

The Impact of Atmosphere in the City on Subjective Well-Being of Rio de Janeiro Residents During (vs. Before) the 2014 FIFA World Cup

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This study looks at the hosting of the 2014 Fédération Internationale de Football Association World Cup in Rio de Janeiro and, based on research drawing on environmental psychology and studies of liminality, hypothesizes that the perceived celebrative atmosphere in the city increases subjective well-being of host city residents (*cariocas*). Data were collected via in-person intercept surveys from 221 and 218 *cariocas* before and during the event, respectively. There was an increase in subjective well-being from before the event to during the event. The results of two-group path modeling revealed further that there was a positive impact of the perceived celebrative atmosphere in the host city on residents' subjective well-being during the event; the effect was weaker (though still positive) for the time period when the event was not being hosted. Initiatives may build upon the atmospheric elements in a city to increase subjective well-being of residents, particularly in the context of event hosting.

Keywords: environmental psychology, liminality, quality of life, sport event, WHO-5 well-being index

The so-called intangible effects of sport events on the host population have gained attention from researchers and practitioners, because empirical assessments of tangible benefits have mainly suggested that the hosting of the events—in particular mega-sport events—is a poor financial investment (Chalip, 2018). Among potential intangible benefits, a positive impact on the health of a host population is one reason why cities bid to host mega-sport events (Kaplanidou & Karadakis, 2010). However, three systematic reviews that appeared in peer-reviewed journals conclude that there is little support for the predicted positive health impact of hosting mega-sport events (Mahtani et al., 2013; McCartney et al., 2010; Weed et al., 2012). One recent study assessed the quality of life of host city residents over time and found a short-lived effect, and only when residents perceived the atmosphere in the city during event hosting positively (Pfitzner & Koenigstorfer, 2016). The host city's atmosphere—particularly liminoid elements that have demonstrable sociocultural effects (Chalip, 2006, 2018)—may be one crucial factor that positively influences residents' subjective well-being, that is, their overall state of

wellness, including affective and cognitive components (Diener, 1984).

This study looks at the 2014 Fédération Internationale de Football Association (FIFA) World Cup and the host city population in Rio de Janeiro. Like carnival, soccer in general and the hosting of the 2014 FIFA World Cup in Brazil in particular play a special role in Brazilian society: the role of identity construction (e.g., as Brazilians and as the land of football and *fiestas*), the role of highlighting and overturning existing hierarchies and conventions (e.g., residents claiming the city for their purposes and protesting against politics and social inequality), and the role of showing the world on a global stage the cultural and social diversity and complexity of the country, including social problems that exist in society (Butler & Aicher, 2015; Kath & Knijnik, 2015; Moraes et al., 2014; Paganotti, 2007; Rosenthal & Cardoso, 2015).

According to DaMatta (1992), “it is through football that Brazilians have, at last, come to identify with such symbols of the nation-state as traditions, the national anthem and the flag. It is through this sport . . . that Brazil exists as a society and a nation” (p. 21). There is suggestive evidence that the hosting of the 2014 FIFA World Cup shares some important features with Rio de Janeiro's carnival, such as the spirit of abandon as well as the break with, and reversal of, everyday reality (DaMatta, 1991; Kath & Knijnik, 2015). For example, individuals take over streets for festivities and perform

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activities that they typically perform at home (e.g., celebrating, having intimate relations with others), and institutions (e.g., schools, public service providers, and banks) close their doors when the event is held. DaMatta (1991) also observed that carnival participants are mostly full of joy, without any rush, and seem to move without purposefully following a certain direction; they have picnics and set up tents, dance, relax, and enjoy life. Similar observations have been made for the 2014 World Cup hosting, where people took over streets that are typically reserved for cars, or where streets were full of people who moved for other purposes than for work and shopping—for the mere enjoyment and to inhale the celebrative aspects of the atmosphere (Kath & Knijnik, 2015; Moraes et al., 2014; Paganotti, 2007; Rosenthal & Cardoso, 2015).

To date, it remains unknown whether the particular atmosphere perceived by host city residents during the hosting of a mega-sport event contributes to subjective well-being. The present study aims partially to fill this research gap. It compares two contexts within the same city (Rio de Janeiro): the context *before* the hosting of the 2014 FIFA World Cup and the context *during* the hosting of the event. In doing so, the research makes the following contributions. First, the study considers the well-established measure of subjective well-being, an important indicator of life satisfaction, as the outcome variable of interest. In their review, Weed et al. (2009, p. 52) call for future mega-sport event research into host residents' subjective well-being as one of the most important variables (among others). While previous research from the perspective of sport economics has focused on subjective well-being at the national level (i.e., individual measures aggregated for countries; Kavetsos & Szymanski, 2010), our study is among the first to focus on subjective well-being at the individual level with relevance for important individual life satisfaction outcomes, an area that only a few studies of event hosting have emphasized so far (e.g., Getz & Page, 2016; Littlejohn, Taks, Wood, & Snelgrove, 2016; Taks, Littlejohn, Snelgrove, & Wood, 2016).

Second, even though both substantive arguments and empirical evidence indicate that most effects of subjective well-being that can be attributed to the hosting of mega-sport events are short-lived (Pfitzner & Koenigstorfer, 2016; Smith, 2014), previous empirical research focused on longer-term effects, spanning several months (e.g., Kaplanidou et al., 2013). Our study considers short-term effects by looking at the 4-week period from just prior to the event through the event itself. The potential increase in subjective well-being may be an indicator of what is considered the short-term "feel-good effect" of the event hosting (Kavetsos & Szymanski, 2010, p. 168). From a methodological point of view, our study rules out the demand effects that result from repeated surveys with the same respondents, a notable concern in Pfitzner and Koenigstorfer's (2016) study design.

Third, this study identifies Rio de Janeiro's atmosphere during the 2014 FIFA World Cup hosting as one

of the drivers of a short-term increase in subjective well-being. Thus, it provides empirical testing for the claims made by Weed et al. (2009, 2012) with regard to the importance of nonsport game-related features in influencing quality of life outcomes in host cities (see also Getz, 2010 for festivals). It also adds to the literature on liminality (e.g., Chalip, 2006, 2018) by looking at the celebrative aspects of the atmosphere, that is, one aspect of the potentially multidimensional liminoid atmosphere construct.

In what follows, we first present a review of the existing literature and the theoretical background of the study. Next, we report the results of an empirical study on 2014 FIFA World Cup host city residents in Rio de Janeiro. We then discuss the results, provide managerial implications, and conclude by assessing the strengths and weaknesses of our work and by offering an outlook for future research.

Literature Review

Subjective Well-Being and Its Determinants

Subjective well-being is defined as "a broad category of phenomena that includes people's emotional responses, domain satisfactions, and global judgments of life satisfaction" (Diener, Suh, Lucas, & Smith, 1999, p. 277). It is linked to better productivity and social relationships, and relates positively (or negatively) to the physiological processes underlying health (or disease; De Neve, Diener, Tay, & Xuereb, 2013; Diener & Chan, 2011).

The predictors of subjective well-being are still not fully understood (Dolan, Peasegood, & White, 2008). Diener et al. (1999) suggested that seven key life domains influence subjective well-being: health, finances, self, family, one's group, work, and leisure. Researchers from different areas, such as psychology, sociology, economics, recreation, and tourism, have assessed the influence of various indicators on subjective well-being. For example, self-rated health, income, evaluations of the self, marital status, quantity and quality of social contacts, job satisfaction, and leisure engagement have been positively related to subjective well-being (see meta-analyses, Bowling, Eschleman, & Wang, 2010; Kuykendall, Tay, & Ng, 2015; Okun, Stock, Haring, & Witter, 1984; Piquart & Sörensen, 2000).

In the context of our study on the 2014 FIFA World Cup hosted in Rio de Janeiro (among other cities), leisure engagement is of particular interest. When individuals engage in leisure time activities, they are typically intrinsically motivated (i.e., they perform the activity for the mere enjoyment) and they perceive freedom in doing whatever they want to do (i.e., they do not feel constrained; Deci & Ryan, 1987; Ryan & Deci, 2000). These experiential features can be used to describe various behaviors that a person perceives as leisure-time activities, such as playing music, exercising, meeting friends, and watching television

(Kleiber, Walker, & Mannell, 2011). Most important to our research, the hosting of the 2014 FIFA World Cup in Rio de Janeiro offers the city's residents various opportunities for leisure engagement, such as attending festivals, meeting friends to follow the soccer games or to attend sport-event-related social events with them, engaging in intercultural social activities, and simply soaking up the atmosphere by wandering around in the city (Da Rosa Borges, Santos Silva, & Da Silva Añaña, 2014).

Leisure engagement in general has a positive and significant effect on subjective well-being (e.g., $r = .26$ in the meta-analysis of Kuykendall et al., 2015). According to the so-called DRAMMA model (Newman, Tay, & Diener, 2014), detachment from work-related thoughts (D), recovery from work stress (R), autonomy (A), mastery (M), meaning (M), and affiliation (A) are needs that can be met when individuals engage in leisure activities. Residents could satisfy these needs during the hosting of the 2014 FIFA World Cup by participating in activities that are typically not offered in the city to the same degree and not sustained (i.e., with regard to frequency and intensity) when the event is not being hosted: watching a soccer game may reduce work-related stress, engaging in social activities and attending social events may satisfy affiliation needs, and supporting a team (in this instance the Brazilian national team) may give meaning to the activities and lives of the residents.

Subjective Well-Being in the Context of the Hosting of the FIFA World Cup

Mega-sport events provide one possible context that offers various leisure time activities to residents and that may then influence their subjective well-being (at least during the time of the hosting of these events). Kavetsos and Szymanski (2010) assessed individuals' subjective well-being in different European countries and provided evidence that any increase from hosting mega-sport events in soccer is not the result of the sporting performance of the home team (i.e., whether the host nation wins or loses, a sport-related feature) but rather is due to the hosting itself, producing a "short term feelgood effect across all gender-age groups" (p. 168). However, their research does not consider cities, but rather nations, and it does not give any indication what the features of the hosting are that produce this effect.

Although systematic reviews are inconclusive with regard to the question of what the factors are that influence whether hosting mega-sport events increases the host population's subjective well-being and related constructs (Mahtani et al., 2013; McCartney et al., 2010; Weed et al., 2012), two more recent empirical studies (not part of these reviews) provide some suggestive evidence. These studies—one repeat cross-sectional study conducted in South Africa in 2010 and one longitudinal study conducted in Brazil in 2014—looked

at either facets of subjective well-being or quality of life. In what follows, we briefly discuss these studies.

Kaplanidou et al. (2013) assessed the impact of hosting the 2010 FIFA World Cup in South Africa on the relationship between selected benefits (from the perspective of the host population) and perceived satisfaction with quality of life. Satisfaction with quality of life was measured via a single indicator. The authors conducted a study before and after the event, interviewing residents in the host nation ($n = 3,789$). The results showed that, 3 months before the event, political, psychological, and social benefits were positive predictors of satisfaction with quality of life. Eight months after the event, the same predictors, plus economic benefits, contributed to satisfaction with quality of life. Satisfaction with quality of life did not change over the course of the 11 months.

Pfützner and Koenigstorfer's (2016) longitudinal study on 2014 FIFA World Cup host city residents ($n = 281$, interviewed in Rio de Janeiro in three waves) showed that there was a positive effect of hosting the event on quality of life over the 4-week hosting period (i.e., from the first wave to the second wave) with regard to two domains but only at high levels of perceived atmosphere: the hosting increased both the social and the environmental domains of quality of life. At low levels of perceived atmosphere, the hosting decreased the psychological domain of quality of life. Although the authors did not provide evidence for why the latter happened, there is one important limitation of the study: participants were interviewed repeatedly online. The first measurement may have increased participants' quality of life concerns, and this could have influenced subsequent measurements; thus, demand effects cannot be ruled out. Furthermore, the study was conducted online, in a setting where participants recalled (but were not experiencing) the city's atmosphere when they filled in the survey; thus, the hosting context may not have been salient to the participants when they took part in the survey during the event hosting.

Further research in anthropology and sociology suggests that the hosting of the 2014 FIFA World Cup provided a context that has some similarities with the carnival hosted in Rio de Janeiro. DaMatta (1991) considers Rio de Janeiro's carnival as an important recurring ritual that has the potential to create gaps in social routines (see Geertz, 1973, for the role of symbols and rituals in cultures). *Cariocas'* fascination comes from the fact that "carnival produces a moment of equality The Brazilian Carnival subverts a normal order marked out by laws, regulations, order Carnival breaks up the elementary groups of society" (DaMatta, 1991, p. 111). Because, according to DaMatta (1991), carnival and soccer share some important characteristics from the perspective of *cariocas*, we can assume that residents' activities during the hosting of the FIFA World Cup 2014 also included activities and rituals that created gaps in social routines. Altogether, the actions of the stakeholders involved in the event have

the potential to create a liminoid atmosphere with its own level of social reality. The level of reality is reflected in the particular atmosphere during the event (among others). Chalip (2006), referring to several examples of previous hosting of mega-sport events, notes that, “it feels as if new energy has been injected into the communal atmosphere—an energy that can be shared by all” (p. 110).

During the 2014 FIFA World Cup, there was a spirit of abandon similar to carnival (DaMatta, 1991), in which residents of Rio de Janeiro could break with their everyday reality (Kath & Knijnik, 2015). Some streets were closed during the event, so residents could take over space that is typically reserved for other purposes and engage in activities that they typically perform at home or somewhere else (e.g., meet friends, follow games on public screens, and talk about politics); because many institutions were closed during game days of the Brazilian team, residents had more leisure time available (Moraes et al., 2014; Rosenthal & Cardoso, 2015).

Perceived Atmosphere During the FIFA World Cup

Although each hosting of a mega-sport event introduces a new contextual setting to researchers (which makes it difficult to generalize results on the predictors of subjective well-being), the festive elements and the perception of an event as a significant national happening that transcends local communities are elements that are consistently used to describe mega-sport events today (Weed et al., 2009, 2012). These features (among others) can generate a special atmosphere in the host city (Chalip, 2006), and they are among the factors that Weed et al. (2009) considered to be most likely related with a positive change in important health determinants. However, empirical evidence for the latter claim is scarce, as the effects of the particular atmosphere during the hosting of a mega-sport event have not been considered in the dominant research stream on the impact of sport events, which has focused on tangible benefits (Chalip, 2006), and they have rarely been considered in empirical studies that assess the impact of mega-sport events on quality of life, life satisfaction, or subjective well-being (with one exception, Pfitzner & Koenigstorfer, 2016).

Atmosphere can be defined as the preferential affective state that individuals attribute to the idiosyncratic features of the environment (Uhrich & Benkenstein, 2010). Places that are perceived as special and stimulating are often described as having a good atmosphere. Environmental psychology models can be used to explain the positive effects of a pleasant atmosphere on individuals and their behavior (Uhrich & Koenigstorfer, 2009). Atmosphere takes an intermediate position between subject and object (Böhme, 1993), which makes operationalizations difficult. Anthropological work based on the concept of liminality helps

describe atmosphere further, particularly in regard to events that are considered as festivals (Getz, 2010). Liminality describes a subjunctive mood of potentiation that challenges established orders and that provides a cultural means of creating variability in tribal societies (Turner, 1977). According to Getz (2010), it represents “the temporary state of being apart from the mundane (as in a ritual, travel or event experience)” (p. 8). According to Chalip (2018), it is further reflected in a “celebratory feeling associated with events that is accompanied by a sense that social rules and roles are relaxed or suspended altogether” (p. 33). As our research focuses on the atmosphere during the hosting of the 2014 FIFA World Cup, we describe the features that potentially made up the liminoid event experience for *cariocas* and that may thus have provided the dope for injection into the city’s atmosphere, to use Chalip’s (2006) figurative description of the powerful effects of liminality.

In his early work, Turner (1967) stated that, “we are not dealing with structural contradictions when we discuss liminality, but with the essentially unstructured” (p. 98). Chalip (2006) refers to sport events and argues that these “events offer more than mere economic value. Indeed, the energy, excitement, and *communitas* associated with event liminality are among those things that make it attractive to host (and to attend) events” (p. 112). Two key elements create liminality: the sense of celebration and social camaraderie (Green & Chalip, 1998; O’Brien & Chalip, 2008). Chalip (2006) further referred to various examples found in the sport event literature, where liminality provides the place and time to individuals to explore otherwise contentious affairs, potentially in relation with others (*communitas*). The liminoid atmosphere of mega-sport events can provide a context, “in which event attendees probe, test, and cultivate their identity with reference to their social context” (Chalip, 2006, p. 111). It provides people a safe space for matters that are highly sensitive to the society (e.g., in regard to Brazil: social inequality, discrimination, politics, and dissatisfaction with the status quo, among others), and people can symbolize or debate important matters (Chalip, 2006), as was seen during the protests prior to the hosting of the 2014 FIFA World Cup (e.g., during the Confederations Cup held in 2013; Butler & Aicher, 2015). Kath and Knijnik’s (2015), Moraes et al.’s (2014), and Rosenthal and Cardoso’s (2015) work indicates that Rio de Janeiro residents indeed used the event context to create a liminoid atmosphere and articulate, and debate on, issues they are concerned about. In what follows next, we present an overview of measurement tools of atmosphere and discuss their ability to assess important features of liminality during the hosting of the 2014 FIFA World Cup (i.e., celebration, camaraderie, identity construction, highlighting and overturning existing hierarchies and conventions, and breaking with everyday reality).

Measurement Tools for Atmosphere Against the Contextual Background of the 2014 FIFA World Cup

The measurement of an event atmosphere is a challenging task, as environmental stimuli interact with personal characteristics of individuals, and only the interaction of the two variables provides a full picture of how an individual feels in and perceives a certain environment (Uhrich & Koenigstorfer, 2009). Bille, Bjerregaard, and Sørensen (2015) stated that, “atmosphere is characterised by a certain ontological and epistemological vagueness, which means that it does not easily lend itself to becoming a subject (or object) of social analysis” (p. 32). In their environmental psychological model, Mehrabian and Russell (1974) considered information rate (measured via 14 adjectives) as a proxy of the arousal level elicited by the environment—a potential indirect measurement tool for atmosphere. The concept is claimed to be “applicable to any type of stimulus configuration—which is important considering environmental psychologists’ interest in stimuli ranging from color patches to cities” (Mehrabian & Russell, 1974, p. 249).

Furthermore, the literature on services proposes a number of measurement tools: Baker (1987) considers (a) ambient factors, (b) design factors, and (c) social factors as components of the service environment that may be considered as an indicator of the environment’s atmosphere. Bitner’s (1992) servicescape model considers (a) ambient conditions, (b) space/function, and (c) signs/symbols/artifacts. Last, Tombs and McColl-Kennedy (2003) developed the so-called social servicescape model that includes the following factors: (a) context (private or group purchase occasion), (b) physical elements (social density), and (c) social elements (displayed emotion of others). Although the latter three models have been used in service industry settings, their usefulness to capture a city’s atmosphere is limited, because the motives and goals of individuals are different (i.e., for them, customers are interested in [or should be influenced toward] making a purchase; in our case, host city residents spend time in the city for other reasons than shopping). In cities, employee–customer relationships are less relevant, and the number of design elements and signs/symbols/artifacts is huge, with less homogeneity compared to service industry settings (where the environment is largely under management control).

In the field of sport management, researchers have developed scales that are specific to sport environments. Wakefield, Blodgett, and Sloan (1996) developed the servicescape model further to propose the so-called sportscape model. Their scale considers several predictors of spectators’ pleasurable event experience. However, it was validated for sport stadiums and cannot be used to measure event atmosphere in a city (e.g., seat comfort and billboards are not features that describe the atmosphere in a city; see Biscaia, Correia, Santos,

Ross, & Yoshida, 2017, who eliminated all stadium-related items in their refinement process of an event atmosphere scale). Furthermore, several scales have been proposed to measure the feel-good factor of the mega-sport event hosting. They include some potential facets of a liminoid atmosphere. Gibson et al. (2014) considered psychic income, a construct originally conceptualized as the economic value of sociopsychological factors of hosting a mega event. Burgan and Mules (1992) indicated that psychic income “may be manifest in civic pride, self confidence, or a festival atmosphere” (p. 709). Gibson et al. (2014) built their psychic income scale upon the scale development efforts by Kim and Walker (2012). In addition to psychic income scales, other scales have been proposed to measure social impact and other variables potentially indicative of camaraderie or *communitas* (e.g., Heere et al., 2013, 2016; Lee, Cornwell, & Babiak, 2012), as it is well accepted that events have social value and can promote social change in the society (Handelman, 1990).

Uhrich and Benkenstein (2010) proposed a one-dimensional atmosphere scale that was originally developed for sport stadiums but is applicable across contexts. It has high validity and reliability (Uhrich & Benkenstein, 2010). Pfitzner and Koenigstorfer (2016) used the scale to measure perceived atmosphere in the city. Compared with the scales mentioned before, this is the only scale that measures atmosphere as a reflective construct (based on a definition provided by the authors) and allows a broad application. The scale has been validated in Portuguese (Pfitzner & Koenigstorfer, 2016).

This study uses Uhrich and Benkenstein’s (2010) definition of atmosphere (see above) and their scale. Note that the scale focuses on celebrative aspects of atmosphere that have a positive interpretation (i.e., assuming that host city residents tend to rather enjoy the atmosphere when they give high ratings on the scale, and that they tend not to enjoy the atmosphere so much when they give low ratings). This should serve the purpose of the study, as we are interested in studying the short-lived excitement in the air during (vs. before) the hosting of the 2014 FIFA World Cup. In what follows, we refer to atmosphere as the preferential affective state that Rio de Janeiro residents attribute to the idiosyncratic features of their city and derive the argument that perceived event atmosphere in the city increases subjective well-being during (vs. before) the hosting of the 2014 FIFA World Cup.

Research Hypothesis

When mega-sport events are hosted, the intangible outcomes and rewards for individuals are mostly unrelated to the quality of the sporting performance or the sporting results (Waitt, 2003; see also Kavetsos & Szymanski, 2010). For example, at the 2000 Olympic Games in Sydney, the excitement surrounding the event was created by community spirit, patriotism, and the desire to

participate as volunteers (Waite, 2003). Furthermore, Waite's (2003) work indicates that perceived atmosphere peaks when the city actually hosts the event (see also Chalip, 2006 for citations from host city residents). For example, the experience of hosting the event (Olympic Games in this instance) was described by one resident as follows: "I will always remember walking down the Olympic Boulevards with crowds, it was such a buzz to be part of something this big" (Waite, 2003, p. 205). The answers to open-ended questions indicate that the atmosphere in the host city may have increased residents' subjective well-being (or its antecedents) when the event took place.

Mehrabian and Russell's (1974) environmental psychological model and the work on liminality (bearing in mind that we focus on the preferential celebrative aspects of atmosphere; Chalip, 2006; Getz, 2010) substantiate our proposition about the relationship between atmosphere and subjective well-being: we expect that the atmosphere that host city residents perceive within their home city may contribute to higher levels of subjective well-being during the hosting of a mega-sport event. In contrast to times when the event is not taking place, residents have more opportunities to escape from their daily routine and to enjoy the celebrative character of their home city.

Methods

Design and Procedure

The study used a repeat cross-sectional survey, in which two demographically similar samples were used at two different points in time (trend study). The design has been used in similar studies of the impact of mega-sport events on a host population (Gibson et al., 2014; Heere et al., 2013; Kaplanidou et al., 2013). All participants gave informed consent for participation.

Data were collected from residents of Rio de Janeiro before and during the 2014 FIFA World Cup. Rio de Janeiro was one of the 12 host cities of this mega-sport event. The first data collection (T_0) took place 1 week before the event's opening ceremony, and the second data collection (T_1) took place 3 weeks later, about 10 days before the end of the event. T_1 was scheduled to take place during the rest days after the round of 16 and before the quarterfinals took place. Brazil, the host nation, was still in the competition at T_1 .

Trained teams of five fieldworkers held in-person intercept surveys using paper-and-pencil questionnaires in high-pedestrian-traffic public areas in the city of Rio de Janeiro. The interviews took place in Portuguese in seven different quarters of Rio de Janeiro: Botafogo, Centro, Copacabana, Flamengo, Ipanema, Santa Teresa, and Urca. At each location, pedestrians were intercepted and asked to participate in the survey. If they agreed, they were asked whether they were residents of Rio de Janeiro. National and international tourists and individuals under the age of 16 years were excluded from

participation. The potential biases introduced by the sampling technique will be discussed in the limitations section. At the end, participants were thanked for participation and fully debriefed concerning the aim of the study. Participants did not receive any monetary or in-kind compensation.

Participants

To determine the required sample size, we considered the correlation between perceived atmosphere in the city and the psychological domain of quality of life of host city residents in Rio de Janeiro (as the psychological domain can be assumed to be most closely related to subjective well-being among the four quality of life domains), taken from Pfitzner and Koenigstorfer's (2016) study. The correlation was .36 for their second-wave measures. The authors measured atmosphere during the event hosting only.

Based on the correlation, G*Power 3.1.9.3 (Faul, Erdfelder, Buchner, & Lang, 2009) revealed a necessary sample size of 56 participants for the sample interviewed during the event hosting. Two hundred and twenty-one participants took part in the study at T_0 , and 218 participants took part at T_1 . Thus, the sample size in our study can be expected to be above the necessary sample size. There were no significant differences concerning gender, age, civil status, household size, employment status, income, or education between participants at T_0 and T_1 . Thus, the two samples were demographically similar (Table 1).

Referring to the whole sample ($N=439$, 222 of whom were women), the mean age of the participants was 32.1 years ($SD=12.6$). According to the World Factbook, the gender ratio in Brazil is 0.97—that is, there are 0.97 males for each female—and the median age is 31.6 (Central Intelligence Agency, 2016). Participants had medium levels of identification with the Brazilian national team ($M=3.95$, $SD=1.72$; we note that identification increased from T_0 to T_1 , which was expected; Table 1).

The majority of participants were employed full time or part time (69%) with a mean income of 3.5 times the Brazilian minimum wage ($SD=3.2$). According to the Better Life Index published by the Organization for Economic Co-operation and Economic Development (2014), about 67% of the working-age population in Brazil has a paid job. Although, in our study, the mean salary was 3.5 times the minimum wage, which is equivalent to 724 Brazilian Real per month (Rousseff, Mantega, Dias, Cella Dal Chiavon, & Alves Filho, 2013), results from the Brazilian census indicate that 33% of the working-age population have a salary between one and two times the minimum wage, and 8.4% of Brazilians receive three to five times the minimum wage (Instituto Brasileiro de Geografia e Estatística, 2012). Thus, our sample had a higher income than the average Brazilian population. This is understandable because income is generally higher in cities and in well-developed areas.

Table 1 Sample Surveyed at T_0 and T_1 and Results of Testing for Differences Between the Two Samples

Variables	T_0	T_1	Differences (Chi-Square or t-Test Results)	
Gender (%; females)	48.9	52.3	$\chi^2(1) = 0.52$	$p = .47$
Age (years), M (SD)	33.1 (13.3)	30.8 (11.7)	$t(437) = 1.94$	$p = .053$
Civil status (%)			$\chi^2(4) = 2.14$	$p = .71$
Single	57.5	54.1		
Married	24.5	27.1		
Partnership	8.6	11.6		
Divorced	7.3	6.3		
Widowed	1.8	1.0		
Household size, M (SD)	2.81 (1.44)	2.93 (1.52)	$t(437) = -.88$	$p = .38$
Employment status (%)			$\chi^2(4) = 5.26$	$p = .26$
Full time	48.2	58.4		
Part time	18.2	13.4		
Student	25.9	20.6		
Retired	3.6	2.9		
Unemployed/not working	4.1	4.8		
Monthly gross household income (BRL, %)			$\chi^2(12) = 16.98$	$p = .15$
<725	3.7	1.5		
725–1,448	13.8	12.7		
1,449–2,172	9.6	11.8		
2,173–2,896	9.6	6.4		
2,897–3,620	6.0	9.8		
3,621–4,344	7.3	7.8		
4,345–5,068	10.1	6.9		
5,069–5,792	3.7	2.5		
5,793–6,516	5.0	5.4		
6,517–7,240	5.0	3.4		
7,241–7,964	2.8	2.9		
7,965–8,688	4.6	1.0		
>8,688	18.8	27.9		
Education (%)			$\chi^2(3) = 3.83$	$p = .28$
Lower than elementary school	0.9	1.0		
Elementary school (9 years)	5.1	3.4		
High school (12 years)	55.3	48.1		
Higher education degree	38.6	47.6		
Perceived country-level corruption in Brazil, M (SD)	4.45 (0.60)	4.41 (0.60)	$t(437) = .63$	$p = .53$
Perceived organizing committee-level corruption at the 2014 FIFA World Cup, M (SD)	4.15 (0.80)	4.21 (0.73)	$t(437) = -.89$	$p = .37$
Identification with the Brazilian national team, M (SD)	3.31 (1.73)	4.61 (1.45)	$t(437) = -8.49$	$p < .001$

Note. FIFA = Fédération Internationale de Football Association; BRL = Brazilian Real.

We note that we did not conduct surveys in the favelas, where income can be assumed to be lower (Da Mata, Lall, & Wang, 2007). In our study, 52% indicated that they had a high school diploma. In the country, about 43% of all Brazilians have obtained the equivalent of a high school diploma (Organization for Economic Co-operation and Economic Development, 2014).

To conclude, it appears that some sociodemographics of the sample were consistent with the Brazilian population (gender, age, and employment status), whereas others were different (income and education). We are not aware of any theories or studies that would indicate different relationships between perceived atmosphere in the city and subjective well-being for different

income and education groups. Thus, despite some important limitations that will be discussed further later, we believe that the sample serves the purpose of the study.

Variables

Subjective well-being was measured via the Portuguese version of the WHO-Five well-being index (WHO-5; Table 2; World Health Organization, 1998). Items were rated on a 6-point rating scale (0 = *at no time*; 5 = *all of the time*). The sum score was then multiplied by four (for reasons of comparison with different versions of WHO scales), where 0 indicates the lowest subjective well-being and 100 indicates the highest subjective well-being (World Health Organization, 1998). As demonstrated by De Souza and Hidalgo (2012), the Portuguese WHO-5 shows good internal and external validity, as well as high-scale reliability.

Atmosphere was measured using seven reflective items taken from Uhrich and Benkenstein (2010; Table 2). To translate the items into Portuguese, two independent native speakers used the forward-backward method (see Pfitzner & Koenigstorfer, 2016). As the scale was originally developed to measure atmosphere in stadiums, the word "stadium" was replaced with "Rio de Janeiro" in all items. Items were anchored at 1 = *do not agree at all* (indicating low atmosphere) and 5 = *fully agree* (indicating high atmosphere).

To test whether atmosphere is a distinct concept, we measured anticipated game-related emotions using the Portuguese adaptation (Biscaia, Correia, Rosado, Maroco, & Ross, 2012) of the Sport Emotion Questionnaire (Jones, Lane, Bray, Uphill, & Catlin, 2005). All items were measured on a 5-point rating scale (0 = *not at all*; 4 = *extremely*). While the scale was proposed to have five dimensions (Jones et al., 2005),

Biscaia et al. (2012) did not find evidence for discriminant validity for positive emotions (excitement and happiness) and, thus, merged these two emotion factors into one factor. In our study, we found the same result. We did not find evidence for discriminant validity for negative emotions (anxiety, anger, and dejection) too, and, thus, we followed Biscaia et al.'s (2012) recommendations and kept the four items with the highest loadings on the respective factor: positive emotions (excited, joyful, cheerful, and pleased) and negative emotions (annoyed, furious, angry, and irritated; see Lins & Borsa, 2014, who also referred to positive and negative emotions in the context of the 2014 FIFA World Cup hosting).

We then conducted an exploratory factor analysis and a confirmatory factor analysis including perceived atmosphere, positive emotions, negative emotions, and subjective well-being. Both analyses supported the four-factor structure. The fit for the 20-item, four-factor confirmatory factor analysis model was good (Hu & Bentler, 1999): $\chi^2(164) = 331.43$, standardized RMR = .037, RMSEA = .048, CFI = .97, and TLI = .97. All the standardized target loadings were above .63. The factor correlations were between $-.45$ and $.73$, and the factor reliabilities were between .83 and .91. The convergence validity criterion (average variance extracted $>.5$) was met, and Fornell and Larcker's (1981) criterion on discriminant validity was met, as the correlations were lower than the respective square roots of the average variance extracted.

Cronbach's alpha was .83 for subjective well-being, .94 for perceived atmosphere, and .91 and .90 for positive and negative emotions, respectively. We computed average scores for perceived atmosphere and subjective well-being, which were used in the analyses.

Table 2 Descriptive Statistics for Subjective Well-being and Perceived Atmosphere

Item	T_0	T_1	Differences (p Value of t -Test Results)
	M (SD)	M (SD)	
Subjective well-being (0–100)	54.8 (22.3)	63.8 (19.6)	<.001
I have felt cheerful and in good spirits	3.10 (1.32)	3.48 (1.10)	<.01
I have felt calm and relaxed	2.80 (1.34)	3.15 (1.17)	<.001
I have felt active and vigorous	2.97 (1.35)	3.41 (1.16)	<.01
I woke up feeling fresh and rested	2.38 (1.39)	2.73 (1.36)	<.001
My daily life has been filled with things that interest me	2.89 (1.39)	3.50 (1.37)	<.001
Perceived atmosphere	2.81 (1.06)	3.90 (0.86)	<.001
There are amazing vibes	3.12 (1.30)	4.23 (0.92)	<.001
There is tremendous enthusiasm	2.86 (1.22)	4.14 (0.94)	<.001
You experience really strong emotions	2.79 (1.31)	3.89 (1.03)	<.001
The atmosphere gives you goose bumps	2.72 (1.29)	3.42 (1.22)	<.001
There's a real thrill in the air	2.94 (1.29)	4.06 (0.96)	<.001
You get caught in the general euphoria	2.52 (1.28)	3.75 (1.15)	<.001
You get a real high	2.79 (1.34)	3.87 (1.06)	<.001

As confounding variables, we assessed team identification (a seven-item scale taken from Wann & Branscombe, 1993; 1 = lowest identification levels, 7 = highest identification levels). Cronbach's alpha was .91. We also measured perceived corruption via three items taken from the Global Corruption Barometer (Hardoon & Heinrich, 2013), a formative scale referring to corruption in Brazil ("Over the past two years, how has the level of corruption in Brazil changed?" 1 = decreased a lot, 5 = increased a lot; "To what extent do you think that corruption is a problem in the public sector in Brazil?" 1 = not a problem at all, 5 = a very serious problem; "In your dealings with the Brazilian public sector, how important are personal contacts to get things done?" 1 = not important at all, 5 = very important). Three similar items referred to corruption within the organizing committee of the 2014 FIFA World Cup (the wording was changed: "Brazil" and "public sector in Brazil" were replaced with "organizing committee of the 2014 FIFA World Cup"). We computed average scores for both corruption measures, and there were no differences in perception between T_0 and T_1 (Table 1).

Data Analysis

Statistical analyses were performed using SPSS 24 (IBM, Armonk, NY) and MPlus 8 (Muthén & Muthén, Los Angeles, CA). The level of significance was $\alpha = .05$. To test our hypotheses, the t test assessing group differences between two independent groups and two-group path modeling were performed. In the latter analysis, between-group differences (i.e., comparisons between during and before the event hosting) were examined using the chi-square difference test. For this test, the significance of the drop in fit is evaluated to determine whether constraining the path between respondents who participated in the survey during the event and respondents who participated before the event to be equal in magnitude is warranted. A (significant) nonsignificant drop in fit indicates that the constrained path is (not) statistically equivalent.

Results

Subjective well-being was higher during, as compared with before, the event: participants rated subjective well-being with 54.8 ($SD = 22.3$) at T_0 , that is, before the event, and with 63.8 ($SD = 19.6$) at T_1 , that is, during the event, $t(437) = 4.49$, $p < .001$; see Table 2. In what follows, we describe the influence of perceived atmosphere in the city (which also increased over time; see Table 2) on individuals' subjective well-being at the two points in time under consideration.

We used a two-group path analysis to find out about the differences in the influence of perceived atmosphere in the city on subjective well-being between the two measurements. Before the event, perceived atmosphere in the city was a positive and significant predictor of subjective well-being, $b = 5.39$, $SE = 1.37$, $p < .001$.

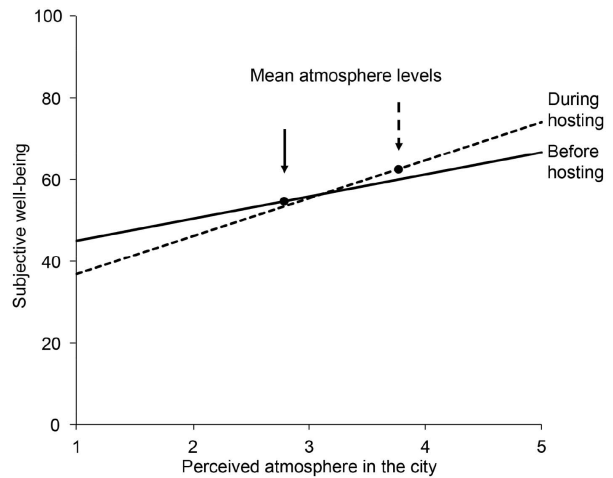


Figure 1 — The relationship between perceived atmosphere in Rio de Janeiro and host city residents' subjective well-being during and before the 2014 FIFA World Cup.

During the event, the relationship between perceived atmosphere and subjective well-being was also positive and significant, with a higher beta coefficient than before, $b = 9.30$, $SE = 1.41$, $p < .001$. The difference in the path coefficient (before vs. during) is statistically significant, $\Delta\chi^2(1) = 3.94$, $p < .05$. The results, thus, support our hypothesis: the positive impact of perceived atmosphere in the city on subjective well-being was stronger at T_1 than at T_0 . Figure 1 illustrates this finding.

Discussion

Theoretical Contribution

The results of the study indicate that there was an increase in host city residents' subjective well-being from before to during the event, looking at two demographically similar convenience samples of Rio de Janeiro residents during (vs. before) the hosting of the 2014 FIFA World Cup. The study identifies perceived celebrative atmosphere in the host city as one predictor of higher levels of subjective well-being of host city residents at the time when the event actually happens in their place of residence (with a stronger influence compared with before).

The study contributes to the literature in several ways. First, it identifies a city's celebrative atmosphere as one of the drivers of subjective well-being when mega-sport events are hosted. Thus, it provides empirical evidence for the "feel-good effect" of the event hosting and the importance of nonsport game-related features in creating this effect (Kavetsos & Szymanski, 2010, p. 168; see also Weed et al., 2009, 2012). Subjective well-being has rarely been considered as an outcome variable in previous studies onto mega events in general and mega-sport events in particular (Dolan et al., 2008). We identified perceived atmosphere in the host city as

one predictor of high levels of subjective well-being at the individual level (host city residents). The results, thus, expand on previous findings that related perceived atmosphere to quality of life domains (Pfitzner & Koenigstorfer, 2016). Taken together, the results of previous research using a longitudinal design (Pfitzner & Koenigstorfer, 2016) and of our study using a repeat cross-sectional design demonstrate that the celebrative atmosphere in the city during the hosting of mega-sport events can have positive effects on the city's residents, yet not all residents are affected equally (and in a positive direction; see left side of Figure 1). The positive perception of the celebrative atmosphere in the city—in accordance with the predictions based upon environmental psychology (Uhrich & Koenigstorfer, 2009) and liminality studies with regard to celebrative aspects (Chalip, 2006)—may cause host city residents to rate their subjective well-being higher at times when the event is taking place. At the same time, the negative perception may reduce subjective well-being for those residents who perceive the atmosphere in the city negatively. Outside the context of the event hosting (prior to the hosting, in this study), the positive (or negative) perception of the celebrative atmosphere also contributes to (or reduces) subjective well-being but to a lesser extent.

Second, the study assessed the short-term change in subjective well-being (rather than long-term changes), as called for by Kavetsos and Szymanski (2010). The temporal closeness of the two measurement points (3–4 weeks in the present study: one measurement 1 week before the event, the second measurement during the event) is important since the feel-good effect is most likely not a long-term legacy of the event, but something that may fade quickly (Kavetsos & Szymanski, 2010). Previous studies have neglected this fact and, thus, could not provide evidence regarding whether the event actually increases or decreases outcomes that are conceptually related to subjective well-being, such as satisfaction with quality of life (Kaplanidou et al., 2013). The present study addresses this limitation. We, however, note that the means of subjective well-being are lower compared with means that have been reported in previous studies on subjective well-being in Brazil. De Souza and Hidalgo (2012) report means of 73.4 ($SD = 18.7$) using a nonrepresentative sample of 1,128 German immigrant descendants from rural towns in South Brazil's Taquari Valley (67% women, mean age 44.3 years). However, De Souza and Hidalgo (2012) write that their sample may be self-selective with regard to motives (because their subjects emigrated to Brazil) and hence with regard to subjective well-being. Thus, it is plausible that the average subjective well-being score was artificially high in their study. Because, to our knowledge, there are no representative studies on subjective well-being in Brazil, we also looked at Organization for Economic Cooperation and Economic Development's (2014) indicator of life satisfaction. The Brazilians rate their life satisfaction at an average of 6.5 (on a scale ranging from 0 to 10, the latter indicating highest life satisfaction). Thus, as in

our study on subjective well-being, the rating is slightly above the mid-point of the scale.

Important features beyond the sport event and beyond the athletes competing in the event have been discussed as drivers of an increase in subjective well-being in host city residents, but not empirically examined in relation to short-term changes in well-being (Getz, 2010). The celebrative elements of a mega-sport event that are relevant to communities in the sense that they create a pleasant liminoid atmosphere in the city are features that have little relation to the sport games per se (e.g., the sporting performance; Chalip, 2006). Our findings, thus, add to the literature on intangible effects of sport events and liminality (e.g., Chalip, 2006). Although liminality is a much broader concept than captured in our atmosphere measure and is difficult to measure using standardized scales, our results should encourage researchers on liminality to relate the concept of city (or event) atmosphere not only to celebrative aspects, but also to aspects of camaraderie, identity construction, highlighting and overturning existing hierarchies and conventions, and breaking with everyday reality, among others. The resulting changes in subjective well-being in the context of sport events may be attributed to these facets [e.g., similar to Welty Peachey, Borland, Lobpries, and Cohen's (2015) approach to study a soccer-for-the-homeless event, a smaller scale event than considered in our study]. The findings may then inspire future model development on the social leverage of mega-sport events (Chalip, 2006, 2018; O'Brien & Chalip, 2008), where liminality is the core leverageable resource.

Implications

Based on the results of our study, public health representatives, municipality officials, and event organizers are advised to work together to promote a stimulating and exciting atmosphere in the host city of mega-sport events. City officials and event organizers may decorate streets, allow people to gather at public places (e.g., by closing streets for parties), have other stakeholders become involved in the event (e.g., restaurants and bars, as well as social event sponsors), and connect the event to cultural happenings, such as music and dance performances, to state some examples. If host city residents perceive the atmosphere in their city positively, residents' subjective well-being may increase.

It can be further recommended that the stakeholders emphasize and use the atmospheric and festive elements in a city to motivate residents to participate in community-oriented events, take health-related actions (e.g., volunteer in the community, be more physically active, increase fitness, and improve health literacy) and hence promote life satisfaction of host city residents. The atmosphere may emphasize those transcendent festival elements that lead communities and residents to perceive that the event brings some purpose to their lives, or that it provides an opportunity to become engaged in

something that is meaningful. Stakeholders may also be recommended to eventually de-emphasize the sporting elements of the event (e.g., the importance that the home team wins, the importance of being inside stadiums to perceive the atmosphere). Chalip (2006) proposed five strategies to foster celebration and social interaction: enabling sociability, creating event-related social events, facilitating informal social opportunities, producing ancillary events, and theming—all of which may contribute to a positive event atmosphere (and potentially even affect the post-event atmosphere, if these intangible benefits or their structures remain; Preuss, 2015). Social events might be particularly effective, as liminality is closely linked to the concept of *communitas* (Chalip, 2006, 2018; Getz, 2010; O'Brien & Chalip, 2008). The absence of emphasis on these features that have not always been systematically related to the event in campaigns surrounding the hosting of mega-sport events in the past, may be one reason why some pro-societal intangible effects of previous mega-sport events were lower than predicted or even nonexistent (Weed et al., 2009, 2012).

Another implication can be made based upon the positive but weaker relation between perceived atmosphere in the city and subjective well-being prior to the hosting of the event. The results may indicate that a city can still provide structures to its residents that make their life more enjoyable outside of the hosting context. Thus, city representatives may implement strategies (e.g., install volunteer programs for both sport and nonsport activities, have a full calendar of cultural activities in different communities) to make sure that city atmosphere levels are continuously high. Also, open spaces such as green parks and water areas (e.g., rivers, lakes, and sea) that can be accessed by individuals for free provide good opportunities for leisure engagement. We note that the safe provision of structures for leisure engagement may grow increasingly difficult to realize, as security concerns affect not only mega-sport event hosting around the world but also the staging of smaller scale events (e.g., Christmas markets).

Limitations and Outlook

Our study is not free from limitations. Methodological shortcomings include the use of in-person intercept surveys from two demographically similar samples at two points in time instead of one sample with follow-up. The latter, however, is subject to limitations too (Pfitzner & Koenigstorfer, 2016). Our design, similar to previous research (Gursoy, Chi, Ai, & Chen, 2011; Kaplanidou et al., 2013), leads us inevitably to a trend-study approach, meaning that implications have to be considered as trends and not as causal interpretations. In addition, the study fails to provide evidence for the development of subjective well-being after the event hosting. For example, the recall of the positive (negative) atmosphere in the city after the event may influence subjective well-being positively (negatively). The city's ambitions to

keep subjective well-being levels high (an aspect that was not considered in our study) and produce a positive legacy of the event hosting are important; future research has to find out whether, when, and how the city's atmosphere can contribute to this goal.

Although our sample is fairly representative for the Brazilian population with regard to gender, employment status, and age, income and education levels were higher than on average. This difference can be explained by the venues of the data collection. Rio de Janeiro has many *favela* inhabitants with low income and low education who were not interviewed in our study. Still, they may have the highest levels of need in regard to improving subjective well-being. Thus, the lack of a representative sample is a serious limitation of our study. Future research may, thus, include low-income and low-education residents and identify those residents who show the least change in subjective well-being, and assess potential reasons for this (e.g., increase in rent for housing; negative consequences of relocation activities, such as more difficult access to health-promoting infrastructures in the city after [vs. before] the hosting). One may assume that any effect caused by the positive perception of atmosphere in the city may be eliminated (or reduced) if these residents feel overruled by the government (or the city or the event organizer) authorities with regard to a personally relevant matter. For example, Rio de Janeiro residents who were evicted from their homes for the purpose of the event hosting likely perceived subjective well-being more negatively during (or after) versus before the event despite potentially positive perceptions of atmosphere in the city.

Our measurement tool of perceived atmosphere focuses on celebrative aspects and is, thus, limited with regard to its ability to capture different facets of liminality. Future studies may develop valid and reliable scales that capture a liminoid atmosphere (if possible), relate the concept to rituals and mega-sport event experiences, and include a broader range of facets. To our knowledge, there is no scale available that assesses liminality as we have conceptualized the construct (see references above). Such a scale requires a definition of liminoid atmosphere at mega-sport events (e.g., Rowe, 2008) and is likely to be a multidimensional construct that covers aspects such as celebration, camaraderie, identity construction, highlighting and overturning existing hierarchies and conventions, and breaking with everyday reality. Liminality may exert its strongest influence on variables that measure social capital, cohesion, and community—factors that do not only concern individual well-being but also relate to important others (e.g., peers).

Considering the specific context in which sport mega-events take place, the atmospheric influence of the use of the event as a platform for addressing societal concerns (e.g., health and education needs, reduction of social inequality, raising voices of dissatisfaction with politicians, and fights against corruption) should not be left out. The relevance of these aspects likely depends on the respective research context (Chalip, 2018; e.g., see

MacAloon, 1984; Peacock, 1985, for Olympic Games contexts). Future studies could replicate the results for more host cities. Also, they could compare them with nonhost cities to provide evidence for the generalizability of the results and the net effect of the hosting (Preuss, 2015). Because the hosting of the 2014 FIFA World Cup shares some important features with Rio de Janeiro's carnival (DaMatta, 1991; Kath & Knijnik, 2015), the study may be repeated during carnival, that is, a yearly event that may have a seasonal effect on subjective well-being.

Conclusions

The perceived celebrative atmosphere in Rio de Janeiro as the host city of the 2014 FIFA World Cup was a positive predictor of subjective well-being of host city residents at the time when the event actually took place. As subjective well-being indicates higher life satisfaction, the creation of an exciting event atmosphere may make some city residents—in particular those who perceive the atmosphere positively—more satisfied with their lives when the event is held (this was even true outside of the context of the hosting but to a lesser extent). The negative perception of atmosphere, however, may reduce subjective well-being. With this research, we hope to contribute to the ongoing discussion on the benefits and detriments of hosting mega-sport events.

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