

Tourism destination advertising: effect of storytelling and sensory stimuli on arousal and memorability

Jianyu Ma, Noel Scott and Yu Wu

Abstract

Purpose – Tourism destination marketers use videos that incorporate storytelling and visual and audio components to evoke emotional arousal and memorability. This study aims to examine the increase in participants' level of arousal and the degree of memorability after watching two different videos.

Design/methodology/approach – A quasi-experimental study was conducted with 45 participants who watched two destination promotional videos. One video used storytelling whereas the other used scenic images and music. The level of arousal was measured using both tonic and phasic electrodermal activity levels. The memorability of each video was measured after seven days by testing the recall accuracy.

Findings – Scenic imagery and music videos were associated with higher-than-average arousal levels, while storytelling videos generated larger-amplitude arousal peaks and a greater number of arousal-evoking events. After a week, the respondents recalled more events from the storytelling video than from the scenery and musical advertisements. This finding reveals that the treatment, storytelling and sensory stimuli in advertising moderate the impact of arousal peaks and memorability.

Originality/value – These results indicate that nonnarrative videos using only sceneries and music evoked a higher average level of arousal. However, memorability was associated with higher peak levels of arousal only in narrative storytelling. This is the first tourism study to report the effects of large arousal peaks on improved memorability in advertising.

Keywords Arousal, Advertising memorability, Electrodermal activity (EDA), Scenery and music, Storytelling, Tourism destination advertising promotion

Paper type Research paper

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旅游目的地广告—故事类和感官刺激对情绪唤醒度和记忆的作用

目的: 旅游目的地常通过感官刺激或故事类广告, 唤醒情绪、加深印象, 吸引潜在游客。本研究旨在发现这两类广告对情绪唤醒度和记忆的不同影响。

设计: 研究采用准实验法, 45名被试观看故事类和由风光、音乐元素构成的感官刺激类旅游目的地视频广告。同时, 使用皮肤电传感器记录即时的情绪唤醒度, 包括全过程均衡值, 和外部刺激事件相关的峰值。以实验七天后的回忆准确性来衡量记忆水平。

结果: 结果显示虽然感官刺激类广告从整体上能激发更高的皮肤电均衡值, 但故事类能激发更多事件相关的峰值, 且峰值变动幅度更大。七天后故事类广告中激发皮肤电峰值的场景与回忆准确性相关, 感官类广告激发峰值的事件与回忆准确性无关。故事类场景激发情绪的场景更容易纳入长期记忆。因此, 广告类别可以视作调节变量, 调节了广告的情感唤醒对长期记忆的影响。

原创性: 本研究发现风光和音乐构成的感官刺激类(非叙事类)广告虽然能激发总体的情绪唤醒度, 但广告记忆度与情绪唤醒的峰值相关, 且在叙事类广告中表现更明显。这是旅游研究中首次报告情绪唤醒度峰值对广告记忆度的作用。

关键词 情绪唤醒度; 广告记忆; 皮肤电反馈(EDA); 风光与音乐类视频广告, 故事类视频广告; 旅游目的地广告促销

文章类型 研究型论文

Received 5 July 2022
Revised 14 October 2022
19 February 2023
28 April 2023
12 July 2023
Accepted 13 July 2023

Funding: Faculty Research Grant by Shanghai Institute of Tourism, Shanghai Normal University.

Publicidad de destinos turísticos: Efecto de contar historias (storytelling) y los estímulos sensoriales sobre la excitación y la memorabilidad

Objetivo: Los anunciantes de destinos turísticos utilizan vídeos que incorporan la narración de historias o el storytelling y componentes visuales y sonoros para evocar la excitación emocional y la memorabilidad. Este estudio examinó el aumento del nivel de excitación de los participantes y el grado de memorabilidad tras ver dos vídeos diferentes.

Diseño: Se realizó un estudio cuasi experimental con 45 participantes que vieron dos vídeos promocionales de destinos. Uno de los vídeos utilizaba la narración de historias (storytelling), mientras que el otro empleaba imágenes escénicas y música. El nivel de excitación se midió utilizando los niveles de actividad electrodérmica tónica y fásica (EDA). La memorabilidad de cada vídeo se midió al cabo de siete días comprobando la precisión del recuerdo.

Resultados: Las imágenes escénicas y los vídeos musicales se asociaron a niveles de excitación superiores a la media, mientras que los vídeos narrativos generaron picos de excitación de mayor amplitud y un mayor número de eventos evocadores de excitación. Al cabo de una semana, los encuestados recordaban más acontecimientos del vídeo de narración que de los anuncios de paisajes y musicales. Resultados que revelan que el tratamiento, la narración o storytelling y los estímulos sensoriales de la publicidad moderan el impacto de los picos de excitación y la memorabilidad.

Originalidad: Estos resultados indican que los vídeos no narrativos que sólo utilizan decorados y música evocaron un nivel más elevado de excitación. Sin embargo, la memorabilidad se asoció con niveles máximos de excitación más elevados sólo en la narración de historias o storytelling. Éste es el primer estudio sobre turismo que informa de los efectos de los grandes picos de excitación en la mejora de la memorabilidad en la publicidad.

Palabras clave Excitación, memorabilidad publicitaria, actividad electrodérmica (AED), paisaje y música, narración, promoción publicitaria de destinos turísticos

Tipo de papel Trabajo de investigación

Introduction

Tourism destination advertising (TDA) is used to communicate new information, appeal to potential tourists, change attitudes toward a particular tourist destination, and increase the probability of a purchase decision while planning for a holiday (Park *et al.*, 2013). TDA can also be used to influence visitor spending on specific aspects of trips (de Souza *et al.*, 2020). However, potential tourists are exposed to numerous advertisements, making the memorability of a specific message over the long term very important. Thus, understanding the determinants of advertisement memorability is critical for improving advertising effectiveness (Guo and Zhu, 2023).

There is extensive literature on the role of affective responses and arousal in advertising memorability (Poels and Dewitte, 2019). Both marketing and tourism researchers have found that arousing advertisements “have a memory advantage” (Bakalash and Riemer, 2013, p. 276). Bolls *et al.* (2001) found that the arousal level of a message is a better predictor of memorability than its valence. Similarly, Rothschild and Hyun (1990) proposed that an advertisement’s level of arousal, rather than an aggregated overall assessment, predicts memorability. However, the majority of tourism studies examine the overall levels of arousal during exposure to stimuli but fail to capture their fluctuations and arousal peaks. This may be attributed to difficulties in collecting data. The associations between arousal peak and memorability of specific stimuli require further elaboration in studies on TDAs.

Destination marketing organizations commonly use scenery, music or storytelling to design promotional videos (Kim and Youn, 2017; Pan and Hanusch, 2011). Scenery and musical advertisements combine visual and audio stimuli, such as pictures, texts and music, to evoke pleasurable responses (Agapito *et al.*, 2014), arouse feelings in the viewer (Alpert *et al.*, 2005) and attract attention (Kim *et al.*, 2014). Typically, they do not include narratives. A video with attractive scenery and congruent background music is emotionally arousing, and can be associated with a brand or destination (Fraser, 2014). However, storytelling (narrative) facilitates immersion, empathy, attention and viewer interest through narrative plots involving attractive characters (Woodside *et al.*, 2008). Such stories can lead to mental transportation and narrative persuasion – a distinctive mental process that involves attention, mental imagery and emotions (Green and Brock, 2000). Narrative transportation requires the activation of

working memory (Gordon *et al.*, 2018). Therefore, both types of advertising (scenery and music or storytelling) evoke affective responses, but differ in the activation of working memory, immersion, attention and interest.

This study examined how these different types of destination advertising vary in their impact on memorability. Moment-to-moment arousal peaks during exposure to advertisements were measured using electrodermal activity (EDA). The EDA, a technique for measuring real-time arousal, outperforms questionnaire surveys in terms of reliability and validity (Li *et al.*, 2015). This technique allows a particular event or appeal in videos to be matched to the arousal peak as measured by the phasic EDA level. The impact of arousal peak on the memorability of corresponding event can then be elaborated.

Literature review

Impacts of arousal on advertisement memorability

Emotions are often described in terms of valence (positive or negative) and level of arousal (Russell, 1980). Poels and Dewitte (2019) distinguish between higher- and lower-order advertisement-evoked emotions. Higher-order emotions include hope, fear and anger and are elicited by a cognitive appraisal of goal relevance, leading to conscious attention. Lower-order emotions involve spontaneous and largely uncontrollable emotional reactions without conscious involvement and are normally defined by the dimensions of valence and arousal. Arousal, which indicates emotional intensity, is a physiological and psychological state. This change occurs in response to different stimuli, such as advertisement messages (Kim *et al.*, 2014), although in most cases, viewers may not be consciously aware of this (Vakratsas and Ambler, 1999).

The memorability of an advertisement refers to viewers' long-term recall of advertised destination attributes and is an indicator of its effectiveness in influencing future behavior (Shen *et al.*, 2021). Memorability has been found to be a better predictor of market share than other marketing indicators (Berain, 2013) because of its direct influence on purchase decisions and brand reputation (Can *et al.*, 2020). This empirical study aims to capture emotional arousal and confirm its impact on advertisements' memorability, especially its specific appeals or designed events.

Studies assessing the effects of emotional valence and arousal on memory have revealed that only arousal has a stable effect on the memorability of advertisements (Bradley *et al.*, 1992). A higher level of arousal that increases the vividness of recollection is more strongly experienced in memories (Ochsner, 2000, p. 242). Moreover, arousal occurs automatically and improves the speed of information accumulation in the memory (Maljkovic and Martini, 2005). This is partly because high arousal triggers the amygdala and hippocampal complexes, which activate long-term memory (Phelps, 2004). In marketing literature, arousal evoked through immersion in an advertisement is more likely to affect product or brand memorability (Escalas, 2004). It also affects travel experience memorability during a trip.

Tourism literature has noted the effects of arousal on memory during experiences in a destination, but has not examined its effect on tourism advertising. For example, Şahin and Güzel (2020) examined the experiential attributes of a destination such as localness, novelty and facilities, and found that arousal improved post experience memorability. Li *et al.* (2022b) found that arousal mediated the relationship between destination atmosphere and memory in a night tourism experience.

Previous studies on arousal in advertisements and tourism have mostly discussed the overall levels of arousal during the entire experience without capturing arousal peaks. Wang *et al.* (2020) proposed the possibility of establishing linkages between optimal arousal and certain stimuli in future studies after they confirmed the mediating effects of arousal levels between environmental stimuli and tourist experiences using respondents' self-reported levels of overall arousal throughout the trip. Thomsen and Heiselberg (2020) examined audiences' arousal responses to film trailers and suggested that if there are few variations in arousal levels during

film watching, audiences will become habituated to the stimuli and their effects on memorability decrease over time. They argue that film producers should purposively select information to create arousal peaks for the information to be retained. Inspired by such research on film design, this study focuses on arousal peaks and their effects on the memorability of certain stimuli in the TDA instead of overall arousal levels, as an extension of studies on the psychological effects of advertisements in tourism literature.

Furthermore, the effects of arousal peaks on memorability may vary among TDAs. For example, when audiences are highly engaged with narrative videos, their attention, working memory and emotional arousal change synchronously (Gordon *et al.*, 2018). In contrast, audiences may rely more on cognitive assessment, but not affective responses, to memorize information when engaging in factual or expository ads (Dessart, 2018). Therefore, the correlation between arousal peaks and stimuli memorability is further studied in different types of TDA using storytelling and factual stimuli.

Storytelling versus sensory stimuli and their impacts on the correlation

Storytelling advertisements, also known as narrative advertisements, use plots, characters, stories and so on to communicate experiential benefits to potential consumers (Yang and Kang, 2021). A well-designed storytelling advertisement can be engaged because of its drama (Kasilingam and Ajitha, 2022), capturing and holding attention (Kılıç and Okan, 2021) and creating empathy for its characters (Morris *et al.*, 2019). Viewers who empathize with characters feel the same emotions as the characters in the story (Gordon *et al.*, 2018; Yang and Kang, 2021). Narrative advertising is likely to evoke more intense emotional responses because of immersion in the story.

Researchers studying the effects of narrative ads have identified this phenomenon as “transportation.” In narrative transportation, the story format encourages the audience to become immersed (Kang *et al.*, 2020). When immersed in an advertisement, viewers engage in intense image processing (Kim *et al.*, 2014; van Laer *et al.*, 2014). Here the viewer “sees” a mental image of the events depicted in the story (Le *et al.*, 2019). These images were then appraised, leading to the elicitation of more arousing emotions. Therefore, narrative transportation leads to an arousal reaction directly related to a particular place, such as a tourism destination.

Studies have confirmed the association between stories and arousal in various contexts, especially events in stories and their corresponding arousals. Morris *et al.* (2019) found that in climate change communication, stories outperformed factual advertising in engaging viewers, evoking more fluctuations in arousal, and inciting proenvironmental behavior. In an electrocardiogram experiment, Gordon *et al.* (2018) found that social marketing advertisements advocating energy efficiency via stories were emotionally arousing and led to energy-saving behaviors. They confirmed that stimuli at the start of narrative advertisements simultaneously elicited higher arousal, attention and working memory. In the context of tourism, the emotional outcomes of storytelling advertisements are usually studied based on their overall impact on behavioral intention. For example, a storytelling video with an interesting plot leads to intention to visit a tourism destination (Moin *et al.*, 2020), due to greater emotional engagement (Chronis, 2012); the understanding of event-evoked arousal peaks in storytelling TDAs inspired their creation.

In tourism, the main alternatives to narrative advertising are factual or nonnarrative advertisements that use a series of sensory stimuli, such as attractive scenic images and music. Such factual advertisements evoke emotional arousal, largely through background music. In research settings, music can trigger arousal without conscious attention (Coan and Allen, 2007; Halko *et al.*, 2015). Hadinejad *et al.* (2019) found that tourism advertisements with music evoked higher emotional arousal than those without. Neuroimaging experiments have indicated that music activates brain network including the amygdala and the hippocampus, which are related to the regulation of emotions (Koelsch, 2014).

Advertising studies have found that the music type affects arousal as well. Music with a rising or falling pitch creates a greater variation in arousal levels (Fernández-Prieto and Navarra, 2017). Music congruent with advertising messages leads to higher arousal and increased behavioral intention (Yang et al., 2021). Similarly, the tempo and genre of music have significant effects on arousal changes as measured by skin EDA (Dillman Carpentier and Potter, 2007) regardless of product familiarity. Few studies have been conducted on the effect of music on arousal in tourism advertisements (Pan and Hanusch, 2011).

The above discussion indicates that advertising stimuli using either stories or sensory stimuli (especially music) can elicit emotional arousal. This study further compared the effect of the two types of stimuli, storytelling versus sensory (including scenery and music), on arousal levels, especially arousal peaks and long-term memory (see H1 and H2). TDA using sensory stimuli is perceived as pleasant and arousing but may not evoke mental imagery or create empathy; therefore, it is less likely to create better stimuli memorability (Green and Brock, 2000) (see H3). The arousal from advertisements was evaluated using physiological measures. Thus, this study provides an empirical comparison of the effects of storytelling and nonnarrative advertisements (scenic and musical) on the association between arousal peaks and memorability (see Figure 1):

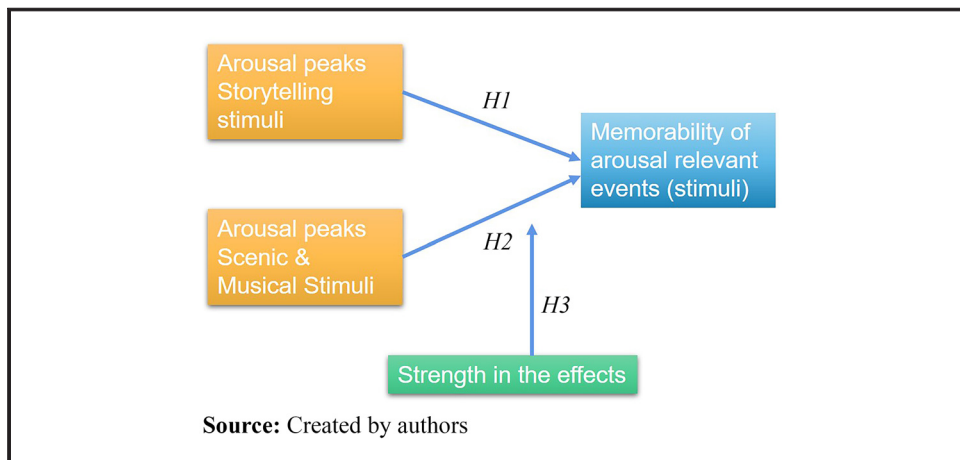
- H1. Arousal peak is significantly correlated with the memorability of the corresponding stimuli in storytelling TDAs.
- H2. The arousal peak significantly correlates with the memorability of the corresponding stimuli in scenery and music TDAs.
- H3. The correlation between arousal peaks and memorability varies significantly between storytelling and, scenery and music TDAs.

Methodology

Sample and sampling

Forty-five Chinese students (23 females and 22 males) from Shanghai Normal University participated in this study in October 2020. Participants were recruited by sending requests to newly enrolled master’s students (aged 22–23 years) who had not been to Shanghai before school registration (verified by their ID number and self-reports).

Figure 1 Conceptual framework of the study



Small samples are common in psychophysiological methods because they generate large amounts of real-time data, allowing statistical analyses to determine significant changes in within-subject measures. This allows the identification of advertisement-evoked arousal and its effects on long-term memory for specific respondents but does not allow generalization of results to the wider population (Wang and Sparks, 2016).

Instruments to measure arousal peaks and memorability

In tourism studies, three main techniques are used to measure arousal (Hosany *et al.*, 2021): self-reported responses using questionnaires and scale items, qualitative responses, such as those used in ethnographic studies and psychophysiological techniques such as EDA (Caruelle *et al.*, 2019), cardiovascular measures (Li *et al.*, 2012), respiration (Baumgartner *et al.*, 2006) and pupil diameter (Jerčić, 2019) (see Appendix 1 for a detailed summary). Each has its own strengths and weaknesses, and appropriate techniques were determined according to the purpose of the study. Psychophysiological methods provide real-time data and measure unconscious responses (Li *et al.*, 2015, 2018) because they reflect changes in the autonomic nervous system. Such methods can avoid recall bias compared with self-reported arousal (Ravaja, 2004).

EDA measures changes in the electrical conductance of the skin. When an arousing stimulus is experienced, the eccrine glands of the skin produce sweat, which increases their ability to conduct currents (Caruelle *et al.*, 2019, p. 147) and changes in the electrical properties of the skin can be measured (Scheirer *et al.*, 2002). EDA responses are typically measured based on the changes in skin conductance (Caruelle *et al.*, 2019). The EDA signal can be decomposed into the tonic and phase components. Tonic skin conductance levels (SCLs) are indicators of a participant's background arousal levels. Phasic skin conductance responses (SCRs) are rapid increases in skin conductance related to discrete stimuli (Benedek and Kaernbach, 2010). This study used SCRs to measure and compare phasic arousal levels to identify arousal peaks and arousal-evoking events in advertisements.

To record EDA data recording and detect SCR, a Grove SCR Sensor produced by Seeed Studio, Shenzhen, China, was used to record skin conductance in microsiemens (μS) at 30 Hz. An SCR response to an event was determined if the phasic peak had an amplitude greater than 20 μS (Braithwaite *et al.*, 2013) and occurred between 1 and 4 s after the event onset (Reimann *et al.*, 2012).

The memorability of advertisements is commonly measured using the indicators of recall and recognition. Recognition measures are used to examine how the advertised objects are perceived, while recall tends to "capture the deeper processing of advertisements" (Shen *et al.*, 2021, p. 2540). There were no significant differences between them when evaluating advertising effectiveness (Weibel *et al.*, 2019). This study uses recall accuracy to test the memorability of the advertised attributes. A phone interview was conducted seven days after the video exposure. The participants were asked to describe the scenes they remembered from the two videos. These responses were matched to the events depicted in one of the two videos (Zhang *et al.*, 2018).

Procedure

This study used a within-group quasi-experimental design to explore the arousal elicited by two TDAs, avoiding differences between groups in terms of age, sex and ethnicity, which can affect EDA (Boucsein *et al.*, 2012).

Two videos produced by the Shanghai Municipal Administration of Culture and Tourism to promote Shanghai as a tourist destination were selected as stimuli for the experiment. Two videos from Shanghai were selected to ensure similar cognitive involvement by subjects (Dawson *et al.*, 2011; Kroeber-Riel, 1979). In addition, the arousing events in the two videos

were separated by sufficient time intervals to determine the effects of specific SCR responses. Previous studies have found that the latency period to a response peak is between 1 and 4 s, with a recovery half-life of 1–3 s (see Figure 2) (Benedek and Kaernbach, 2010). By selecting a video that produced nonoverlapping SCRs, decomposition analysis to detect overlapping SCRs was avoided. The two videos originally differed in length, but were edited to have the same duration (see Appendix 2 for details). Two minutes of relaxing music was inserted before each video to allow the respondent to return to their baseline arousal level. A pilot test was conducted with 18 participants (16 females and 2 males) to categorize the two videos as scenery and music or storytelling advertisements by filling out a questionnaire after viewing.

The experiment was conducted in a quiet, temperature-controlled laboratory environment. The participants were first informed of the experimental procedure and asked to sign a consent form. Next, they were asked questions regarding demographic information (age, sex and education), which was their dominant hand, and their previous experience visiting Shanghai. The SCR sensor electrodes were fitted to the middle and ring fingers of the nondominant hand, with instructions to rest the hand on a desk during the experiment. Participants then viewed the two videos in a randomized sequence. They then completed a follow-up survey one week later. To avoid recall bias, the participants were not informed of the purpose of the follow-up survey.

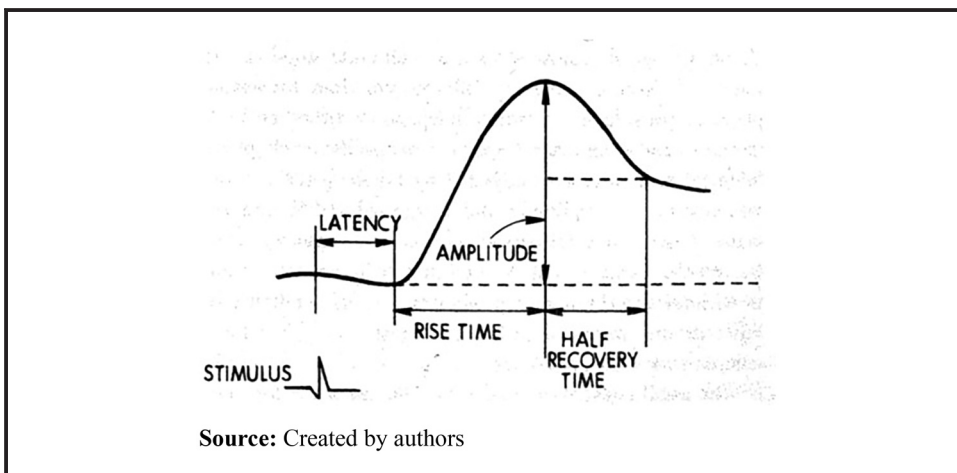
Data analysis methods

Both the SCL and SCR data were collected using Arduino microprocessor-based software and exported to Microsoft Excel for analysis. SCLs were treated as the average level of the subject's SCL over the entire experiment for reference. The total SCRs for each participant was computed as the average amplitude of each SCR identified in one video (Bettiga *et al.*, 2017; Lajante *et al.*, 2012; Ohme *et al.*, 2009). The events in each video associated with the SCR peaks were identified. The memorability of each event was calculated as the natural logarithm of the odds ratio between the proportions of accurate and inaccurate memorability. Logistic regression was used to determine the correlation between an event's average SCRs and memorability (Missaglia *et al.*, 2017). The formula used is as follows:

$$\ln\left(\frac{p}{1-p}\right) = z = \sum b_i x_i$$

p is the proportion of subjects who remembered a certain scene;

Figure 2 An example of the components of an ER-SCR (taken from Dawson *et al.*, 2011)



x_i is the mean of amplitude values of SCRs among the subjects; and
 b_i is the correlation coefficient between SCRs responses and long-term memory.

Results

The 45 participants' individual SCLs values were calculated for both videos (see Figure 3). The average SCL level for the scenic and musical video (311 μ S) was higher than that for storytelling video (292 μ S).

The analysis of SCRs was conducted only for 43 subjects because participants No. 25 and 26 produced no qualified SCR's for either video and were removed from the sample set. The events identified by SCRs were named based on the main characteristics, and the speed of music playing was categorized as slow, medium or fast tempo, its transcripts, and the total number of SCRs it elicited (see Tables 1 and 2).

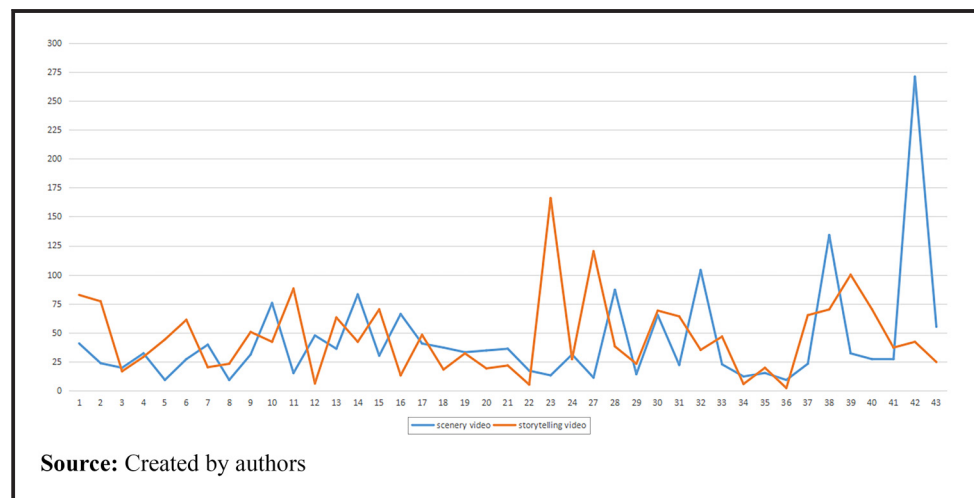
The storytelling videos generated 437 SCRs from 43 subjects, whereas the scenic and musical videos elicited 369 SCRs. The average SCR amplitude was 38 (μ S) for the storytelling video and 31 (μ S) for the scenic and musical videos. The storytelling video had higher and more numerous arousal peaks than the scenery and music advertisements (see Figure 3).

The correlation between the peak arousals and the memorability of arousal-evoking events was significant for the storytelling video ($b = 0.339$, $p < 0.05$), but not for the scenery and music videos ($b = -0.186$, $p = 0.144$). This finding suggests that events that evoke arousal in scenic and musical videos do not evoke strong memorability. However, arousing events in storytelling videos create stronger memorability. Therefore, $H1$ is supported for storytelling TDAs but $H2$ is rejected for scenic and musical TDAs. $H3$ is supported. The treatments, storytelling versus sensory stimuli of the TDA, moderated the impact of the arousal peaks on memorability (Table 3).

Discussion and conclusion

This study seeks to determine whether storytelling (narrative) advertisements have a greater effect on arousal peaks and memorability than nonstorytelling (scenery and music) advertisements. The results indicate that narrative stimuli evoke more event-specific arousal peaks through increased attention and cognitive immersion than nonstorytelling stimuli. A similar result was found when comparing storytelling versus factual ads about climate change,

Figure 3 Participants' average values of SCRs for the two videos



Source: Created by authors

Table 1 Shots/musical information and SCRs events in the scenery and music video

No.	Shots' information	Time duration seconds	SCRs events	Musical tempo
1	Temple sunrise	1–4	11	Medium speed
2	Water town mud figures	22–25	12	motion with Chinese
3	Shanghai style dumpling ready to serve	30–33	12	Flute as BGM
4	Candy calligraphy	34–41	12	
5	The Buddhism temple	42–45	10	
6	Traditional handicraft	46–49	13	
7	The Taoism temple	58–67	20	
8	Scenery changed to modern architectures with music tempo change	69–74	15	Medium to fast speed
9	Young people working on city graffiti	75–81	10	
10	Old style motor cycle riding on downtown road	83–87	16	
11	The Catholic Church	101–107	10	
12	People in Shanghai traditional lanes with rapid shots changes	108–115	22	Fast speed with vivid tempo
13	The magnificent hotel	116–120	12	
14	The yachting club	121–125	9	
15	The sunset on the river	126–135	26	Slow speed
16	The lightening up of Pudong Lujiazui financial zone	136–139	9	Fast speed medium to fast speed
18	Fireworks and overview of the city skylines	156–157	19	Fast speed with vivid tempo
20	Ending	175–179	12	Slowing down

Source: Created by authors

because embedding information in a story structure “facilitate experiential processing, heightening affective engagement and emotional arousal” (Morris *et al.*, 2019, p. 19).

The results also indicate a relationship between narrative advertisement events that evoke stronger arousal and stronger memorability. This may be due to a specific pattern of arousal that allows sufficient variation to build memorable scenes (Thomsen and Heiselberg, 2020), or because viewers “transport” the meaning of story into their mental images, the appraisals of which evoke arousals and relevant memorability (Le *et al.*, 2020). Similar results were found by Quevedo *et al.* (2003) who noted increased memorability among participants exposed to emotional arousal compared to a neutral story, yet there were no differences in short-term memory. Narrative cues in storytelling advertisements encourage both attention and interest, leading to imagery processing and, hence, greater memorability (Bakalash and Riemer, 2013).

Theoretical implications

These results link advertising messages to their corresponding emotions and behavioral outcomes. Poels and Dewitte (2019) propose that future research should “consider when and how advertisement-evoked emotions could benefit the consumer and which specific emotions are better at place than others” (p.88). In line with their advice, we confirmed that advertisement-evoked arousal peaks can better influence the memorability of the advertisement, especially events that elicit peaks when attentively watching narrative advertisements.

The findings also support the importance of developing a stream of literature examining various types of experiences using cognitive psychology theory (Campos *et al.*, 2020; Le *et al.*, 2020; Scott, 2020) and the cognitive appraisal theory of emotion (Ma *et al.*, 2013). It is recommended that these theories can be used to understand the complexities of narratives in advertising and their effectiveness. Arousal from narratives have been found to be associated with empathic concern for characters in stories (Vaccaro *et al.*, 2021) and the imagination of story sequences (Adaval and Wyer, 1998). This reflects the increased relevance and interest

Table 2 Shots/scripts (asides) information and SCRs events in the storytelling video

No.	Shots' information	Time duration seconds	SCRs Events	Script information (Asides)
1	Precludes	1–15	41	Seconds count down
2	Title	16–19	10	A leisure life under the phoenix trees
3	City sunrise	20–25	17	In 1998, I came to Shanghai to perform with the ensemble
4	Debut of the main character (He)	29–33	9	It was the first time in my life that I saw such a huge city
5	Hustle and bustle in the city center	35–38	16	In my eyes, the buildings were as stunning as the Battlestar in the comics
6	He is viewing the highest building of Shanghai from the bottom	39–43	12	I made up my mind to resign and take exams for entering Shanghai Conservatory for further study
7	He was gazing at Wukang Mansion, a landscape building in French concession of Shanghai	46–50	9	During the days preparing for the test, I lived in the basement here
8	He was walking into the traditional Shanghai building	52–57	14	I walked through this lane every day for the class
9	A Shanghai style lane	58–62	12	And I saw a stooped granny who collected trash almost every time
10	A stray cat in the lane and stooped granny living in the lane	63–68	19	She had no idea that the way she fought hard for life with her bowed back gave me so much strength
12	He was wondering in the lane and entering one of the Shikumen, a traditional Shanghai residential house	75–79	19	Miraculously, I never saw her again after I was admitted to Shanghai Conservatory
13	He was looking afar for the city on his balcony	82–87	18	It was such a pity in my heart that I owed her an appreciation
14	A bird view of Shanghai conservatory	88–92	14	This could be the fate, just like the phoenix trees (firmiana) and my life here
15	People around the CPC first congress site	93–97	13	During my stay in Shanghai, my life has never left the shadow of phoenix trees
16	People around Sinan Masion	98–101	13	Some says if you can see the phoenix tree from the window, you see the real Shanghai
17	He was walking in the road under phoenix trees	101–105	9	To me, under the tree, there are many roads that I have walked through these years as well as the tough times that I've gone through
18	He was touching the branch of a phoenix tree	106–109	12	This feeling of living next to masters gives me a sense of sureness to find my way
19	A close shot for the phoenix tree leaves, and parks and roads under the trees	110–116	11	This is the kind of life I am pursuing for
20	A bird view of the Shikumen and he was walking through them	117–121	15	And life is my greatest source of inspiration
21	The façade of the old-style villa in Shanghai under the shadows of phoenix trees	122–127	17	In this giant metropolis
22	Great artists' sculptures in Shanghai	128–133	11	The phoenix trees provide shadows for me, As well as a paved way for me to follow
23	The man was walking on the steps of a villa	134–138	10	Ending
24	The man was wandering in a bookshop in this villa	139–144	18	
25	The man was reading books and climbing up to the top of the villa	145–150	10	
26	People are taking photos in front of net-popular café and have drinks outdoor	151–159	21	
27	The man was walking towards a café	160–164	12	
28	He entered the café	165–168	10	
29	Shots are fading away	173–178	21	

Source: Created by authors

created by immersion in the narrative, which generates a higher level of arousal, according to the cognitive appraisal theory of emotions.

In line with the use of the cognitive psychology theory, this study highlights the usefulness of related methods of data collection. EDA was used to facilitate a better understanding of the effect of narratives on memorability by detecting changes in arousal. SCLs cannot differentiate between the evoked arousal variations of two different videos, whereas SCRs allowed the

Table 3 Correlation between subjects' GSR amplitude and recall odds

Description	Correlation coefficient, <i>r</i>	Sig. (<i>p</i>)
Storytelling video: odds/ amplitude	0.339	0.014*
Imagery video: odds/ amplitude	-0.186	0.144

Notes: * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$
Source: Created by authors

current study to detect arousal events in ads and associate them with memorability. The EDA recording equipment and analysis software are now readily available.

Practical implications

Designing narrative-style advertisements can improve memorability for destination marketers. A shift from goods-service logic to memory-dominant logic is advocated to enhance value cocreation. Nonnarrative scenery and music advertisements are commonly used in destination marketing; however, destination brand-related stories can also be used to establish durable connections with potential travelers (Kasilingam and Ajitha, 2022). Consumers may better recall specific events in storytelling advertisements, thereby enabling connections with destination attributes and influencing travel decisions.

Narrative persuasion can also be used in digital media vlogging (video blogging) on social networking platforms (Gaffar *et al.*, 2022). Destination marketing offices (DMO) can collaborate with experienced uploaders to develop story-like videos to increase memorability (Lund *et al.*, 2018) and encourage purchase intentions using live streaming (Li *et al.*, 2022a). Furthermore, DMOs can use both stories and music as affective cues to enhance experiential engagement and value-cocreation in TDA to generate greater purchase intention (Buhalis *et al.*, 2023). Furthermore, practitioners can use psychophysiological data collection techniques when designing advertisements to quantify their emotional responses, and, hence, their effectiveness (Guixeres *et al.*, 2017).

Limitations and future research

This study used a quasi-experimental design that needs to be validated through further research. Future studies could replicate this experiment with a sample that is representative of the population of visitors to Shanghai. A full experimental design is encouraged to introduce a controlled group and manipulate the type of story, level of empathy, intensity of events, for further exploration of the impacts. Personal variables of EDA and memorability, such as demographics, preknowledge and goals, should be clarified using a between-subjects design. Future studies should also take advantage of the decomposition analysis of EDA to deal with overlapping SCRs so that more advertisements of various tourism destinations can be selected as stimuli to validate the current findings.

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Appendix 1

Table A1 A brief summarization on the measurement of emotional arousal

<i>Means of measurement</i>	<i>Indicators</i>	<i>Sample literature</i>
Self-reported	Semantic Difference Scale (SDS) Self-assessment Manikin Scale (SMS)	Ma et al. (2013) Langner et al. (2015)
Indirect qualitative methods	Ethnographic interview Zalman metaphor-elicitation Corpus Linguistics	Yoo et al. (1998) Troilo et al. (2014) Rahmani et al. (2019)
Physiological approaches	Electrodermal activity EDA Cardiovascular measures such as Heart rate variations (HRV); Blood Pressure (BP); Cardiac Output(CO) Total Peripheral Resistance TPR Facial coding Respiration Pupil diameter	Bolls et al. (2001) Guixeres et al. (2017) , Li et al. (2012) , Morris et al. (2019) Neumann and Waldstein (2001) Bigné et al. (2023) Liu and Huang (2023) Kuwamizu et al. (2022)
Brain scan technology	Functional Magnetic Resonance Imaging (fMRI) Magnetoencephalography (MEG) Electro-encephalography (EEG)	Vaccaro et al. (2021) Ambler et al. (2000) , Gordon et al. (2018)
Behavioral measures	Vocal pitch & amplitude	Bachorowski and Owren (1995) , Scherer et al. (1991) , Li et al. (2012)

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Appendix 2. Brief introduction of the two videos

"Shanghai Tourism Promotion Video" used only scenery pictures and background music and no subtitles or words. It showed a series of modern scenes of urban Shanghai precincts and attractions, including modern iconic architectures, local communities, and historical heritages, to give evidence arguing Shanghai to be an international metropolitan tourism destination. The arrangement of sceneries follows the time sequence and shows the landscapes of Shanghai from morning, daytime, and night.

"The Leisure Life in Shanghai" was a mini-movie with a storyline. The main character, a professional singer, tells audiences part of his life story by recounting his amazement when he first came to Shanghai, his subsequent decision to quit his job and move to Shanghai to prepare for the Shanghai Conservatory of Music entrance examination. The character then talks about the life during this exam preparation period, the importance of the sycamore trees (also known as phoenix trees) found near his residence to him, and his favourable impression of the life in Shanghai.

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