling has been introduced to multiple areas concerning health and education, including e-counselling, science communication, and work-based learning [17, 27, 34]. The sensory experience of narratives, however, is yet to be evaluated to gain a full understanding of what serious storytelling may offer. As Gonçalves, Henriques, and Machado [23] emphasised, narratives are multi-sensory. To uncover the benefits of serious storytelling, relevant visual, textual, auditory, and vocal components or enablers of serious storytelling should be specified. For instance, in health, the distinction of sensorial components of narratives will be vital to fully appreciate narrative experience in cognitive narrative psychotherapy. In education, such a distinction can inform learning style considerations [19].

This investigation focuses on the effects of visual stimuli on storytelling. As the affinity of media technology for visual objects amplifies in everyday life, intermixing visualisation and storytelling has become an increasingly intuitive way of communication [35, 41, 47]. With the parallel growth of transmedia storytelling [32], distinguishing effects of different sensory inputs will be necessary to advance the development of serious storytelling in theory and practice. The delineation of a sensory landscape is an important step towards theorising narratives interventions. The insights gained may enable researchers and practitioners to develop appropriate and superior techniques to optimise intervention effects and increase scalability of visual narrative interventions.

## 2 Background: Interview performance anxiety

The effects of visual stimuli on serious storytelling may be observed via interview performance anxiety. Selection interviews, shortened as interviews hereafter, are one of the oldest and still the most dominant means of modern selection activities [11, 26, 30, 69]. They are a high anxiety-inducing situation, typically taking place in unfamiliar settings and involving interactions with strangers [5]. They incite fear of failing the evaluative and competitive activity before, during and even past the interviews [72]. The consequences of poor performance can jeopardise one’s life chances, that is, securing work opportunities, programs of study, scholarships, promotions, or funding. Because of the prevalence of merit-based competitive selection activities, interview anxiety has become one of the most common anxiety experiences encountered by the general population and individuals with anxiety [13].

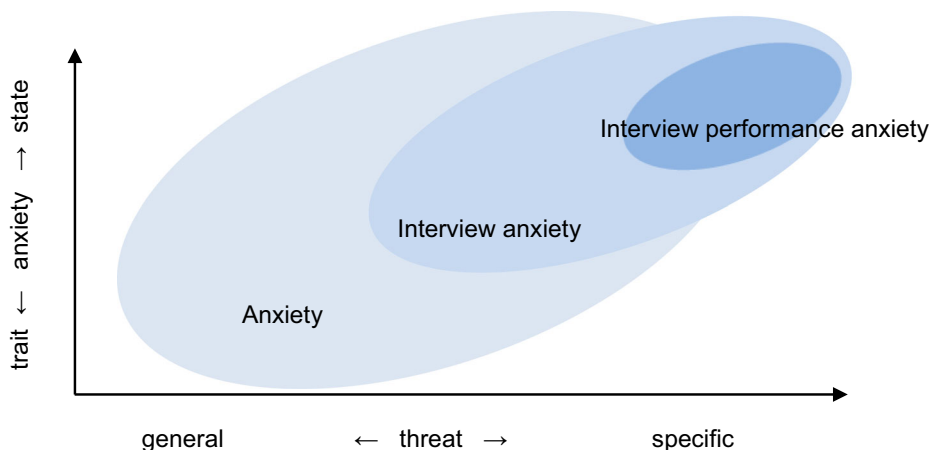
McCarthy and Goffin reported five dimensions of interview anxiety- performance, behaviour, communication, appearance, and social anxiety [51]. Of these dimensions, performance anxiety has the most threat specificity and situation dependence; therefore, is the most appropriate dimension to observe the visual intervention effects of serious storytelling. Interview performance anxiety is an excessive concern over the outcome of an evaluation situation that can impact interview performance [51, 59, 62]. In general, interviewees predisposed to some forms of anxiety are typically at greater risk of interview anxiety, but individuals with no known anxiety disorders can also experience interview performance anxiety [3, 12]. Interview performance anxiety may be conceptualised as a subset of interview anxiety, which may

coexist or interact with generalised and other forms of anxiety (Fig. 1). Anxiety, as defined by the 11th revision of the International Classification of Diseases (ICD-11) is the ‘apprehensiveness or anticipation of future danger or misfortune accompanied by a feeling of worry, distress, or somatic symptoms of tension’ [70]. Persistent symptoms of anxiety, as termed as generalised anxiety disorder, distresses and impairs individuals’ ability to function [71]. Interview performance anxiety is therefore multi-layered and dependent on state and trait anxiety as well as individual responses to perceived threat [51].

Several gaps exist in interview anxiety research. For decades, it has been acknowledged that managing interview anxiety is an important skill to maximise interview performance. However, there has been a lack of focus on helping interviewees prepare and manage interviews [39]. The selection interview literature is disproportionately published in human resource management and personnel psychology with the focus on interview and interviewer process such as assessing validity, reliability, and structure of interviews [48, 58]. Insufficient research addresses the needs of people who are vulnerable in interview situations, at the interventional level. This imbalance presents a risk to evidence-based guidance for interviewees to perform their best and renders information exchange in interviews ineffective.

## 2.1 Selection interview as serious storytelling

The gaps in the extant literature may be remedied by the framing of selection interviews as a form of serious storytelling. The contemporary selection interview is a classic setting where quality and impressive narration for a serious purpose takes place. Modern interviews draw heavily from the behavioural interview philosophy that past behaviour is the best indicator for future performance; therefore, requiring interviewees to recount actual events in structured, sequential story forms [33, 60]. In recent years, interviews have also evolved from relying on physical attendance to using new media and digital arrangements, such as pre-recorded video interviews and online interviews, to enable personal narratives and further expressions of individuality. Emerging digital and online interview methods present further opportunities to apply serious storytelling to interviews.



**Fig. 1** Interview performance anxiety as a multi-layered anxiety condition comprising state and trait anxiety and threat specificity

## 2.2 Using serious storytelling with images to address interview performance anxiety

Stories are a powerful means to recall and shape obscured experience, construct meaning, and convey understanding [52]. An individual's ability to tell stories for serious purposes, however, cannot be taken for granted. The present study examines the use of images as visual triggers for serious storytelling. Images are the most common visual objects whose creation and consumption require a low threshold of technology. Used in narrative interventions, they help individuals externalise and disclose thoughts, internalise experiences and desirable behaviours, and rescript the realities they perceive; thus, relieving anxiety [42]. Images may assist narrative preparation by providing visual thinking strategies [16, 28] to recall events and details to create thick and rich descriptions. Narrators are mentally transported back to the time and place of an event momentarily to capture authentic details and sentiments of an event; thereby instilling confidence in the speaker and listener about the story.

## 3 The present study

We investigate the effects of a visual narrative intervention on reducing interview performance anxiety by incorporating images into serious storytelling for images' ubiquitous use in everyday life and ability for annotation and classification [8, 29]. We hypothesise that a minimal intervention, in which interviewees prepare images to assist serious storytelling will alleviate interview performance anxiety. We predict the intervention will reduce an interviewee's anxiety towards interview performance. Besides the intervention, participant's career information literacy and other factors could also affect their interview performance anxiety. These factors may include prior interview anxiety experience (pre, during, post, and overall), gender, age, work experience, and plan upon degree completion; therefore, should be controlled for as covariates.

### 3.1 Related work

Limited previous research exists in using visual narrative interventions to address anxiety conditions. Several studies have used elaborate technologies such as virtual and augmented reality to create realism and a sense of presence in interviews [38, 54]. However, virtual immersion experiences are costly exercises with concerns of motion sickness and induced anxiety [9]. Images, in contrast, are highly accessible visual artefacts that can be considered for this study due to their diverse applications in narrative-based interventions and low requirements of intervention incorporation for meaningful changes [42]. Photos, pictures, paintings, and drawings have been used in diverse narrative interventions of exposure therapy [1], identify construction [21], occupational wellbeing [24], psychiatric assessments [40], migrant mental health [56], and self-counselling [73]. Photos trend upwards as a prevalent image-based stimulus because of smart digital photography and social media [25]. These basic visual artefacts present low barriers to procurement and can be generated through intervention participants' immediate networks.

### 3.2 Minimal intervention needed for change (MINC)

Given the reality that health and education professionals, as well as their clients, were commonly limited by available resources and time, we adopted the minimal intervention needed for change design [22]. MINC is characterised by low intensity, costs,

**Table 1** Minimal intervention needed for change (MINC) design of serious storytelling with images for interview anxiety

Characteristics	MINC Status	Serious storytelling with images for interview anxiety
Intensity	low	One-hour training with practice. Exposure group has image preparation instruction
Cost and resources	low	Brief training for assessors. Low technology: Exposure group uses images for story preparation in private
Theoretical components	low	Training based on a common interview skills training technique
Complexity	low	Easy implementation for administrator and participant

resources, and complexity of interventions to produce meaningful results for the benefit of reach, effectiveness, adoption, implementation, maintenance, access, and scalability. Following the MINC design, we consider a brief intervention with low technology requirements and can be easily adopted by administrator and participants, as outlined in Table 1. The STAR (Situation, Task, Action, Result) behavioural interview technique commonly used by vocational counsellors, career advisors, and human resources specialists can be incorporated into the serious storytelling training. This approach has been adopted in two case studies previously [43], whose findings informed this randomised control trial.

Anticipating future practice effects, the objective of this study is to detect an initial meaningful difference in reduced interview anxiety by 10% to be 20% in effect size. Based on the MINC design, we seek not drastic changes but quantum improvements, especially for a complex phenomenon like anxiety. Realistic micro-transformations that foster gradual, sustainable, and replicable enhancement mark our approach.

## 4 Method

The central part of the study was a double-blind, randomised control (RCT) to reduce bias and manage imbalance in baseline variables effectively. Participants were allocated into exposure and controlled groups based on a balanced random allocation of anxiety levels. Participants and their interviewers were kept blind to the study design and participant allocation; therefore, the images were only used for private preparation and were not shared among participants or with interviewers. To examine the burden experienced by participants, qualitative data via a participant focus group and written submissions were collected for a deductive thematic analysis of participant's experience of the MINC design. Finally, images that the exposure group participants used for serious storytelling preparation were collected for analysis. This study received ethics approval from Macquarie University Human Research Ethics Committee (reference no. 5201830874476).

### 4.1 Participants

Students ( $n = 87$ ) undertaking a capstone subject at a large Australian university were recruited to participate in this study. The subject was a final year compulsory unit for students in several undergraduate science programs. This subject capped off university studies by facilitating student transition to work and other opportunities. It contained discipline-related

career information literacy learning and an individual interview simulation [45]. The purpose of the simulation was for students to consolidate prior learning and practice articulating graduate capabilities with supporting examples. Students were required to research and identify a targeted opportunity, prepare a mock application, and attend an individual interview. Consent was sought from students to participate in this study and include their interview data for research purposes. Information about the study was provided to the students but the actual intervention (image instruction) was not disclosed. Consent was voluntary and non-consent bore no consequences.

A power analysis was conducted using superiority trials sample size calculation [74]. The null hypothesis was that the treatment was not more efficacious than the control treatment by a statistically relevant amount. Due to the lack of suitable reference statistics from comparable studies, we used a large standard deviation of 30, and an upper limit of a targeted effect size ( $\delta$ ) of 20 for the calculation, with power set to 0.8 and alpha 0.05. This produced a minimum sample size of 27.8 in each of the exposure and control group.

## 4.2 Procedures

All students in this course received the one-hour serious storytelling training incorporating the STAR behaviour interview technique. The training presented serious storytelling techniques for interviews and a range of potential interview questions. Participants consenting to the study took a questionnaire determining their levels of generalised anxiety and career information literacy, which were two important covariates to consider for this study. According to their levels of generalised anxiety (non-case, mild, moderate, and severe), participants were randomly assigned to the exposure and control groups. Both groups received instructions via email about their individual interviews in a week, including a list of potential questions and the requirement of preparing three examples in the STAR format individually. The exposure group participants had an additional preparation requirement of using three images to prepare their stories. These images were intended for participants' private preparation and not to be shared with the interviewers. There was no further guidance on what images to use. One week later, just before the interview simulation, a researcher not involved in the participant allocation and interviews collected images from the exposure group participants. The interviewers took turns to ask three questions from the list of questions presented in the training. Immediately after the interviewers, each participant completed a questionnaire to report their interview anxiety. A debrief session (in-person focus group) with the participants then took place, where participants described their interview simulation experience and preparation. Participants were also invited to provide written feedback.

## 4.3 Measures

### 4.3.1 Measure of anxiety in selection interviews (MASI)

The construct of interview anxiety was defined by McCarthy and Goffin as 'feelings of nervousness or apprehension that are relatively stable within job applicants across employment interview situations' [51]. There were five dimensions to the construct of interview anxiety-performance, behaviour, communication, appearance, and social anxiety. The focus of our study was the widely accepted interview performance anxiety that related to evaluative situations such as test-taking and exams. The interview performance anxiety scale had five items, including feeling nervous about their performance, being overwhelmed by thoughts of

doing poorly, being worried about lower performance than others, being troubled by thoughts of failing to the extent that one's performance is reduced, being worried about not getting the job/opportunity, and being worried about whether one is a good candidate for what they apply.

The other four interview anxiety dimensions (behaviour, social, appearance, and communication) were not our target outcomes because they were comparatively more trait-related than situation related and also because of the constraints of the experimental set up (i.e., communication protocol as well as social setting and expectation were not completely unfamiliar; the dress code of formal attire was not mandated). However, we did not exclude the use of the full set of MASI as it could provide additional information should future researchers consider broadening the scope of the MINC design. The MASI had six items for each dimensionality of interview anxiety, totalling 30 items. Our focus remained the interview performance anxiety due to its specificity to the interview situation and the concern over the outcome of an evaluative situation. A visual analogue scale with the a 100 mm line segment indicating the extent to which participants agreed with the statement was used.

#### **4.3.2 The anxiety scale of the hospital anxiety and depression scale (HADS-A)**

The HADS-A, a brief screening tool commonly used in the public health system where this study took place, determined the participants' levels of generalised anxiety. It contained seven items evaluating respondents' anxiety experience in the past week. Total scores less than eight were considered as none-cases, eight to ten indicated mild anxiety, 11 to 14 were classed as moderate anxiety, and 15 to 21 were cases with severe anxiety. Past reviews of the scale had found satisfactory internal consistency, concurrent validity and case finding ability; therefore, it was considered adequate to use for both the general population and people diagnosed with anxiety [7, 31].

#### **4.3.3 Career information literacy (CIL)**

The participants were recruited from a course containing career readiness development with CIL measurement. The career information literacy posited a person's understanding about themselves and the outside world as a type of information literacy that affected their decision making and goal setting [44]. CIL was an individual's perceived ability to locate, access, interpret, evaluate, and synthesise data to create knowledge for career development. The CIL had 12 items measuring a person's understanding about themselves, their knowledge of the world around them, their reasoning and style of decision making, and the adjustment they made for career transition, across generic (non-discipline), situated (discipline-based), and transformative (trans-discipline) dimensions of career development learning. The same visual analogue scale used to measure MASI in this study was adopted.

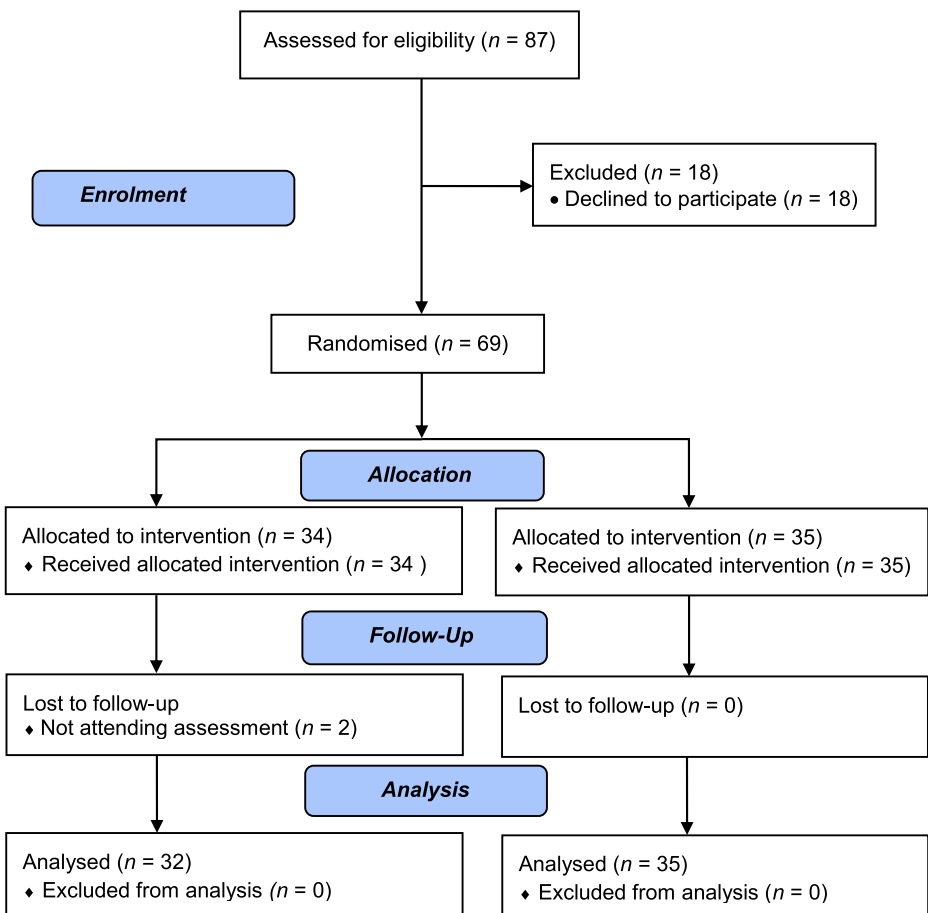
#### **4.3.4 Participant background and previous interview anxiety experience**

Participants identified their demographic and background features (gender, age, work experience, plan upon degree completion). They also reported their previous interview anxiety experience (pre, during, post, and overall) according to the same visual analogue scale method used for MASI and CIL measurements.

#### 4.4 Data analysis

Ordinal regression for continuous responses was the method adopted to analyse the data yielded by visual analogue scales [50]. Analyses were performed in R [15] using the package of ordinalCont [49]. The model included performance anxiety and other dimensions of interview anxiety, including behavioural, communication, social, and appearance anxiety as responses. The predictor of the model was exposure to the intervention of serious storytelling with images, with covariates of previous interview anxiety experience, gender, age, work experience, and plan following degree completion. The effect size of significant predictors is calculated by comparing the predicted outcomes either across levels of categorical predictors (e.g., exposure vs. no exposure) or for a quartile change (median to upper quartile) for continuous predictors, with the other variables fixed at their reference or median value.

A deductive thematic analysis [10, 57] of the qualitative data collections from participants was conducted to uncover their experience of the intervention based on MINC. Images



**Fig. 2** Sampling and flow of participants of a randomised control trial using the participant flow chart following Consolidated Standards of Reporting Trials guidelines (CONSORT) [63]



collected from participants in the exposure group were reviewed with an analytical framework of visual stimuli used in narrative interventions for adult anxiety [42].

## 5 Results

Sixty-nine students consented to participate in this study (Fig. 2). The participation rate of eligible subjects in this cohort was 77%. The subject allocation randomly placed participants on the same HADS-A levels in the exposure group ( $n = 34$ ) and the control group ( $n = 35$ ). Most participants ( $n = 67$ ) completed the training and measurement (97%). Two people in the exposure group did not complete the interview simulation, leaving the final number of 32 in the exposure group, and 35 in the control group.

The majority of the study participants were under 25 years of age (89.55%), had work experience over a year (80.60%), and planned to work upon degree completion (74.63%). The number of participants at various levels of generalised anxiety was comparable between the exposure and control groups. Of all participants, 44.78% were none-cases according to HADS-A, while more than half of the participants (55.22%) had mild (19.40%), moderate (16.42%) and severe anxiety (19.40%). Table 2 summarises the participants' characteristics deemed as covariates.

Table 3 outlines participants' previous overall previous interview anxiety experience, including in the phases of before, during, and after interviews.

Participants' self-reported career information literacy is presented in Table 4. The CIL items indicated the emphases participants placed on the 12 career information literacy learning aspects.

Table 5 outlines interview anxiety results of the focal dimension, namely, performance anxiety, in this study. Results of other dimensions of the MASI are also included. Internal

**Table 2** Number and percentage of participants in exposure and control groups based on gender, age, work experience, plan upon degree completion and anxiety (HADS-A)

Participant characteristics	Exposure ( $n = 32$ )		Control ( $n = 35$ )	
	n	(%)	n	(%)
Gender				
Male	14	(43.75)	12	(34.29)
Female	18	(56.25)	23	(65.71)
Age (years)				
$\leq 25$	29	(90.63)	31	(88.57)
$> 25$	3	(9.38)	4	(11.43)
Work experience (year)				
$\leq 1$	3	(9.38)	10	(28.57)
$> 1$	29	(90.63)	25	(71.43)
Plan upon degree completion				
Work	23	(71.88)	27	(77.14)
Study	23	(71.88)	19	(54.29)
Other	1	(0.03)	6	(17.14)
Anxiety (HADS-A)				
None-case	15	(46.88)	15	(42.86)
Mild	6	(18.75)	7	(20.00)
Moderate	5	(15.63)	6	(17.14)
Severe	6	(18.75)	7	(20.00)

**Table 3** Participants' previous experience of interview anxiety

Previous interview anxiety	Exposure ( <i>n</i> = 32)		Control ( <i>n</i> = 35)	
	M	SD	M	SD
Pre-interview	66.97	33.10	70.06	32.52
During interview	64.78	30.51	61.66	32.28
Post-interview	47.41	31.71	38.77	34.25
Overall	59.72	29.51	56.83	27.85

consistency was found to be very high across the scales of interview anxiety, previous interview anxiety experience, career information literacy, and HADS-A, with Cronbach's alpha ranging from 0.84 (social anxiety) to 0.91 (performance anxiety and HADS-A). For parsimony, scores of items under each interview anxiety dimensions were averaged over each anxiety dimension.

### 5.1 Ordinal regression

Ordinal regression results are presented in Table 6. Exposure to the serious storytelling with images intervention was found to have been associated with reduced interview performance anxiety with an effect size of  $-36.7$ , 95% CI  $[-54.7, -2.5]$ . Generalised anxiety had a positive relationship with social, appearance, and composite interview anxiety. The more severe the generalised anxiety, the more severe a person experienced these dimensions of interview anxiety. Especially for those who had severe anxiety, generalised anxiety influenced their composite interview anxiety (aggregated scores of five dimensions) by an effect size of  $68.0$ , 95% CI  $[7.9, 129.2]$ . In addition, post interview anxiety was associated with increased interview performance anxiety with an effect size of  $7.5$ , 95% CI  $[1.2, 8.9]$ .

**Table 4** Participants' career information literacy (CIL) scores

CIL measure	Exposure ( <i>n</i> = 32)		Control ( <i>n</i> = 35)	
	M	SD	M	SD
Generic-Self	67.28	17.65	63.46	20.31
Generic-Opportunity	65.25	24.25	64.31	23.87
Generic-Decision	64.63	25.14	62.94	25.90
Generic-Transition	60.16	23.55	55.54	29.31
Situated-Self	70.94	14.42	61.17	20.66
Situated-Opportunity	60.91	27.81	62.49	22.66
Situated-Decision	66.28	22.68	62.46	28.59
Situated-Transition	62.22	19.62	52.69	29.25
Transformative-Self	69.97	24.72	73.57	22.28
Transformative-Opportunity	48.09	23.55	51.80	20.72
Transformative-Decision	39.94	28.59	36.60	27.09
Transformative-Transition	52.03	27.25	52.83	31.23

Generic refers to non-discipline specific career development learning. Situated refers to discipline specific career development learning. Transformative refers to trans-discipline career development learning. Each type of career development learning contains personal domains of the self, external domains of opportunity, planning domains of decision making, and action domains of transition

**Table 5** Results of interview performance anxiety scores, including other dimension of interview anxiety (behavioural, communication, social and appearance anxiety) based on the Measure of Anxiety in Selection Interviews (MASI)

MASI measure	Exposure (n=32)		Control (n=35)	
	M	SD	M	SD
<b>Performance anxiety</b>				
In the interview, I got very nervous about whether my performance was good enough	43.00	32.48	51.23	28.26
I was overwhelmed by thoughts of doing poorly when I was in the interview	34.03	30.94	34.43	26.99
I worried that my interview performance would be lower than that of other applicants	36.97	29.46	30.17	23.44
During the interview, I was so troubled by thoughts of failing that my performance was reduced	33.44	27.17	26.54	25.68
During the interview, I worried about what would happen if I didn't get the job/opportunity	40.81	28.23	38.29	30.57
While taking the interview, I worried about whether I was a good candidate for what I was applying	25.88	27.24	31.34	28.97
<b>Behavioural anxiety</b>				
During the interview, my hands shook	32.28	34.48	41.71	33.61
My heartbeat was faster than usual during the interview	58.41	29.60	52.37	31.51
It was hard for me to avoid fidgeting during the interview	38.59	31.74	42.00	28.82
The interview made me perspire (e.g., sweaty palms, underarms).	45.44	33.14	40.74	32.55
My mouth got dry during the interview	49.97	35.94	43.23	34.88
I felt sick to my stomach in the interview	21.59	27.46	23.77	29.54
<b>Communication anxiety</b>				
I became so apprehensive in the interview that I was unable to express my thoughts clearly	42.47	26.85	43.66	28.95
I got so anxious while taking the interview that I had trouble answering questions that I know	46.34	28.30	42.97	29.87
During the interview, I couldn't think of a thing to say	25.31	21.87	25.94	24.16
I felt that my verbal communication skills were weak	38.25	28.51	40.37	28.51
During the interview I found it hard to understand what the interviewers were asking me	14.25	15.67	12.14	15.07
I found it difficult to communicate my personal accomplishments during the interview	38.09	25.08	43.20	25.79
<b>Social anxiety</b>				
While taking the interview, I became concerned that the interviewers would perceive me as socially awkward	23.03	26.08	27.74	31.72
I became very uptight about having to socially interact with the interviewers	17.91	18.40	20.69	22.55
I got afraid what kind of personal impression I was making on the interviewers	30.72	26.87	32.63	28.11
During the interview, I worried that my actions would not be considered socially appropriate	17.50	22.03	16.29	18.52
I worried about whether the interviewers would like me as a person	25.31	24.25	23.74	26.52
When meeting the interviewers, I worried that my handshake would not be correct	21.22	26.24	23.23	29.72
<b>Appearance anxiety</b>				
I felt very uneasy about my appearance when I was being interviewed	20.44	24.24	26.77	26.07
Before the interview I felt so nervous that I spent an excessive amount of time on my appearance	25.00	26.55	20.00	24.15
In the interview, I worried that the interviewers would focus on what I consider to be my least attractive physical features	11.34	13.18	13.69	21.44
I found it hard to relax because I did not look my absolute best in the interview	12.13	14.50	16.66	23.73
I felt uneasy that I do not look perfect when I walked into the interview	14.81	16.11	19.00	23.61
During the interview, I worried about whether I had dressed appropriately	17.13	21.05	22.23	26.15

Most of the other covariates did not produce significant results, except that increased behavioural interview anxiety was found in the exposure group with prior experience of overall interview anxiety (30.3, 95% CI, [5.8, 48.3]) and three types of career information

**Table 6** Effects of covariates on performance interview anxiety, all other MASI interview anxiety dimensions (behavioural, social, appearance, communication) and composite interview anxiety, based on best models for each regression

Interview anxiety	Covariates	Estimate	Std. Error	t. value	p. value	Effect size	95% CI
Performance	Exposure	-2.20	1.02	-2.17	0.048*	-36.7	-54.7, -2.5
	Post-interview anxiety	0.03	0.01	2.16	0.048*	7.5	1.2, 8.9
	Exposure0: Post interview anxiety	-0.02	0.02	-1.53	0.148		
	Exposure1: Overall previous interview anxiety	0.01	0.02	0.73	0.478		
Behavioural	Exposure	-1.66	1.10	-1.52	0.150		
	Anxiety-mild	-0.50	0.58	-0.86	0.406		
	Anxiety-moderate	0.45	0.58	0.78	0.446		
	Anxiety-severe	1.20	0.61	1.95	0.070		
	Exposure0: overall previous interview anxiety	0.00	0.01	0.22	0.827		
	Exposure1: overall previous interview anxiety	0.03	0.01	2.52	0.024*	30.3	5.8, 48.3
Social	Anxiety- mild	1.37	0.62	2.19	0.045*	11.5	1.4, 25.7
	Anxiety- moderate	1.62	0.60	2.69	0.017*	13.5	4.3, 30.2
	Anxiety- severe	1.82	0.62	2.95	0.010*	15.3	5.7, 35.3
Appearance	Anxiety- mild	0.56	0.55	1.00	0.333		
	Anxiety- moderate	1.12	0.64	1.77	0.099		
	Anxiety- severe	1.33	0.59	2.24	0.041*	23.9	2.1, 32.9
Communication	Generic-self awareness	-0.00	0.02	-0.25	0.805		
	Generic- opportunity awareness	0.01	0.01	0.54	0.595		
	Generic-decision making	-0.01	0.01	-0.83	0.415		
	Generic-transition	-0.02	0.01	-1.64	0.115		
	Situated-self awareness	-0.03	0.02	-1.74	0.097		
	Situated-opportunity awareness	-0.01	0.01	-1.19	0.247		
	Situated-decision making	-0.00	0.01	-0.32	0.753		
	Situated-transition	0.01	0.01	0.84	0.409		
	Transformative-self awareness	-0.00	0.01	-0.25	0.809		
	Transformative-opportunity awareness	-0.03	0.01	-2.32	0.030*	-5.4	-9.1, -0.6
	Transformative decision-making	0.02	0.01	2.13	0.045*	3.9	0.4, 7.9
	Transformative- transition	0.02	0.01	2.33	0.030*	5.0	0.7, 8.4
Composite	Anxiety- mild	0.84	0.60	1.40	0.187		
	Anxiety- moderate	1.11	0.61	1.81	0.095		
	Anxiety- severe	1.49	0.65	2.27	0.041*	68.0	7.9, 129.2
	Exposure0: post interview anxiety	0.01	0.01	1.25	0.233		
	Exposure1: post interview anxiety	0.02	0.01	2.02	0.065		

Significance: 0.05 \*\*\*, Effect size at the median value of covariates on visual analogue scale 0–100 for interview anxiety dimensions, 0–500 (aggregated) for composite interview anxiety.

literacy had relatively small effects on communication anxiety. The transformative conceptions of opportunity awareness (identifying non-traditional work) were associated with less communication interview anxiety. But the transformative conceptions of decision making (deciding on non-conventional career paths) and transition (taking critical action to adapt to transitions) were associated with more interview communication anxiety.

**Table 7** Minimal intervention needed for change (MINC) themes of participant feedback

Characteristics	MINC Status	Serious storytelling with images for interview anxiety
Intensity	low	Training was brief. There's room for more practice Participants believed repeated practice would be beneficial
Cost and resources	low	Technology requirement was low No costs to participants No problem sourcing images for exposure group, but some exposure group participants had some difficulty deciding on which image to use
Theoretical components	low	Training technique easy to follow Further information about the technique was freely available online Participants suggested further improvisation to the preparation.: adding script or captions to the images, rehearsing with someone beforehand, verbalising responses by oneself, gaining more life experience
Complexity	low	Easy implementation for administrator and participant

## 5.2 MINC deductive thematic analysis

In total, 33 students participated in the session and 26 written submissions were received. In Table 7, we present findings of participant experience, cognitive burden, and perceived efforts in proportion to effects to check implementation conformity to the MINC design.

## 5.3 Image analysis based on a visual narrative intervention analytical framework

In total, 98 images were submitted by the exposure group. All participants used digital images. No one used hard copy images. Drawing on a recent systematic review consolidating visual stimuli used in narrative interventions for adult anxiety [42], we analysed all the images according to the artefact origin- native or foreign.

Native images originated via the participant's networks, with the participant being an image user possessing a direct relationship with the image creation. These included images taken and artwork created by or for the participant and their networks. Examples can include photos, drawings, paintings or other images of art or record produced or owned by participants or their colleagues, friends, and families. Some native images that participants provided were photos of fieldwork, workplaces, trips, and events. Foreign images were sourced from alien networks with no participant involvement in the image production. Typically, they were photos or clipart downloaded from websites. For example, images of people working together, icons of healthcare, logos, and symbols. They could also be hard and soft copies of third party distributed flyers or printed materials.

**Table 8** Table of image format type and origin (TIFTO) summarising serious storytelling images

Image format type	Origin		Total
	Native	Foreign	
Photo	55 (56%)	29 (30%)	84 (86%)
Clipart	2 (2%)	12 (12%)	14 (14%)
Total	57 (58%)	41 (42%)	98 (100%)

Because the images submitted were all digital images, to determine the source of the images, two independent reviewers viewed the images and conducted reverse image searches online separately to trace the image origins. It was found that 58% of the images were native images and 42% were foreign images. The reviewers also identified the images as photos or clipart. Photos were hard or soft copies of images created using light sensitive methods or materials, electronically or chemically. Clipart was graphic illustrations created manually or electronically. Much more participants were found to have used photos (86%) than clipart (14%) to support serious storytelling. A Table of Image Format Type and Origin (TIFTO) (Table 8) summarises the images.

## 6 Discussion

### 6.1 Effects of serious storytelling with images on interview performance anxiety

Our findings supported the a priori notion that preparing interviewees by engaging them in serious storytelling with images prior to an interview can reduce interview performance anxiety. The intervention of serious storytelling significantly reduced the degree to which participants were affected by interview performance anxiety with an effect size at median value of  $-36.7\%$ . There may be several explanations why the image-based preparation made a difference. As a type of visual stimuli, seeing the images may have relieved interview performance anxiety because images assist memory recall, especially episodic memory (specific event recollection) and flashbulb memory (vivid event snapshots with high emotionality) [61]. The images engage the narrator with the tasks at hand and help the narrator concentrate on the past event; thereby, sticking to the event occurrence and distracting themselves from the fear of the interview. Seeing the images may also have enabled the narrator to externalise thoughts and articulate rich details of the stories. Some of the images are symbolic, which may help internalise meaning constructed from an event; therefore, adding confidence to the storytelling. In preparing the images or deciding which images to use, the storytellers may also attempt rescripting experiences in a different light; therefore, seeing alternative ways of telling the stories before settling on the most advantageous one to use [68]. Post-interview anxiety that participants experienced previously was found to be associated with interview performance anxiety. This suggested that a risk of future interview anxiety existed based on how a person felt after an interview.

### 6.2 Effects of covariates on other dimensions of interview anxiety

We did not find any intervention effects on the other interview anxiety dimensions that we did not target (social, behavioural, appearance, and communication), but the results uncovered several covariate effects on those dimensions of interview anxiety which were worthy of reporting. Anxiety affected the social, appearance, and composite interview anxiety of the participants (Table 6). Severe generalised anxiety has a strong association with the composite interview anxiety (all five dimensions). Previous overall interview anxiety was associated with increased behaviour interview anxiety for those who had the image-based intervention. It was likely that even when the interview performance anxiety was reduced, those who had previous anxious interview experience still experienced behavioural anxiety because the underlying autonomic arousal mechanism was stimulated by the images. Given that adrenaline-fuelled bodily experiences had the potential to make or

break performances [18, 53], it would be worthwhile for follow-up studies to investigate the relationship between interview anxiety and performance.

Small effects of CIL on communication anxiety were found. Although the transformative CIL regarding opportunity awareness (opportunity awareness transcending discipline boundaries) seemed to have been associated with less communication interview anxiety (nervousness about verbal and nonverbal communication skills), transformative CIL regarding decision making (think outside of the box) and transition (challenge one's existing thinking and take critical actions) were associated with more communication interview anxiety. This might indicate that the abstract nature of these career conceptions presented more challenges to communicate in interview settings. However, the small effect sizes on the observed scale prohibited speculation or further interpretation.

### 6.3 Serious storytelling with images intervention design and applications

For many participants, the interview simulation was their first formal interview experience. Most participants felt that even with the training, they were still over-anxious, underprepared, and needed more practice. If the other more trait-based dimensions of interview anxiety are targeted, a MINC with longer exposure, or more intensity and practice, would most likely be required.

*To be honest, this interview is my first interview. I have never had any experience in entering a job and interviewing. I think this training helped me build my own confidence and also introduced me to the environment that the interview represents. What I have learned from this exercise will benefit me in the future as I have learned how to control my nerves while talking to the interviewers as stress is the main problem that the person can encounter while talking in front of people. Therefore, practicing this will help me to keep calm and be confident.*

- Participant 19

For the participants, the interview simulation itself was part of the intervention, not just an outcome measurement. Although the interview simulation was anxiety-inducing and many participants said they dreaded it, their feedback contained an honest appreciation of this experience.

*As someone with pretty intense social anxiety, I knew that this mock interview was going to push me mentally and physically. I absolutely dreaded it, because I knew there was no way I could appear confident even if I practiced what I was going to say 1000 times... The simulation should be continued for future students. Although stressful and I wish I didn't have to do it, I know that I've definitely gained skills that will help me in the future. It's only with practice that I'll have any chance of feeling more comfortable in that situation.*

- Participant 60

The results support the MINC design of the one-hour instruction and practice followed by the preparation of three images. As per Table 7, the MINC status was low for the criteria regarding intensity, costs and resources, theoretical components, and complexity. Participants felt more effects could be achieved with more work required of the participants such as scripting, more

rehearsals, verbalise responses, etc. The training itself, which both the exposure and control groups received, was beneficial. However, the image instruction that the exposure group received helped retain memory of specific events.

*The instructions of using 3 images of what I will be talking about to answer the possible interview questions...I believe that this is a good technique to remember specific scenarios .... This is something I have not done for previous interviews but this is something I aim on doing for future interviews I will attend.*

- Participant 43

## 6.4 Serious storytelling images

Although the number of images gathered for this intervention was small, we presented an initial analysis within the scope of this study. Our aim was to identify relevant characteristics of current images to guide future image collection. Distinguishing image origins (native or foreign) and image formats (photos and clipart) illustrated the participants' image choices and behaviours. This would have implications for instructional design, technology development, and visual data mining based on image storage formats (bitmap and vector) [20]. We found that participants, without any restrictions on the type of images to use, chose to use their own images mostly (58%) and photos (86%). The images used according to the TIFTO in descending usage order were native photos (56%), foreign photos (30%), foreign clipart (12%), and native clipart (2%). Although clipart images existed in abundance online, they only accounted for 14% of images participants used in this study. This suggested that most participants were realistic image users as opposed to symbolic image users. More users preferred images with concrete details for serious storytelling. This may also mean that people might already have habitually taken photos of significant experiences and had easy access to the photos via smart devices technologies or cloud storage. If this was the case, e-portfolio or other employability curative technology developers could anticipate technology requirements to accommodate this user behaviour. It was also possible that events with photos were more likely to be recalled; therefore, the memory retrieval or remembrance of significant events was biased. To understand this, large quantities of images could be accumulated for analysis and more characteristics may be used to classify the images.

## 6.5 Limitations

There are several significant limitations to this study. Because the RCT prioritises internal validity, high caution should be taken in generalising the findings to other cohorts or circumstances. The study was also set up to focus on performance interview anxiety; therefore, the results of other dimensions of interview anxiety should be reviewed in light of future relevant studies. Another limitation is that despite participants' nervousness, the interviews were still simulations, not actual selection interviews. Most importantly, it is possible that the differences detected were results of extra preparation. To verify this, future studies using a placebo group should be conducted. Limitations based on the MINC design also existed. The interval between the training, intervention and the interview simulation was one week; therefore, it was unclear how long the effects would last. Further research questions can be raised to see the effects of repeatedly practice, or an interval of more or less days.



We acknowledge that other visual stimuli may be of use to serious storytelling and do not claim superiority of visual narrative interventions over other interventions. This study also does not evaluate different visual stimuli. Visual artefacts have been deployed in other studies addressing adult anxiety, such as virtual reality and videos; therefore, there is potential to explore effects from different visual methods [42]. We do note that these visual stimuli usually require more technical ability and set-up on the part of participants and the intervention administrators than the image-based intervention in this study. We have chosen a basic form of visual artefacts- images for our MINC design to meet the requirement of low threshold of technical abilities and mitigate side effects reported in previous studies [42]. However, the growing popularity of story-based content would mean different interventions involving serious games, immersive virtual reality, and videos are worthy of exploration [14, 64]. Future studies involving diverse visual methods may help determine the effectiveness of different serious storytelling applications.

## 6.6 Significance

This study makes several contributions to visual narrative intervention research. Theoretically, it brings visual narrative interventions and media enhanced technology together via serious storytelling. Technology-mediated interventions have benefits of scalability and data analytics for narrative methods. Over time, with the accumulation of serious stories, further analysis can be performed on the content, course, content, and channel of serious storytelling as proposed by Lugmayr et al. [46]. Conceptually, the study also addresses the lack of distinction between a person's ability to work and a person's ability to secure work. Anxiety is the most prevalent mental health concern amongst working age people [67]. Understanding its relationship to performance and potential interventions for interview anxiety may reduce barriers to accessing employment and other opportunities.

Methodologically, the study strengthens the evidence for visual narrative interventions through the most rigorous study design. The double-blind RCT removes bias and volunteer effects. The gap between the intervention and assessment is one week; therefore, the effects of history and maturation are minimised. Practically, the study demonstrates the effects of an intervention based on the MINC approach, which is administrator and client-friendly. It also provides much needed evidence base for the popular STAR technique, used by vocational counsellors, career advisors, HR trainers, hiring managers, and recruiters regularly.

## 6.7 Future directions

Managing interview anxiety concerns health and rehabilitation practices, as well as career guidance in vocational and tertiary education. Findings from this study may inform developments of rehabilitation technologies (RT) and learning technologies (LT). RT has been shown to significantly improve employment outcomes via body function restoration and environmental adjustments [66]; however, it can do more in the provision of psychotherapeutic aid [55]. Assistive devices and services may be used for people with mental and physical disabilities in the interrelated areas of education, rehabilitation, and employment. In LT, products aiming to enhance users' employability already exist. E-portfolios, for example, are used to visually capture employability evidence. This study provides evidence of potential effects from visual evidence that could be used in applications such as e-portfolios. If e-portfolio adopts a design based on visual narratives, it may serve as more than a passive record

but an active storytelling device. Findings from this study indicate a clear participant preference of photos (86%), which supports previous visual methods in addressing anxiety in adults, including photo elicitation, photo walkabouts, photovoice, and photo-self narrative [42].

In time, techniques such as content-based image retrieval and object recognition may be invested to examine the relationship between the images used and the consequent narratives. Research questions may be posed to uncover if there is an association between features of the images and elements of the narratives. Narratives are the product of information recall and meaning reconstruction. As image retrieval and analysis techniques mature [6, 36, 37, 65], questions may be posed to examine the relationship between the types of images and the memories they evoke or represent. Further intervention may then be conceived to enhance the strengths of image-based interventions. Novel ways to link media, memory, mental states (such as anxiety), and narratives may be conceived. In turn, the classification of images and their metadata may be re-evaluated.

## 7 Conclusion

The present investigation is impelled by a need to harness the ever-growing media technology in everyday life to reduce barriers and fulfill human potential. As a media genre, serious storytelling with images lends itself to visual narrative applications in health and education. The use of images has already been applied in health and education technology for various purposes. The question for visual narrative intervention research is if the visual adds value to narrative intervention in ways that the textual or verbal cannot. We use the case of interview anxiety to establish effects of visual stimuli on narrative interventions. We ask if having the images before interviews reduces performance anxiety. In other words, is seeing associated with relieving? Results from the double-blind RCT established that the imagery-supported intervention was associated with relief of interview performance anxiety.

Interview performance anxiety is an under-researched area that can have significant impact on interviewees' career success. Visual narrative interventions offer potential avenues to address this issue from both health and education-based practices. Given the high level of anxiety among participants in this study (55.2% with mild to severe generalised anxiety according to the HADS-A) and the anxiety statistics reported on university students and the general population [2, 4], we suspect that many people are at risk of interview anxiety. There is potential to use media technology to address this issue. Further studies using different methods, cohorts, and visual stimuli may add to the repertoire of serious storytelling, so that media technology and applications can be optimised to improve productivity and efficiency in health, education, and other applicable areas.

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## Declarations

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