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Considering Tobler's first law of geography in a tourism context

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HIGHLIGHTS

- Significant difference in visitor's travel distance existed among the destinations.
- Visitors also differed in their perceived emotional solidarity with residents.
- An inverse relationship between travel distance and emotional solidarity was found.
- A compelling argument in support of Tobler's law within a tourism context is made.

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ABSTRACT

Despite potential benefits from applying Tobler's law in a tourism context, the law has been used sparingly within the tourism literature. This study seeks to expand the use of Tobler's law in tourism research by examining the relationship between tourists' distance travelled to a destination and the perceived degree of emotional closeness such visitors have with community residents. In doing so, visitor data from three uniquely distinct Texas destinations were analyzed. Results suggest that visitors to the destinations not only differed in their average travel distances, but also the perceived levels of emotional solidarity with residents. Results supported Tobler's law in a tourism context, whereby results indicated that the further an individual travelled to a destination, the less they agreed with feeling close to destination residents. Implications and future research direction opportunities are offered at the close of the work.

1. Introduction

Although details may vary, it is generally agreed that tourism entails the movement of individuals from one locale to another. Some definitions have specified the physical or the temporal dimensions by mandating that at least 50 miles be travelled by visitors or that they be gone from their normal place of residence for at least 24 h (Mill & Morrison, 1985), while the United Nations (U.N.) (2010) presents a vaguer notion of the concept, indicating tourism is travel that occurs to a destination outside one's usual place of residence. Regardless of the divergence, the academic consensus has been that the notion of tourism requires a geographical backdrop, and this makes distance—whether physical or perceived—a vital component in defining and understanding the concept.

Given such intimate linkage between tourism and geography, it makes logical sense to apply geographical frameworks in the study of tourism. Considered the only law of geography, Tobler's first law of geography has been well-received for its practical and illustrative power (Sui, 2004). The law, in a rather simple manner, suggests that distance influences the relationship between two phenomena; it assumes that things are related to one another, but distance

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between them dictates the strength of the relationship, with phenomena or objects located in close physical proximity to one another being more related than those phenomena or objects located geographically further apart (Tobler, 1970).

Although the idea may sound obvious, the law has been shown to be effective in explaining a wide variety of social (Besley & Case, 1995; Chen & Rodden, 2009; Dorigo & Tobler, 1983) and natural (Bjorholm, Svenning, Skov, & Balslev, 2008; Poulin, 2003) phenomena. Considering a more complex system, tourism provides an ideal context by which to verify the legitimacy of Tobler's law. The benefits of embracing the law, should it yield significant relationships among tourism measures, include the potential to aid in the explanation of complex events (e.g., the perceived relationship between residents of and visitors to particular destinations) pertaining to both demand and supply aspects of the tourism system.

Despite such anticipated benefits and its inherent association with geography, tourism researchers have considered Tobler's law sparingly. Few scholars (Ahn & McKercher, 2015; Ho & McKercher, 2014; McKercher, 2008; Mechinda, Serirat, & Gulid, 2009; Zhang, Xu, & Zhuang, 2011) have considered the law within a tourism context, focused exclusively from a demand-side approach. Considering Tobler's law with aspects of supply and demand not only provides great potential in explaining tourism phenomena in a general sense, but also the relationship that exists between destination tourists and residents, in more specific terms. Therefore, the main purpose of this paper is to examine the relationship between tourists' distance travelled to a destination and the perceived degree of emotional closeness such visitors possess with residents living there.

2. Literature review

2.1. Tobler's first law of geography

Despite cited shortcomings (see Barnes, 2004; Miller, 2004; Smith, 2004), some scholars (Eldridge & Jones, 1991; Goodchild, 2008) consider Tobler's first law of geography to be crucial in understanding spatial interaction and patterns. Tobler (1970) is credited with claiming that, "Everything is related to everything else, but near things are more related than distant things" (p. 236). While acknowledging that a more complex model may provide greater explanatory power, Tobler (1970) was concerned that it would potentially make a model increasingly more complex and rigid in return for little additional explanatory power. With much resemblance to the logic of Occam's razor (i.e., entities are not to be multiplied beyond necessity), Tobler put forth his idea with a balanced consideration between universality and efficiency.

The law drew much attention from fellow geographers throughout the 1970s and 1980s, even prompting a special session on it held during the Association of American Geographers meeting in 2003. While some scholars questioned the existential possibility of a universal law in social sciences (Barnes, 2004; Smith, 2004), others offered criticism citing the inherent vagueness of the law (Miller, 2004). Responding to the doubts and criticism, Tobler (2004) defended his law by drawing on comparisons with other proposed and existing laws in economics (e.g., Pareto's law of income distribution, Say's law of market), sociology (e.g., Scheler's law of three phases), and psychology (e.g., Thorndike's law of effect) as he explained how ambiguity makes the law more comprehensive in the world of increasing complexity.

Despite doubts and criticism raised against the law, many scholars have found the law useful in explaining phenomena concerning physical, psychological, and even temporal distance. Miller (2004) recognized how it emphasized the importance of geospatial components in social science and helped develop techniques for spatial analysis and geographic information system (GIS). Similarly acknowledging the illuminating role of the law, Sui (2004) described Tobler's first law as "a searchlight in geographers' exploration," providing clues for potentially significant relationships, while Goodchild (2004) envisaged possible extensions of the law with GIS advancements.

Outside of geography, Tobler's law has been frequently used by social scientists, as well as natural scientists and engineers. In political science, the law has been proven useful in explaining shared political preference of voters living in proximity (Chen & Rodden, 2009; Rodden, 2010). Also, in public policy, the law inspired Seldadyo, Elhorst, and De Haan (2010) to find that neighboring countries tend to show a similar degree of competency in governance. Such geographical similarity was also reported in national government tax policy within the U.S. (Besley & Case, 1995; Case, Rosen, & Hines, 1993) and Belgium (Heyndels & Vuchelen, 1998). Tobler's law also extends outside of social sciences, garnering support for its applicability in explaining species richness and species composition of American palm tree communities (Bjorholm et al., 2008) and how Wikipedia articles contributed from closer proximity are more likely to be related to each other than ones from a distance (Hecht & Moxley, 2009).

In tourism, scholars have frequently applied distance decay model, a similar concept to Tobler's law, in studying how tourism demand relates to actual or perceived distance from an origin to a destination. Studies have commonly reported exponentially declining demand as distance increases both in domestic (Paul & Rimmawi, 1992; Zhang et al., 2011) and international tourism settings (Lew & McKercher, 2002; McKercher, Chan, & Lam, 2008). Such inverse relationships were evident even when perceived distance was taken into consideration (Zhang et al., 2011), suggesting the law can also be expanded to psychological aspects. Other findings also include the validity of the distance decay model when controlling for the frequency of previous visits (Paul & Rimmawi, 1992) or tourists' attitudes and other psychological traits (Zhang et al., 2011).

Although distance decay model studies have underscored the importance of considering distance in tourism, such work has largely been limited to analyzing behavioral aspects of visitors using simple statistics. Furthermore, the lack of explicit comment on Tobler's law suggests that tourism scholars have been relatively slow in incorporating the law into their research. However, more recently published works have attempted to utilize Tobler's law in an effort to more effectively explain tourism phenomena (Ahn & McKercher, 2015; Eagles, Johnson, Potwarka, & Parent, 2015; Ho & McKercher, 2014; Zhang et al., 2011). Ho and McKercher (2014), in their study of Hong Kong visitors, showed the filtering effect of distance which leads to different visitor segmentation and behavior. In another study of Hong Kong visitors, Ahn and McKercher (2015) examined the effect of cultural distance on visitor motivation. Noticeably, Eagles et al. (2015), in their study of visitors to Canadian parks, suggested that the classic distance decay model with a smooth exponential decay curve (i.e., Tobler's law) may not hold in some cases. However, even with such exceptions, Eagles et al. (2015) accepted the general idea of the law and suggested a modified version of it.

Despite the academic progress apparent in more recent works, much room for further contribution exists. Most research focusing on the distance decay model (if not all), has relied on secondary data provided by convention and visitor bureaus (see Ahn & McKercher, 2015; Ho & McKercher, 2014; Zhang et al., 2011) or

park administration offices (see Eagles et al., 2015). Moreover, prime attention has been drawn to the relationships between distance and behavioral aspects of visitors, such as expenditure patterns and preferred activities of international travelers (Fang Bao & Mckercher, 2008; Ho & McKercher, 2014). While these studies are meaningful for their managerial implications, they have left an important question unanswered: how does the physical distance one travels to reach the destination factor into the perceived degree of emotional closeness visitors have with destination residents?

2.2. Emotional solidarity

With historical roots in classical sociology, Durkheim is credited as the individual who brought forth the notion of emotional solidarity. As a structural functionalist, Durkheim (1995[1912]) considered the social fact of solidarity as the cohesion of individuals within a group demonstrated through ritualistic behavior and deeply-held beliefs. It was in the classic texts of *The Division of Labor in Society* (1893) and *The Elementary Forms of the Religious Life* (1912) where Durkheim laid the theoretical foundation for solidarity among individuals from a macro-sociological perspective. Birthed in *The Elementary Forms*, and amended by the work of Collins (1975), the theoretical framework posits that emotional solidarity is forged through individuals' interaction with each other as well as their collective beliefs and shared behaviors.

While research involving the concept of emotional solidarity has occurred from a micro-sociological perspective in fields and disciplines such as intergenerational studies, anthropology, social psychology, and sociology (Bahr, Mitchell, Li, Walker, & Sucher, 2004; Clements, 2013; Kubow, 2013; Merz, Schuengel, & Schulze, 2007), the concept has been examined recently within the travel and tourism literature. This line of research began with the development of measures for each of Durkheim's key constructs (i.e., interaction, shared beliefs, and shared behavior) (Woosnam, Norman, & Ying, 2009), followed by the creation of the 10-item Emotional Solidarity Scale (ESS) comprised of three dimensions: *feeling welcomed*, *emotional closeness*, and *sympathetic understanding* (Woosnam & Norman, 2010).

Psychometric properties (i.e., reliabilities and validities) to date, for each dimension, have been strong. Following the development of the creation of scales to test the original Durkheim model, Woosnam (2011) and Woosnam and Aleshinloye (2013) revealed through structural equation modeling that interaction, shared beliefs, and shared behavior significantly predicted emotional solidarity between residents and tourists.

Short of this initial research and the work conducted by Woosnam, Aleshinloye, Winkle, & Qian (2014) (where length of residence was found to be a significant predictor of levels of emotional solidarity), a preponderance of the work concerning emotional solidarity as of late has considered the construct a precursor to or antecedent of various outcome variables. Woosnam (2012) found emotional solidarity significantly explained residents' perceived impacts of tourism development. Examining two Mexico-U.S. border destinations, Woosnam, Shafer, Scott, and Timothy (2015) revealed that emotional solidarity with residents did explain tourists' perceived safety in each region. Woosnam, Dudensing, and Walker (2015) also found that nature tourists' expenditures could be explained by emotional solidarity with residents. The extant research concerning emotional solidarity indicates the potential for exploring additional antecedents of the construct.

2.3. Study purposes

The tourism literature involving Tobler's law is not only scant but limited in the sense that only secondary data has been utilized and that behavioral aspects have been primary measures of consideration. Some works (Ahn & McKercher, 2015; Zhang et al., 2011) have even substituted cultural distance for physical distance. To date, no one has considered the link between physical distance travelled and emotional closeness or solidarity with destination residents. Although emotional solidarity may appear similar to cultural distance as each is a social psychological construct, the former is nevertheless a more general and widely applicable concept, whereas the latter is mostly confined to an international travel context. Furthermore, Ahn and McKercher (2015) have utilized cultural distance to explain tourist motivations and behaviors, whereas the focus of the present study is on examining the link between physical and emotional distance.

With these considerations in mind, the present study utilizes visitor data collected at three uniquely different Texas destinations, to address a threefold purpose. First, an examination will be undertaken to see if a significant difference in the number of miles travelled from origin to destination (using a straight-line measure) exists in the three destinations. Next, visitors' perceptions of the closeness they feel with destination residents will be assessed to determine if significant differences exist across the locations. Finally, the relationship between distance visitors travelled to each of the three destinations and their perceived emotional solidarity with residents will be examined. Based on the notion of Tobler's Law, an inverse relationship is proposed between distance travelled and perceived emotional solidarity.

3. Methods

3.1. Overview of study sites

3.1.1. Galveston County

A coastal destination, situated approximately 45 miles southeast of Houston, Galveston County is considered a major Texas tourist destination (Fig. 1), boasting Galveston Island and the Bolivar Peninsula. In 2013, it was estimated that 582.3 million individuals visited Galveston County, spending USD$687.2 million, which contributed to USD$951.8 million in total economic impact and 33.6% (i.e., 10,205 jobs) of all jobs in the town (Tourism Economics, 2014). Since the deadly landfall of Hurricane Ike in 2008, tourism in the area has made a solid and steady recovery as visitor volume and accommodation spending reached new peaks in 2013 (Tourism Economics, 2014).

3.1.2. The lower rio grande valley (LRGV)

The LRGV covers four Texas counties (i.e., Starr, Hidalgo, Willacy, and Cameron) which lay along the northern bank of the Rio Grande River (Fig. 1). Despite some negative images associated criminal activity along the border, the region has been a much-visited destination among birders and cultural excursionists. In the context of nature tourism, Woosnam, Dudensing, Hanselka, and Aleshinloye (2012) reported that USD$307 million in direct expenditure led to USD$463 million in total economic output and 6613 full- and part-time jobs in the region, implying the significant contribution that this niche form of tourism makes on the regional economy.

3.1.3. Big Bend National Park

Approximately 500 miles to the northwest of the LRGV, Big Bend National Park is one of the largest and most remote national parks in the continental U.S. (Fig. 1). Visitors to the area are often in search of specific vegetation types, bird species, geographic patterns, and rich cultural heritage dating back to Native Americans, Spanish settlers, Mexicans, and Texans (National Park Service, n.d.). Over

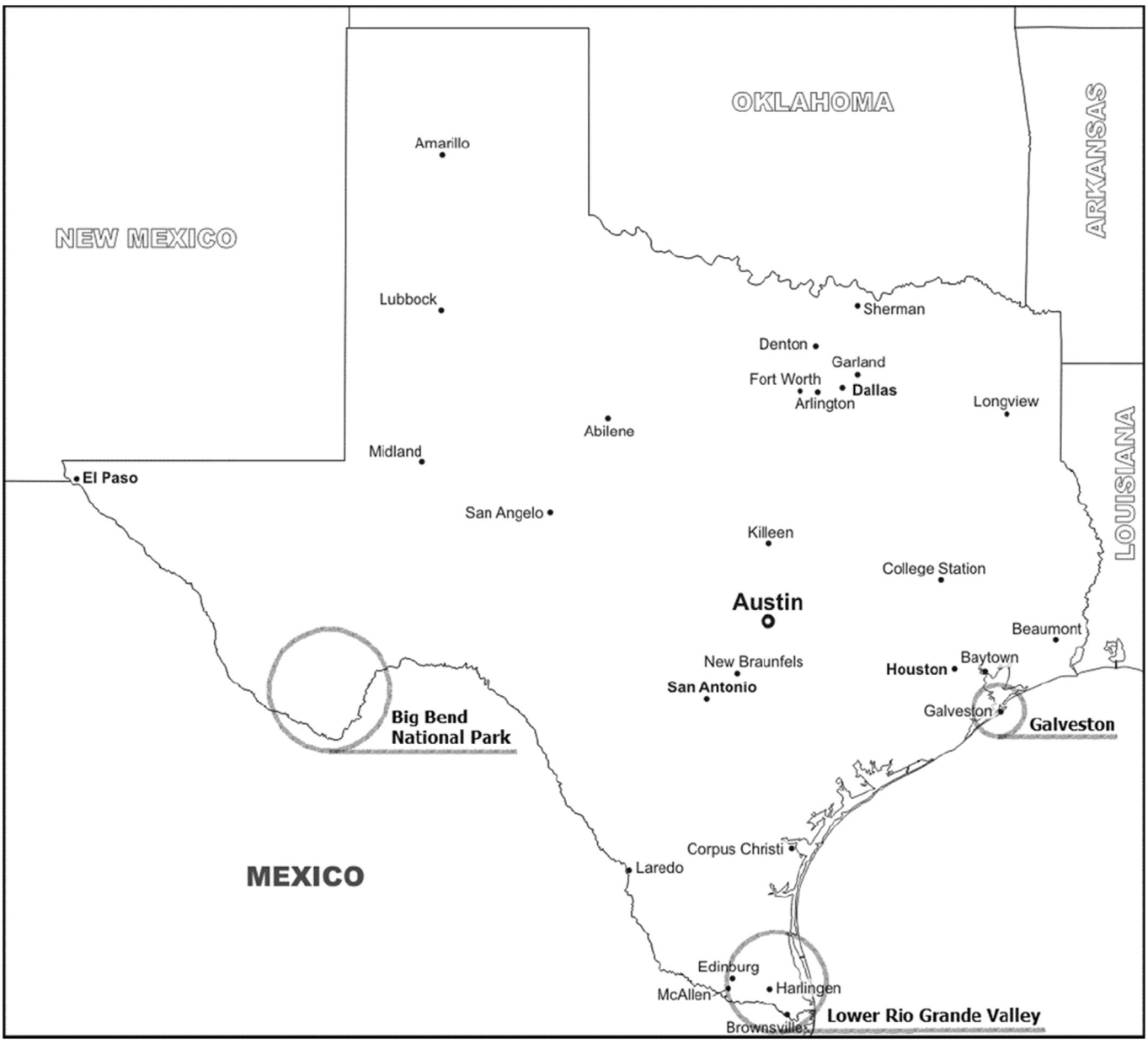

Fig. 1. Study site locations.

the last decade, the park has received approximately 350,000 visitors per year on average (National Park Service, 2014), and Brewster County (the county which boasts Big Bend National Park) received USD$60.4 million in direct visitor expenditures in 2014, which created 1210 tourism-related jobs county-wide (Dean Runyan Associates, 2015).

3.2. Sampling and data collection

For all three study sites, systematic sampling with a random starting point was used. Researchers stationed in key attractions approached every *n*th group of visitors, informed individuals of the study, checked if they were visitors to the area, and asked one individual from each party if they were willing to participate in an on-site, self-administered survey.

Data collection in Galveston County was done over five weekends during the months of July and August. Of 660 individuals who were approached and asked to participate in the survey, 61 were found to be Galveston County residents and excluded. Among the remaining 599 visitors, 142 refused to participate; hence only 457 accepted and participated in the survey (76.3% acceptance rate). However, 10 of those 457 did not complete the instrument (97.8% completion rate), resulting in the final sample size of 447; an effective response rate of 74.6%.

In the LRGV, data collection occurred over a 12-month period involving 12 randomly-selected weekends. Overall, researchers contacted 486 visitors to the area and asked them to participate. Fifty-four declined to participate and 49 had already been contacted by researchers stationed in other sites. This resulted in 383 individuals who accepted and completed the survey instrument, which led to an effective response rate of 78.8%.

Much like in the LRGV, data from the Big Bend National Park

were collected over a period of twelve months from visitors during six sampling periods (primarily over weekends). However, unlike the other two sites, data collection in the Big Bend featured an initial onsite contact asking individuals if they were willing to participate in either a follow-up mail or online survey (identical in content and structure). Of the 963 visitors who were contacted onsite, 879 agreed to participate (91.3% acceptance rate). Among those 879, 711 preferred the follow-up survey delivered either by email (653 individuals) or mail (58 individuals). However, 58 were excluded as their email addresses were found to be invalid. Overall, 495 of the remaining 653 completed and returned the follow-up survey, yielding an effective response rate of 75.8%.

3.3. Measures and data analysis

Although the survey instruments for the three study sites varied in their detail, each contained questions in regards to visitors' ZIP code at their permanent residence, emotional solidarity with residents, travel history to the destination, likelihood of returning, and demographic information. To measure emotional solidarity, the 10-item *Emotional Solidarity Scale* (ESS) developed by Woosnam and Norman (2010) was used, while a self-reported home ZIP code was used to calculate distance between origin and destination.

Prior to data analysis, researchers calculated a straight-line distance from one's permanent residence to the destination (i.e., Galveston, the LRGV, or Big Bend National Park) under consideration. This was done by inputting corresponding ZIP codes to an online distance calculator (i.e. www.melissadata.com). To get more accurate straight distances, the ZIP codes of the actual points where the survey was distributed were used. While the Big Bend National Park has a single ZIP code for the whole area (i.e., 79,834), researchers pinpointed ZIP codes of specific streets and piers (based on where the instrument was administered) for Galveston and the LRGV, as the destinations contained multiple ZIP codes. In calculating distance travelled, researchers excluded responses which did not provide a valid U.S. ZIP code. This resulted in the following final sample size for each dataset: 442 for Galveston (five excluded), 333 for the LRGV (50 excluded) and 447 for the Big Bend (32 excluded).

To address the first aim of this paper (i.e., to see if the number of miles travelled from origin to the destination significantly differed across the three locations), ANOVA was undertaken to determine if between-group differences were present (with the use of post-hoc analyses to examine pairwise comparisons). Similarly, for the second goal, a MANOVA followed by post-hoc analysis was conducted. MANOVA looks at how the means of multiple dependent variables (i.e., ESS items in this situation) vary across levels of an independent variable (i.e., Texas destination) concurrently (Green & Salkind, 2013). To ultimately examine the relationship between distance visitors travelled to each of the three destinations and their perceived emotional solidarity, simple linear regression models were tested for each of the three ESS factors within each dataset.

4. Results

4.1. Description of samples

Table 1 presents a descriptive summary of participants' socio-demographic, socio-economic, and travel characteristics. The LRGV and Big Bend samples were very similar, while visitors to Galveston remained relatively distinct. Galveston visitors were significantly younger on average (M_{GALV} = 39.51) than LRGV (M_{LRGV} = 55.5) or Big Bend (M_{BB} = 51.9) visitors. In terms of gender, samples from Galveston and the LRGV were split fairly evenly, however the Big Bend sample had a slight preponderance of women (62.2%). Slightly more than half of the visitors to the LRGV and the Big Bend had a household income of at least $75,000. Income comparisons could not be drawn with Galveston visitors as different income brackets were used. The similarity between LRGV and Big Bend samples also persisted in education; slightly more than 70% of visitors to these two destinations had at least an undergraduate education, while roughly half of Galveston visitors (53%) did.

Table 1
Descriptive summary of participants.

Variable	Galveston (%)	LRGV (%)	Big Bend (%)
Socio-demographic and -economic			
Age (n_{GALV} = 444, M_{GALV} = 39.5; n_{LRGV} = 377, M_{LRGV} = 55.5; n_{BB} = 464, M_{BB} = 51.9)			
18-29	22.5	08.0	11.9
30-39	29.5	10.9	10.6
40-49	26.2	10.6	17.0
50-59	14.6	21.2	22.8
60-69	04.9	34.5	28.4
≥70	02.3	14.9	09.3
Gender (n_{GALV} = 445; n_{LRGV} = 379, n_{BB} = 471)			
Female	53.7	50.9	37.8
Male	46.3	49.1	62.2
Household income (n_{GALV} = n/a; n_{LRGV} = 329, n_{BB} = 449)			
<USD $75,000	–	44.4	41.9
≥USD $75,000	–	55.6	58.1
Education (n_{GALV} = 445; n_{LRGV} = 375, n_{BB} = 453)			
High school or less	14.2	12.0	05.5
Some college	32.8	15.7	19.6
College degree	36.6	30.7	43.5
Graduate degree	16.4	41.6	31.3
Travel			
First-time visitor (n_{GALV} = 447; n_{LRGV} = 333, n_{BB} = 477)			
No	74.9	76.0	42.1
Yes	25.1	24.0	57.9
Group size (n_{GALV} = 447, M_{GALV} = 4.5; n_{LRGV} = 382, M_{LRGV} = 2.4; n_{BB} = 474, M_{BB} = 3.8)			
Days in region, current trip (n_{GALV} = 439, M_{GALV} = 2.7; n_{LRGV} = 303, M_{LRGV} = 5.5; n_{BB} = 474, M_{BB} = 6.1)			
Days in region, over year (n_{GALV} = n/a, M_{GALV} = n/a; n_{LRGV} = 308, M_{LRGV} = 19.1; n_{BB} = 474, M_{BB} = 21.5)			

When we examined travel characteristics, less consistent patterns arose among the samples. Roughly three-fourths of the visitors to Galveston and the LRGV said they had visited prior (74.9% and 76%, respectively), compared with only 42.1% of the Big Bend visitors. LRGV and Big Bend visitors travelled in relatively smaller groups (2.4 and 3.8 travelers per group, respectively) than did those to Galveston (4.5 per group), but stayed longer in general (M_{LRGV} = 5.5, M_{BB} = 6.1, M_{GALV} = 2.7). While no comparable data were collected from Galveston visitors concerning number of days stayed throughout the year, LRGV and Big Bend visitors stayed in their respective destination a similar number of days during the year (M_{LRGV} = 19.1, M_{BB} = 21.5).

4.2. Travel distance comparison among destination visitors

Initially, the three visitor samples were compared based on how far individuals travelled from their origin to destination (Table 2). The three groups differed significantly in their average distance travelled. Visitors to the LRGV made the longest trip from home (in miles) on average (M_{LRGV} = 766.33), effectively surpassing those of the Galveston or the Big Bend visitors, whose average trip lengths were 187.81 and 578.06 miles, respectively. However, despite the significant differences across all three destinations, the LRGV and the Big Bend together should be regarded more as long-haul

Table 2
Comparison of mean travel distances (in miles) to the three Texas destinations.

Variable	Galveston	LRGV	Big Bend
N	442	320	447
M[1, 2]	187.81[a,b]	766.33[a,c]	578.06[b,c]
Median	105.8	674.9	425.9
SD	215.9	629.6	440.2

[1] $F(2, 1206) = 176.29$, $p < 0.001$.
[2] Same letter in a row indicates significant mean difference at $p < 0.05$ critical-level.

destinations. This makes intuitive sense given the geographic location of the LRGV and Big Bend and the distant proximity to major large cities within the state. Whereas, Galveston, with its close proximity to Houston (the fourth largest city in the U.S.), is a prime day-trip destination for many.

4.3. Comparison of perceived emotional solidarity with destination residents

A MANOVA was conducted to see if visitors to each study site differed in their perceived emotional solidarity with residents. This resulted in significant differences in mean scores for eight ESS items. As the Box's M test resulted in rejecting the homogeneous variance and covariance assumptions, the Pillai's Trace coefficient (which is known be more robust in such situations) (Olson, 1979) was examined. With a Pillai's Trace coefficient of 0.123, F (20, 2446) = 8.02, $p < 0.001$, and $\eta^2 = 0.062$, it was concluded that significant differences among the ESS item scores were present across the samples. Following Cohen's suggestion (1988), the multivariate η^2 based on Pillai's Trace was moderate (0.062) in its effect size, meaning that 6.2% of the multivariate variance of the 10 ESS items was associated with the selected destination.

As a follow-up to the MANOVA, a series of ANOVAs and post-hoc tests were undertaken (Table 3). Following Green and Salkind (2013) suggestions, the alpha level was adjusted to 0.005 (i.e., the Bonferroni method) for each ANOVA in an effort to control for Type 1 error across the multiple ANOVAs; the alpha value was established to account for 10 dependent variables by dividing the standard 0.05 by the number of dependent variables.

With the exception of two ESS items (i.e., "I feel residents appreciate the contribution we (as visitors) make to the local economy" and "I am proud to be welcomed as a visitor to…"), significant mean differences were found across every ESS item at the $p < 0.005$ critical-level. The highest mean scores were found among LRGV visitors, while means among Big Bend visitors were the lowest. For some items, all three groups deviated significantly from others in their responses, but generally most noticeable differences were visible among LRGV and Big Bend visitors.

Table 4
Differences in ESS composite factor mean scores[1, 2, 3] between three Texas destinations.

Factor	Galveston Mean	LRGV Mean	Big Bend Mean	F	P
Emotional closeness	4.17[a]	4.98[a,b]	4.01[b]	37.51	<0.001
Sympathetic understanding	4.59[a,b]	5.23[a,c]	4.35[b,c]	47.43	<0.001
Feeling welcomed	5.64	5.85[a]	5.63[a]	05.54	0.004

[1] MANOVA model Pillai's Trace = 0.082, $F(6, 2488) = 17.82$, $p < 0.001$, $\eta^2 = 0.041$.
[2] Same letter in a row indicates significant mean difference at $p < 0.017$ critical-level.
[3] Items were rated on a 7-point scale, where 1 = *strongly disagree* and 7 = *strongly agree*.

Given previous studies (see Woosnam & Aleshinloye, 2013; Woosnam, Shafer et al., 2015, Woosnam, Dudensing et al., 2015) have demonstrated a three-factor structure (i.e., *emotional closeness*, *sympathetic understanding*, and *feeling welcomed*) of the ESS, composite factor means were calculated among corresponding items (Table 4). As a result, *feeling welcomed* yielding the highest means across all samples, ($M_{GALV} = 5.64$, $M_{LRGV} = 5.85$, $M_{BB} = 5.63$) followed by *sympathetic understanding* ($M_{GALV} = 4.59$, $M_{LRGV} = 5.23$, $M_{BB} = 4.34$) and *emotional closeness* ($M_{GALV} = 4.17$, $M_{LRGV} = 4.98$, $M_{BB} = 4.01$).

Replicating the same steps employed for the individual items, a second MANOVA with post-hoc comparisons for the factors was undertaken. Based on MANOVA results (Pillai's Trace = 0.082, F (6, 2488) = 17.82, $p < 0.001$, $\eta^2 = 0.041$), significant differences were found in factors across the destinations, suggesting that visitors to different destinations have forged different degrees of emotional solidarity with residents. Visitors to the LRGV indicated feeling a significantly higher degree of *emotional closeness* and *sympathetic understanding* with residents than did those visitors to the other two destinations. Despite generally high mean scores for *feeling welcomed* across the samples, LRGV visitors once more reported feeling more welcomed than did Big Bend visitors.

4.4. Relationship between travel distance and emotional solidarity

To explore how travel distance relates to emotional solidarity, simple linear regression models were built and tested for each

Table 3
Differences in ESS factor items[1, 2, 3] between the three Texas destinations.

Factor and Item	Galveston Mean	LRGV Mean	Big Bend Mean	F	p
Emotional closeness					
I feel close to some residents I have met in …	4.05[a]	4.89[a,b]	3.88[b]	37.73	<0.001
I have made friends with some residents in …	4.30[a]	5.09[a,b]	4.16[b]	30.98	<0.001
Sympathetic understanding					
I identify with residents of …	4.81[a]	5.31[a,b]	4.56[b]	26.12	<0.001
I have a lot in common with residents of …	4.67[a,b]	5.17[a,c]	4.33[b,c]	30.69	<0.001
I feel affection toward residents of …	4.92[a]	5.58[a,b]	4.64[b,]	41.25	<0.001
I understand … residents.	4.53[a]	5.11[a,b]	4.38[b]	24.14	<0.001
Feeling welcomed					
I am proud to be welcomed as a visitor to …	5.75	5.98	5.72	5.33	0.005
I feel residents appreciate the benefits associate with me coming to the community.	5.57[a]	5.64[b]	5.30[a,b]	8.52	<0.001
I feel residents appreciate the contribution we (as visitors) make to the local economy.	5.62	5.66	5.56	0.70	0.497
I treat residents of the … fairly.	5.74[a]	6.15[a]	5.92	12.67	<0.001

[1] MANOVA model Pillai's Trace = 0.123, $F(20, 2446) = 8.02$, $p < 0.001$ $\eta^2 = 0.062$.
[2] Same letter in a row indicates significant mean difference at $p < 0.005$ critical-level.
[3] Items were rated on a 7-point scale, where 1 = *strongly disagree* and 7 = *strongly agree*.

Table 5
The relationship between distance travelled and emotional solidarity factors.

Emotional Solidarity Factor by Log Distance	β_0	β_1	t	R^2	p
Galveston					
Emotional closeness	4.636	−0.062	−1.306	0.004	0.192
Sympathetic understanding	5.403	−0.108	−2.283	0.012	0.023*
Feeling welcomed	5.765	−0.026	−0.550	0.006	0.582
LRGV					
Emotional closeness	6.280	−0.204	−3.430	0.041	0.001***
Sympathetic understanding	6.448	−0.218	−3.689	0.047	0.000***
Feeling welcomed	6.277	−0.094	−1.569	0.009	0.118
Big Bend					
Emotional closeness	6.674	−0.182	−3.892	0.033	0.000***
Sympathetic understanding	6.850	−0.226	−4.898	0.051	0.000***
Feeling welcomed	6.289	−0.084	−1.779	0.007	0.076

* Significant at $p < 0.05$ critical-level.
** Significant at $p < 0.01$ critical-level.
*** Significant at $p < 0.001$ critical-level.

sample. Following the suggestion of Tabachnick and Fidell (2013), distance was log-transformed to account for the non-normality of distance that was prevalent across the samples. Hence, log-transformed straight-line distance was held constant as the independent variable, and each ESS factor served as the dependent variable of each model. Table 5 presents the regression analysis output. The log distance from one's residence to the destination successfully predicted one ESS factor (out of three) within the Galveston sample, two for the LRGV sample, and two within the Big Bend sample (all at the $p < 0.05$ critical-level).

As revealed in Table 5, the negative regression coefficient (β_1) implies that distance travelled and emotional solidarity were negatively related. In other words, the further a visitor travelled from home, the less they agreed with feeling close to or a sense of solidarity with destination residents. As a value of log (Distance) increases by roughly 4% for every 10% increase in raw straight-line distance (e.g., when raw distance increases from 10 to 11, the value for log (Distance) changes from 1 to 1.04), an ESS factor score will form a downward curve with a decreasing rate of change when graphed against straight line distance (Fig. 2). Unique effect size (i.e., R^2) values for the significant models ranged from 0.012 to 0.051, meaning that 1.2%–5.1% of the variation in an ESS factor score was explained by distance travelled. Overall, effect sizes were modest, with those reported for the LRGV and Big Bend samples being fairly comparable (i.e., ranging from 0.033 to 0.51).

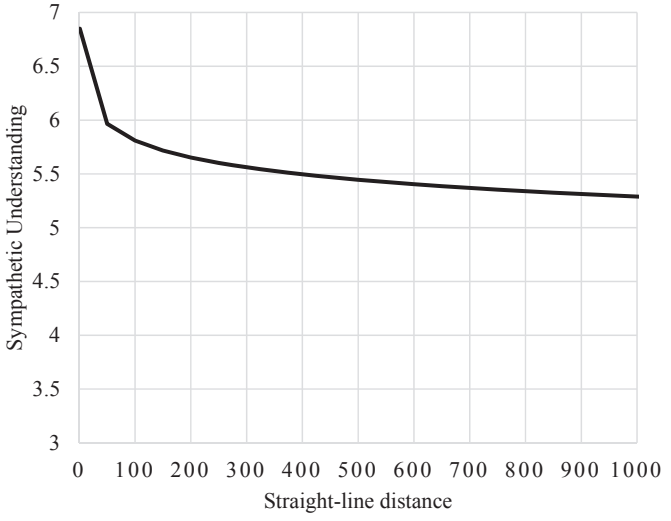

Fig. 2. Example of ESS factor from Big Bend sample graphed against straight-line distance.

5. Conclusion and discussion

Based on the notion of Tobler's law, this study primarily looked at how distance travelled to a destination can explain visitors' perceived emotional solidarity with residents living in such destinations. Results from three unique Texas destinations provide support for Tobler's law in a tourism context, whereby it was shown that the further an individual travelled to a destination, the less they agreed with feeling close to destination residents.

In initially comparing the average straight-line distances between one's residence and the destination under consideration, significant differences were found with LRGV visitors travelling the farthest and Galveston visitors the shortest distances. While the LRGV also significantly surpassed the Big Bend in terms of travel distance, both are relatively long-haul destinations requiring extensive time to travel. This sets the LRGV and the Big Bend apart from Galveston, whose visitors usually came from less than 200 miles away. Many studies have reported that long-haul and short-haul tourists deviate in their socio-economic profiles (Crouch, 1994; Ho & McKercher, 2014; Lim, Min, & McAleer, 2008), preferred on-site activities (Fang Bao & Mckercher, 2008; Ho & McKercher, 2014), degree of satisfaction (Mechinda et al., 2009), and motivations for visiting (Mechinda et al., 2009), making it reasonable to suspect that the difference in travel distance between Galveston and the other two may contribute to differences in visitors' perceptions of the relationship they possess with destination residents.

Visitors to the three destinations also differed in their perceived emotional solidarity with residents; in general, LRGV visitors indicated the highest degree of agreement with all ESS factors and items of ESS. Of the 10 emotional solidarity items, eight generated significant differences in their means scores across the samples. Conforming to the work of Woosnam, Dudensing et al. (2015) and other preceding works on emotional solidarity, *feeling welcomed* was the highest rated factor, while *emotional closeness* provided the lowest factor means. Interestingly, visitors to Galveston and LRGV reported similar levels of emotional solidarity across all the items, while LRGV and the Big Bend visitors were more distinct from each other. This is somewhat surprising given the fact that LRGV and the Big Bend can all be identified as long-haul destinations adjacent to the U.S.-Mexico border. However, this can potentially be explained by the greater proportions of repeated visitors to Galveston (74.9%) and LRGV

(76.0%), compared to that of the Big Bend (42.1%). Such a higher ratio of repeated visitors may lead to a greater chance for visitor-resident interactions to occur (Woosnam, Dudensing et al., 2015), which has been shown to be a significant predictor of emotional solidarity (Woosnam & Aleshinloye, 2013). Another interpretation may be that the Big Bend is more sparsely-populated than the other two destinations, providing less chance for visitors to interact with residents.

Considering the predictive nature of the log-transformed distance travelled on visitors' emotional solidarity with residents, results confirmed the initial presupposition that an inverse relationship would exist. Findings from the LRGV and Big Bend samples (with more significant models) provide the most compelling argument in support of Tobler's law within a tourism context. Coinciding with the existing body of literature (see Eagles et al., 2015; Lee, Guillet, Law, & Leung, 2012; Paul & Rimmawi, 1992), this study also found that the outcome variable (in this case, ESS factor) exponentially declined as distance visitors travelled from origin increased. However, any pattern analogous to Effective Tourism Exclusion Zones (ETEZ) (a range where little or no demand occurs) (McKercher & Lew, 2003) or a secondary peak (Paul & Rimmawi, 1992) was found from this study.

Ultimately, results reveal that the closer an individual lives to a destination, the more emotionally tied they feel to destination residents. This suggests that the applicability of Tobler's law in tourism expands beyond analyzing tourism demands (Lew & McKercher, 2002; Paul & Rimmawi, 1992; Zhang et al., 2011) or tourist behaviors within destinations (Fang Bao & Mckercher, 2008; Ho & McKercher, 2014). Galveston data generated the fewest significant models relative to the other two destinations. Distinctive visitors to Galveston may be partially responsible for this. The descriptive summary of Galveston visitors reveals that the destination is sought more by younger individuals travelling in larger groups and staying for shorter periods of time.[1] The longer visitors are in a destination, the greater potential for interaction to occur with residents. As Woosnam and Norman (2010) found, such interaction between residents and tourists can significantly explain emotional solidarity between representatives of each group.

In addition to demonstrating the applicability of Tobler's law within a tourism context, this work adds to the growing body of literature concerning emotional solidarity. While the emphasis as of late has focused on determining outcomes of emotional solidarity, such as attitudes regarding tourism development (Woosnam, 2012), perceived safety in a tourism destination (Woosnam, Shafer et al., 2015), and tourist expenditures (Woosnam, Dudensing et al., 2015), this work marks the first time since Woosnam (2011), Woosnam and Aleshinloye (2013), and Woosnam et al. (2014) that an antecedent other than interaction, shared beliefs, shared behavior, or length of residence significantly explained the construct. This work provides further justification for future consideration of spatial measures (beyond distance travelled) in explaining a greater degree of variance in emotional solidarity, especially considering Durkheim's (1995[1912]) model.

Based on this work, destinations can be distinguished from one another based on distance visitors are willing to travel. It goes without saying that as DMOs are aware of visitors' origins, they can more effectively and efficiently promote their destination. For instance, nation-wide marketing may be cost-ineffective for Galveston Island, where most of the visitors are from within a 200-mile radius of the city. Rather than focusing on costly marketing advertisements via television commercials or at trade shows, billboard signs or even internet marketing campaigns may provide more effective return on investment. However, the same strategy will not work for the Big Bend, where the area is more sparsely populated and the visitors tend to come from further distances. In such instances, examination of visitors' motivations and intentions while on-site would prove most worthwhile. With knowledge that LRGV and Big Bend visitors not only stay longer in the destination but are also in search of more nature-based experiences, advertising via niche publications (i.e., those focused on outdoor adventures, birding, etc.) could potentially yield more visitors.

5.1. Limitations and future research

This work is not without its limitations. Effect sizes (R^2 values) were somewhat weak for the regression analyses. Adding additional variables other than distance would likely add in explaining a greater degree of variance in emotional solidarity with residents. As Kline (2016) indicates, the more variables considered within a model, the greater likelihood unique effect and cumulative effect sizes would increase. However, this needs to be done with caution and great theoretical consideration (i.e., based on extant evidence from empirical work or proposed relationships developed throughout the literature), especially if one is to consider structural paths within structural equation modeling. As indicated earlier, the focus of this particular study was to examine the link between physical distance travelled and emotional distance (or solidarity in this case) visitors perceive with destination visitors. As stated earlier, adding other spatial variables may compliment findings within the current study such as cultural distance (Ahn & McKercher, 2015) or time distance (Cooper & Hall, 2008).

The intent of our study was to sample individuals in three particular destinations, which yielded three unique samples. In so doing, participants could only respond to questions pertaining to the destination under consideration. For instance, person 1 was visiting destination A and could likely not respond to questions concerning travel to and solidarity with residents living in destinations B and C. Future research should look at how solidarity may differ across multiple destinations, while using individuals from the same sample and not three separate samples, as we did here. The challenge in this future research endeavor would be how to gain access to individuals having visited the same locations under consideration.

One additional line of research that may be fruitful concerns the consideration of solidarity with individuals residing in areas where little tourism occurs (i.e., in ETEZ as McKercher & Lew, 2003 put forth). Does the psychological equivalent of an ETEZ exist, whereby areas are characterized by a lack of (or possess minimal degrees of) emotional solidarity with local residents? To date, work centered on emotional solidarity has resulted in mean scores of ESS items and factors that are typically positive. Future work should continue to consider distance travelled in an effort to examine the relationship with residents whereby visitors may perceive the relationship as negative. In such an instance, consideration should be made in potentially renaming the ESS to reflect both positive and negative perceptions of the relationships. One potential name may be the *Emotional Solidarity-Discord Scale*.

Appendix A. Supplementary data

Supplementary data related to this article can be found at http://dx.doi.org/10.1016/j.tourman.2017.03.021.

[1] In an effort to determine whether party size and length of stay explained a notable degree of significance in emotional solidarity, each construct was added to the regression models. Neither significantly contributed to the models with R^2 values ranging from 0.019 to 0.071 (which was a modest increase from 0.012 to 0.051 in the existing significant models).

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