Article

Subjective Immediate Experiences during Large-Scale Cultural Events in Cities: A Geotagging Experiment

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Abstract: Cities are increasingly exploiting new activities such as large-scale cultural events in public open spaces. Investigating the subjective immediate experiences of visitors is valuable to reflect on these events and their configuration in the city. Therefore the aim of this study is twofold: (i) to demonstrate a data collection methodology to measure subjective immediate experiences of visitors and (ii) to test different types of factors that influence visitors' subjective immediate experiences at cultural events by means of the new methodology. A quantitative research that is enabled by geotagging, paper surveys and secondary data (location characteristics and weather conditions) is applied at the Dutch Design Week event in Eindhoven, the Netherlands. After data collection, a binary logit model is estimated. It is found that apart from age and intended duration of stay, visitor characteristics do not influence the subjective immediate experiences while temporal, physical environmental and weather conditions do. Specifically, it is found that subjective immediate experiences at outdoor locations are mainly influenced by location characteristics. This study shows that the proposed data collection methodology is useful for gathering insights especially on the influence of physical characteristics on subjective immediate experiences. The paper concludes with recommendations for future research and with suggestions to policy makers and event managers.

Keywords: subjective immediate experiences; geotagging; GPS; cultural event; event visitors

1. Introduction

Large-scale events have the potential to create a vast amount of urban tourism by attracting visitors that bring economic advantages to hosting cities in the global competition [1]. Besides, events also bring social capital and cultural regeneration that have impact on the places in which the events are staged [2]. Thus, another role of events in cities is to regenerate or create better places for living, working and visiting, even after the events. It is important for event providers and urban planners to create spaces that generate positive experience during the events, because this will attract new and repeated visitors and also will support the enhancement of places in cities [3,4]. However, event managers and local organizers usually do not obtain useful feedback about how the event and its physical space are experienced by event visitors (both locals and tourists).

During large-scale events in cities, a physical transformation or adaptation of the urban space is undertaken to emphasize the image of the city and to brighten up the attraction. This spatial change is temporary and dissimilar to everyday life. According to Vengesayi et al. [5], event locations are the primary factors that pull visitors to a certain location. Secondary factors are the support services and facilities surrounding these locations such as the transport network and amenities. At large and multi-staged events in cities, while visitors move to different urban areas to visit the attractions, place characteristics such as places to rest and eat, safe crossings, easy accessibility, etc. contribute to visitors' experiences and therefore play a role in visitors' perception of a place [6]. Therefore, visitors'

experiences stem from interacting with the new environment during the consumption of products and services. These experiences result in emotional and cognitive outcomes, which indicate the perception of places [7].

Experiences during events are closely associated with its location and physical environment [8], thus investigating the immediate experiences would reflect more details on the event and its configuration. Time and space are intrinsic parts of visitors' immediate experiences [8]. Immediate experiences are expected to vary over time and space, depending on a variety of factors, such as the amenities, facilities or the weather. Thus, analyzing the subjective immediate experiences would enable the understanding of the complex interactions between visitors and the event setting, and hence support more comprehensive feedback on event activities [9,10]. Learning about the visitors' subjective immediate experiences can give event managers and the hosting city valuable insights not only to improve the quality of the events, their settings in terms of resource allocation such as the exhibition locations, services and facilities around them, but also to improve the urban environment in general.

Hitherto, research on visitors' experiences has most often avoided the immediate nature of the experiences and focused on the overall satisfaction of visitors, which is evaluated by traditional satisfaction surveys. Few earlier studies [11–14] examined the subjective immediate experiences during leisure and tourism activities in real settings. These studies asked respondents to log their experiences via tape-recordings or surveys but the logs were not accurate in terms of their geographical recordings [15]. A handful of recent studies (i.e., [9,15–19] emphasize the importance of the subjective immediate experiences and their variance over time and space for leisure and tourism activities. In these studies, data collection is demonstrated by means of location-based technologies (e.g., GPS enabled tracking devices or apps) and additional web tools or paper surveys. The collected data is used either for analyzing the experiences at an aggregated level or for mapping and visualizing the exact location of experiences. However, these studies generally include only a subset of relevant factors that could influence the subjective immediate experiences into their analysis. Especially physical environmental characteristics appear to be under investigated.

In the light of previous studies, the aim of this study is twofold: (i) to demonstrate a data collection methodology to measure subjective immediate experiences of visitors during large-scale events and (ii) to test different type of factors (amongst others physical environmental characteristics) that influence visitors' subjective immediate experiences at cultural events by means of the new methodology. This paper adds to the knowledge of existing studies on subjective immediate experiences, especially by focusing on the interaction of cultural event visitors with the spatial environment by means of geotagging and surveys. Moreover, it presents a study that uses a large sample and time frame in the real world setting compared to previous studies.

In the present study, a quantitative research is applied considering visitors' subjective experiences at the Dutch Design Week event in the Netherlands. This event consists of multiple indoor and outdoor venues. In the course of the study, by means of a new data collection methodology, it is investigated how (i) visitor characteristics, (ii) temporal characteristics, (iii) weather conditions and (iv) physical environmental characteristics at a given time and space influence the subjective immediate experiences. The first three types of characteristics are investigated for their impact both on indoor and outdoor immediate experiences, while the physical environment characteristics are only investigated for their influence on the outdoor immediate experiences. This is done by estimating a logit model on the collected data.

This study is done within the framework of the European Union Horizon 2020 ROCK (regeneration and optimization of cultural heritage in creative and knowledge cities) project. The ROCK project aims to develop an innovative, collaborative and circular systemic approach for the regeneration and adaptive reuse of historic city centers. In the ROCK project, large-scale events are exploited as one of the enablers of sustainable urban transformation.

The following theoretical section discusses the approaches that are used to explore subjective immediate experiences and the factors that are hypothesized to have an impact on the experiences.

Since currently there are very few studies on subjective immediate experiences during cultural events, this section hypothesize the relation between different attributes and subjective immediate experiences considering the literature from a variety of disciplines (i.e., psychology, urban planning and tourism). The third section describes the methodology and sample descriptive. The fourth section describes the outcomes of the experiment. Finally, the fifth section draws conclusions regarding the main findings of the study, reflects on the limitations of the study and the data collection method and explores avenues for further research.

2. Subjective Immediate Experiences and Influencing Factors

In recent years, cities are not only assessed by their objective criteria (i.e., infrastructure) but also with their subjective criteria (i.e., attractiveness, wellbeing and quality of life). Since during post-industrial transition, the way economic and social value is created has changed [20]. In that sense, culture is playing a new role as a potential engine of the emerging experience economy [21]. This has also resulted in a shift in the assessment of tourism and leisure activities towards more subjective types of value (i.e., quality of life, a sense of well-being and sustainability) [22].

Cities are increasingly exploiting new activities such as large-scale cultural events and festivals that stem from cultural narratives (i.e., Light Festivals in Lyon and Eindhoven, Perth International Arts Festival and Edinburg Festival Fringe), to (re)build their image, to improve their attractiveness, and hence stimulate sustainable urban development [23,24]. Besides economic advantages, cultural events and festivals have several positive impacts on the society as they create platforms to develop stronger social bonds through memorable experiences [25] and to increase socio-cultural exchange within the society [26]. On the other hand, events also cause several negative impacts if the implementation is not conducted in a sustainable way. These perceived negative impacts are usually seen as environmental pollution, traffic congestion, spatial inequality of services and facilities and social conflicts [26] that as a result influences the overall wellbeing and quality of life of people.

In the literature, the perception of visitors are evaluated mainly by overall satisfaction surveys that are based on people's memories and memorable experiences after the event. However, Lee and Kyle [27] indicate that remembered experiences during festivals show inconsistency with the self-reported momentary experiences. Wood and Moss [28] explain that the remembered experience might be different to the immediate experiences. The immediate nature of experiences has also been acknowledged in the literature but they are not extensively investigated. While remembered experiences are useful to understand the overall satisfaction from an event, immediate experiences and how they are perceived can be useful to understand where and when certain feelings occur and what factors influences these feelings. Thus policy makers and event managers can conduct interventions to turn negatively experienced places (i.e., polluted, congested or no facilities) into positive ones, which will lead to better quality of life and wellbeing in the society through advancement of large-scale events.
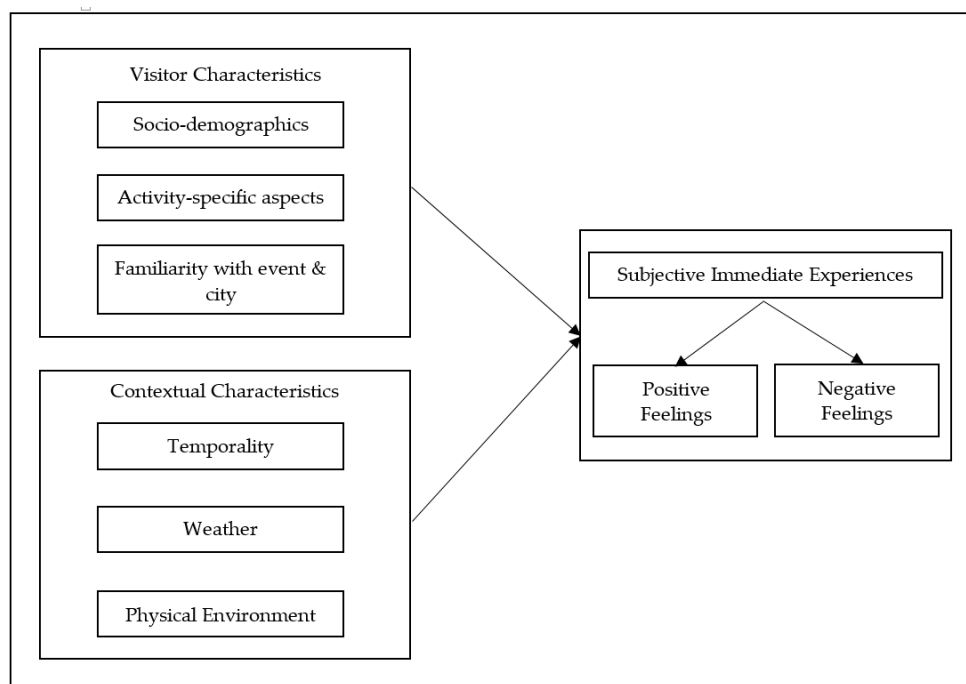
2.1. Subjective Immediate Experiences

According to Pine and Gilmore's [29] theory on experience economies, people consume experiences rather than products and services. Therefore businesses should construct "staged" consumption events, which will generate a satisfactory and memorable experience for the customers. This theory suggests that experiences occur within an individual who is engaged with a situation that provides physical, emotional, spiritual and intellectual values. Due to that, experiences are claimed to be subjective, intangible, continuous and highly personal phenomena [30].

Subjective experiences can refer to two different states: the overall experience and the immediate experience. The overall experience of an individual is usually measured with the satisfaction concept and is the outcome of a sequence of independent experiences [31]. Immediate experience deals with the on-site and real-time nature of the experience itself and can be explained as the interaction process between the individual and the individual's physical and social environment [32]. Due to the responsiveness to varying interactions, immediate experiences are volatile and episodic.

Each experience evokes an immediate affective meaning (association). The perception of what is experienced at the moment varies in two dimensions, positive vs. negative and activated vs. deactivated affect [33,34]. According to Sheth and Mittal [35], the affective meaning is perceived as the result of consciousness of an occurrence. Affect is usually described as an inclusive concept that refers to emotions, and both affect and emotion are used interchangeably in respect to human feeling states [11]. As an example to this conceptualization, the occurrence of "being lost" is an immediate experience and the emotions such as anger and fear are the negative affective states as a result of "being lost".

To summarize, if an individual interacts with his/her environment at a certain moment, this results in a subjective immediate experience. Therefore, the immediate experiences are influenced by personal characteristics and contextual variables, including environmental characteristics [10,32,36]. Throughout a cultural event, a person can have a set of immediate experiences. The evaluation of each immediate experience by the individual reflects the affective meaning associated to the experience, which then later can be characterized as positive and negative feelings [37]. Figure 1 shows the conceptualization of these aspects for our study. Below sub-sections will further explain visitor/personal characteristics (socio-demographics, familiarity with the place and activity specific aspects), contextual characteristics (physical environment, temporality and weather conditions) and recent methodological studies on subjective immediate experiences.

Figure 1. Conceptual model.

2.2. Visitor Characteristics

As mentioned above, personal and contextual variables are relevant to the immediate experiences. Personal variables can be categorized into personality traits and socio-demographics. Personality traits such as mood and disposition are intrinsic to the type of the affective state that an individual attaches to immediate experiences [36]. Although the impact of socio-demographic characteristics, i.e., education, income and marital status, has been found influential on the overall experiences such as well-being and satisfaction, it is anticipated that these characteristics have less impact on the immediate experiences [36]. This is seen in studies of other domains (i.e., psychology and urban planning) that investigated on-site real-time experiences, as no significant relation between socio-demographics and immediate experiences could be found [38–40]. This is also shown in an event related study, as the immediate experiences are found to be more influenced by the contextual variables such as weather and season [9].

In addition, individuals' subjective immediate experiences may also depend on other factors such as the activity purpose, company and knowledge/familiarity of the place. The type of the activity is an important aspect of subjective experiences. If people participate in a leisure activity, they already tend to feel more positive during the activity as it is the initial motivation of participating in such activities [12]. In addition to that, in large-scale event activities, the urban space is shaped in order to increase the positive experiences. Moreover, knowledge of the place might influence the subjective immediate experiences as a person might acquire additional spatial knowledge or memories from previous visits might pop up [40,41]. For instance, a visitor may avoid the areas that have evoked negative experiences in the previous visit or a visitor might know the more interesting areas for his visit. Furthermore, Anderreck et al. [42] argue that social interactions influence the perception of experiences. Csikszentmihalyi and Hunter [10] found that activities that are performed with acquaintances improve momentary happiness and activation. Ettema and Smajic [41] show that walking alone leads to negative affective state compared to walking in company. However, Weijs-Perrée et al. [43] found that having a travel company has no influence on the immediate experiences.

2.3. Contextual Characteristics

Contextual characteristics can be considered as a physical environment, temporality and weather conditions. Since Kevin Lynch's work [44], it is accepted that people's experiences are closely associated with the physical environment or contexts, such as transport accessibility to and service facilities at the visited location. This is increasingly acknowledged as outdoor surroundings are influential on the affective states that individuals experience through the stimuli the environment generates. Therefore, adequate physical aspects of activities such as service and infrastructure related to the activities can lead to more positive evaluations of experiences. For example, event visitors may not feel pleased if they have difficulties to access the event area, while visitors at noon may feel cozy if they can easily find restaurants nearby. This relation between the physical environment and the immediate experiences has potential to be investigated. However, the empirical work on this subject is lacking in the literature.

The temporal aspects such as day of the week and time of day are also found to influence the immediate experiences during activities as people reported more positive feelings during weekends and when they spent more time at a stimulating activity such as event visits [10]. However, when temporal aspects are considered in the urban setting (in space), their effect is found to be little or insignificant on the affective state of immediate experience [40,41].

Next, the weather conditions, e.g., temperature, rain occurrence and cloudiness, can influence the subjective feelings of people directly (i.e., mood changes) or indirectly (i.e., alteration of activities) [45]. This is especially relevant for outdoor settings as in large-scale events people go from one exhibition location to another.

Finally, physical environmental attributes such as the availability and accessibility of facilities may influence immediate experiences. Although above mentioned theories from studies such as Hull [12], Csikszentmihalyi and Hunter [10], Eid and Diener [36] and Mannell and Iso-Ahola [32] are relevant to event experiences, they disregard the influence of physical environment characteristics. In addition, urban planning related studies such as Kevin Lynch [44], Birenboim [40], Ettema and Smajic [41] and Weijs-Perrée et al. [43] discuss the immediate experiences in the built environment but not specifically during large-scale events. However, generic experiences and event experiences may differ as visitors probably have some expectations of event experiences while generic experiences can occur anywhere or anytime. Thus, event experiences are more related to its content and setting. This is also because event settings, theme, program and technical systems are usually designed in order to create certain effects [14]. Mossberg [46] discusses that visitor experience is influenced by many factors including other visitors, products and services offered and the physical environment. However, there are not many studies that focus on exploring, which physical environment attributes have more potential for positive experiences of visitors.

2.4. Methodologies to Measure Immediate Experiences of Visitors

In recent years, immediate experiences and methodologies to measure them have taken the interest of researchers in the tourism and leisure field. This is especially due to the new technologies i.e., GPS, WiFi and smart apps that enable to record and log immediate experiences. For instance, Loiterton and Bishop [19] used GPS and personal digital assistant (PDA) devices in the Royal Botanic Garden in Melbourne with the purpose of tracking the visitors. The PDAs allowed asking location based questions on subjective feelings. The collected data is used in an agent-based model to predict the movement of visitors. Zakrisson and Zillinger [9] used GPS and additional surveys to understand the positive/negative experiences of tourists. Later the data was combined with survey data on the activity purpose and seasonal characteristics in order to identify the type of tourists. Pettersson and Zillinger's [18] work aimed to present the methods that can be used for measuring the subjective immediate experiences. In this study, participants were equipped with GPS devices during the Biathlon World Championships of 2008 that took place in Östersund, Sweden. Participants geotagged their location whenever they experienced positive and negative feelings. At the end of the day, they were given additional questionnaires to report on their experiences. They conclude that using GPS and additional surveys give more insights on the experiences of visitors. Birenboim et al. [17] investigated the use of a smartphone app collecting GPS data and SMS reports on the visitors' subjective experiences at their visit to Aalborg Zoo. Birenboim [16] used a similar method at an outdoor music event in order to map the sense of security and positive/negative experiences. Shoval et al. [15] demonstrates the application of novel methods by combining spatio-temporal data with physiological measures of emotion and semantic contextual information in order to obtain understanding of tourists' experience. They combined four data collection techniques (high-resolution locational data, real-time surveying techniques using the experience sampling method, physiological measures of emotion (electro-dermal activity) and traditional surveying techniques) and applied these techniques to a sample of 68 tourists in Jerusalem. They conclude that the combination of techniques produces rich insights on tourists' experiences and emotional characteristics of touristic locations.

Apart from suggesting new methodologies and exploring the variance of experiences in time and space, these studies also focus on the influence of personal characteristics and season on the subjective immediate experiences. However, they did not take into account the influence of physical environment characteristics on the immediate experiences. This is important as experiences affect people's sense of place as such previous experiences will shape future experiences and visitations [47]. Moreover, in these studies, the investigation is still limited in the real-world settings. Since these studies took place in restricted and small environments for a limited time frame of several hours. In addition to these studies, there are other researches such as [48–51], focusing on location-based services to facilitate the data collection for people's emotions in the cities as the reflector of immediate experiences. However, these studies do not aim to comprehend the influencing aspects of these emotions.

As the recent literature on subjective immediate experiences suggest, the exact time and locational data has a fundamental role in understanding visitors' subjective immediate experiences. The development of new technologies such as mobile data networks and indoor/outdoor positioning, e.g., Wi-Fi and global positioning system (GPS), facilitates the observation of experiences at a higher resolution at the time and space they occur. These technologies enable observing the movement patterns of individuals, periods of activities and location [52,53]. Moreover, these technologies allow the experiences to be geo-tagged and recorded with their time and location. Using technologies that can register experiences upon their occurrence are more preferable for studying immediate experiences as it reduces the risks of failing to recall the experience when using post hoc approaches of data collection. In addition, it also allows understanding when and where the experiences occurred so that physical environmental characteristics of immediate experiences can be observed.

3. Methodology

Our study followed the theories from the previous studies and brought their different perspectives on people's immediate experiences together in the context of a large-scale event. This study assumed that at a large-scale cultural event with activities at multiple locations in the city, visitors' subjective to immediate experiences stem at least partly from the interaction between the visitor and his/her environment. The conscious occurrence of experiences result in affective states that can be distinguished as positive and negative. Due to the immediate nature of experiences, a GPS enabled study is conducted. A data collection is done during a large-scale cultural event "Dutch Design Week" by means of a geotagging method and surveys. Respondents are asked to geotag their immediate experiences. Surveys are used to gather data on visitor characteristics and the affective states of geotagged experiences.

The experiment provided the main data on the visitors' personal characteristics and the immediate experience characteristics in time and space. In addition to the experiment, data from secondary sources OpenStreetMap (data version 2017, OpenStreet Map Foundation, Cambridge, UK) and KNMI, the Royal Netherlands Meteorological Institute (De Bilt, The Netherlands) are collected to include contextual characteristics of the physical environment and weather. Finally, the collected data is structured for estimating the influence of visitor characteristics and contextual characteristics on the affective states of immediate experiences, as shown in Figure 1.

For estimation, the affective states of experiences are used as the dependent variable (positive/negative) while the independent variables are visitor, temporal, physical environment and weather conditions. Due to the binary nature of the dependent variable, a binary logit model is estimated. Below, the study area, data collection procedure and sample are discussed in detail.

3.1. Study Area

This study is conducted during the Dutch Design Week (DDW) event in Eindhoven, The Netherlands. Eindhoven is a city in the south of the Netherlands with approximately 225,000 residents. It is the 5th largest city in the Netherlands and the largest city in the Noord-Brabant region. DDW is an annual event about Dutch design. This event takes place every year at the end of October and it lasts for 9 days with exhibitions, workshops, seminars and parties at approximately 80 different venues in the city. Those 80 venues can be indoor and outdoor and they are distributed over three areas in the city, namely center area, Strijp area and east area. Figure 2 shows the exhibition locations within the three areas in Eindhoven. For this event, visitors have to buy a ticket. In 2017, DDW was conducted for the 17th time. The design works from 2500 designers were exhibited and approximately 300,000 people visited the exhibitions [54].
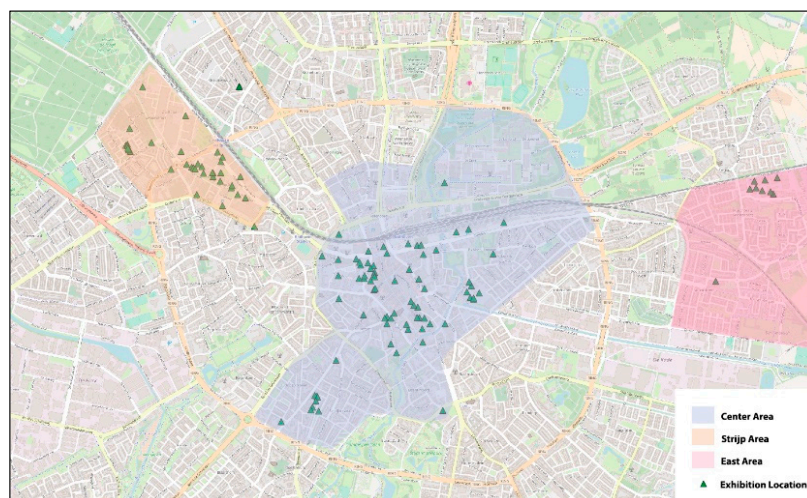

Figure 2. Location of exhibitions and areas.

3.2. Data Collection Procedure

The data was collected during four different days of the event in October, 2017. The respondents were approached next to the ticket office, which was located near the central train station. Researchers started recruiting respondents at 9:00 am. In order to collect data on event visitors' immediate experiences, we applied a mixed approach of GPS device enabled geotagging and questionnaires. For that purpose, a device called 747Pro GPS trip recorder was used, which allowed users to log their routes. With the device, points of interests (POI) could be recorded by a push button. With built-in buzzer alarm and light, the device let the user know whether the GPS location was set and a POI was recorded successfully. The GPS devices were set to register a record every 3 s, including latitude, longitude, date, time, altitude and POI registration.

During data collection, the participants were first asked to fill in a questionnaire about their socio-demographic background, and their familiarity with the event and the city. Then they were asked to carry a GPS device and fill in a second questionnaire during their visits at the event.

Respondents were told that if they had an experience that they could translate into a feeling during their visit, they should push the POI button of the GPS device and report their affective state of the experience in the second questionnaire. It is important to note that we asked respondents to report immediate experiences that were only related to the event and its setting, so social interactions (i.e., a nagging child or receiving bad news) were not within the scope of the data collection. Respondents were told how the GPS device works. For example, if the yellow light on the device was constant, it meant that GPS has no signal and they had to wait until it is regularly flashing. This was done as respondents could lose the signal at some locations such as indoors and enable them to register the experience when there was a signal again.

In the second questionnaire that comes along with the GPS device, questions related to immediate experience and its location were asked. An example per experience can be seen in Table 1 and Figure 3. In this questionnaire, affective states of experiences were categorized into positive and negative feelings as suggested by the literature [33,34]. Respondents were asked to indicate the category of their feeling for the immediate experience. For respondents' convenience, we defined the positive feelings as satisfaction; joy; excitement; interested; peaceful; loving and inspired and the negative feelings as irritation; anger; fear; disgust; disappointment; boredom and confusion. However, if they would like to register a feeling that was different than the given feelings, they were allowed to write it down. In the second questionnaire, respondents were also asked to indicate the location of the experience in terms of whether it was indoors or outdoors and to specify the location on the given paper map. This was done for the purpose of validating the GPS logs. Finally, they were asked to bring the GPS devices and the second questionnaire back to the researchers by 8:00 pm at the latest or send it back by post.

Table 1. Experience related questions in the second questionnaire.

Category of Experience		Location of Experience
Positive Feelings	**Negative Feelings**	
Satisfaction	Irritation	
Joy	Anger	
Excitement	Fear	
Interested	Disgust	Indoor
Peaceful	Disappointment	Outdoor
Loving	Boredom	
Inspired	Confusion	
Other	Other	
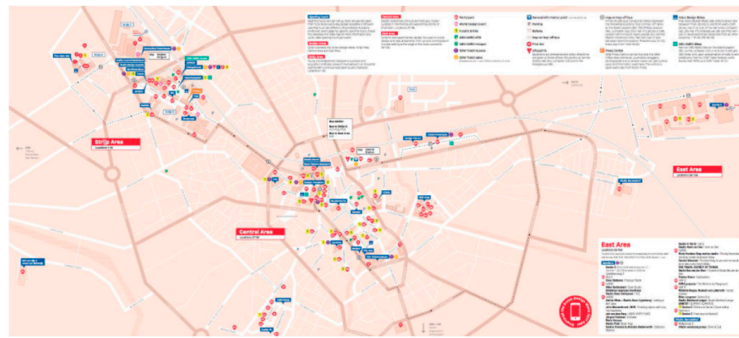
Figure 3. Map provided to respondents for labeling the location of experiences.

A total of 281 respondents returned GPS devices with subjective immediate experience questionnaires. After the cleaning process, the data from 234 respondents were found to be useful. 63 respondents were registered 21/10/2017, the first day of the event, 48 respondents 24/10/2017, 50 respondents 26/10/2017 and 73 respondents were registered 28/10/2017.

The questionnaires enabled collecting respondents' characteristics and the type of feelings reflecting the immediate experiences while GPS data enabled the registration of immediate experiences in time and space. By using GPS data the following variables could be extracted: location and time of the day the experience was registered, time from start until the experience was registered and day of the week.

Extracting the Physical Environmental and Weather Characteristics

To minimize respondents' burden, spatial and weather characteristics were collected from external databases. For this purpose, firstly the data related to the facilities, land use and network infrastructure were gathered from OpenStreetMap (OSM) database of Eindhoven city. OSM data provides sufficient details and classification on networks and point of interests for the current study. A dedicated spatial searching function was developed to find the distance to specific facilities and the quantity of specific facilities. Taking the registered experience location of respondents as a reference point, the module searches the surrounding areas within 100 m. For the distance to a specific type of facility, the distance that is the shortest among all found facilities was used. In addition, the number of certain facilities within the 100-m buffer area was automatically counted. The list of physical environmental characteristics extracted from the OSM data is shown in Table 2.

Table 2. List of physical environment characteristics extracted from OpenStreetMap data.

	Contextual Variables
Distance to nearest facilities	Rail line
	Bus stop
	Primary road
	Secondary road
	Residential road
	Water way
	Train station
	Restaurant, café, bars
	Shops and supermarkets
	Exhibition location
Number of facilities within 100 m	Restaurants, café, bars
	Shops and supermarkets
	Bus stops
	Other exhibitions

The weather data, which is available at hourly ranges, was gathered from the Royal Netherlands Meteorological Institute. Temperature, the occurrence of rain and the cloudiness each hour of a day was matched with the hour of each registered experience. Finally, all the data were converted and merged into one dataset for estimation.

3.3. Sample Description

In total, responses from 234 respondents were used for this study. Table 3 represents the sample characteristics of respondents. It shows that the majority of the sample was female and 30 years old or younger. 35% of respondents were not familiar with Eindhoven while 12% were extremely familiar. In addition, 54% of the respondents have never visited DDW before. 55% of respondents indicated that they would combine the event visit activity with other activities such as shopping, visiting bar/café/restaurant and work. 41% of the respondents intended to spend less than 5 h at the event. The majority of the respondents were visiting the event with a company that might include family members, friends or colleagues. The majority of the sample visited DDW at the weekend.

Table 3. Sample characteristics (*N* = 234).

Variable	Levels	Frequency	Percentage
Gender	Female	148	63%
	Male	86	37%
Age	≤30 years old	167	71%
	>30 years old	67	29%
Travel Company	Alone	97	41%
	With others	137	59%
Combining Other Activities	Yes	129	55%
	No	105	45%
Familiarity with Eindhoven	Not at all	83	35%
	Slightly	51	22%
	Somewhat	32	14%
	Moderately	40	17%
	Extremely	28	12%
Familiarity with DDW	Never visited	127	54%
	One or more times visited	107	46%
Intended Duration of Visit	≤5 h	95	41%
	>5 h	139	59%
Day of Visit	Weekday	98	42%
	Weekend	136	58%

Tables 4 and 5 show the characteristics of subjective immediate experiences in the sample. In total, 1017 immediate experiences were registered from 234 respondents. 73% of registered experiences had the positive affective state. The majority of the experiences were registered indoors, in the central area of Eindhoven, between 12:00 and 15:00 h, and with dry weather. Moreover, the majority of the experiences were registered within the first 4 h of the visit.

Table 4. Experience specific characteristics—continuous variables (*N* of experiences = 1017).

Variable	Mean	St. Deviation	Min	Max
Total Number of Experiences per Respondent	4.3	2.5	1	13
Temperature at Time of Experience	14.5	1.9	11.1	17.5
Cloudiness of Sky at Time of Experience (1: sky visible to 9: sky invisible)	7.7	0.8	2	8

Table 5. Experience specific characteristics—discrete variables (*N* of experiences = 1017).

| Variable	Level	All Experience (#)	All Experiences (%)	Positive Experience (#)	Negative Experience (#)
Time of Experience	Before 12:00 h	163	16%	118	45
	Between 12:00–15:00 h	662	65%	476	186
	After 15:00 h	192	19%	151	41
Time from start until Experience	Within one hour	198	19%	140	58
	Within two hours	195	19%	148	47
	Within three hours	184	18%	130	54
	Within four hours	169	17%	124	45
	Within five hours	99	10%	74	25
	More than five hours	172	17%	129	43
Location of Experience	Indoor	865	85%	645	220
	Outdoor	152	15%	100	52
Area of Experience	Central	639	63%	464	175
	Strijp	365	36%	272	93
	East	13	1%	9	4
Rain Occurrence at Time of Experience	Yes	194	19%	147	47
	No	823	81%	598	225

Table 6 shows the mean values for distance to facilities and number of facilities within 100 m for registered immediate experiences. The facilities that are not found within a 100-m radius of an experience are assigned to the value of 100 m. According to Table 6, the immediate experiences occurred on average close to exhibitions, residential roads, bus stops and restaurants/cafés/bars. Moreover, the number of facilities within a 100-m radius from immediate experiences was highest for exhibitions, followed by bus stops, restaurants/cafés/bars, and shops. No train station was found within 100 m of an experience.

Table 6. Secondary physical environment characteristics of experiences.

	Variable	Mean	St. Deviation	Min	Max
Distance to Nearest Facilities within 100 m	Rail line	95.62	15.79	4.28	100
	Bus stop	76.52	29.28	2.34	100
	Primary road	95.43	16.49	0.29	100
	Secondary road	97.57	12.75	0.20	100
	Residential road	62.18	33.61	0.26	100
	Water way	98.18	10.36	3.49	100
	Train station	100	0	100	100
	Restaurant, café, bars	85.43	25.81	6.39	100
	Shops and supermarket	93.81	18.92	3.49	100
	Exhibition locations	26.80	24.66	0	100
Number of Facilities within 100 m	Restaurants, café, bars	0.83	1.46	0	9
	Shops and supermarkets	0.23	0.64	0	9
	Bus stops	1.33	1.52	0	5
	Exhibitions	4.26	2.69	0	12

The distribution of immediate experiences in space in terms of their affective meanings of positive and negative feelings can be seen in Figure 4a,b. Most of the experiences were registered in Central and Strijp-S areas. Compared to these areas, there were few observations from the east area because the east area was the least visited one by the respondents. The hotspots for both positive and negative feelings were located in the same areas. These areas are popular locations with prominent public spaces in normal days due to their accessibility, surrounding services and atmosphere. For instance, Strijp-S area is an industrial redevelopment area, which is transformed into a mixed use creative and culture district. The area hosts start-up companies, cultural institutions, many creative shops and several recurring

cultural events. It is also nearby the city center and well integrated to the city core. Compared to Strijp-S, the east area, which is a place for creative entrepreneurs, is relatively a newer district and also further from the city center. It should be noted that immediate experiences were not only registered at exhibition locations but at other places such as public spaces, shops and cafés as well.

| (a) | (b) |
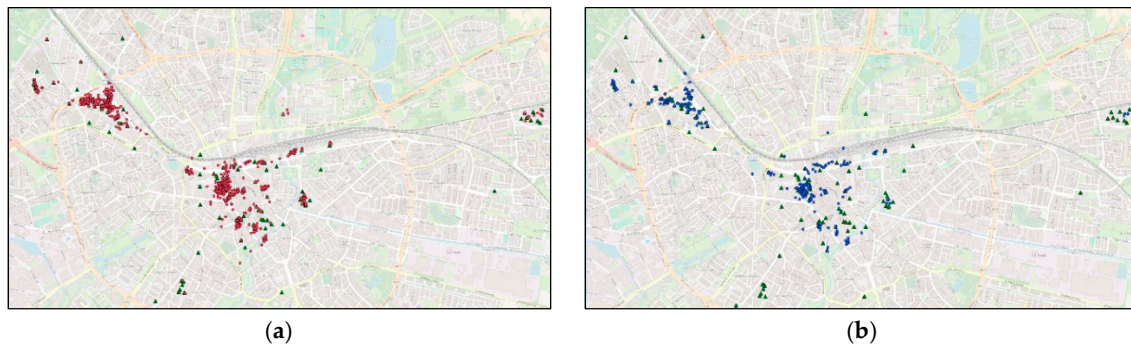
Figure 4. Distribution of positive and negative experiences in space (**a**) red: positive experience; green: exhibition location and (**b**) blue: negative experience; green: exhibition location.

4. Estimation Results

In this study, the affective states were used as the dependent variable (positive/negative). The independent variables could be classified as visitor, temporal, physical environment and weather characteristics. To prepare the data for estimation, categorical variables were dummy coded, while continuous variables "distance to facilities" and "time from start until experience" were used in logarithmic form. As each respondent could have several immediate experiences registered at different times, the data had a panel structure. For that purpose, we first estimated a mixed binary logit model because this model enables accounting for the panel data structure and allows for taste variation by introducing random coefficients for attributes [55,56]. However, none of the standard deviations of random coefficients were found to be significant. This indicates that the sample was homogenous in terms of the affective states of immediate experiences. Therefore, we considered a conventional binary logit model more suitable for this study and it is reported below.

It is important to note here that we estimated two separate models, the first model with only visitor, temporal, indoor/outdoor and weather characteristics and the second model replacing the indoor/outdoor variable by the physical environment characteristics. Since these physical environment attributes represent outdoor settings, they were included in the estimation as interaction with the experiences that occurred outdoors. In the second model, a step-wise approach was applied for the physical environment characteristics and only the significant ones were included in the final model.

The estimation is done by using NLogit software (Version 5.0, Econometric Software Inc. Plainview, NY, USA) [57]. According to the estimation, the first model had a ρ^2 of 0.173 and the second model had a ρ^2 of 0.177. In the context of behavioral studies, this is a decent model fit [56]. The results of model estimations are shown in Table 7. In both models, it was found that the constant had a negative and significant effect at the 1% significance level. The constant was coded 1 for a negative experience and 0 for a positive experience. This means that visitors tended to attach a lower value to a negative immediate experience than to a positive experience. It could thus be concluded that visitors tended to be more positive than negative regarding their experiences. The values attached to an experience increase or decrease depending on the scores of the explanatory variables and the corresponding parameters. The effects of the different factors on the immediate experiences would be discussed subsequently.

Table 7. Estimation results on the positive affective state of immediate experiences [1].

Variables		Model 1—Coefficients	Model 2—Coefficients
Constant		−1.002 ***	−1.002 ***
Gender	Female	0.094	0.087
Age	≤30	−0.276 *	−0.270
Travel company	Alone	0.141	0.147
Combining other activities	Yes	0.185	0.166
Familiarity with Eindhoven		0.051	0.045
Familiarity with DDW	Never Visited	0.225	0.201
Intended duration of visit	≤5 h	−0.296 *	−0.277 *
Day of the week	Weekend	0.406 **	0.394 **
Time of experience	<12:00	−0.171	−0.209
	12:00–15:00	−0.289	−0.340
Time from start until experience		0.064	0.074
Rain at time of experience	Yes	0.356	0.377
Visibility of the sky		−0.013	-0.021
Temperature		0.113 ***	0.118 ***
Location of experience: Outdoor		−0.558 ***	NA
Outdoor experience * Number of exhibitions		NA	0.179 *
Outdoor experience * Distance to bar/café/restaurants		NA	−1.175 ***
Outdoor experience * Distance to railway lines		NA	0.846 **
Log-likelihood base		−1409.861	−1409.861
Log-likelihood model		−1166.227	−1160.799
Pseudo rho-squared		0.173	0.177

[1] Note: ***, ** and * = significance at 1%, 5% and 10% level.

4.1. Visitor Characteristics

In Model 1, it was found that respondents younger than 30 years old were less likely to have positive affective states for their immediate experiences. However, the significance of this effect was small and the significance was lost in Model 2. Visitors who intended to spend less than 5 h at the DDW event had a negative and significant influence on the affective meaning of the experience at the 10% level. This might mean that people who intended to spend less than 5 h at the event were less likely to have experiences associated with positive feelings. A probable explanation would be that the DDW event was large and distributed in the city, and visitors who intended to spend little time (less than 5 h), could not visit many exhibitions or could not visit all the exhibitions that interested them. That might be influencing the affective state of their experiences.

Except age and intended duration of visit, none of the visitor characteristics had a significant influence on the affective state of immediate experiences. This was expected as the previous literature suggested personal characteristics are more effective on the overall experiences. In the context of event activities, visitor characteristics including personal characteristics, knowledge of the event and city and company might have more influence on the overall satisfaction of the event rather than on the immediate experiences.

4.2. Temporal Characteristics

It was found that visiting the DDW event during the weekend increased the probability of having experiences associated with positive feelings. This is in-line with the previous literature [10,40]. This finding might be related to both people's mood at the weekend as they have less strict commitments and also that activity locations might have a more pleasant atmosphere at the weekends than during working days.

4.3. Physical Environment Characteristics

In Model 1, being outdoors was entered in the model as a main effect and it had a negative influence on the affective state of experiences. This means that when an experience occurred in an outdoor environment, this experience was less likely perceived as positive. This variable was significant at the 1% level, which shows that an outdoor physical environment was strongly associated with affective states.

In Model 2, outdoor experiences were interacted with physical environmental attributes. According to the results, an increasing number of exhibitions nearby the immediate experiences increased the probability of having positive experiences. In addition, increasing distance to bar/café/restaurant facilities decreased the probability of having a positive experience. These findings show that visitors were more likely to have positive experiences if they could find nearby eating/drinking facilities and other exhibitions. Another interesting finding was that with increasing distance to railway lines, the experiences were more likely to be perceived as positive. One of the reasons for that might be the undesirable perception of railway lines by people.

4.4. Weather Characteristics

It was found that increasing temperature increased the probability of having positive experiences, as expected. Surprisingly, rain occurrence and cloudiness were not found to be influential on immediate experiences. A probable reason is that visitors might have taken some rain into account.

4.5. Discussion of Results

According to the data, more positive immediate experiences were registered than negative ones. Moreover, the majority of experiences were registered indoors, which might mean that most immediate experiences were related to the content of the exhibition and the indoor atmosphere.

In this study, two logit models were estimated to assess the effects of the characteristics of visitors, time, physical environment and the weather on the subjective immediate experiences at DDW. We found that temporal, physical environmental and weather conditions were the most influential factors on the affective states of immediate experiences, rather than the visitor characteristics (except age and intended duration of visit). This might be due to the interdependence between immediate experiences and their direct environment rather than personal characteristics and spatial knowledge aspects.

We found that the visitors tended to have a positive attitude towards the immediate experiences in general. Young visitors and visitors who intended to stay less than 5 h tended to be more critical. Moreover, when the event was being visited at the weekend, there were more positive immediate experiences. This was also the case if the outdoor temperature increased. As weather was an important factor in event failure, it confirmed to preferably organize events with exhibitions at multiple locations in relatively warm periods. Indoor experiences appeared to be considerably more appreciated than outdoor experiences. When looking at the physical characteristics of the outdoor locations specifically, it was mainly nearby railway lines that were not appreciated. On the other hand, locations nearby bars, cafés and restaurants and especially nearby exhibitions were appreciated.

These findings might suggest that the affective state of outdoor immediate experiences was more influenced by the atmosphere and the usage of space. In addition, the time of the immediate experience was not found to be influential on the affective state, which is in line with previous studies in the urban planning field [44,46]. It might be that time is captured by the physical environment and weather, which are the intermediaries of time and immediate experience. On the other hand, intended duration of the event visit activity and the day of the visit were found to be influential on both indoor and outdoor immediate experiences. Although these aspects were related to the choices that visitors made before the event, they influenced the immediate experiences.

Overall, the findings of this research show that the data collection methodology, which was applied on a large scale setting with 234 respondents, was useful to capture and measure the subjective

immediate experiences. The results show that the temporal, physical environment and weather characteristics play a strong significant role in influencing visitors' immediate experiences rather than visitor characteristics. Moreover, it was seen that when physical environmental characteristics were included in the factors among others, they were found to have more influence on the subjective immediate experiences compared to other factors. Results indicate that subjective immediate experiences at cultural events were more associated with the immediate environment.

5. Discussion and Conclusions

Research that analyzes the subjective immediate experience at large-scale cultural events and its relation with physical urban environment is still limited. Therefore, one of the contribution of this study was that its attempt to capture and measure subjective immediate experiences at a large-scale cultural event while taking into account the relation with physical urban environment (objective variables). Moreover, existing empirical studies on the subjective immediate experiences took place in restricted and small environments for a limited time frame of several hours. Therefore, another contribution of this study was that it demonstrates a large-scale data collection from 234 respondents by means of GPS devices and surveys. In addition to this, this study combined the collected data with secondary data sources for physical urban environment characteristics and weather. Since, with the approach used in this current study, it was possible to capture where the subjective immediate experiences took place. This enabled us to extract more data about the surroundings that could help to improve the organization of events and to develop policy on urban environments. In addition, as the subjective momentary experiences at cultural events are a relatively new subject, this study provided experiences that might support data collection in future research.

We concluded that geotagging with GPS devices was useful to collect immediate experiences, especially in outdoor environments. For indoor environments, other devices (i.e., Wi-Fi and Bluetooth) might be more accurate. Although using GPS loggers and paper surveys was proved to be useful, it is also demanding both for researchers and the respondents. Therefore, a practical tool such as a smartphone app that will enable respondents to geotag their experiences and to respond prompt surveys about the characteristics of experiences and underlying reasons can be more useful for the implementation of this study.

The idea of collecting geotagged data and combining this with other databases (i.e., weather, land use and surveys) appears to be successful, especially in the context of the Dutch Design Week in Eindhoven as this event provides a nice test case because the locational attributes of the exhibitions differ considerably. In a future study, more secondary data on the physical environment such as bike facilities, public restrooms, parking lots, etc. could be added to the analysis to see their influence on immediate experiences. Integrating more other data sources to analysis such as geotagged social network data would enable further investigations of affective states of experiences [50,51], and improve this study further. Finally, in the future, the routes that are taken by visitors should be derived from the GPS logs and integrated into the study for more insights. Especially, temporal mapping can reveal the experience hotspots in time and space.

According to the findings of this empirical study, visitors give more value to the positive immediate experiences than negative ones but the values attached to an experience increase or decrease depending on the temporality, physical environment and the weather of the experience. Especially visitors appear to be sensitive to number of exhibitions, distance to café/bars and distance to railways. These findings make it clear that physical environment characteristics should be investigated further in future studies. Moreover, the findings can help to shape the experiences at different locations. At large-scale events, usually prominent public spaces are chosen for exhibitions. The infrastructure and nearby facilities support the suitability of the public spaces to accommodate such exhibitions. However, the prominent public spaces will be known by a large public and after a few years these public spaces will not become better known. The prominent public spaces might even face problems of congestion, dirt and noise during events, which is not desired for the city, its residents and visitors. By using different locations in

the city, cities would benefit from a more equal distribution of exhibitions in the city. Less prominent public spaces that have potentially suitable location attributes might be improved or prepared to host events. This will attract visitors to different parts of the city, which will become better known and reduce the spatial inequality in cities. To select such potentially suitable locations, based on findings, we advise to look for locations located at some distance from railways and close to cafes and restaurants or otherwise by adding temporary drink and food facilities. Thus large events can promote and encourage future visitation of less prominent public spaces. Providing memorable experiences in different locations will optimize the placemaking opportunities for cities and also reduce the negative impacts of events on cities and citizens. Besides, with this approach, negatively experienced places can be observed and turned into positively experienced places by implementing necessary interventions.

In a future study, personality traits should also be included in the experiment in order to test their influence on the subjective immediate experiences. Additionally, the different affections such as joy, inspiration, confusion and disappointment can be further investigated to gain more insight into the immediate experiences and their environments. Following that, interviewing the respondents about the reasons of affective states can enrich the conclusions from the study as there might be various underlying reasons for the found effects. By analyzing the collected immediate experiences, we found some interesting statistical relationships between immediate experiences and physical environment attributes. However, the causality of these relationships still has to be tested in future research.

Overall, our study shows that measuring the subjective immediate experiences of visitors give valuable insights for improving the events and the city especially in terms of the spatial configuration of exhibition locations and services and facilities around these locations. This would help cities to be more attractive which can result in repeated and more visits. In addition, this can lead to improvement of urban environments and reduction of spatial inequality, which would lead to positive societal impacts such as increased quality of life and wellbeing for residents and visitors.

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