

## Examining the influence of virtual reality tourism on consumers' subjective wellbeing

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### ABSTRACT

Tourism consumption has been outlined as having a positive effect on individuals' subjective wellbeing, however, we had limited empirical or conceptual understanding on the propensity of *VR tourism* in fostering positive subjective wellbeing and the subsequent effects this has for tourism providers and policymakers. A vacation transports one's self to an alternative world, physically. In parallel, VR transports one's self to an alternative world, virtually. Accordingly, through a multiple quantitative study research-design and drawing on the theoretical lens of *Presence-Theory* and *Effort-Recovery-Theory*, this research uncovers the positive effect of *VR tourism* on individuals' subjective wellbeing, the nuance of the sense of presence in VR tourism in enabling psychological-detachment and enhancing consumer wellbeing along with the subsequent attitude and behaviour intentions stimulated by consumer wellbeing. Our results pertain that not only can *VR tourism* provide important societal and health benefits in recovery and enhancing individuals' wellbeing, but also benefits from an economic perspective.

### 1. Introduction

Recent world events including Covid-19, the cost of living crisis, conflict, and climate change have brought about unprecedented challenges to the travel and tourism sectors. At the beginning of the pandemic in October of 2020, the International Air Transportation Association outlined that international air traffic all but disappeared with airlines only carrying 10% of usual levels (IATA, 2021). 2021 brought new hopes for recovery, but those hopes dissipated with new coronavirus variants including Delta and Omicron. Finally, just as vaccines and new treatments inspired travellers to release pent-up demand, conflict in Europe, heightened discussions on the impact of climate change, as well as dire economic predictions related to the cost-of-living crisis brought more uncertainty and economic-related constraints to consumers. This uncertain environment has brought about an amplification of consumers' use of technology to the highest levels ever seen (Calugar-Pop & Lee, 2020) and into categories which previously had limited technology presence, including tourism consumption (Talwar, Kaur, Nunkoo, & Dhir, 2022). As such, some operators within the tourism sector turned to

Virtual Reality (VR hereafter) to offer would-be travellers an experience that immerses them in a destination away from their physical real-world location (Stainton, 2020).

Prior to the world events of the early 2020s, VR was used as a preview to experience hotels, resorts, attractions and cultural heritage sites (Fan, Jiang, & Deng, 2022; Kim, Lee, & Jung, 2020; McLean & Barhorst, 2021; Talwar et al., 2022; Tussyadiah, Wang, Jung, & Tom Dieck, 2018). VR has also been used as a tool by the tourism sector to demonstrate safety practices. More recently however, VR has been used as an overall alternative to physical travelling, as such VR experiences including *FlyView* now offer consumers the opportunity to experience flying over the city of Paris, *YouVisit* enables consumers to immerse themselves in Macchu Picchu to explore the Inca Trail, while *Disney World* allows consumers to immerse themselves in the *Disney Theme Parks*. Some of these innovative experiences are free while others attract fees. Accordingly, world events have stimulated a new branch of tourism, namely VR tourism.

We define *VR tourism* as a holistic tourism experience viewed through VR technology without the need to physically travel anywhere. The travel and

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tourism sector has developed a slow but steady growth in the use of VR as an alternative to physical travelling (Beck, Rainoldi, & Egger, 2019). The application of VR in tourism as an alternative to physical travelling received some early attention from academics (e.g., Williams & Hobson, 1995; Guttentag, 2010; Huang, Backman, Backman, & Chang, 2016), though the focus of tourism-related VR research has been largely on the use of VR as a preview to a destination, attraction or hotel to either market or sell services (Zeng, Cao, Lin, & Xiao, 2020). However, the recent impact of worldwide events on the sector has significantly fuelled the development and demand of VR tourism as an alternative to physical travelling (Sarkady, Neuburger, & Egger, 2020). Until recent times, VR has been viewed as somewhat of a gimmick amongst some consumers (Hollister, 2019). With travel and tourism inaccessible for large parts of the global population for a variety of reasons, virtual tourism has become a welcome alternative allowing consumers to ‘virtually travel’ across the world to relieve wellbeing pressures present in the physical world (Yang, Lai, Fan, & Mo, 2021).

VR enables those consumers longing for a vacation to experience an alternative virtual travel experience while restricted from physical travel. Despite the fact VR has been heralded with the potential to revolutionise and redefine the tourism industry (Beck et al., 2019), the initial outlook could not have ever imagined the speedy adoption propelled by recent world events from physical tourism to VR tourism in a short space of time. Thus, VR tourism could offer an accessible and sustainable alternative product to satisfy the ongoing and future wellbeing needs of some consumers.

Worldwide events such as the advent of Covid-19 and the cost-of-living crisis have not only caused the risk of physical illness but also psychological stress to individuals all over the world (Xiao, 2020; Zheng, Luo, & Ritchie, 2021). Such stress has been noted as causing anxiety, depression, problems sleeping, decreased immune system and behavioural issues (da Silva & Neto, 2021; Huang & Zhao, 2020). Thus, it is not surprising that Individuals' wellbeing is at the forefront of policymakers' agendas. Therefore, finding ways to guide the public to effectively manage their wellbeing particularly during a public health emergency has become an urgent reality to avoid negative psychological consequences (Cao et al., 2020). Numerous stress management and relaxation practices exist that can help individuals to ease psychological pressures (Sharma & Rush, 2014). Tourism consumption has been outlined as enabling individuals to recover from stress (Zins & Ponocny, 2022). In turn, it has been long known that one of the most significant drivers for seeking a vacation is to escape from a usual routine or stressful situations (Mannell & Iso-Ahola, 1987).

Accordingly, Su, Tang, and Nawijn (2020) find that taking a vacation can increase individuals' overall psychological wellbeing. Taking time away from normal day-to-day life is seen as an integral part of human life for numerous individuals (Richards, 1999). More so, Hobson and Dietrich (1995, p.23) suggest that “tourism is a mentally and physically healthy pursuit to follow in our leisure time”. Through the theoretical lens of *bottom-up spillover theory*, prior research has demonstrated that the life event of a vacation positively influences an individual's life satisfaction (Neal, Sirgy, & Uysal, 1999; Neal, Uysal, & Sirgy, 2007; Sirgy, Kruger, Lee, & Yu, 2011). Chen and Petrick (2013) conducted a comprehensive systematic literature review of 29 published articles on the health and wellness benefits of travel experiences, the authors conclude the overall positive effects of tourism consumption has on wellbeing.

While tourism consumption has been outlined as having a positive influence on individuals' wellbeing (Yu, Smale, & Xiao, 2021), we have little understanding of the propensity of VR tourism in fostering positive subjective wellbeing and the subsequent effects this has for tourism providers and policymakers. A vacation transports one's self to an alternative world, physically. Similarly, VR transports one's self to an alternative world, virtually. Parallels can be drawn between both the purpose of a vacation and the essence of VR. Accordingly, through the theoretical lens of *Presence Theory* - the psychological feeling of

transporting and being present in a non-physical space (see: Sheridan, 1992), and *Effort-Recovery Theory* – the understanding that relaxation and psychological detachment aids recovery (see: Meijman and Mulder, 1998), this research aims to understand the role of presence in VR tourism in enhancing consumer wellbeing and the subsequent attitudinal and behaviour intentions stimulated by consumer wellbeing. Given the inaccessibility of travel and tourism for many consumers due to world events and personal circumstances, the potential of VR tourism to positively influence wellbeing, the propensity for positive brand-related outcomes derived from psychological wellbeing, and the possibility of a new revenue-generating form of tourism, this research adds to our theoretical knowledge of VR tourism and provides a timely understanding to the travel and tourism literature.

The following section first discusses the literature on VR in tourism drawing on the lens of presence theory. Subsequently, we discuss the literature on the role of vacations in relation to consumer wellbeing and the benefits of consumer wellbeing in tourism. Next, we discuss our methodological approach which consisted of two lab based experiments. Accordingly, we present our findings before moving on to the theoretical and practical implications of our research. We conclude with future research avenues.

## 2. Literature review

### 2.1. VR in tourism

Hobson and Dietrich (1995) detail that VR is a computerised environment that provides individuals with the sense they are transporting from the physical real world to a virtual world. Desai, Desai, Ajmera, and Mehta (2014) outline that VR is a simulated three dimensional computer generated environment that provides individuals with the feeling of being present within that environment. VR is largely grounded on the principles of presence and immersion (Beck et al., 2019). The depth of immersion and presence experienced within VR distinguish it from any other technology (Wei, Qi, & Zhang, 2019). Immersion refers to the level in which the real environment is omitted, the extent the individual is surrounded (i.e., panoramic-view) and the array of vivid sensory cues (Beck et al., 2019). Presence on the other hand is described as the “feeling of being there” as the individual forgets about the physical real-world and experiences the virtual world as the more inductive real-world (Ijsselstein & Riva, 2003; Slater & Wilbur, 1997). Recent scholarly work has demonstrated that further advanced VR technology which enables greater levels of involvement and interactivity results in a deeper level of immersion and presence (Bogicevic, Seo, Kandampully, Liu, & Rudd, 2019; Diemer, Alpers, Peperkorn, Shibani, & Mühlberger, 2015).

VR can include both synthetic and 360-degree content (Beck et al., 2019). While the replication of reality is not essential in VR, realistic material is critical in the tourism industry (Marasco, Buonincontri, van Niekerk, Orlowski, & Okumus, 2018). Thus, vivid 360-degree visuals with added synthetic content have become popular within VR tourism to capture an authentic, immersive and interactive experience (Marasco et al., 2018; Slater & Sanchez-Vives, 2016). Beck et al.'s (2019) systematic literature review outlines a consensus regarding the differentiation of VR systems based on the concept of immersion and the technical capabilities of the hardware (i.e., enabling visual immersion), thus three categories of VR exist; “fully -, semi- and non-immersive VR” (Beck et al., 2019, pg. 588). Fully immersive VR is enabled through head-mounted displays (HMD). Such hardware enables the outright isolation of the individual from the physical real-world. In comparison, within semi- and non-immersive VR, an individual maintains a level of contact with the physical real-world. Slater and Sanchez-Vives (2016) outline that HMDs isolate individuals from any external stimulus while the visual display within the HMD is continually updated based on the individual's movements and actions. Thus, fully immersive VR transports an individual into a completely new world that responds to their interactions. The emergence of affordable VR HMDs has boosted the application and

demand for VR in tourism (Tussyadiah et al., 2018). HMDs such as the Oculus Go, Google Cardboard, HTC Vive and the Samsung Gear offer consumers the ability to experience VR in the comfort of their own home from the starting price of 9 US dollars (ARVR Google Cardboard, 2021). While each of these HMDs provides a range of different experiences, each offers a fully immersive experience blocking out stimuli from the real-world. Despite the availability and affordability of modern VR HMDs, such hardware incorporates a level of personal invasiveness given that an individual must attach the device to their face, while non-wearable VR is considered less immersive, it is also less invasive to use (Beck et al., 2019). Semi-immersive VR does not require an individual to attach hardware to their body or face, instead, this usually consists of a screen or several screens that can display 360-degree visuals. Non-immersive VR (often referred to as desktop VR) represents the most common and simplistic means of VR (Dorner, Jung, Grimm, & Gobel, 2013). Through the use of a regular computer display, a three dimensional space is simulated (most often with 360-degree visuals) and an individual can interact with the virtual world through tapping the screen or clicking a mouse (Liu, Liu, Choi, & Chen, 2016). While non-immersive VR as described is considered VR in the simplest terms, some scholars suggest this is an over-reach (Slater & Sanchez-Vives, 2016). Guttentag (2010) notes that numerous tourism providers develop 'VR-type' experiences but are not genuine VR. However, given the proliferation of VR systems and the advent of different capabilities of VR HMDs, a cataloguing of VR systems detailing their technical competences is required (Beck et al., 2019). Accordingly, Beck et al. (2019, p. 591) advance our understanding of VR in tourism through the following definition, "Virtual Reality (VR), in a tourism context, creates a virtual environment (VE) by the provision of synthetic or 360-degree real-life captured content with a capable non-, semi-, or fully-immersive VR system, enabling virtual touristic experiences that stimulate the visual sense and potentially additional other senses of the user for the purpose of planning, management, marketing, information exchange, entertainment, education, accessibility or heritage preservation, either prior to, during or after travel."

## 2.2. Presence in VR

VR is largely grounded on the principle of presence (Beck et al., 2019). The level of presence achievable within VR is unrivalled by any other technology (Wei et al., 2019). Presence theory refers to the psychological feeling of being present in a non-physical space. Presence can often be referred to as telepresence and is commonly used interchangeably with presence (see: Draper, Kaber, & Usher, 1998). Lombard and Ditton (1997, p. 1) describes presence as an "illusion that a mediated experience is not actually mediated". More so, scholars (Ijsselstein & Riva, 2003; Schubert, Friedmann, & Regenbrecht, 2001; Sheridan, 1992; Slater & Usoh, 1993; Steuer, 1992) refer to presence as the extent to which an individual feels 'physically' present in the virtual environment. Thus, the level of presence a tourism consumer experiences through VR is dependent upon the extent to which the consumer feels they have shifted from the physical world to becoming present in an alternative virtual world (Wei et al., 2019). Kim and Biocca (1997) distinguish presence as incorporating two key components, "arrival (the feeling of being present in a mediated environment)" and "departure (the feeling of separation away from the physical environment)". The sense of presence in technology has been detailed as a critical factor in shaping consumer attitudes and behavioural intentions within the virtual environment (Bogicevic et al., 2019; Faiola, Newlon, Pfaff, & Smyslova, 2013).

The extent to which presence is felt is influenced by the level of media richness, and the number of sensory stimuli (Steuer, 1992). The greater the number of senses stimulated by a medium, the more likely the medium will elicit the sense of presence (Lombard & Ditton, 1997; Steuer, 1992). More so, the characteristics of the display (including the image quality, image size, motions, dimensionality) and the level of

interactivity can further influence the sense of presence within a computer-mediated environment (Steuer, 1992). Given that VR omits the physical real world and provides individuals with a high level of interactivity, such as tracking psychical movement including head movements and walking, as well as tactile sensation, beyond other types of technology (i.e., a website) it is logical that a heightened sense of presence is experienced.

In a tourism context, parallels can be drawn between the notion of a vacation and presence in VR. For the most part, individuals seek vacations to leave behind their usual environment and transport to a new environment, which can seem like a different world, leaving behind the strains of everyday life and work commitments (Chen, Petrick, & Shahvali, 2016). In sync with this, the presence experienced by consumers in VR can again make them feel like they have shifted from their current environment and embedded themselves in a different world (Bogicevic et al., 2019). Thus, the presence experienced in VR moves individuals beyond passive users of technology to individuals feeling like they are active users within the medium.

## 2.3. Vacations and wellbeing

A vacation is defined as taking trips for pleasure out with an individual's usual environment and is considered a fundamental part of human life for numerous individuals (Richards, 1999). Hobson and Dietrich (1995, p.23) detail "that tourism is a healthy pursuit to follow in our leisure time". Accordingly, taking vacations can positively influence individuals' subjective wellbeing as they have the opportunity to omit their usual environment detaching from the strains of work and their day-to-day routine (Chen & Petrick, 2013). There are many conceptualisations of wellbeing within the literature (see: Sirgy et al., 2006 for an overview). Some scholars take a positive psychology view on the conceptualisation and measurement of wellbeing including both hedonic and eudaimonic wellbeing (e.g., Vada, Prentice, & Hsiao, 2019; Su et al., 2020; Lengieza et al., 2019). On the other hand, Sirgy (2020) outlines that wellbeing and quality of life studies usually take on either an objective or subjective nature. Objective studies measure psychological wellbeing based on social indicators such as income or crime rate, Subjective studies measure psychological wellbeing based on the perceived satisfaction that individuals experience in their life (Neal et al., 2007). Accordingly, we take a subjective viewpoint of psychological wellbeing and operationalise it as an individual's satisfaction with their life. Sirgy (2010) outline that achieving personally meaningful goals is associated with subjective psychological wellbeing. Vacation planning and consumption are often considered meaningful goals in life (Chen & Petrick, 2013), which in turn, influence individuals' psychological wellbeing.

As observed by Mannell and Iso-Ahola (1987), one of the greatest drivers of vacation experiences is to escape the usual routine or stressful circumstances. Vacations can aid individuals in their recovery from stress and enhance their subjective wellbeing (Sonntag & Fritz, 2007). Stress recovery refers to a person's functioning returning to its pre-stress state (Kalevi and Kinnunen, 2010; Meijman & Mulder, 1998). Recovery and unwinding from stressors are regarded as being important for individuals' health and wellbeing (Sonntag & Fritz, 2007). Through the lens of *Effort-Recovery Theory* (see Meijman & Mulder, 1998) which pertains that psychological detachment as well as relaxation can help recovery as no additional stresses are pinned on one's functioning, this study draws on the psychological detachment element of *Effort-Recovery Theory* from usual life as a driver of vacation experiences. Psychological detachment has been outlined as an important part of any recovery process (Etzion, Eden, & Lapidot, 1998). Psychological detachment can be defined as the sense of being psychologically removed from one's usual life. Sonntag and Fritz (2007) studied the importance of psychological detachment from everyday work through taking a vacation. The authors found that individuals who engaged in psychological detachment had a positive impact on their life satisfaction. *Effort*

*Recovery Theory* pertains that recovery occurs when no further demands are requested on an individual's system (Meijman & Mulder, 1998). Thus, psychological detachment is a critical component of recovery. When individuals are psychologically detached they are no longer making demands on themselves and are accordingly able to recover.

Relaxation is a process that can aid psychological detachment (Sonnetag & Fritz, 2007) and reduce stress (Yang et al., 2021). A degree of relaxation can be achieved when performing pleasurable activities such as walking in nature, gaming, or other activities that put few demands on the individual, enabling them to psychologically detach from mentally thinking about their usual routine (Chen et al., 2016). Accordingly, given that vacations are defined as taking pleasure trips (Chen & Petrick, 2013), they provide a level of relaxation and psychological detachment. Previous research in the tourism domain articulates the benefits of tourism on mental and physical wellbeing (e.g., Hobson & Dietrich, 1995). Tourism benefits on wellbeing have been largely studied through the lens of *bottom-up spillover theory* (see: Diener, 1984). The theory pertains that overall life satisfaction is affected by the way in which individuals evaluate life events and domains (including work, leisure, and family). These studies have considered vacations as a life event and find them to have a positive influence on life satisfaction (see: Neal et al., 2007; Sirgy et al., 2011). While the positive influence of vacations on health and wellbeing have been outlined in numerous studies (e.g., Gilbert & Abdullah, 2004; Nawijn, Mitas, Lin, & Kerstetter, 2013; Neal et al., 2007; Sirgy et al., 2011), the underpinning psychological process that fosters positive wellbeing and life satisfaction has been studied by a limited number of scholars such as Chen et al. (2016). It is therefore critical to understand the role of psychological detachment in enhancing wellbeing, particularly through the technological vehicle of VR. While vacations have been heralded as positively influencing consumer wellbeing, scholars have outlined that the positive outcomes of a vacation often have a limited lasting effect of up to one month (Etzion, 2003a, 2003b; de Bloom et al., 2010, 2011; Westman & Eden, 1997). Thus, not only could VR tourism have a positive effect on wellbeing during a period of restricted travel, but for those who are unable to travel (i.e., physically or financially) and could also act as an outlet for those to 'top-up' the feeling of taking a vacation as the positive vacation outcomes start to subside.

Through the lens of *Presence Theory*, which pertains the psychological feeling of being 'physically' present in a non-physical space, VR has the capability to transport an individual to an alternative world (virtually). Given that a vacation is transporting an individual to an alternative world (physically), in effect omitting their usual life activities, clear parallels can be drawn between the transportation and presence in a physical vacation with the 'transportation' and 'sense of presence' in VR. Previous research has found that VR can help individuals feeling isolated in confined environments to reduce stress and enhance their mood (Anderson et al., 2017) and has been used as a distraction tool to reduce patients' stress in the medical field (Mohammad & Ahmad, 2019). Accordingly, we hypothesise the following:

*H1: VR tourism will positively enhance a consumer's subjective wellbeing.*

*H2a: Presence in VR tourism will positively influence a consumer's subjective wellbeing.*

*H2b: Presence in VR tourism will positively influence a consumer's psychological detachment.*

*H3: A consumer's psychological detachment from their usual routine enabled by the VR tourism experience will enhance a consumer's subjective wellbeing.*

## 2.4. Benefits of wellbeing

Limited research has assessed the outcomes of positive consumer wellbeing. Most tourism-based studies on subjective wellbeing or

quality of life have not gone beyond the construct to understand the effects on individuals' behaviour. Importantly, the limited prior research assessing the positive effects of subjective wellbeing (Grzeskowiak & Sirgy, 2007; Kim, Kim, & Hwang, 2019) has outlined that individuals' subjective wellbeing can be positively associated with brand-related outcomes, such as loyalty towards a brand, purchase intention, and reuse intentions. Research conducted on restaurant patron behaviour (see: Ha & Jang, 2010; Park, 2004; Carpenter, 2007; Kim, Jeon, & Hyun, 2012) found consumer wellbeing as one of the most important motivational drivers to dine out. As such, those consumers who experience positive wellbeing from their dining out experience are likely to revisit again in the future while holding positive attitudes towards the restaurant. Sirgy et al. (2007) posit that wellbeing perceptions play an important role in consumer decision making, for example, to enhance their wellbeing and life satisfaction a consumer may decide to purchase a first-class flight ticket or buy from a specific brand. Further to this, related studies (Hwang & Hyun, 2017; Sirgy & Lee, 2008) outline that consumers are willing to accept higher prices for products or services that enhance their wellbeing. More so, Sirgy and Lee (2008) find that consumers will readily pay more for wellbeing enhancing products or services without complaints. Thus, positive wellbeing appears to play a role in influencing behavioural intentions.

Despite this, we have no conceptual or empirical understanding of technology-induced positive wellbeing and the subsequent effects on individuals' attitudes and behaviour. Thus, we aim to assess such relationships and hypothesise:

*H4: An individual's positive subjective wellbeing from the VR tourism experience will positively influence attitudes towards the destination.*

*H5: An individual's positive subjective wellbeing from the VR tourism experience will influence the willingness to pay for a VR tourism experience.*

Fig. 1 provides a pictorial representation of Hypotheses H2a through to H5. The subsequent sections will outline our multiple study approach to test our hypotheses.

## 3. Methods and results

In order to test our hypotheses, we conducted two studies in the UK. In Study 1, we tested Hypotheses H1 (*H1: VR tourism will positively enhance a consumer's subjective wellbeing*). In this study, we assessed individuals' subjective wellbeing in two stages; first prior to the VR tourism experience, and second following the VR tourism experience. In Study 2, we tested the hypothesised model as detailed in Fig. 1. Through the theoretical lens of *Presence Theory* and *Effort-Recovery Theory* we were able to advance our understanding on the role of VR tourism on subjective wellbeing, specifically examining the sense of presence induced in VR (H2a; H2b) and the feeling of psychological detachment (H3). More so, in Study 2 we advance our knowledge on the outcomes of positive subjective wellbeing deriving from a VR tourism experience (H4; H5). The subsequent sections provide specific details on the methodological approach for each study.

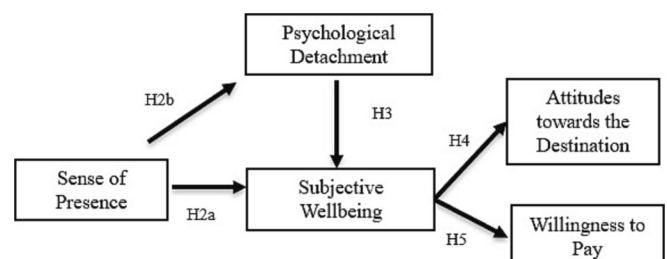


Fig. 1. Hypothesised model.

### 3.1. Study 1

In study 1, we employed a repeated measures design with two measurement points through the distribution of a questionnaire. Data were captured in 2021 in the UK during the Covid-19 pandemic.

Participants were recruited with the aid of a market research agency. Potential participants were told that the research would have two phases one week apart and was in relation to tourism and that good computer skills were required. In exchange for their time, participants were sent a Google Cardboard VR headset to keep or were entered into a prize draw for an Amazon shopping voucher. In the first phase (measurement point 1), participants' subjective wellbeing was measured along with the capture of descriptive data. Subjective wellbeing was measured through the use of Diener et al.'s (1984) five-item satisfaction with life scale, anchored on a 7-point Likert scale ranging from Strongly Disagree (1) to Strongly Agree (7). The scale has been used by numerous studies measuring subjective wellbeing. In the second phase (one week later; measurement point 2), the same set of participants were either sent a Google Cardboard VR headset or instructions to visit a website. Thus, participants were split into two groups, either our VR tourism treatment group or our website control group.

For those assigned to the VR tourism (treatment) group, instructions were provided to participants along with a video on how to put together their Google Cardboard VR headset (an image of the instructions can be seen in Appendix A). Participants were also provided with a description and a link to a VR experience of a Disneyworld theme park to view through their Google Cardboard VR device. Participants were told, 'You have gone on vacation to Disney World, Orlando, Florida, you have decided to go to the theme park Magic Kingdom, view the VR experience through your Google Cardboard Headset'. The VR experience consisted of a walk-through of the Magic Kingdom theme park in Walt Disney World, Orlando, Florida. Orlando is one of the leading tourist destinations for UK travellers making it an appropriate destination for a VR tourism experience (HolidayExtras, 2021). The VR experience lasted 16 min.

Similarly, for those in the website (control) group, instructions were provided with a link to access a gallery of images of the Magic Kingdom theme park (34 images were available in total). The gallery was responsive to viewing on both a mobile or desktop device. Participants in the control group were provided with the following modified description, 'You have gone on vacation to Disney World, Orlando, Florida, you have decided to go to the theme park Magic Kingdom, view the theme park through the gallery of images'.

Following the experience (both VR and control), participants were asked to answer the same questions on their subjective wellbeing (Diener et al.'s, 1985 scale) as they did in phase 1 (measurement point 1) of the study. We used a trap question to ensure participants viewed the VR experience or viewed the image gallery, participants were asked, 'please select the phrase you were asked to report at the end of the VR/image gallery experience'. In total, 594 participants took part in phase 1 of study 1; 14 participants did not respond to the second phase of the research; thus 580 participants took part. The 14 respondents who did not respond were removed from phase 1. The 580 respondents were split evenly between the treatment group and the control group ( $n = 290$ ). All respondents answered the trap question correctly. Of the 580 participants, 59% were female; aged between 18 and 53 years old  $M_{age} = 32$  years old. Participants had good or above computer skills from answering a 5-point Likert scale question on rating their computing skills ( $M_{skills} = 4.4$ ; S.D. 0.4). Additionally, 21% of the participants had experienced immersive VR through a headset device. 62% of participants go on vacation at least once per year, 28% go on vacation multiple times per year, while 10% vacation at least once every two years. 42% of the sample had physically visited the Magic Kingdom theme park in Disney World, Orlando, Florida. We compared the responses of those who had previously physically visited and those who had not and found no significant differences.

#### 3.1.1. Measures

The same 7-point Likert scale from Diener et al. (1985) was used in phase 1 and one week later in phase 2 of study 1. This enabled us to capture individuals wellbeing prior to and post the VR experience. We also controlled for any major life events that could impact the results. Table 1 provides details of all the scale items used in both study 1 and study 2. Accordingly, the tables present the source of the scales and the associated Cronbach's alpha coefficient in the assessment of the scale's reliability, composite reliability and average variance extracted. More so, we assessed how realistic the VR tourism experience was to each of the participants. This was measured on a 7-point Likert scale (ranging from 1 = very unrealistic; 7 = very realistic); the check illustrated that the scenario was a realistic situation for them ( $M_{realistic} = 6.19$ ,  $t = 18.37$ ,  $p < .001$ ).

#### 3.1.2. Data analysis

To test hypothesis H1, we calculated a paired samples  $t$ -test in SPSS 27 to examine any change in consumers' wellbeing following the VR tourism experience. The results outline the positive influence of the VR tourism experience on consumers' wellbeing:  $M_{priorVR\_wellbeing} = 5.15$  (SD = 0.412),  $M_{postVR\_wellbeing} = 6.75$  (SD = 0.326),  $t(209) = 10.610$ ,  $p < .001$ , eta squared = 0.68. Hence, the results support H1, pertaining that a VR tourism experience can positively influence consumers' wellbeing. We can also see that the website image gallery view had no significant influence on consumers' wellbeing. A paired samples  $t$ -test was calculated between consumers' subjective wellbeing prior to the website image gallery experience and consumers' wellbeing following the experience. The results revealed no significant differences,  $M_{web-prior\_wellbeing} = 5.20$  (SD = 0.501),  $M_{webpost\_wellbeing} = 5.49$  (SD = 0.473),  $t(212) = 1.67$ ,  $p = .366$ .

More so, we conducted a further independent  $t$ -test to assess consumer wellbeing between those participants viewing the VR experience and those viewing the website image gallery experience. The results assert the positive effect of the VR tourism experience in comparison to the website image gallery experience on consumers' wellbeing,  $M_{website\_wellbeing} = 5.49$  (SD = 0.473),  $M_{VR\_wellbeing} = 6.75$  (SD = 0.326),  $t(218) = 13.187$ ,  $p < .001$ , eta squared = 0.43. Thus, following our analysis, we conclude support for H1. We discuss this result in more detail in subsequent sections.

### 3.2. Study 2

In this study we assessed the hypothesised relationships detailed in Fig. 1. The same set of respondents from the VR tourism treatment group in study 1 completed a survey following their VR tourism experience of the Magic Kingdom theme park with their Google Cardboard VR headset. Hence, study 2 followed on from the questions asked of participants in Study 1. Thus, 290 participants took part in this study.

#### 3.2.1. Measures and data analysis

The measures utilised in Study 2 were drawn from tested scales from previously published academic literature. A 7-point Likert scale was used to measure *Sense of Presence*, *Psychological Detachment*, *Subjective Wellbeing*, *Attitudes towards the Destination* and *Willingness to Pay*. All scale items can be found in Table 1.

To assess the hypotheses detailed in Fig. 1 (H2a, H2b, H3, H4, and H5), we used structural equation modelling (SEM) in AMOS Graphics 27. Data were prepared in SPSS 27 for SEM. We used SPSS to calculate descriptive statistics, scale reliabilities, variance, and composite reliabilities. SEM comprises two key parts; first, the calculation of the measurement model is tested through conducting a confirmatory factor analysis (CFA); second, the estimation of the structural model is calculated through structural equation modelling.

#### 3.2.2. Results

All scales used in the study presented Cronbach alpha coefficients of

**Table 1**  
Measurement scales.

Variable	Scale Reference	Adapted Scale	CA	CR	AVE
Subjective Wellbeing	Adapted from: <a href="#">Chen et al. (2016)</a>	<ul style="list-style-type: none"> <li>• In most ways my life is close to my ideal.</li> <li>• The conditions of my life are excellent.</li> <li>• I am satisfied with my life.</li> <li>• I feel I have the important things I want in life.</li> <li>• If I could live my life over, I would change almost nothing.</li> </ul>	0.803	0.827	0.631
Psychological Detachment	Adapted from: <a href="#">Sonnentag and Fritz (2007)</a>	<ul style="list-style-type: none"> <li>• I got a break from the demands of usual life</li> <li>• I was able to distance myself from the demands of usual life</li> <li>• I didn't think about my usual life at all</li> <li>• I forgot about my usual life</li> </ul>	0.791	0.802	0.664
Sense of Presence	Adapted from: <a href="#">Tussyadiah et al. (2018)</a> ; <a href="#">Kim et al. (2019)</a>	<ul style="list-style-type: none"> <li>• I felt like I was actually there in the VR environment.</li> <li>• It seemed as though I actually took part in the action of the VR (sightseeing).</li> <li>• It was as though my true location has shifted into the VR environment.</li> <li>• I felt as though I was physically present in the VR environment.</li> </ul>	0.811	0.764	0.713
Attitudes towards the destination	Adapted from: <a href="#">Spears and Singh (2004)</a>	<ul style="list-style-type: none"> <li>• Unappealing/ Appealing</li> <li>• Bad/Good</li> <li>• Unpleasant/ Pleasant</li> <li>• Unfavourable/ Favourable</li> <li>• Unlikeable/ Likeable</li> </ul>	0.785	0.833	0.598
Willingness to Pay	Adapted from: <a href="#">Hultman, Kazemina, and Ghasemi (2015)</a>	<ul style="list-style-type: none"> <li>• How willing would you be to pay for a VR tourism experience</li> <li>• How willing would you be to have the VR experience if you had to pay for it</li> <li>• How willing would you be to pay for a VR tourism experience as opposed to a regular tourism experience</li> </ul>	0.847	0.811	0.626

(CA = Cronbach's Alpha; CR = Composite Reliability; AVE = Average Variance Extracted)

$\alpha > 0.7$ . The calculation of the CFA presented goodness-of-fit:  $\chi^2_{(382)} = 841.264$ ,  $p = 0.001$ ,  $\chi^2/df = 2.20$ ; RMR = 0.015, RMSEA = 0.043, SRMR = 0.039, NFI = 0.992, CFI = 0.988, TLI = 0.941. Additionally, the regression coefficients ranged from 0.29 to 0.71 and were statistically significant. Subsequently, the Average Variance Extracted (AVE) was calculated to measure convergent validity, where each value surpassed the benchmark value of 0.5 ([Hair, Black, & Babin, 2010](#)). Additionally, construct reliabilities were above 0.70, demonstrating adequate convergent validity for all constructs (See: [Table 1](#)). The AVE scores also exceeded the square of their correlations affirming support for discriminant validity (see Appendix B). Moreover, multicollinearity was assessed through a variance inflation factor analysis (VIF). Accordingly, the results detailed that no variable surpassed the critical value of 3.0 ([Hair et al., 2010](#)); thus, multicollinearity was not violated.

Further, to avoid inaccurate conclusions derived from the data, the data were assessed for common method bias (CMB) ([Podsakoff, MacKenzie, Lee, & Podsakoff, 2003](#)). In AMOS Graphics, we presented a common latent factor (CLF) encompassing every item from each of the variables in the model. The CLF presented the value 0.423. To compute the common method variance (CMV) 0.502 was squared, presenting the value of 0.252 (25.2%). According to [Ranaweera & Jayawardhena \(2014\)](#), values falling below 50% adhere to the improbability of CMB.

Lastly, following the calculations on scale reliability, composite reliability, common method bias, convergent and discriminant validity as well as the *goodness of fit* reported from the CFA, the *goodness of fit* of the structural model was calculated. The structural model illustrated *goodness-of-fit*:  $\chi^2_{(15)} = 41.358$ ,  $p < .05$ ,  $\chi^2/df = 2.7$  RMSEA = 0.047 SRMR = 0.021, RMR = 0.016, GFI = 0.985, CFI = 0.971, NFI = 0.975, TLI = 0.959. The regression coefficients were all positive and statistically significant. [Table 2](#) details the results of hypotheses H2a, H2b, H3, H4, and H5.

The results detailed in [Table 2](#) support each of the hypotheses in the study. As such, this research provides interesting insights for tourism marketers and policymakers. With regard to H2a, we find that the sense of presence in the VR tourism experience has a significant influence on consumers' subjective wellbeing ( $\beta = 0.573$ ,  $t = 4.34^{***}$ ). Thus, VR's ability to transport an individual and induce the feeling of 'being there' enables consumers to feel like they are on vacation. Hence, the digital sense of presence in VR positively influences subjective wellbeing in a similar vein to an actual real-world vacation.

More so, in support of H2b, the sense of presence in VR tourism displayed a positive influence on psychological detachment from usual life ( $\beta = 0.551$ ,  $t = 4.20^{***}$ ). Thus, the VR tourism experience is capable of taking individuals away from their daily life, transporting to an alternative world and detaching individuals from the strains of daily life.

**Table 2**  
Hypotheses results.

Hypothesis	Relationship	$\beta$ ; t; p-value	R <sup>2</sup>	Support
H2a	SOP→PW	$\beta = 0.573$ , t = 4.34***	0.58	Hypothesis Supported
H2b	SOP→PD	$\beta = 0.551$ , t = 4.20***	0.30	Hypothesis Supported
H3	PD→PW	$\beta = 0.757$ , t = 6.74***	0.58	Hypothesis Supported
H4	PW→ATD	$\beta = 0.402$ , t = 3.01**	0.16	Hypothesis Supported
H5	PW→WTP	$\beta = 0.383$ , t = 3.12**	0.15	Hypothesis Supported

(SOP = Sense of Presence, PW = Psychological Wellbeing, PD = Psychological Detachment, ATD = Attitude towards the Destination, WTP = Willingness to Pay;  $\beta$  = Standardised Regression Coefficient; t = t-value; \*\* =  $p < .05$ , \*\*\* =  $p < .001$ , ns = not significant)

Relatedly, in support of H3, we find that psychological detachment has a positive influence on consumers' subjective wellbeing ( $\beta = 0.757$ ,  $t = 6.74^{***}$ ). Therefore, in line with effort-recovery theory, VR's ability to take individuals away, psychologically detaching them from their daily life to allow them to recover has a positive influence on consumers' subjective wellbeing. Overall, we find that the sense of presence and psychological detachment explain 58% of the variance in consumers' wellbeing. According to Cohen (1988), a large effect size in social science research is any value over 25%. Thus, the sense of presence and the psychological detachment afforded by VR tourism explains a significant proportion of variance in consumers' subjective wellbeing. Additionally, we tested the mediating effect of psychological detachment between the sense of presence and subjective wellbeing. The bootstrap test of the indirect effect was tested in AMOS Graphics. The results of the bootstrap test found that the indirect effects on the path (Sense of Presence - Psychological Detachment - Subjective Wellbeing  $p = .035$ ) were statistically significant  $p \leq 0.05$ , thus pertaining to the importance of the mediating role of psychological detachment.

While we find the positive influence of VR tourism on consumers' subjective wellbeing, we also affirm the positive effects of such subjective wellbeing on consumers' attitudes and behaviours. Accordingly, in support of H4, consumers' subjective wellbeing following a VR tourism experience has a positive influence on attitudes towards the destination ( $\beta = 0.402$ ,  $t = 3.01^{**}$ ). Thus, the positive influence of the digital VR tourism experience on enhancing a consumers' wellbeing in turn positively influences attitudes a consumer holds towards the destination. To date, a consumers' subjective wellbeing has been largely overlooked in shaping attitudes. Even more so, digitally induced positive subjective wellbeing has received no previous attention within the literature. In turn, our findings affirm the importance of VR tourism experiences not only for policymakers but for tourism brands aiming to shape positive consumer attitudes.

In support of H5, we find that a consumer's positive subjective wellbeing has a positive influence on their willingness to pay for a VR tourism experience ( $\beta = 0.383$ ,  $t = 3.12^{**}$ ). The extant literature posits that enhanced subjective wellbeing is a motivational driver of revisit intentions and vacation purchase intentions. However, our finding in support of H5 outlines the important role of VR tourism as an experience and accordingly, like a real-world vacation, individuals' willingness to pay for the experience.

Lastly, we tested the mediating effect of subjective wellbeing between the sense of presence and dependent variables. Again, the bootstrap test of the indirect effect was tested in AMOS Graphics. The results of the bootstrap test found that the indirect effects on the paths (Sense of Presence - Subjective wellbeing- Attitudes towards the Destination  $p = .043$ ; Sense of Presence - Subjective wellbeing- Willingness to Pay  $p = .039$ ) were statistically significant  $p \leq 0.05$ , thus pertaining to the importance of the mediating role of subjective wellbeing.

The theoretical and practical implications of the results in both Study 1 and 2 are discussed in more detail within the subsequent sections.

#### 4. Discussion

While tourism consumption has been affirmed as having a positive influence on consumers' subjective wellbeing (see: Chen et al., 2016; Nawijn et al., 2013; Sirgy, 2010; Sonnentag & Fritz, 2007), we had no conceptual or empirical understanding of the propensity of VR tourism in fostering positive subjective wellbeing and the subsequent effects this has for tourism providers and policymakers. This study has provided empirical evidence on the positive influence of VR tourism on consumers' subjective wellbeing, advancing our understanding of digital tourism consumption.

Previous research outlines that a vacation transports one's self to an alternative world, physically (Sirgy, 2010). Similarly, VR transports one's self to an alternative world, but virtually. Thus, we find that parallels can be drawn between both the purpose of a vacation and the

essence of VR. Accordingly, through the theoretical lens of *Presence Theory* - the psychological feeling of transporting and being present in a non-physical space, and *Effort-Recovery Theory* - the understanding that relaxation and psychological detachment aids recovery, this research has uncovered the positive role of VR tourism on consumer wellbeing and the nuance of the sense of presence in VR tourism in enhancing psychological detachment, subjective wellbeing and the subsequent attitude and behaviour intentions stimulated by consumers' subjective wellbeing.

##### 4.1. Theoretical implications

We defined VR Tourism as a *holistic tourism experience viewed through VR technology without the need to physically travel anywhere*. Given recent world events resulting in travel and tourism becoming inaccessible for numerous consumers (e.g., global pandemic, cost of living crisis, European conflict, and changes to sustainable behaviour), VR tourism has gained more attention in the travel and tourism sector. A steady growth in the application of VR in tourism in recent years has seen the technology being used to preview destinations or hotels (Zeng et al., 2020). Additionally, prior research has outlined the capability of VR in influencing consumer attitudes and behavioural intentions (see: Tussyadiah et al., 2018). However, through study 1, we uncover the positive influence of VR tourism on consumers' wellbeing. Prior literature asserts that taking vacations can positively influence individuals' wellbeing as they have the opportunity to omit their usual environment detaching from the strains of work and their day-to-day routine (see: Chen & Petrick, 2013). Underpinned by *Presence Theory*, VR can enable individuals to omit their usual environment through the sense of presence inherent within the experience, accordingly the ability to omit the usual environment explains the positive influence of VR tourism on consumers' wellbeing. The results of study 1 pertain that a VR tourism experience is capable of enhancing consumers' wellbeing in comparison to a less immersive experience (i.e., an image gallery on a website). The depth of the sense of presence inherent within VR distinguishes it from any other technology. Study 2 affirms the positive influence of the sense of presence in VR on consumers' subjective wellbeing, and therefore advances our understanding of the sense of presence within VR and its role on wellbeing. Consequently, technologies capable of delivering a similar level of presence as VR, (e.g., semi-immersive virtual reality or augmented reality), could also have a positive effect on consumer wellbeing.

The literature pertains that one of the greatest drivers for tourism experiences is to escape stressful environments (Mannell & Iso-Ahola, 1987). Through the lens of *Effort Recovery Theory*, we outline that psychological detachment can aid recovery and consumer wellbeing as no additional stresses are placed on an individual's functioning. The results of this research further our understanding of VR tourism in this regard given that the sense of presence experienced from the VR tourism encounter positively influenced psychological detachment. Thus, the sense of presence in VR, i.e., the ability to transport an individual away, omitting the real world, enables individuals to psychologically detach from the real world, no longer making demands on their own functioning and accordingly able to recover.

More so, the literature asserts that relaxation can stimulate psychological detachment. Accordingly, relaxation can be achieved when performing pleasurable activities (e.g., vacation, gaming, walking in nature). Previous literature avers that taking a vacation is a relaxing activity due to the limited psychological demands placed on an individual. However, this research sheds light on the benefits of VR tourism, the results affirm that not only does VR tourism enable consumers to psychologically detach, but such detachment positively influences consumers' subjective wellbeing. Therefore, the digital VR tourist experience may mirror the positive influence of a traditional physical tourism experience. Given the restricted travel due to world events and the continued demand for vacations, and the role of vacations in the

relaxation process to facilitate psychological detachment and recovery from the stress and strains of individuals' daily lives, VR tourism offers consumers an alternative means to enhance their subjective wellbeing. Notably, however, we do not know the lasting influence of VR tourism on psychological detachment and consumer wellbeing. Given the commentary from scholars on the varying lasting effects of vacations on consumer wellbeing (e.g., Su et al., 2020), further research is required on the lasting wellbeing effect derived from VR tourism.

More so, given that the sense of presence and psychological detachment explain 58% of the variance in consumers' subjective wellbeing, the results affirm the technology's capability to transport individuals to an alternative world inducing the feeling of 'being there', while detaching consumers' from the strains of their day-to-day routine. In addition to the positive effects that were found in relation to enhancing consumers' wellbeing, we also affirm the positive influence of an enhanced wellbeing on attitudes and behavioural intentions. Research to date has presented limited empirical insight on the effects of a positive consumer wellbeing, largely, the extant literature focuses on consumer satisfaction (Grzeskowiak & Sirgy, 2007), while some studies surmise the positive influence of consumers' subjective wellbeing on shaping attitudes and behaviours. However, given the increased attention on individuals' wellbeing, tourism providers, brands and policymakers ought to understand not only the drivers but also the outcomes of enhanced wellbeing. Specifically, we find that an enhanced subjective wellbeing can positively influence consumers' attitudes towards a destination. Previous research found that wellbeing is one of the most important drivers of consumer attitudes towards a restaurant (see: Ha and Jang, 2010; Park, 2004; Carpenter, 2007; Kim et al., 2012), in this research we find that an enhanced subjective wellbeing motivated by the use of VR technology has a similar positive effect on destination attitudes. Accordingly, we build upon the limited research on the outcomes of consumer subjective wellbeing and illustrate the propensity of immersive VR technology in the form of a VR tourism experience to enhance wellbeing and develop positive attitudes towards a destination.

The literature affirms that wellbeing perceptions play an important role in consumer decision making (see: Sirgy, 2010). Previous work has indicated that an individual's wellbeing can motivate the decision to purchase a first-class flight ticket as a means of satisfying a life goal. Other research has indicated that consumers are willing to pay more for products or services capable of enhancing their wellbeing (Sirgy & Lee, 2008). Building upon these works, this research affirms that positive subjective wellbeing resulting from a VR tourism experience influences individuals willingness to pay for a VR tourism experience in the future. Accordingly, we can draw parallels between wellbeing as a motivational driver for physical tourism experiences as well as a motivational driver for digital VR tourism experiences.

The results of this study indicate that VR tourism can draw out similar psychological benefits to traditional physical tourism. Due to the depth of the sense of presence available in immersive head-mounted VR devices, individuals are able to feel 'physically' present in a non-physical space, where they seem to have shifted from the real world to a virtual world. Given that VR omits the physical real world, consumers are able to escape the usual routine and stressful environments, in a similar vein to shifting from the 'physical real world' to a 'physical vacation world', escaping the usual routine. Such escape and omission of the real world enables consumers to temporarily leave behind their day-to-day routine permitting psychological detachment and positive subjective wellbeing. Thus, technology-enabled VR tourism offers consumers an alternative means of enhancing their subjective wellbeing in a similar manner to traditional real-world vacations.

#### 4.2. Practical implications

Numerous practical implications for tourism providers and policymakers arise from this research. For tourism providers, our research demonstrates that VR tourism not only provides functional benefits such

as showcasing their venue, but it can also provide psychological benefits to individuals through enhanced wellbeing. The positive subjective wellbeing effect from VR tourism can, in turn, shape positive attitudes towards the destination and tourism provider.

For policymakers, our research shows that VR tourism experiences can positively influence wellbeing, which have broader implications for society. Given that VR tourism enables individuals to psychologically detach from the stress and strains of day-to-day life and enhance wellbeing, investment in VR tourism should be made a priority to enable these pertinent social and health benefits. More so, given the psychological stress world events such as Covid-19 has placed on one's functioning, causing anxiety, depression, sleeping problems and behavioural issues (da Silva & Neto, 2021; Huang & Zhao, 2020), establishing processes to effectively manage subjective wellbeing has become an urgent reality for now and into the future. Thus, VR tourism could offer a new stress management and relaxation practice to ease psychological pressures and to recover from the strains of daily life. Previous research (see: Sonnentag & Fritz, 2007) affirms the positive influence of taking a vacation on individuals' psychological wellbeing. However, at a time of restricted travel or as an alternative means of recovery in the future, VR tourism could have a similar positive influence on psychological detachment and wellbeing as physical tourism due to the level of presence inherent within an immersive HMD VR experience.

Not only can VR tourism provide important societal benefits in enhancing wellbeing, but it also has significant benefits from an economic perspective. VR tourism opens up a new avenue of revenue for tourism providers. Our results pertain consumers' willingness to pay for VR tourism experiences due to their positive influence on enhancing subjective wellbeing and detachment. Given the restricted travel and the apprehension towards tourism activities, new revenue streams are a welcomed boost for the sector. Previous research acknowledges consumers' willingness to pay for products or services (even at a premium price) should they have a positive influence on their wellbeing. Thus, tourism providers should develop such VR tourism experiences while communicating the wellbeing benefits of the experiences, enabling psychological detachment and to escape away from the real world to experience an exotic or exciting destination.

However, beyond periods of restricted travel, VR tourism could become an alternative sustainable digital tourism option that merits investment from tourism providers given the willingness of consumers to pay for the experience. More so, such VR tourism experiences open up a new accessible form of tourism for those consumers who are unable to travel due to financial constraints or physical functioning constraints. Accordingly, tourism providers and policymakers ought to consider ways to make VR tourism accessible to consumers from a hardware point of view. Low-cost VR head-sets such as the Google Cardboard device provides an economically viable option while pop-up VR facilities in shopping malls or other entertainment outlets are practical. Lastly, given the rise of online subscription services such as *Netflix* and *Amazon Video*, which enable consumers to detach from daily life, tourism providers could consider subscription services to VR tourism experiences in a similar vein, fostering new business revenue through an innovative modern business model.

#### 4.3. Limitations and future research

This research has taken the initial steps in uncovering the propensity of VR tourism in fostering positive subjective wellbeing and the subsequent effects this has for tourism providers and policymakers. However, certain limitations of this study provide future avenues for research.

Firstly, while this study finds that VR tourism can positively influence individuals' subjective wellbeing, to further advance our understanding, future research should conduct experiments to compare the effects of a VR vacation versus a traditional vacation to identify any differences on wellbeing. This would shed light on the comparability of VR tourism and traditional tourism, while advancing our understanding



on the propensity of VR tourism as an alternative to traditional tourism.

Secondly, we utilised the Google Cardboard VR head-set in our study. Future research should test the results with other VR hardware. While the Google Cardboard headset is a fully-immersive form of VR, other professional devices such as the HTC Vive enables more movement tracking which may influence the results. In a similar vein, it would be interesting to understand if the same effects are found in semi-immersive VR environments, such as panoramic screens in a VR room without the need of a VR headset.

Third, as outlined in our discussion, given the insight on the varying lasting effects of vacations on consumers' psychological wellbeing, further research is required on the lasting subjective wellbeing effect derived from VR tourism. A longitudinal research design to measure the influence of VR tourism at multiple time points would enhance our understanding. Relatedly, it would be interesting for future research to assess the lasting influence of repeating the same VR tourism experience vs. new VR tourism experiences on consumer wellbeing. This would be an interesting insight given the high revisit rates many consumers have with specific tourist destinations.

Fourthly, we utilised one type of VR tourism experience, a walk-through of the Magic Kingdom theme park in Walt Disney World, Orlando, Florida. It would be advantageous to test the influence of VR tourism on individuals' subjective wellbeing in different types of tourism experiences in varying destinations.

Fifth, it would be interesting to understand the effects of VR tourism across different types of travellers (i.e., frequent travellers vs. occasional travellers). Relatedly, it would add to our knowledge of VR tourism to test the effects of VR tourism on travellers seeking different experiences (i.e., adventure vs. relaxing).

Sixth, given this research was conducted during the Covid-19 global pandemic, future research should assess consumers' willingness to pay

for a VR tourism experience post-pandemic related restrictions, to affirm ongoing willingness to pay for such experiences.

Seventh, from a subjective wellbeing point of view, it would be beneficial to understand the influence of VR tourism vs. other comparable relaxation activities (e.g., watching a TV series or playing computer games) on an individual's subjective wellbeing.

Lastly, we measured one part of psychological wellbeing, namely, subjective wellbeing. Future research could also measure objective wellbeing to provide a more holistic overview of wellbeing. Alternatively, a recent growing body of literature drawing on positive psychology measures wellbeing from both a hedonic and eudaimonic perspective. To further our understanding of VR on consumer wellbeing, future research could measure wellbeing through the lens of positive psychology.

#### CRediT authorship contribution statement

**Graeme McLean:** Conceptualization, Writing – review & editing, Methodology, Data curation, Visualization, Validation, Writing – original draft. **Mansour AlYahya:** Conceptualization, Writing – review & editing, Methodology, Data curation, Visualization, Validation, Writing – original draft. **Jennifer B. Barhorst:** Writing – review & editing, Writing – original draft, Visualization. **Kofi Osei-Frimpong:** Writing – review & editing, Writing – original draft, Visualization.

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#### Appendix A. Google Cardboard VR headset and instructions



## Appendix B. Convergent and discriminant validity

	CR	AVE	SW	PD	SP	ATD	WP
Subjective Wellbeing (SW)	0.827	0.631	0.631				
Psychological Detachment (PD)	0.802	0.664	0.351	0.895			
Sense of Presence (SP)	0.764	0.713	0.266	0.214	0.844		
Attitudes towards the destination (ATD)	0.833	0.598	0.294	0.177	0.161	0.773	
Willingness to Pay (WP)	0.811	0.626	0.271	0.189	0.201	0.391	0.791

CR - Construct Reliability; AVE – Average Variance Extracted.

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