The experience of stress in communities with high tourism visitation vs low tourism visitation

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Introduction

In a series of recent studies, residents of tourism destinations have indicated that tourism is a cause of stress, with a multitude of stressors experienced across individuals and communities (Jordan & Vogt, 2017a). However, the evidence of stress caused by tourism has been self-reported in response to direct questions via survey. Questions remain as to whether residents of host communities simply report experiencing tourism related stress because they have been directly asked about it via survey. There is also a dearth of information about the geospatial distribution, quantity, and magnitude of stressors experienced in communities with high tourist visitation vs. communities with low tourism visitation (Jordan & Vogt, 2017a). Technological advances have opened new data collection avenues to address these questions. Mobile phone geographic information systems (GIS) applications allow data to be collected in real time via smartphone and analyzed both statistically and geospatially. Classical modes of using GIS have depended on trained professionals inputting data gathered independently (Dunn, 2007). However, there is a history of collecting spatial information first-hand from participants in the form of sketch-mapping (Chambers, 2006). The proliferation of smartphone technology now allows data collection like sketch-mapping to become a real-time experience via GIS mobile applications.

In this study, we seek to address three deficiencies in the understanding of how and where tourism related stress occurs. First, do host community residents mention tourism as a stressor when unprompted by a researcher? Second, does the experience of tourism related stress occur differently in a highly visited tourism destination vs a less visited tourism destination. Third, where do tourism related stressors occur in the community? To answer these questions, we recruited participants from a high-visitation tourism community and low-visitation tourism community and tracked their stressful experiences via the ArcGIS Survey123 App on their smartphones.

Literature Review

Stress

Stressors are anything which negatively affect an individual's homeostasis, contributing to what is known as allostatic load (McEwen & Wingfield, 2003; McEwen, 2004). Stress can force positive behavioral changes and is a natural part of life, but long periods of chronic stress can negatively impact an individual's health (McEwen, 2004). The physical effects of chronic stress can compound over time and commonly include hypertension, depression, Chronic Fatigue Syndrome, increased risk for autoimmune and inflammatory disorders (McEwen & Wingfield, 2003), and even the reduction of brain matter (Selye, 1998). Stress is often experienced through *daily hassles* which are minor inconveniences that build up over time. Although these small stressors may seem unimportant, the compounding effects of stress can lead to small stressors creating major health issues (McEwen & Wingfield, 2003). Stressors that are perceived as controllable by the individual are more likely to lead to active coping mechanisms, which in turn tend to mitigate many of the negative health outcomes of stress (Jordan, 2017b).

There is a small but growing body of literature examining the experience of stress in tourism host communities (Jordan, Vogt, & DeShon, 2015). Stressors in tourism destination communities include crowding, unmet development expectations, increased cost of living, and rising levels of pollution. Unmet development expectations can be a lack of tourists, jobs, and money that may have been promised to the community when they invested in tourism infrastructure (Jordan & Vogt, 2017b). However, tourism in a community does not always cause the same type or magnitude of stress. Instead it is dependent on the cultural milieu of a destination, indicating that stress is not an inevitable result of tourism (Husbands, 1986) and that there may be ways to reduce or prevent stress in tourism destination communities. Different types of tourism can cause different levels and types of stress. Small-scale development may be less likely to exacerbate stressors caused by tourism such as over-crowding and over-development when compared to mass tourism on a large scale (Jordan, 2014). If, for example, residents of a destination can feel significantly involved in the planning process it may lead them to feel that stressors caused by tourism are under their control and engage in more positive coping strategies (Jordan & Vogt, 2017a)

Geographic Information Systems (GIS)

GIS has gained popularity as a research tool steadily over the past 20 years. It has been used in a variety of contexts such as comparing subjective well-being with environmental factors (Björkman, 2018), measuring resident attitudes toward green spaces (Balram & Dragićević, 2005), collecting local information about tourism attractions (Kantola, Uusitalo, Nivala, & Tuulentie, 2018), and capturing changing perceptions of an area over time (Pearsall, Hawthorne, Block, Walker, & Masucci, 2015). However, its usage is still colored by its history as a resource only available to privileged populations in wealthy, technologically advanced countries (Dunn, 2007). Traditionally, the collection of GIS data has been limited by those with knowledge of complex equipment and methodologies. However, difficulties of applying GIS by non-experts are deeper than unfamiliarity with technology. Traditional use of GIS exemplifies a Western attitude toward geospatial information, In many cultures, GIS is practically unusable and community-source spatial information is gathered through exercises like sketch-mapping (Chambers, 2006). Sketch mapping is a methodological technique in which participants are asked to add information to a cartographically accurate map. The advent and widespread availability of hand-held smart devices (84% of Americans live in a household with at least one smartphone (NW, Washington, & Inquiries, 2017)), has made mobile applications of GIS a possible analogue of traditional sketch-mapping activities in Western cultures.

Sketch mapping exercises utilize cartographically accurate maps, and in doing so the activity is distinct from the more widely recognized mental mapping in which research participants are asked to draw a map from scratch of the area or route in question. In sketch mapping exercises, the new, altered maps "represent the unique and varied lived experiences of social groups, households, or individuals" in a way that emphasizes each respondent's personal experience with and perception of an area (Boschmann & Cubbon, 2014). The information participants mark on their maps can have a stronger basis in their perception of a situation rather than reality. For example, when sketch-mapping was used in Garfield, Arizona to compare residents' perceptions of crime in their neighborhood with those of police officers who worked in that neighborhood, the researchers found that, while the areas marked by police officers roughly corresponded with crime statistics, residents' perceptions did not (Lopez & Lukinbeal, 2010). Indeed, sketch mapping is often used to capture a spatial representation of changing perceptions (Pearsall, Hawthorne, Block, Walker, & Masucci, 2015).

Utilizing GIS as a form of technology enhanced sketch mapping is a form of participatory GIS (PGIS). PGIS is a combination of participatory mapping methods and GIS technology that is growing rapidly as technology continues to advance (Chambers, 2017). Properly functioning PGIS programs can empower communities and open new avenues of social change within a community (Rambaldi, Kyem, McCall, & Weiner, 2006). It also allows for researchers to easily compare qualitative and quantitative spatial data collected from numerous respondents (Lopez & Lukinbeal, 2010). Growing technology continues to bring rapid changes to the field. Web- and app-based GIS can reach many more people than traditional PGIS, which is often conducted in community meetings. When factors such as familiarity with the interface, gate-keepers, and ease internet access are accounted for, web- and app-based GIS can truly exemplify the guiding principles of PGIS (Dunn, 2007).

GIS in Tourism

Within the tourism industry, GIS has largely been used in support of marketing and accessibility efforts aimed at tourists and destination planning. Marketing and accessibility efforts generally revolve around creating interactive maps that provide information about local points of interest (Dye & Shaw, 2007; Kantola, Uusitalo, Nivala, & Tuulentie, 2018; Noguera, Barranco, Segura, & Martínez, 2012; Petrevska & Koceski, 2013). While many of these tools were developed classically by a researcher without local input, at least one was developed using a more participatory method. In Levi, Finland, developers solicited information from tourists who had previously visited the resort about their favorite areas and types of activities they engaged in within the destination. However, the developers did not attempt to solicit similar information from locals and, rather than engaging in bottom-up planning, suggest offering the information gathered from tourists to entrepreneurs so that they can provide the experiences tourists desire in the locations they are interested in visiting (Kantola, Uusitalo, Nivala, & Tuulentie, 2018).

GIS has been used in other destination planning situations as well, but many of those lack the participatory aspect and rely on more traditional applications such as direct geospatial comparisons (Beedasy & Whyatt, 1999; Knaap, 1999; Riddington, McArthur, Harrison, & Gibson, 2010) such as finding the proportion of visitors to Scotland who will be impacted by the presence of wind farms (Riddington et al., 2010). GIS can also be used to relate attitudes to different geospatial characteristics. In China, it was used to map the relationship between storeowner's irritation with tourists and their proximity to pedestrian hubs within a shopping district (Zhang, Wong, & Lai, 2018). There is a gap in the research applying participatory GIS techniques to resident's perception of tourism impacts.

Methodology

Site selection

Data were collected in the communities of Sedona and Camp Verde, in the U.S. state of Arizona. Sedona is a well-established tourism destination located in the Verde Valley that attracts both domestic and international visitors. The industry is worth $600 million and supports over 10,000 jobs ("Reports and Research," 2015) and produces 65% of the city's operating budget ("Tourism revenue increases," 2016). With an estimated population size of 10, 336 (U.S. Census Bureau, 2017b), Sedona is comparable in size to the second research site, Camp Verde, which has an estimated population size of 11,201(U.S. Census Bureau, 2017a). Despite being of a similar size and having access to many of the same natural resources, Camp Verde captures only 26.7% of all

visitors to the Verde Valley compared to Sedona's 84.9% (https://nau.edu/economic-policy-institute/wp-content/uploads/sites/20/Verde-Valley-2008.pdf). The cities were selected due to their similarities in size and discrepancies in visitation rates. As the stress caused by tourism can be perceived differently by different cultures and in different locations (Husbands, 1986), it was necessary for the cities to be of a similar cultural and geographic background to remove as many conflicting variables as possible.

Data collection

Participants were recruited through flyers posted at community bulletin boards in each town, flyers distributed to community gathering places such as churches and libraries, and postings on social media groups related to either Sedona or Camp Verde. Participants were required to attend an introductory session in which the ArcGIS Survey 123 app was downloaded on to their phone and they were instructed in its use. Participants were also given information about the nature of stress and stressors to help them correctly identify stressors in their life. At no point during the informational session was tourism mentioned as a cause of stress to avoid priming participants.

Participants were then asked to use the app to record every instance of stress they felt over a two-week period, including information about the magnitude of the stressor (0=not at all stressed, 4=extremely stressed), a description of the stressor, any attempted coping mechanisms, and the participant's geographic location at the time of recording. At the end of the two-week period, participants were asked to attend a debriefing session, in which the app was deleted from their phones by a researcher and the participants were awarded with a $100 gift card as an incentive for participation.

The findings presented in this paper are preliminary, as additional data collection is on-going at the time of submission. To-date there have been a total of 16 participants from the community of Camp Verde, and 10 participants from the community of Sedona. From these 26 participants, a total of 408 stressful events were recorded, meaning over the two-week study period, participants experienced an average of 15.7 stressors, or just over 1 stressor per day. Study participants recorded a total of 65 participant days (out of a possible 364) where no stressors were reported, meaning approximately 18% of participant days did not include stress.

Data analysis

In this paper, we utilize mixed methods of analysis on data collected via ArcGIS Survey123. Descriptive analysis of stressor data was conducted utilizing the IBM SPSS software suite. Content analysis of participant descriptions of stressors was conducted using in Microsoft Excel. Geospatial analysis was conducted using the ArcGIS software suite.

Results

Frequency and magnitude of stress

Participants from Sedona experienced a total of 151 stressors, for an average of 15.1 stressors per person over a two-week period. Participants from Camp Verde experienced a total of 257 stressors, for an average of 16 stressors per person over a two-week period. A keyword search of answers to the question "please discuss what is causing you stress," revealed that tourism was specifically mentioned as a stressor 9 times, all by individuals who reside in Sedona. Further, 50% of study participants who resided in Sedona specifically mentioned tourism as a cause of stress in their lives. Finally, an independent samples t-test revealed that, on average, residents of

Campe Verde experienced significantly higher levels of stress when reporting stressors (μ=1.78) compared to residents from Sedona (μ=1.49) ($p<.05$).

Table 1 - Differences in stressors reported by research participants

Community	Number of stressors	Number of tourism related stressors	% of participants mentioning tourism as a stressor	Average magnitude of stress
Sedona (high tourism)	151 (15.1 per person)	9 (0.9 per person)	50%	1.49*
Camp Verde (low tourism)	257 (16.0 per person)	0 (0.0 per person)	0%	1.78*

***p<.05**

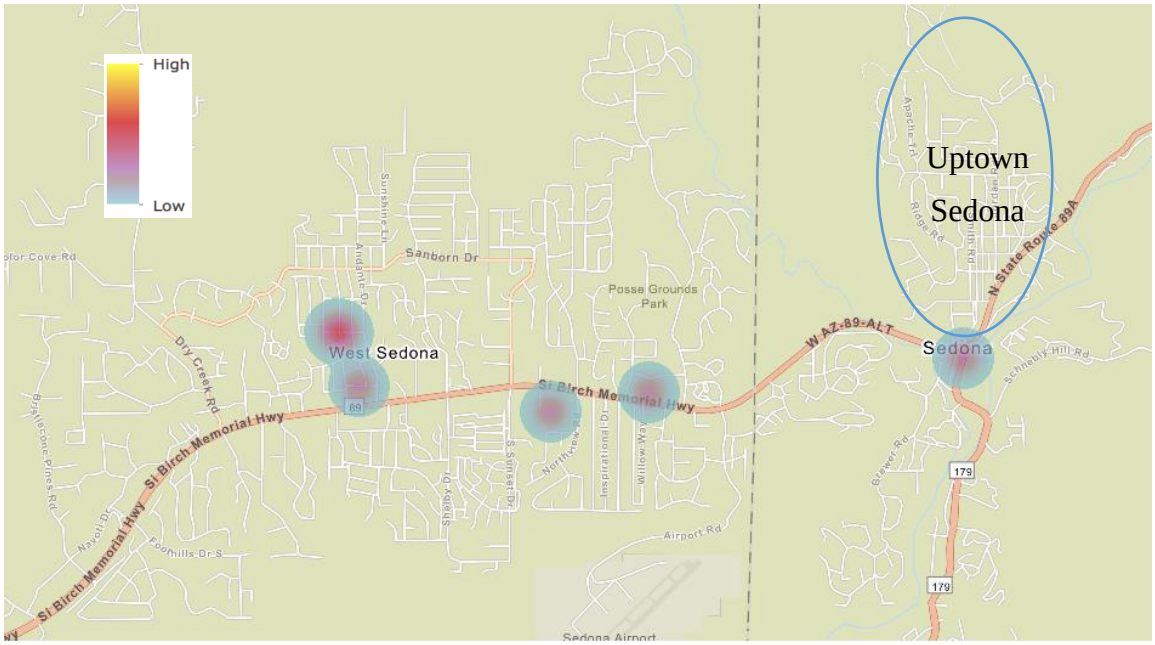
To analyze where tourism stressors occurred, ArcGIS was used to create a heatmap of the magnitude of tourism related stressors reported by research participants (Figure 1). Only one instance of stress directly caused by tourism was reported near Uptown Sedona which is marketed as a walkable downtown and perceived by some locals to be a "tourist trap" on user review websites like TripAdvisor. This may be because residents of Sedona expect to find tourists within this area (GhiaGirl, 2013), and have prepared themselves for the eventuality of encountering them. When, however, tourists venture outside of Uptown Sedona and begin to impact the daily lives of residents there are more instances of tourism- related stress reported. Participants identified tourists specifically as causing 'daily hassles' by disrupting their routines. Participants mentioned:

> "Tourist holding up traffic because don't know how to use the roundabout. Illegal lane change that blocks traffic."
>
> "Stopped at W. Sedona McDonald's to buy senior coffee and discovered noon time tourists created long wait."

Participants also reported stress related to short-term vacation rentals, such as Airbnb's, that were adjacent to their residence. One participant said:

> "… I have an AirBnB next door that stores it's trash and recycling barrels out on the street right at the property line. Ugly. And now it's overfilled, the lid doesn't close tight and the ravens are picking at it."

Figure 1 - A map displaying the magnitude of stress for stressors directly related to tourism within Sedona, AZ



Discussion and Conclusions

Findings in this paper extend theory by validating and extending previous work exploring the experience of tourism-related stress in host communities. In the following paragraphs, we discuss the answers to study research questions as evidence of this theoretical validation and extension.

In answer to the first research question posed, residents of the high-visitation community (Sedona) did mention tourism as a stressor even though they were not prompted by researchers to do so. This finding begins to validate previous work by Jordan and Vogt (2017b, 2017a), in which individuals were directly asked whether tourism caused them stress.

In answer to the second research question posed, the experience of tourism related stress differed greatly between a highly visited tourism community and a less visited tourism destination. Half of the participants in Sedona indicated that tourism caused them stress. This figure is similar to a study of tourism related stress in Hawaii (Jordan, Spencer, & Prayag, In Press), but lower than the nearly 80% of residents of a tourism community in Jamaica who indicated they had experienced tourism related stress (Jordan & Vogt, 2017a). Despite a large portion of Sedona residents experiencing tourism related stress, such stressors represented only a small portion (6%) of the overall stressors experienced by residents.

Finally, GIS heatmap analysis indicated that the majority of tourism related stressors occurred *outside* of the tourism zone in Sedona. While initially this finding may appear somewhat surprising, closer analysis of quotes revealed that it was actually the presence of tourists in "non tourism" or "back stage" areas of town that caused *daily hassles* for residents (MacCannell, 1973). This finding is similar to previous research by Jordan & Chui (2018), which found that residents' perceived impacts of AirBnBs were mostly due to the distribution of tourists to non-tourism zones.

Practically, these findings are useful to tourism destinations in that they provide further evidence that tourism related stress is a prevalent issue. There is mounting evidence that the presence of tourism in 'backstage' areas is an issue that tourism communities need to address.

Limitations

The major limitation of this research is sample size, although this is less of an issue when the unit of analysis is stressors rather than individuals or communities. Such small sample size is more common in quasi-experimental design studies than survey-based research. However, the fact remains that findings are based on data from only 26 individuals. Data collection is ongoing, and it is our hope that we will have a larger dataset from which to present at the conference.

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