A Conceptual and Methodological Framework of Leisure Activity Loyalty Accommodating the Travel Context: Application of a Copula-Based Bivariate Ordered-Response Choice Model

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ABSTRACT

Leisure activities, and their associated trips, account for a significant percentage of US households' annual travel. Unfortunately, due to the variety and flexibility of these activities, leisure travel behavior is still not well understood, especially with respect to its travel context (*i.e.* how easy is it to access a destination and/or the intrinsic recreation value of travel to pursue a leisure activity). Furthermore, no unified conceptual understanding of leisure loyalty (or supporting empirical analysis) has emerged. This paper introduces a unified conceptual framework for considering leisure activity loyalties within a travel context, based on two distinct elements of leisure loyalty behavior - destination satisfaction and activity involvement. The framework is based on the notion that individuals' leisure activity involvement is situational, and is heightened by specific travel context instances or circumstances. As a result, three new measures are introduced that incorporate travel context: *general*, *independent*, and *dedicated* activity loyalty. Additionally, this paper undertakes a unique empirical analysis to further support the inclusion of travel context in leisure activity loyalty. The analysis employs a unique 2001 NHTS dataset comprised of households' daily and long-distance leisure activities within an ordered-response copula-based model methodology that incorporates an underlying latent loyalty measure. The model recognizes the impact of household location factors, household economic factors, household demographics, and season of year/day of week variables on leisure activity loyalties. The results confirm that households demonstrate significant loyalties to travel contexts across all leisure activities (represented by *independent* and *dedicated* activity loyalties), especially resting and sightseeing. Moreover, individuals are generally not loyal to destinations *per se*, as much as they are loyal to the activities they are able to participate in at the destinations. Finally, implications for travel demand modeling and tourism management as well as future research opportunities are discussed.

Keywords: Leisure travel behavior, leisure loyalty, vacation travel, copula approach, ordered-response model.

1. INTRODUCTION

Leisure travel, broadly defined as travel to visit friends and relatives, outdoor recreation, and entertainment and other non-maintenance personal activities, "accounts for the majority (75%) of all US (long-distance, home-based) domestic trips", in terms of both the number of trips (US Travel Association, 2005) as well as the vehicle miles traveled (Schlich *et al.*, 2004).[1] Over the past few decades, improved technology, faster information dissemination, expanded social networks, and increased available leisure time budgets has further contributed to the rise of leisure activities and associated trip-making among US households. In fact, leisure travel has become ingrained into US households' way of life, with many households routinely making both daily short-distance leisure trips and long-distance vacation trips (Bargeman and van der Poel, 2006). US households made over 1.5 billion leisure person-trips in 2008, and many planners anticipate the number of leisure trips to continue to grow (US Travel Association, 2008). Further, recent changes in the economy and fuel prices do not seem to have had a substantial impact on household time and money expenditures on leisure travel. (Hotel News Resources, 2007 and Holecek and White, 2007).

Understandably, leisure trips and activities are quite different from typical daily commutes and maintenance activities. Leisure trips are generally less obligatory, have more variety in purpose and location of participation, may not be pursued regularly, and peak toward evenings and weekends (Kemperman *et al.*, 2006, Brey and Lehto, 2007, Lockwood *et al.*, 2005). It is perhaps because of this inherent variety and less regularity of participation of individuals and households that, despite being a significant percentage of our travel, leisure travel behavior is still not very well understood. Of course, the implication is not that there is insufficient research in the area of leisure travel. It has become a critical subject of analysis for planners and decision-makers, since leisure travel significantly impacts regional economic and social development (Limtanakool *et al.*, 2006), as well as contributes to emission levels and regional congestion (Schlich *et al.*, 2004). Thus, academics and other researchers have strived to better understand leisure travel behavior and decision-making to improve transportation policies, infrastructure, and land development. For instance, researchers generally acknowledge that each individual develops leisure preferences, routines and habits similar to non-leisure travel

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[1] Leisure travel is sometimes also defined as "all journeys that do not fall clearly into the other well-established categories of commuting, business, education, escort, and sometimes other personal business and shopping" (Anable, 2002).

behavior. Studies also suggest that such leisure preferences and habit formation are closely tied to the concept of *leisure loyalty*, commonly defined as "a biased behavior expressed over time by an individual with respect to one or more alternatives that is a function of psychological processes" (Jacoby and Kyner, 1973, Bargeman and van der Poel, 2006). This *leisure loyalty* concept has been used to explain reduced price sensitivities of customers to leisure activities and to study customer retention/attraction issues (see, for example, Shoemaker and Lewis, 1999, Alegre and Juaneda, 2006, McMullan and Gilmore, 2008).

Still, while the study of "regular and repetitious" travel behavior has been studied in depth over the past decade (see Schlich and Axhausen, 2003, Bhat *et al.*, 2005, Spissu *et al.*, 2009), much regarding leisure loyalty is relatively fuzzy and unexplored (Schlich *et al.*, 2004). There is the lack of a clear, unified conceptual understanding of leisure loyalty (Bandyopadhyay and Martell, 2007, Lee *et al.*, 2007) as well as limited empirical analysis of leisure loyalty behavior (due in part to the difficulty in collecting data and proper methods of analysis; Bargeman *et al.*, 2002). Perhaps even more importantly, there is inadequate consideration of the *travel context* (*i.e.,* short or long-distance trips) in existing leisure loyalty research. On the other hand, for decidedly flexible leisure activities, the travel context becomes a defining characteristic. Even with several leisure activity options, the fact that individuals choose sometimes to travel longer distances to participate in activities that they could very well pursue closer to home implies that the travel context of leisure activity participation needs due consideration when studying leisure loyalties and leisure activity participations.

This paper introduces a unified conceptual framework for considering leisure activity loyalties within a travel context, based on two distinct elements of leisure loyalty behavior - destination satisfaction and activity involvement. Additionally, this paper undertakes a unique empirical analysis of loyalty for five types of leisure activities using a new copula-based model methodology. The paper is structured as follows. The next section discusses the destination satisfaction and activity involvement elements of leisure loyalty. Section 3 introduces the travel context-based loyalty framework. Section 4 presents the data source and sample used for the empirical analysis in the paper. Section 5 details the copula-based ordered probit methodology. Empirical results are discussed in Section 6, and Section 7 concludes with future work and implications.

2. DEFINING AND MEASURING LOYALTY

As alluded to earlier, leisure loyalty is a challenging and multidimensional topic, with many factors influencing leisure travel behavior. It should not be a surprise, therefore, that different disciplines have approached the topic from distinct perspectives. However, among the many disciplines, two of the most fundamental elements of leisure loyalty studied in the literature are destination satisfaction and activity involvement. The consumer behavior/marketing perspective attempts to describe loyalty based on consumers' destination satisfaction. As a result, this strand of the literature focuses on destinations and quantitative measures of destination loyalty. On the other hand, the psychological perspective attempts to understand loyalty based on individuals' activity involvement. This approach focuses on activities and qualitative measures of activity involvement loyalty. The benefits, challenges, and common underlying themes of both theories are discussed in turn in the following two sections.

2.1 Loyalty through Destination Satisfaction

The study of destination satisfaction assumes that travelers form connections and repeat behavior based on their relationships with destinations (Yoon and Uysal, 2005). This is based on the premise that the more satisfied travelers are with their experience at a destination, the more likely they will be to develop loyalty to that destination (see Petrick, 2005 and Castro *et al.*, 2007). Satisfaction, in turn, is determined by whether individuals' expectations are consistent with their experiences and final destination image (Hernandez-Lobato *et al.*, 2006, Lam and Hsu, 2006, Oom do Valle *et al.*, 2006). While the exact nature of this process is still unclear, many consumer behavior researchers prefer this approach as it allows them to thoroughly analyze the most productive ways to develop destinations to retain customers and increase consumption (Chi and Qu, 2008, Kim, 2008).

A substantial amount of the destination loyalty-related research literature has focused on identifying and measuring a series of quantifiable "push" and "pull" factors describing satisfaction and expectation (for examples, see Crompton, 1979, Sirakaya *et al.*, 1996, Yoon and Uysal, 2005, Alegre and Juaneda, 2006, Kemperman *et al.*, 2006, Lam and Hsu, 2006, McCormack *et al.*, 2008, and McMullan and Gilmore, 2008). 'Push' factors detail travelers' motivations and perceptions that cause them to pursue leisure travel (*i.e.* the need to escape, self awareness, socialization, *etc.*), and 'pull' factors characterize destination attributes that attract

them to specific destinations (*i.e.* available activities, price, comfort, attractiveness). Incidentally, some 'push' characteristics also describe the travel context for reaching the destination (for example, travel time, travel distance, and travel reliability), although they are never identified as such.   Theoretically, individuals' satisfaction is determined by the overall balance of (and interaction between) 'push' and 'pull' factors, but in practice they are predominantly studied independently (Baloglu and Uysal, 1996 and Kim, 2008). Ultimately, these 'push' and 'pull' factors are used to calculate the behavioral and attitudinal measures of destination satisfaction and, by association, leisure loyalty (Peter and Olson, 1999, Chen and Gursoy, 2001, Yoon and Uysal, 2005, Bandyopadhyay and Martell, 2007, and Kim, 2008).

Destination satisfaction is most commonly measured in terms of behavioral responses, such as indicators of visitation frequency or amount spent, simply because these are observable or recordable (Pritchard and Howard 1997, Oppermann 1998, Chen and Gursoy, 2001, Barnes, 2002, Rittichainuwat *et al.*, 2003, Alegre and Juaneda, 2006, Hernandez-Lobato *et al.*, 2006). Of course, there are variations on these measures including *intentions,* defined as the intention to continue usual buying, the intention to buy more than usual, and the willingness to recommend (Taylor, 1998, Chen and Gursoy, 2001, Chi and Qu, 2008), and *spatial repetition*, defined as the degree to which individuals and households choose the same destination on consecutive vacations (Bargeman *et al.*, 2002). Individuals loyal through destination satisfaction will spend more and visit more often. These measures can then be compared with destination 'push' and 'pull' factors to determine which ones are more effective at developing loyalty.

However, the behavioral measures only capture one aspect of leisure loyalty: retention (Barnes, 2002). As Chen and Gursoy (2001) acknowledge, "non-repeat visit behavior may not preclude an individual's loyalty to a destination they previously visited, while a repeat visitation to a particular destination may not warrant tourists' loyalty to that destination". What of those who repeatedly visit a destination only out of convenience rather than any loyalty? The convenience element of accessing the destination would then be mistaken for loyalty (this is the case of "spurious loyalty"; see Kozak *et al.*, 2002 and Petrick, 2005). Also, what of those who, while satisfied and would recommend a destination, do not return simply because they want to seek different travel experiences? The variety-seeking element regarding destinations would then be mistaken for lack of loyalty (this is the case of "latent loyalty"; see Chen and Gursoy, 2001 and Kozak *et al.*, 2002). Behavioral measures fail to capture such subtleties in destination choice

for leisure activity participation. As a result, researchers have started integrating attitudinal measures (typically quantified by using likert-scale based stated preferences of overall impression or level of attachment; see Yoon and Uysal, 2005) with behavioral measures to describe the emotional connection that individuals' make with destinations (Alegre and Juaneda, 2006).   The result is a stronger understanding of leisure destination loyalty, relative to considering behavioral (or even attitudinal) measures independently (Rittichainuwat *et al.*, 2003, Oom do Valle *et al.,* 2008).   These integrated measures incorporate the fact that individuals essentially are building relationships with destinations; the stronger the relationship, the more personal involvement one has with the destination (Barnes, 2002, Niemeyer, 2009). To this end, personal involvement biases individuals' destination satisfaction, and strengthens leisure loyalty. Petrick (2005) was able to identify the various types of leisure loyalty described above by comparing attachment and revisitation: low attachment and low revisitation implies low destination loyalty, high attachment and high revisitation implies high destination loyalty, low attachment and high revisitation implies spurious loyalty, and high attachment and low revisitation implies latent loyalty.

Despite the improvements just discussed, even integrated destination satisfaction measures are still unable to fully capture or describe leisure loyalty (Petrick, 2005).   First, destination satisfaction measures are not effective at describing the evolution of leisure loyalty over individuals' lifecycles.   Researchers acknowledge that loyalties naturally change over time as both destinations (Oppermann, 1995) and individuals grow (McMullan and Gilmore, 2008). This is especially true for leisure activities (Rapoport and Rapoport, 1975, Oppermann, 1995, Limtanakool *et al.*, 2006).   Oppermann (1995) further proposed that individual loyalties may even be cyclical, changing periodically based on annual events and changes in family structures. Segmentation and cluster analyses based on ages, genders, and motivations are common in this field (Decrop & Snelders, 2005, Castro *et al.*, 2007), but no significant empirical studies exist that definitively describe variations in loyalty for full market heterogeneity.

More importantly, destination satisfaction measures of loyalty fail to address the travel context of leisure activities (how easy is it to access a destination and/or the intrinsic recreation value of travel to pursue a leisure activity).   While an element of the travel context is suggested by the concept of "spurious loyalty", even this type of "loyalty" is measured on the (solely) destination-based attributes of low attachment and high revisitation, without any consideration of

the travel to the destination. Research also suggests that, ultimately, individuals are generally not loyal to destinations *per se*, as much as they are loyal to the activities they are able to participate in at the destinations (see Shoemaker, 1994, Sung, 2004, Yoon and Uysal, 2005, Kemperman *et al.*, 2006, Oom do Valle *et al.,* 2008). Thus, it is important to evaluate the quality of a destination's activity opportunities, as well as individuals' interest in those activities and the travel context to the destination (as opposed to measuring loyalty based on attachment to a destination bereft of the activity opportunities at the destination and/or based on revisitation to the destination without consideration of the travel context).

2.2 Loyalty through Activity Involvement

The study of leisure loyalty through activity involvement (rather than destination satisfaction/attachment) assumes that individuals' leisure behavior over a period of time is influenced by their psychological need to participate in various leisure activities, independent of the destinations in which they pursue them. Activity involvement theory, defined as "an unobservable state of motivation, arousal or interest toward a recreation activity or associated product" (Havitz and Dimanche, 1997), is based on three principles: (1) Individuals develop a psychological attachment with activities, (2) Individuals have logical and emotional commitments in their life and the way they pursue their lives, and (3) Individuals vary in their psychological and logical/emotional commitments (Scanlan and Simons, 1992, Casper and Stellino, 2008). This translates into a process in which individuals participate in activities, build emotional involvements, and develop loyalties through established commitments (Gahwiler & Havitz, 1998, Josiam *et al.*, 1999, Pritchard *et al.*, 1999, Brey and Lehto, 2007, Casper and Stellino, 2008) As such, the activity involvement approach to leisure loyalty is more effective at describing those individuals who ascribe loyalty to 'getting away' or 'thrill seeking' that aren't attached to destinations (Decrop and Snelders, 2005). Loyalty measures for activity involvement are surprisingly similar to those collected in destination satisfaction, with behavioral measures (*i.e.* activity frequencies and patterns; see Lehto *et al.*¸2004 and Brey and Lehto, 2007) and attitudinal measures (*i.e.* likert scales of 'resistance to change' and 'ability to choose'; see Pritchard *et al.*, 1999). Furthermore, it is important to recognize that this process varies across individuals based on demographics (Casper and Stellino, 2008) as well as needs, attitudes, and lifestyle (Kim, 2008). It follows that as individuals' motivations change over their lives, so do

their activity involvements and loyalties. The literature claims that people have predictable travel motivational patterns based on changes in needs, interests, and travel experiences (Pearce and Lee, 2005, Brey and Lehto, 2007). These individual activity involvement trajectories are further explained through two important theories of behavior: recreation specialization and optimal arousal.

Recreation specialization provides insight into why we not only participate in wider varieties of activities, but also become increasingly specialized in them (Schlich *et al.*, 2004). According to the theory, we become specialists in activities (as opposed to generalists) the more often we participate in them. In fact, specialization is a unique form of loyalty that is based exclusively on increased knowledge and skill sets rather than emotions (Devall, 1973; Bryan, 1977; Shibutani, 1955). Therefore, "for a given activity, the participants exhibit a continuum of behavior from general interest to a very focused involvement. Previous experience, knowledge about the activity, and the level of investment in the activity are all important in classifying a person as having a specialist interest" (Pearce and Lee, 2005). Brey and Lehto (2007) further showed that recreation specialization carried across daily and vacation activities. Those individuals who frequently participated in daily skill-based leisure activities were found to commonly pursue those same activities while on vacation, resulting in recreation specialization across multiple travel contexts (short-distance travel and long-distance travel).

Optimal arousal, on the other hand, provides an explanation of individuals' process for selecting and pursuing activities. First introduced by Iso-Ahola (1983), it recognizes that individuals receive intrinsic benefits from participating in leisure activities. As a result, individuals are motivated to pursue those leisure activities that provide the highest personal benefits. However, unlike recreation specialization, optimal arousal assumes there are limits to how much of a single leisure activity an individual will participate in before it loses its draw (*i.e.* satiation). Naturally, this process varies by person; while activity novelty may add intrinsic worth to some people, others find more benefit in routine (Niinen *et al.*, 2004; see LaMondia *et al.*, 2008 for an econometric model based on the theory of optimal arousal). Ultimately, individuals select and pursue leisure activities over their lives based on a self-optimizing process of maximized benefits and optimum stimulation. This provides a more realistic framework to form leisure activity loyalties. It explains how individuals may be loyal to a specific leisure activity for a period of time but may shift that loyalty when they get bored. It further explains

how individuals tend to pursue many leisure activities at the same time as a way to keep all of them interesting and novel (Godbey and Graefe, 1991).

Activity involvement measures of loyalty provide insight into leisure behavior, but, like destination satisfaction measures, are unable to fully capture or describe leisure loyalty. First, the emphasis of activity involvement research remains on long-distance vacation activities, despite the continued recognition that daily intra-urban and long-distance inter-urban activities are inter-related in terms of the type and frequency of leisure activities pursued (Brey and Lehto, 2007, Larsen, 2007). The literature on intra-urban leisure activities and trips is especially sparse (Pozsgay and Bhat, 2001, Bhat and Gossen, 2004).

Most importantly, activity involvement theory also fails to differentiate activities by travel contexts. In fact, the theory explicitly assumes that leisure activities pursued locally and on long distance vacations are simply extensions of the same motivations. Brey and Lehto (2007) exemplify this assumption in their study comparing leisure activity commitment across daily and long-distance travel; they state that as individuals build experience with a daily version of an activity, they will participate in that activity wherever they go, because it is the same thing. While this may apply to skill-based leisure activities, it is also possible that people perceive leisure activities performed close to home as different than those that they travel long distance for. In other words, rather than optimal arousal necessarily only "kicking in" over time (so that individuals in a phase where they want to spend time in entertainment will travel both short distance and long distance for entertainment), optimal arousal may also operate continuously and may be implemented through the deliberate mechanism of changing travel context (so that individuals spend time in entertainment at a location close by to their home, but consciously avoid entertainment activities at a location farther away from their home). These issues are discussed in more detail in the next section.

3. INCORPORATING THE TRAVEL CONTEXT

The previous discussions of destination satisfaction and activity involvement demonstrate that, while these approaches provide a description of leisure activity loyalty, they are not quite complete. The destination specialization approach to loyalty does not consider individuals' commitment to activities, although it does describe their emotional attachment to destinations. The activity involvement approach, conversely, thoroughly details individuals' interest in

activities but fails to explore how activities vary by destination. Most importantly, neither distinguishes activities by travel context. As a result, little is understood of the behavioral setting of loyalty (*i.e.* the relationship between activities, destinations, and commitment) (Gahwiler and Havitz, 1998, Brey and Lehto, 2007). Fortunately, a consideration of travel context provides the common unifying dimension to understand leisure activity loyalty and behavior

Travel context is broadly defined in this study as the type of travel an individual undertakes to participate in a leisure activity. In other words, leisure activities pursued on a daily basis have a different travel context than leisure activities pursued on vacation. While individuals today have many options for participating in leisure activities, through a variety of travel contexts, they are still frequently demonstrating loyalty behavior. Individuals are, however, repeating leisure activities within similar travel contexts, and not at common destinations (Etzel and Woodside, 1982, Gahwiler and Havitz, 1998, George and George, 2004, Schlich *et al.*, 2004, Froehlich *et al.*, 2006, Brey and Lehto, 2007, Lee *et al.*, 2007). Clearly, individuals are distinguishing activities by travel context; leisure activity involvement has become situational, heightened by specific travel context instances or circumstances (Gahwiler and Havitz, 1998). The process for developing loyalty to activities within a travel context can be described as moving from involvement with an activity to developing an attachment with that activity in a specific travel context to building loyalty with that activity. This travel context interpretation of leisure activity loyalty unifies destination satisfaction and activity involvement approaches. First, travel context supports destination satisfaction because it is an integral part of destination image through place dependence (Moscardo *et al.*, 1996, Chi and Qu, 2008, Yuksel *et al.*, 2009). Second, travel context supports emotional destination attachment because it allows for individuals to "form activity attachments to types of travel" (Barnes, 2002, George and George, 2004). Third, travel context supports recreation specialization because as activities in one type of travel context become routine, individuals can develop loyalty to similar activities within a new travel context (Brey and Lehto, 2007). Finally, travel context supports optimal arousal because it allows for variety and novelty in leisure activities through deliberate choices of varying travel contexts at different destinations as well as considers activity involvement from a lifecycle perspective (Bargeman *et al.*, 2002, Larsen, 2008). Ultimately, "a (leisure) trip cannot be regarded as independent from its travel context" (Schlich *et al.*, 2004).

Additionally, one needs to redefine loyalty measures based on the introduction of travel context to leisure activity loyalty. Three new types of leisure activity loyalties may be identified: *general*, *independent*, and *dedicated*. These new travel context-sensitive activity loyalties are identified by comparing individuals' participation in activities across both daily and long-distance travel contexts. For example, *general activity loyalty* describes a household's general loyalty (or disloyalty) in pursuing more of a specific leisure activity, regardless of travel context. Alternatively, *independent activity loyalty* refers to the case when household's relative loyalty (or disloyalty) in pursuing a specific leisure activity in one specific travel context is independent of the loyalty in the other travel context. Finally, *dedicated travel loyalty* represents the case when a household dedicatedly goes out of its way to pursue more of a specific activity type in one travel context, but is disinclined to participate in that specific activity type in the other travel context. It is important to recognize that it is possible for households to demonstrate multiple types of loyalty effects based on the type of leisure activity. For example, a household may be *generally loyal* to recreation and entertainment activities (meaning they tend to often hike and go to sporting events, both as part of intra-urban short-distance pursuits as well as on long-distance trips) as well as *dedicatedly loyal* to visiting daily travel (meaning they tend to regularly visit friends as part of their intra-urban leisure pursuits, but rarely do so on long distance trips). These new definitions of loyalty are further explored in an empirical analysis that jointly examines the number of daily activity pursuits and long distance activity episodes for each of five leisure activity purposes.

4. DATA SOURCE

The main source of travel data for the current study is the 2001 National Household Travel Survey (NHTS). The survey, which was conducted between March 2001 and May 2002, is unique in that it recorded two sets of travel data from participating households from across the United States through a series of phone interviews and mailings. The first set included all short distance daily travel and activities a household made over a 24 hour survey day; the second set included all long-distance (defined as travel to a destination 50 miles or further away from the home) travel and activities a household pursued over the 4 weeks (*i.e.* month) prior to the study day. Both sets of data included detailed trip, activity, and travel party information (*i.e.* travel mode, party composition, distance, travel time, and purpose). Household sociodemographics,

such as income, household composition, and home ownership were also collected. (For more information on the survey, please refer to FHWA, 2004) The 2001 NHTS dataset contains complete daily short distance and monthly long-distance travel information for 69,817 households.

4.1 Sample Formulation

The leisure activity sample used in this study was extracted from the NHTS data in a series of steps. First, the short distance daily travel and the long distance monthly travel datasets were formatted to determine the total number and types of out-of-home leisure activity episodes (or "bouts") each household undertook during the 24 hour and 4-week survey periods, respectively. For short distance daily travel, households could record only one destination activity purpose for each trip. Five short distance leisure activity purposes were identified for the current analysis: *entertainment* (defined as "going out/ hanging out for entertainment, theater, sports event, going to bar, *etc*."), *recreation* (defined as "going to the gym, exercising, or playing sports"), *resting* (defined as "rest or relaxation"), *sightseeing* (defined as "visiting public place such as a historical site, museum, park, library, *etc*."), and *visiting* (defined as "visiting friends or relatives"). Each short distance trip was then translated to a unique contribution to each activity purpose. Thus, a trip from home to a location involving recreation activity participation would contribute one recreation activity episode (though a trip back home from the recreation activity participation site to home would not contribute episodes to any leisure activity purpose). For each long-distance trip, households could record up to four activity purposes. Five long distance activity purposes, corresponding one-to-one with the groupings for short distance trips, were identified: *entertainment* (defined as "entertainment such as theater, concert, sports event, gambling, *etc*."), *recreation* (defined as "outdoor recreation such as sports, fishing, hunting, camping, boating, *etc*."), *resting* (defined as "rest or relaxation"), *sightseeing* (defined as such), and *visiting* (defined as "visiting friends or relatives"). Note that a long-distance trip with more than one activity purpose is recorded as contributing one episode of each activity purpose. Thus, if a household made a single long-distance trip during the 4 week period, and if this trip is pursued for both entertainment and recreation, we record this as one long-distance episode for entertainment and one long distance episode for recreation. This procedure was adopted because

our emphasis is on leisure activity involvement. In any case, only 6.4% of the long-distance trips contained multiple activities and were therefore counted multiple times.

Once each leisure activity episode was identified by purpose, the number of short distance episodes per day and the number of long distance travel episodes per month were obtained by activity purpose through the appropriate aggregation of episodes of each purpose. Households that did not participate in any leisure activity at all across both the short distance travel context and the long distance travel context were next removed from the original dataset. Additionally, households that reported more than 15 short distance trips and/or 15 long distance leisure episodes during the recording period were also removed.[2] The resulting dataset comprised 28,294 households with at least one long-distance or daily leisure activity episode. The counts of short distance daily and long distance monthly leisure activity episodes (henceforth referred to as 'daily' episodes and 'long distance' episodes, respectively) were then merged with information collected regarding each household. Household data consists of location characteristics, economic information, and demographics. Further, information regarding the season of year and day of week of survey data collection was also available for each household. Finally, to compare leisure activity loyalty across specific daily and long-distance activity purposes, the final dataset was partitioned into five comparison datasets, each focusing on the pair of daily and long distance episodes for a single activity purpose. In doing so, households were included in each specific comparison dataset only if they pursued at least one daily or one long distance leisure activity episode of that specific purpose. As a result, the entertainment, recreation, resting, sightseeing, and visiting datasets contained 7,106 households, 11,576 households, 2,264 households, 1,833 households, and 16,673 households, respectively.

4.2 Sample Description

Of the 28,294 households in the full sample, 92.9% of households participated in at least one daily leisure episode and zero long distance leisure episodes, 3.4% participated in zero daily leisure episodes and at least one long-distance episode, and 3.7% participated in a combination of both daily and long distance episodes. The higher prevalence of daily episodes relative to long distance episodes in the mix of a typical household's leisure pursuits is to be expected, and

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[2] This upper limit was based on the observation that 99.9% of all households participated in 15 or fewer long-distance episodes and 15 or fewer daily trips. The remaining 0.1% of households reported an unrealistic number of trips.

illustrates the heavy influence of the travel context in leisure activity participation. The percentage of households participating in one or more episodes of each activity purpose within the daily travel context is provided in Table 1a, along with the average number of episodes of each activity purpose for households who participate in that activity purpose. Thus, the first row of Table 1a indicates that 20% of households participate in one or more entertainment episodes during the survey day and, among these households, the average number of entertainment episodes is 1.66. The results from this table indicate that households are most likely to participate in one or more visiting episodes as part of their daily travel context, followed by recreation and entertainment. Daily resting and sightseeing are the leisure purposes most seldom participated in across the sampled households. Table 1b provides the corresponding descriptive information for long distance travel. One notices the same trend across activity purposes as for daily leisure. However, it is also clear that visiting family and friends is a more dominant purpose category within long distance trips than it is for daily trips. In terms of the average number of episodes of participation in each activity purpose (among households who participate in that activity purpose), the second columns of Table 1a and 1b show no substantial variations across activity purposes within each travel context, though visiting activity episodes are made more frequently than episodes of other leisure activity purposes in both the travel contexts.

The emphasis of the model analysis in the paper is on jointly modeling the number of daily and long distance episodes for each of the five leisure purposes identified in Table 1, and to examine which kind of travel context-based loyalty effect (*general*, *independent*, or *dedicated*) is appropriate for each of the five leisure purposes.

5. METHODOLOGY

5.1. Background

In our empirical analysis, there are two dependent variables for each activity purpose – the number of daily leisure episodes and the number of long distance episodes. For each dependent variable, we use an ordered-response structure that assumes that there is an underlying continuous latent "loyalty" measure whose horizontal partitioning maps into the observed set of count outcomes. The higher the latent loyalty measure for daily leisure episodes, the higher is the observed number of daily leisure episodes. The same is true for long distance leisure episodes. Each of these daily leisure and long distance loyalty measures may be influenced by a multi-

dimensional set of observed (to the analyst) household characteristics and unobserved (to the analyst) characteristics associated with the individual and her/his environment (such as lifestyle, health consciousness, sociability, *etc.*). However, the real comprehensive insight into leisure activity loyalty across travel contexts is obtained by comparing the direction of the effects of variables on the latent loyalty in the daily and long-distance contexts. For example, a variable that has the same sign of effect on both the daily and long distance (latent) loyalty measures contributes to *general activity loyalty*. A variable that has a significant impact on one loyalty measure, but not on the other contributes to *independent activity loyalty*. Finally, an exogenous variable that has opposite signs of effects on the two underlying loyalty variables contributes to *dedicated travel loyalty.* In addition*,* we recognize and accommodate the inter-relationship in the daily and long distance loyalty measures due to unobserved factors by jointly modeling the two loyalty measures. A positive dependence in the unobserved factors affecting the daily and long distance loyalty measures would imply general activity loyalty effects (due to the unobserved factors), zero dependence would imply independent activity loyalty, and negative dependence would mean dedicated travel loyalty. Of course, these effects may all vary by activity purpose, and hence the analysis of daily and long distance loyalties is undertaken separately by activity purpose.

5.2. Model Structure

In this section, we will present the model structure for a specific activity purpose. Thus, we suppress the index for activity purpose. For each household q ($q = 1, 2,\ldots, Q$), let f_q represents the number of daily leisure episodes and let g_q represent the number of long distance leisure episodes. Let m be an index for the number of daily leisure episodes ($m = 0,1, 2,\ldots, M$) and let n be the index for the number of (monthly) long distance episodes ($n = 0,1,2,\ldots, N$). The equation system takes the following form:

$$
\begin{aligned}
&f_q^* = \alpha' x_q + v_q, \; f_q = m \quad \text{if } \delta_{m-1} < f_q^* < \delta_m \\
&g_q^* = \beta' y_q + \eta_q, \; g_q = n \; \text{if } \psi_{n-1} < g_q^* < \psi_n
\end{aligned}
\tag{1}
$$

where f_q^* and g_q^* are the latent loyalty measures associated with daily and long distance activity episode participation; x_q and y_q are exogenous variable vectors (with no constant terms),

including household location factors, household economic factors, household demographics, and season of year/day of week variables; α and β are corresponding coefficient vectors to be estimated; v_q and η_q are random error terms; the δ_m and ψ_n terms represent thresholds that relate the latent loyalty measures f_q^* and g_q^* to their observed counterparts f_q and g_q, respectively,   in   the   usual   ordered-response   fashion $(\delta_{-1} = -\infty, \delta_M = \infty; -\infty < \delta_0 < \delta_1 < \delta_2 < \ldots < \delta_{M-1} < \infty)$ and $(\psi_{-1} = -\infty, \psi_N = \infty; -\infty < \psi_0 < \psi_1 < \psi_2 < \ldots < \psi_{N-1} < \infty)$. The error terms v_q and η_q may take any parametric distribution. In the current study, we examine both logistic and normal marginal distributions for these error terms, and choose the distribution that provides the best data fit. The error terms v_q are assumed to be independent and identically distributed (IID) across individuals q, and the error terms η_q are also assumed to be IID across individuals q. Further, for the logistic case, a standard logistic distribution is used for the error terms, while, for the normal case, a standard normal distribution is used for the error terms (these standardizations are innocuous normalizations needed for econometric identification). For presentation ease, let the marginal distribution of v_q be $F(.)$ and the marginal distribution of η_q be $G(.)$.[3] Also, for notational convenience, define $b_{qm} = \delta_m - \alpha'x_q$ and $d_{qn} = \psi_n - \beta'y_q$.

With the preliminaries above, the probability that household q undertakes m daily episodes and n long distance episodes can be written as follows:

$$\Pr[f_q = m, g_q = n] = \Pr[b_{q,m-1} < v_q < b_{qm}, d_{q,n-1} < \eta_q < d_{qn}]$$
$$= \Pr[v_q < b_{qm}, \eta_q < d_{qn}] - \Pr[v_q < b_{qm}, \eta_q < d_{q,n-1}]$$
$$- \left\{ \Pr[v_q < b_{q,m-1}, \eta_q < d_{qn}] - \Pr[v_q < b_{q,m-1}, \eta_q < d_{q,n-1}] \right\} \qquad (2)$$

The above joint probability depends upon the dependence structure between the random variables v_q and η_q. In the current paper, we use a flexible copula-based approach to characterize the dependence between these error terms. The copula approach allows the testing

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[3] Thus, in the context of the current analysis, $F(.)$ may be the standard logistic cumulative distribution function or the standard normal distribution function. The same is the case with $G(.)$. Note that, in the approach we use, it is not necessary that both $F(.)$ and $G(.)$ should be simultaneously logistic (logistic-logistic) or simultaneously normal (normal-normal). Rather, we can also test the normal-logistic and logistic-normal pairings.

of several types of dependence structures, so that the analyst can choose the one that best fits the data rather than pre-imposing the very restrictive, but commonly used, bivariate normal (BVN) distribution assumption. More generally, let the joint cumulative distribution function of v_q and η_q be $H_{v,\eta}(z_{q1}, z_{q2})$. Then, $H_{v,\eta}(z_{q1}, z_{q2})$ can be expressed as a joint cumulative probability distribution of uniform [0,1] marginal variables U_1 and U_2 as below:

$$H_{v,\eta}(z_{q1}, z_{q2}) = \Pr[v_q < z_{q1}, \eta < z_{q2}] = \Pr[F^{-1}(U_1) < z_{q1}, G^{-1}(U_2) < z_{q2}]$$

$$= \Pr[U_1 < F(z_{q1}), U_2 < G(z_{q2})]. \tag{3}$$

Then, by Sklar's (1973) theorem, the above joint distribution (of uniform marginal variables) can be generated by a function $C_\theta(.,.)$ such that:

$$H_{v,\eta}(z_{q1}, z_{q2}) = C_\theta(u_{q1} = F(z_{q1}), u_{q2} = G(z_{q2})). \tag{4}$$

where $C_\theta(.,.)$ is a copula function and θ is a dependency parameter (assumed to be scalar), together characterizing the dependency between v_q and η_q.

The probability expression in Equation (2) can be re-written in terms of the copula function as:

$$\Pr[f_q = m, g_q = n] = C_\theta[F(b_{qm}), G(d_{qn})] - C_\theta[(F(b_{qm}), G(d_{q,n-1})]$$

$$- \left\{ C_\theta[(b_{q,m-1}), G(d_{qn})] - C_\theta[F(b_{q,m-1}), G(d_{q,n-1})] \right\} \tag{5}$$

A variety of bivariate copula functions are available, and we test several of these for appropriateness in the current empirical context. These include the traditional Gaussian copula (*i.e.*, the bivariate normal dependency structure), the Farlie-Gumbel-Morgenstern (FGM) copula, and the Archimedean class of copulas (including the Clayton, Gumbel, Frank, and Joe copulas). The reader is referred to Bhat and Eluru (2009) for a detailed discussion of these alternate copulas and the visual plots of their implied dependency.[4]

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[4] An important note here. Many of the Archimedean copulas (including the Clayton, Gumbel, and Joe copulas) can only accommodate positive dependencies (unlike the FGM, Gaussian, and Frank copulas). Thus, these copulas cannot even handle the situation of potential negative dependence (*i.e.*, dedicated travel loyalty effects). However, to examine the appropriateness of these copulas for the potential presence of dedicated loyalty effects, one only has to re-formulate the model system in Equation (1) by introducing the v_q term in the first equation with a negative sign.

5.3. Model Estimation

The parameters to be estimated in the joint bivariate ordered response model include the α and β vectors, the M δ_k parameters $(\delta_{-1} = -\infty, \delta_M = \infty; -\infty < \delta_0 < \delta_1 < \delta_2 < \ldots < \delta_{M-1} < \infty)$, the N ψ_n parameters $(\psi_{-1} = -\infty, \psi_N = \infty; -\infty < \psi_0 < \psi_1 < \psi_2 < \ldots < \psi_{N-1} < \infty)$, and the θ parameter characterizing the dependency between the error terms for the copula under consideration. To write the log-likelihood function, define $I_q(m, n)$ as an indicator variable that takes the value of 1 if household q pursues m daily episodes and n long distance episodes, and 0 otherwise. Then, the log likelihood function for the copula model takes the following form:

$$\log L = \sum_{q=1}^{Q} \sum_{m=0}^{M} \sum_{n=0}^{N} I_q(m, n) \log \Pr[f_q = m, g_q = n]$$

All the parameters in the model are estimated by maximizing the log-likelihood function above using the GAUSS matrix programming language.

6. EMPIRICAL RESULTS

6.1 Variable Specification

A variety of household characteristics were considered for each of the five leisure activity purposes. These household characteristics attempted to comprehensively capture both the behavioral and emotional loyalty push factors towards different activities in a manner consistent with the current literature. The specification included household location factors, household economic factors, household demographics, and season of year/day of week variables. Household location factors describe variation in households' activity loyalty across different metropolitan statistical areas, neighborhood types, and census regions. Household economic factors highlight differences in behavior based on home ownership, home type, income, telephone access, and vehicle ownership. Household demographics detail how activity loyalty varies by household members and lifecycle status. Finally, season of year and day of week identify the impact that alternative travel seasons, travel days, and September 11, 2001 has on leisure activity participation.

6.2 Copula Specification and Dependency Effects

For each activity purpose, the empirical analysis involved estimating models with two different univariate (*i.e.*, marginal) distribution assumptions (normal and logistic) for the error terms v_q and η_q, and seven different copula structures (independence, Gaussian, FGM, Clayton, Gumbel, Frank, and Joe).[5] As discussed in Section 4, in the copula approach, there is no need to assume that the marginal distributions of the v_q and η_q error terms are simultaneously normal (normal-normal) or logistic (logistic-logistic); instead v_q and η_q terms can have a normal-logistic or logistic-normal distribution. We examined all these four possible combinations for the error terms v_q and η_q, as well as the seven copula dependency structures, for a total of 28 copula-based models for each activity purpose. In addition, we also estimated another batch of 12 copula-based models (four possible combinations of the error terms with three copula dependency structures after reversing the sign on the v_q in the first equation to allow dedicated travel loyalty effects even with the Joe, Gumbel, and Clayton copulas). The Bayesian Information Criterion (BIC) is employed to select the best copula model, since the traditional likelihood ratio test for comparing the alternative copula-based models is not applicable (Trivedi and Zimmer, 2007, page 65, and Bhat and Eluru, 2009). The BIC for a given copula model is equal to $-2\ln(L) + K\ln(Q)$, where $\ln(L)$ is the log-likelihood value at convergence, K is the number of parameters, and Q is the number of observations. The copula that results in the lowest BIC value is the preferred copula. However, since all the competing models in the current analysis have the same exogenous variables and the same number of thresholds, the BIC information selection procedure measure is equivalent to selection based on the largest value of the log-likelihood function at convergence.

      Among the different copula models tested for each of the five leisure activity purpose, the model that considers a normal marginal distribution for each of the error terms v_q and η_q , and uses a Frank copula to link the two error terms, consistently provided the best data fit. The Frank

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[5] Due to space considerations, we are unable to provide additional details on the structures of different copula types. Interested readers are referred to Bhat and Eluru (2009). Also, note that the independence copula, as should be self-explanatory, is a copula that assumes independence. In the notation of Section 5.2, the independence copula corresponds to $C_\theta(u_1, u_2) = u_1 u_2$.

copula was much superior in particular to the Gaussian copula in the current empirical context for each activity purpose.

6.3 Model Estimation Results

The final estimation results for the entertainment, recreation, resting, sightseeing and visiting daily/long-distance activity copula models are detailed in Table 2. The coefficients in the tables provide the effects of exogenous variables on the latent daily leisure loyalty and long distance leisure loyalty measures for each activity purpose. For each exogenous variable (all variables are dummy variables in the final specification), the base category is identified immediately after the variable label in the first column. A '-' entry in a cell of Table 2 indicates that the corresponding row exogenous variable also constitutes the base category when examining the influence of variables on the corresponding column activity purpose-travel context loyalty measure. The threshold values that translate the latent daily and long distance loyalty measures to the observed daily and long distance activity episodes are not shown in the table to conserve on space. These thresholds do not have any substantive interpretation.

6.3.1 Household Location Factors

Household residential location significantly affects leisure activity loyalty. However, it is unclear whether this relationship is a result of leisure activity opportunities based on the area of residence of a household, or self-selection effects where a household has already determined its leisure behavior and selects a residential location that supports the behavior. Either way, one of the significant loyalty parameters is the size of the metropolitan statistical area (MSA) a household lives in (relative to the smallest possible MSA, which has a population less than 250,000). The initial intuition is that the larger the MSA in which a household lives, the more leisure activities that should be available within a shorter distance of the household. However, the results indicate that, in general, and across all leisure activity purposes, households residing in larger MSAs have a higher long distance activity loyalty and lower daily activity loyalty than those residing in an MSA with a population less than 250,000. This is a case of dedicated activity loyalty toward long distance activities, perhaps triggered by a desire to "get-away" from busy stressful environments. Interestingly, households located outside of MSAs tend to form similar

loyalties to long-distance leisure activities (relative to households residing in MSAs of a population less than 250,000) as those households located in large MSAs.

Another way to characterize household residential location is by neighborhood type, defined as rural, town, suburb/second city, or urban. Households located in rural regions show (relative to households in non-rural regions) a *dedicated loyalty* toward long-distance entertainment and recreation leisure activities (*i.e.*, a higher propensity to participate in entertainment and recreation long distance and a lower tendency to participate in these activities close to home), and an *independent loyalty* toward long-distance sightseeing leisure activities (*i.e.*, a higher propensity to participate in sightseeing activities long distance with no inclination one way or the other with respect to sightseeing activities close to home). Households located in towns also tend to demonstrate a *dedicated loyalty* toward long-distance entertainment and sightseeing leisure activities. This is intuitive, as there are traditionally fewer entertainment, sightseeing or recreation activity opportunities available in local rural areas and smaller towns. Households located in urban regions, however, tend to demonstrate an *independent disloyalty* towards long-distance entertainment and visiting leisure activities. Note that this does not imply that urban households participate more in daily entertainment or visiting activities than non-urban household; rather, urban households show a strong disinterest in traveling long distances to pursue these types of activities, relative to non-urban households.

The final measure of household residential location broadly evaluates loyalty trends across census regions of the United States, relative to the Northeast. Households located in the Midwest tend to demonstrate a *dedicated loyalty* towards long-distance recreation and visiting activities, but demonstrate an *independent disloyalty* towards daily entertainment leisure activities. Households located in the South and West tend to demonstrate a *dedicated loyalty* towards all long distance leisure activity types. While it is difficult to explain some of these large scale location effects, it is still useful to recognize that leisure activity loyalties vary significantly across the country.

6.3.2 Household Economic Factors

Household economic factors are one of the most common sets of characteristics used in studying travel behavior. As a result, a variety of household factors were included in the model estimation to describe how household lifestyle and living standards influence leisure activity loyalty. Home

ownership and the type of home a household owns, for example, provide insight into how settled or structured a household is. Both these indicators may reflect the presence of a strong local social network within the area. Therefore, it is not surprising that households that own or rent their home (as opposed to having someone else provide living space) tend to demonstrate a *dedicated loyalty* towards daily visiting leisure activities. Additionally, such households demonstrate an *independent disloyalty* towards daily entertainment and long-distance sightseeing leisure activities.

Likewise, the type of home in which a household resides further describes their lifestyle: households in single detached homes may have more home maintenance as well as more committed, structured lifestyles; households in apartments, duplexes or townhomes do not have the same level of home maintenance and have less committed, structured lifestyles. Those in mobile homes, trailers, and other kinds of housing arrangements (the base category used in including housing type effects) are least likely to have a structured lifestyle. The results indicate that households living in single homes tend to demonstrate a *dedicated loyalty* towards long-distance visiting leisure activities, suggesting that they have a more spatially-diverse social network to which they are well connected relative to those living in mobile homes and trailers. These households also demonstrate an *independent loyalty* towards daily resting leisure activities, meaning that they don't need to 'get away' or travel long-distance to enjoy rest and relaxation. Even more notable is the apartment-dwellers' *dedicated loyalty* towards daily resting leisure activities. It seems that apartment dwellers are especially content enjoying local relaxing opportunities. They also demonstrate an *independent loyalty* towards daily sightseeing leisure activities, which further emphasizes their interest in the local area. Finally, households residing in single detached homes and in apartments/duplexes/townhomes demonstrate an *independent disloyalty* towards long-distance recreation leisure activities (relative to households living in mobile homes and trailers).

Annual household income is traditionally a significant predictor of leisure travel. Households with higher incomes can afford to travel further, more often, and for longer periods of time. The model estimation compared leisure activity loyalty across four income levels, relative to those less than $20,000. Interestingly, households in each of the higher income levels, in general, show long distance loyalty for all activity purposes. This supports the belief that most households consider long-distance leisure travel, such as vacations, a normal (and expected) part

of their lives. However, families with the lowest level of income are not able to afford this kind of long distance leisure travel. In general, for recreation activities, there is a *general loyalty* effect as income increases, with households more likely to participate in both daily and long distance activities (except for the 20-39.9K income category). However, there is also a dedicated loyalty effect toward long distance visiting episodes as income rises, especially in the 60-79.9K income category.

Similar to income, household cell phone use provides insight into whether households are (a) able to spend more discretionary funds that might be used for leisure travel and (b) well connected to their social network. Both these consideration would provide motivation for pursuing leisure activities in the long-distance travel context. In fact the estimation results show that households with more cell phones tend to demonstrate a *dedicated loyalty* towards long-distance recreation and visiting leisure activities as well as an *independent loyalty* towards long-distance entertainment and sightseeing leisure activities. Moreover, households with more cell phones demonstrate an *independent disloyalty* towards daily resting leisure activities, meaning that they'd rather spend their daily leisure time on other activities.

Finally, the estimation considered the impact of vehicle and bicycle ownership had on leisure activity loyalty. In both cases, increased ownership suggests that households consider travel enjoyable in and of itself and not just a means to reach activities. Because these households enjoy the act of traveling, one would anticipate that they prefer travel contexts that maximize their traveling experience. Indeed, households with more vehicles show a *dedicated loyalty* towards long-distance recreation leisure activities. Similarly, households with more bicycles reveal an *independent loyalty* towards daily recreation and resting leisure activities.

6.3.3 Household Demographics

It is commonly recognized within the current literature that as households evolve over time, their travel patterns change as well. This study identified a variety of household demographics and lifecycle factors that affect leisure activity loyalties, the first set of which is the number of different types of household members.   Households with more adults, or perhaps exclusively adults, demonstrate an *independent loyalty* towards daily entertainment, recreation, and visiting leisure activities. While the loyalty to adult-oriented activities is not surprising, the loyalty to daily travel contexts is. It most likely draws attention to the difficulty that households have in

planning or taking long-distance trips around multiple adults' schedules and responsibilities. Interestingly, households with more children demonstrate a similar loyalty to the daily travel context, perhaps because it is hard to plan and manage long distance trips with more children. Households with more drivers, on the other hand, demonstrate an *independent loyalty* towards long-distance entertainment and visiting leisure activities. Clearly, household members who have the ability to travel long-distance take advantage of this opportunity. However, as household members take on work responsibilities, the household's ability to participate in leisure appears to decrease, especially in recreation-oriented leisure (regardless of travel context).

One of the most significant household characteristics affecting leisure travel is the presence (and ages) of children. While most household leisure activities are ultimately decided upon by the parents, children have been known to influence parents' decisions. Overall households with children are extremely loyal to the daily travel context, which is consistent with much of the literature. It is much easier for parents as well as children to pursue local leisure activities, due to limited free time and the difficulty in planning and managing long trips. Additionally, children tend to prefer routines and familiarity with destinations, which further supports local travel contexts. This is especially seen in households with children aged 0 to 5 years, who show an *independent loyalty* to all types of daily leisure activities. Households with young children may not have a considerable amount of free time, but these new parents appear to use their time to expose young children to all types of leisure activities. The variety of leisure activities may serve as a distraction for young children and a break for parents. As children get older, they develop their own preferences and may start to define routines. The results indicate that households with children aged 6-21 show a *dedicated loyalty* towards daily visiting activities (*i.e.*, a higher propensity to participate in daily visiting pursuits, with a corresponding disinclination to participate in long distance visiting pursuits).

The variables related to the age of the household head suggest loyalty evolution trends over time. In general, households tend to exhibit less loyalty toward daily entertainment and visiting activities. When taken together, the effects of the "children" variables and the "age of household head" variables suggest that when children leave home, the "empty nester" households participate less in daily leisure activities, especially entertainment and visiting.

Finally, the estimation included two ratios that further characterize households: number of drivers to number of vehicles and number of workers to number of vehicles. For both ratios,

low values indicate that households have an excess of vehicles, which implies high discretionary spending and mobility. On the other hand, high ratio values indicate that households have fewer vehicles, implying tighter scheduling and limited mobility. The empirical results show that households with limited mobility based on the number of drivers per vehicle variable are less likely to participate in long distance recreation and visiting episodes, and more likely to participate in daily visiting episodes. The situation is exactly reversed for the number of workers per vehicle. The latter effects do not have an immediate intuitive explanation, and need further exploration in future studies.

6.3.4 Season of Year/ Day of Week Variables

The final model characteristics consider the travel period in which each household pursued their leisure activities. The estimation results confirm that distinct seasonal leisure activity loyalties are formed during the year, due to changes in weather, holidays, and work/school commitments. In the fall, households demonstrate a *dedicated loyalty* towards daily entertainment leisure activities. Traditionally, this is the season when schools start, group activities begin, and households reconnect with their social groups; all of which lead to a seasonal loyalty to entertainment leisure activities. A few months later, during winter, households demonstrate an *independent loyalty* towards long-distance visiting leisure activities. As one would expect, the holidays during winter encourage households to make long-distance trips they make to visit family and friends that they may not see regularly. Households surveyed in the spring tend to demonstrate a *dedicated loyalty* towards daily sightseeing and long-distance visiting leisure activities. These findings indicate that as the weather gets warmer, households become loyal to spending time outside both at home and with friends and family further away. Across each season, households demonstrate an *independent disloyalty* towards daily recreation and resting leisure activities, relative to summer.

One would additionally anticipate differences in leisure loyalty depending on the day of the week. Of course, this variable is not relevant for long distance episodes, because long distance episodes were based on a 4-week reporting period. But, for daily travel, the results show higher participation loyalty (or propensity) over the weekends relative to weekdays, a clear manifestation of more time availability to pursue leisure over the weekends.

Since half of the survey was completed before September 11, 2001, we considered the impact the attack (or any national incident) had on leisure activity loyalties. After the attack, households demonstrated a *general disloyalty* toward recreation leisure activities regardless of whether it was daily or long-distance. This is consistent with the overall reduction in recreational travel during that time. Households also demonstrated an *independent disloyalty* toward long-distance visiting leisure activities. This is to be expected as visiting is the most common leisure activity and would naturally face the biggest decline in associated travel after an extreme event. The increased *dedicated loyalty* toward long-distance entertainment and resting leisure activities in the immediate aftermath of 9/11 is interesting, and needs more careful investigation in future studies.

6.3.5 Dependency Parameters

In our empirical analysis, the dependency parameter in the Frank copula consistently turned out to be negative and highly significantly different from zero for each activity purpose (see bottom row of Table 2).[6] The implication is that unobserved factors that increase the daily loyalty measure reduce the long distance loyalty measure, and vice versa. This supports the notion that, after controlling for observed factors, households choose different kinds of activity purposes in their daily leisure and their long distance leisure pursuits. This is a case of dedicated travel loyalty effects due to unobserved factors. The magnitude of the negative relationship due to unobserved factors in the daily and long distance loyalty measures for each activity purpose can be assessed using the Kendall's measure of dependency[7]. The dependency values for each of the five activity purposes are: -0.63 (entertainment), -0.50 (recreation), -0.73 (resting), -0.76 (sightseeing), and -0.48 (visiting). Clearly, the highest level of loyalty dissonance between the daily and long distance travel contexts is for sightseeing and resting activities.

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[6] The Frank's copula allows a stronger central clustering of data points and lesser clustering at the edges relative to the Gaussian copula. In the current empirical context, this means that individuals are likely to be clustered around the medium-medium levels of the two-dimensional daily and long distance loyalty spectrum, and less so at the low-high end or the high-low end of the spectrum, given the negative dependence.

[7] Kendall's measure of dependency (τ) transforms the dependency parameter (θ) into a number between -1 and 1

(see Bhat and Eluru, 2009). For the Frank copula, $\tau = 1 - \dfrac{4}{\theta}\left[1 - \dfrac{1}{\theta}\int\limits_{t=0}^{\theta} \dfrac{t}{e^t - 1} dt\right]$ and $-1 < \tau < 1$. Independence is

attained in Frank's copula as $\theta \to 0$.

7. CONCLUSIONS

Leisure activities, and their associated trips, account for a significant percentage of US households' annual travel. Unfortunately, due to the variety and flexibility of these activities, leisure travel behavior is still not well understood. While researchers have introduced a variety of theories and frameworks to describe households' leisure activity loyalty, no unified conceptual understanding of leisure loyalty (or supporting empirical analysis) has emerged. Perhaps even more importantly, there is inadequate consideration of the travel context (*i.e.*, short or long-distance trips) in existing leisure loyalty research.

This paper introduces a unified conceptual framework for considering leisure activity loyalties within a travel context based on two distinct elements of leisure loyalty behavior - destination satisfaction and activity involvement. The framework is based on the notion that individuals' leisure activity involvement has become situational, heightened by specific travel context instances or circumstances. The process for developing loyalty to activities within a travel context can be described as moving from involvement with an activity to developing an attachment with that activity in a specific travel context to building loyalty with that activity. As a result, three new types of loyalty measures were introduced that incorporate travel context: *general*, *independent*, and *dedicated*. These new travel context sensitive activity loyalties, identified by comparing participation in activities across both daily and long-distance travel contexts, provide insights into leisure activity travel behavior.

Additionally, the study conducted an empirical analysis to support the inclusion of travel context in leisure activity loyalty. The analysis employed a unique 2001 NHTS dataset comprised of households' daily and long-distance leisure activities within a new copula-based model methodology that incorporated an underlying latent loyalty measure. Specifically, the model evaluated the impact that household location factors, household economic factors, household demographics, and season of year/day of week variables had on leisure activity loyalties. The results confirmed that households demonstrate significant loyalties to travel contexts across all leisure activities (represented by *independent* and *dedicated* activity loyalties), especially resting and sightseeing. In fact, there were very few *general* activity loyalties, which describe households' pursuit of leisure activities regardless of travel context. It also became clear that households' loyalties change as they evolve over time. Finally, households seem to

associate activities pursued during the long-distance travel context with 'getting-away' from daily responsibilities. As a result, households appear to have more emotional attachment to activities associated with long-distance travel.

Redefining leisure activity loyalty within a travel context has significant implications for travel planning, demand modeling, and tourism management. Planners have traditionally used destination loyalty to identify and market towards specific population groups. Developing loyalty improves economic strength, through reduced price sensitivities and expanded customer retention/attraction, as well as improves transportation planning models, through better estimates of travel behavior. However, previous definitions of loyalty have not been very successful, because of their inability to account for individuals' latent or spurious behavior. The study results indicate that, through *independent* and *dedicated* activity loyalty, individuals are generally not loyal to destinations *per se*, as much as they are loyal to the activities they are able to participate in at the destinations in a certain travel context. Thus, it is important to evaluate the quality of a destination's activity opportunities, as well as individuals' interest in those activities and the travel context to the destination (as opposed to measuring loyalty based on attachment to a destination bereft of the activity opportunities at the destination and/or based on revisitation to the destination without consideration of the travel context).

There are, of course, many opportunities to extend the current study. First, the study exclusively considered leisure activities. However, many leisure activities are undertaken in conjunction with work-related activities, so it is important to further study the impact that these two types of activities have on each other. Second, this study modeled each leisure activity purpose independently. However, households are constantly prioritizing among all leisure activities when they make decisions, so it is important to further study the interactions between different activity purpose loyalties. Considering individuals' preferences over all activities would provide insights into activity substitutions, combinations, and exclusivity. Third, this study considered only a single day for short trips and a month for long trips. However, households pursue leisure activities throughout the year, so it is important to further study how these loyalties evolve for a household over a year, multiple years, or (at least) over different seasons. Finally, this study treated households as the decision-making unit. However, each household is composed of a variety of members, and studying how the activity loyalties of

individual members are shared, reinforced, and compromised within the family unit would be an interesting avenue for further research.

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REFERENCES

Alegre, J. and C. Juaneda (2006) Destination loyalty: consumers' economic behavior. *Annals of Tourism Research* 33(3): 684-706.

Anable, J. (2002) Picnics, Pets, and Pleasant Places: The Distinguishing Characteristics of Leisure Travel Demand. *Social Change and Sustainable Transport,* Indiana University Press, Bloomington, IN, 181-190.

Baloglu, S. and M. Uysal (1996) Market segments of push and pull motivations: a canonical correlation approach. *International Journal of Contemporary Hospitality Management* 8(3): 32-38.

Bandyopadhyay, S. and M. Martell (2007) Does attitudinal loyalty influence behavioral loyalty? A theoretical and empirical study. *Journal of Retailing and Consumer Services* 14: 35-44.

Bargeman, B., C. John and H. Timmermans (2002) Vacation behavior using a sequence alignment method. *Annals of Tourism Research* 29(2): 320-337.

Bargeman, B. and H. van der Poel (2006) The role of routines in the vacation decision-making process of Dutch vacationers. *Tourism Management* 27: 707-720.

Barnes, J. (2002) From the customer's perspective: defining loyalty. *Bristol Group, Inc.* http://www.crmguru.com/features/2002a/0214jb.html.

Bhat, C.R., and N. Eluru (2009) A Copula-Based Approach to Accommodate Residential Self-Selection Effects in Travel Behavior Modeling. *Transportation Research Part B* 43(7): 749-765.

Bhat, C.R. and R. Gossen (2004) A mixed multinomial logit model analysis of weekend recreation episode type choice. *Transportation Research Part B* 38(9): 767-787.

Bhat, C.R., S. Srinivasan, and K.W. Axhausen (2005) An Analysis of Multiple Interepisode Durations Using a Unifying Multivariate Hazard Model. *Transportation Research Part B* 39(9): 797-823.

Brey, E.T. and X.Y. Lehto (2007) The relationship between daily and vacation activities. *Annals of Tourism Research* 34(1): 160-180.

Bryan, H. (1977) Leisure value systems and recreational specialization: the case of trout fisherman. *Journal of Leisure Research* 9: 74-187.

Casper, J.M. and M.B. Stellino (2008) Demographic predictors of recreation tennis participants' sport commitment. *Journal of Park and Recreation Administration* 26(3): 93-115.

Castro, C.B., E.M. Armario, and D.M. Ruiz (2007) The influence of market heterogeneity on the relationship between a destination's image and tourists' future behaviour. *Tourism Management* 28: 175-187.

Chen, J.S. and D. Gursoy (2001) An investigation of tourists' destination loyalty and preferences. *International Journal of Contemporary Hospitality Management* 13(2): 79-85.

Chi, C.G. and H. Qu (2008) Examining the structural relationships of destination image, tourist satisfaction and destination loyalty: an integrated approach. *Tourism Management* 29: 624-636.

Crompton, J. (1979) Motivation for pleasure vacation. *Annals of Tourism Research* 6(4): 408–424.

Decrop A. and D. Snelders. (2005) A grounded typology of vacation decision-making. *Tourism Management.* 26: 121-132.

Devall, B. (1973) The Development of Leisure Social Worlds. *Humboldt Journal of Social Relations* 1:53–59.

Etzel, M.J. and A.G. Woodside (1982) Segmenting vacation markets: the case of the distant and near-home travelers. *Journal of Travel Research* 20: 10-14.

Federal Highway Association (FHWA) (2004) 2001 National household travel survey: user's guide. January 2004: Version 3.

Froehlich, J., M.Y. Chen, I.E. Smith, and F. Potter (2006) Voting with your feet: an investigative study of the relationship between place visit behavior and preference. *Ubicomp 2006.* LNCS 4206: 333-350.

Gahwiler, P. and M.E. Havitz (1998) Toward a relational understanding of leisure social worlds, involvement, psychological commitment, and behavioral loyalty. *Leisure Sciences* 20(1): 1-23.

George, B.P. and B.P. George (2004) Past visits and the intention to revisit a destination: places attachment as the mediator and novelty seeking as the moderator. *Journal of Tourism Studies* 15(2): 51-66.

Godbey G. and A. Graefe (1991) Repeat tourism, play and monetary spending. *Annals of Tourism Research* 18(2): 213–225.

Havitz, M. E., & Dimanche, F. (1997). Leisure involvement revisited: Conceptual conundrums and measurement advances. *Journal of Leisure Research* 29(3): 245-278.

Hernandez-Lobato, L., M. M. Solis-Radilla, M.A. Moliner-Tena, and J. Sanchez-Garcia (2006) Tourism destination image, satisfaction and loyalty: a study in Ixtapa-Zihuatanejo, Mexico. *Tourism Geographies* 8(4): 343-358.

Holecek, D. and R. White (2007) Record-High Gas Prices Won't Negatively Affect Travelers, MSU Researcher Says. Michigan State University Tourism Center News Release: May 17, 2007.

Hotel News Resource (HNR) (2007) Consumers Aren't Letting Record Gas Prices Get In The Way of Their Next Vacation. http://www.hotelnewsresource.com: June 1, 2007.

Iso-Ahola, S.E. (1983) Towards a Social Psychology of Recreation Travel. *Leisure Studies* 2: 45-56.

Jacoby, J. and D.B. Kyner (1973) Brand loyalty versus repeat purchasing behavior. *Journal of Marketing Research* 10: 1-9.

Josiam, B.M., G. Smeaton and C.J. Clements (1999) Involvement: travel motivation and destination selection. *Journal of Vacation Marketing* 5(2): 167-175.

Kemperman, A.D.A.M., M.M.W. Ponje and J.J.P. Timmermans (2006) Analyzing heterogeneity and substitution in trip making propensity to urban parks: a mixed logit model. *Tourism Analysis* 10: 223-232.

Kim, K. (2008) Analysis of structural equation model for the student pleasure travel market: motivation, involvement, satisfaction, and destination loyalty. *Journal of Travel and Tourism Marketing* 24(4): 297-313.

Kozak, M., T.C. Huan, and J. Beaman (2002) A systematic approach to non-repeat and repeat travel: with measurement and destination loyalty concept implications. *Journal of Travel and Tourism Marketing* 12(4): 19-38.

Lam, T. and C.H.C. Hsu (2006) Predicting behavioral intention of choosing a travel destination. *Tourism Managemen.* 27: 589-599.

LaMondia, J., C.R. Bhat, and D.A. Hensher (2008) An Annual Time Use Model for Domestic Vacation Travel. *Journal of Choice Modelling* 1(1): 70-97.

Larsen, J. (2008) De-exoticizing leisure travel. *Leisure Studies* 27(1): 21-34.

Lee, J., A.R. Graefe, R.C. Burns (2007) Examining the antecedents of destination loyalty in a forest setting. *Leisure Sciences* 29: 463-481.

Lehto, X.Y., J.T. O'Leary, and A.M. Morrison (2004) The effect of prior experience on vacation behavior. *Annals of Tourism Research* 31(4): 801-818.

Limtanakool, N., M. Dijst, and T. Schwanen (2006) Long-distance travel: a decomposition analysis for the UK and the Netherlands. *Tijdschrift voor Economische en Sociale Geografie* 97(4): 389-404.

Lockwood, A., S. Srinivasan, and C.R. Bhat (2005) An Exploratory Analysis of Weekend Activity Patterns in the San Francisco Bay Area. *Transportation Research Record* 1926: 70-78.

McCormack, G.R., B. Giles-Corti, and M. Bulsara (2008) The relationship between destination proximity, destination mix, and physical activity behaviors. *Preventive Medicine* 46: 33-40.

McMullan, R. and A. Gilmore (2008) Customer loyalty: an empirical study. *European Journal of Marketing* 42(9/10): 1084-1094.

Moscardo, G., A.M. Morrison, P.L. Pearce, C. Lang, and J. T. O'Leary (1996) Understanding vacation destination choice through travel motivation and activities. *Journal of Vacation Marketing* 2(2): 109-122.

Niemeyer, P. (2009) Going beyond behavioral loyalty. *Return on Behavior Magazine.* *http://www.returnonbehaviormagazine.com/main-articles/going-beyond-behavioral-loyalty-6.html*

Niinen, O., E. Szivas, and M. Riley (2004) Destination loyalty and repeat behavior: an application of optimum stimulation measurement. *International Journal of Tourism Research* 6: 439-447.

Oom do Valle, P., A. Correia, and E. Rebelo (2008) Determinants of tourism return behavior. *Tourism and Hospitality Research* 8: 205-219.

Oom do Valle, P., J.A. Silva, J. Mendes, and M. Guerreiro (2006) Tourist satisfaction and destination loyalty intention: a structural and categorical analysis. *International Journal of Business Science and Applied Management* 1(1): 25-44.

Oppermann, M. (1995) Travel life cycle. *Annals of Tourism Research* 22(3): 535-552.

Oppermann, M. (1998) Destination threshold potential and the law of repeat visitation. *Journal of Travel Research* 37(2): 131-137.

Pearce, P.L. and U. Lee (2005) Developing the travel career approach to tourist motivation. *Journal of Travel Research* 43: 226-237.

Peter, J.P. and J.C. Olson (1999) *Consumer Behavior and Marketing Strategy.* 7th Edition. New York: McGraw-Hill.

Petrick, J.F. (2005) Reoperationalising the loyalty framework. *Tourism and Hospitality Research* 5(3): 199-212.

Pozsgay M. A., and C. R. Bhat (2001) Destination Choice Modeling for Home-Based Recreational Trips. *Transportation Research Record 1777:* 47-54.

Pritchard, M.P. and D.R. Howard (1997) The loyal travel: examining a typology of service patronage. *Journal of Travel Research* 35(4): 2-10.

Pritchard, M.P. and M.E. Havitz, and D.R. Howard (1999) Analyzing the commitment-loyalty link in service contexts. *Journal of the Academy of Marketing Science* 27(3): 333-348.

Rapoport, R., and R. N. Rapoport (1975) *Leisure and the Family Life Cycle*. London: Routledge & Kegan Paul.

Rittichainuwat, B.N., H. Qu, and J.K. Leong (2003) The collective impacts of a bundle of travel determinants on repeat visitation. *Journal of Hospitality & Tourism Research* 27(2); 217-236.

Schlich, R. and K.W. Axhausen (2003) Habitual travel behavior: evidence from a six-week travel diary. *Transportation* 30: 13-36.

Schlich, R., S. Schonfelder, S. Hanson, and K.W. Axhausen (2004) Structures of leisure travel: temporal and spatial variability. *Transport Reviews* 24(2): 219-237.

Shibutani, T. (1955) Reference Groups as Perspectives. *American Journal of Sociology* 60:562–569.

Shoemaker, S. (1994) Segmenting the US travel market according to benefits realized. *Journal of Travel Research* 32: 8-21.

Shoemaker, S. and R.C. Lewis (1999) Customer loyalty: the future of hospitality marketing. *International Journal of Hospitality Management* 18: 345-70.

Sirakaya, E., R.W. McLellan, and M. Uysal (1996) Modeling vacation destination decisions: a behavioral approach. *Journal of Travel & Tourism Marketing* 5(1/2): 57-75.

Spissu, E., A.R. Pinjari, R.M. Pendyala, and C.R. Bhat (2009) A Copula-Based Joint Multinomial Discrete-Continuous Model of Vehicle Type Choice and Miles of Travel. *Transportation* 36(4): 403-422.

Sung, H.H. (2004) Classification of adventure travelers: behavior, decision making, and target markets. *Journal of Travel Research* 42: 343-356.

Taylor, T. B. (1998) Better loyalty measurement leads to business solutions. *Marketing News* 32(22): 41–42.

US Travel Association (2005) US Travel Market Overview – Travel Volumes & Trends. http://www.tia.org/researchpubs/us_overview_volumes_trends.html

US Travel Association (2008) Annual Travel Forecast. http://www.tia.org/resources/PDFs/Research/National_Summary_for_Web.pdf

Yoon, Y. and M. Uysal (2005) An examination of the effects of motivation and satisfaction on destination loyalty: a structural model. *Tourism Management* 26: 45-56.

Yuksel, A., F. Yuksel, and Y. Bilim (2009) Destination attachment: effects on customer satisfaction and cognitive, affective and conative loyalty. *Tourism Management* Forthcoming.

Table 1: Descriptive Statistics of Participation by Leisure Purpose and Travel Context

Table 1a: Daily Leisure Activity Loyalty

Daily Leisure Activity Purpose	Total Number (%) of Households Participating In This Type of Daily Leisure Activity	Average Number of Activity Episodes of Households Participating in This Type of Daily Leisure Activity
Entertainment	5666 (20.0%)	1.66
Recreation	10793 (38.1%)	1.59
Resting	1497 (5.3%)	1.65
Sightseeing	1246 (4.4%)	1.62
Visiting	12915 (45.6%)	1.85

Table 1b: Long-Distance Leisure Activity Loyalty

Long-Distance Leisure Activity Purpose	Total Number (%) of Households Participating In This Type of Long-distance Leisure Activity	Average Number of Activity Episodes of Households Participating in This Type of Long-distance Leisure Activity
Entertainment	1734 (6.1%)	2.10
Recreation	1191 (4.2%)	2.05
Restomg	811 (2.9%)	2.02
Sightseeing	618 (2.2%)	1.83
Visiting	5139 (18.2%)	2.29

Table 2: Leisure Activity Models Results

	Entertainment				Recreation				Resting				Sightseeing				Visiting			
	Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Household Location Factors																				
MSA Population																				
(Base: ...less than 250,000)																				
...between 250,000 & 499,999	-	-	0.077	1.14	0.078	2.25	-	-	-	-	-	-	-	-	-	-	-	-	0.057	1.42
...between 500,000 & 999,999	-0.299	-5.74	0.406	5.42	-	-	0.235	3.51	-0.135	-1.45	0.192	1.69	-	-	-	-	-0.186	-5.54	0.386	8.63
...between 1,000,000 & 2,999,999	-0.240	-6.01	0.373	5.88	-0.106	-3.25	0.384	7.29	-0.241	3.53	0.366	4.44	-0.241	-2.96	0.223	2.33	-0.247	-9.50	0.523	14.49
...over 3,000,000	-0.230	-5.95	0.385	6.48	-0.129	-4.16	0.385	7.79	-0.289	-4.89	0.379	5.13	-0.245	-3.58	0.249	3.22	-0.274	-10.90	0.527	14.76
...outside of an MSA	-0.305	-7.69	0.507	8.44	-0.048	-1.42	0.261	4.55	-	-	0.105	1.28	-0.238	-3.12	0.302	3.37	-0.211	-8.88	0.555	16.51
City Size																				
(Base: ...in Second City or Suburb)																				
...in Rural Region	-0.109	-2.85	0.146	2.84	-0.074	-2.56	0.113	2.18	-	-	-	-	-	-	0.099	1.17	-	-	-	-
...in Town	-0.090	-2.81	0.140	3.34	-	-	-	-	-	-	-	-	-0.110	-1.84	0.140	2.04	-	-	-	-
...in Urban Region	-	-	-0.083	-1.42	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.091	-2.62
Census Region																				
(Base ...in the Northeast)																				
...in the Midwest	-0.059	-1.76	-	-	-0.052	-1.87	0.103	2.18	-	-	-	-	-	-	-	-	-0.091	-3.99	0.174	6.33
…in the South	-0.411	-10.54	0.493	11.80	-0.239	-7.51	0.552	10.92	-0.536	-8.50	0.587	8.84	-0.669	-8.84	0.736	10.02	-0.422	-17.06	0.631	21.53
...in the West	-0.288	-7.12	0.455	10.19	-0.180	-5.49	0.608	11.81	-0.470	-7.02	0.578	8.20	-0.467	-6.61	0.554	6.78	-0.478	-17.25	0.631	19.44

Table 2: Leisure Activity Models Results (Continued)

	Entertainment				Recreation				Resting				Sightseeing				Visiting			
	Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Household Economic Factors																				
Home Ownership *(Base: ..Provided by Someone Else)*																				
…Owns home	-0.355	-1.98	-	-	-	-	-	-	-	-	-	-	-	-	-0.980	-6.97	0.300	2.23	-0.313	-2.19
…Rents home	-0.385	-2.11	-	-	-	-	-	-	-	-	-	-	-	-	-1.067	-6.79	0.281	2.07	-0.272	-1.88
Home Type *(Base: … in Mobile Home/Trailer/Other Accom.)*																				
...in Single, Detached Home	-	-	-	-	-	-	-0.184	-2.17	0.242	1.50	-	-	-	-	-	-	-0.035	-1.47	0.084	2.88
...in Apartment, Duplex, or Townhouse	-	-	-	-	-	-	-0.208	-2.21	0.288	1.71	-0.177	-2.14	0.109	1.73	-	-	-	-	-	-
Household Annual Income *(Base: …is less than $20,000)*																				
...is between $20,000 and $39,999	-	-	0.126	2.30	-0.123	-4.10	0.226	3.44	-	-	-	-	-	-	-	-	-	-	0.082	2.76
...is between $40,000 and $59,999	-	-	0.143	2.60	-	-	0.167	2.61	-	-	-	-	-	-	0.122	1.71	-	-	0.154	5.09
...is between $60,000 and $79,999	-	-	0.167	2.73	0.092	3.03	0.144	2.07	-	-	-	-	-	-	0.136	1.54	-0.520	-2.13	0.153	4.19
...is greater than $80,000	-	-	0.203	3.58	0.104	3.87	0.160	2.52	-	-	0.104	2.02	-	-	0.133	1.75	-0.124	-5.46	0.270	7.90
Household Telephone Access																				
Number of Cell Phones in the household	-	-	0.029	1.89	-0.020	-1.92	0.028	1.73	-0.025	-1.25	-	-	-	-	0.530	2.03	-0.023	-2.68	0.046	4.30
Household Vehicle Ownership																				
Number of Vehicles in the household (5 max)	-	-	-	-	-0.052	-4.23	0.116	4.21	-	-	-	-	-	-	-	-	-	-	-	-
Number of Bicycles in the household (5 max)	-	-	-	-	0.059	7.33	-	-	0.029	1.71	-	-	-	-	-	-	-	-	-	-

Table 2: Leisure Activity Models Results (Continued)

| | Entertainment | | | | Recreation | | | | Resting | | | | Sightseeing | | | | Visiting | | | |
	Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Household Demographics																				
Household Members																				
Number of Adults in the household (5 max)	0.090	4.93	-	-	0.170	8.15	-	-	-	-	-	-	-	-	-	-	0.131	10.04	-	-
Number of Children in the household (5 max)	0.123	7.60	-0.086	-5.69	0.128	9.31	-	-	0.057	2.47	-	-	0.175	4.91	-0.167	-5.55	0.116	10.61	-	-
Number of Drivers (5 max)	-	-	0.062	2.41	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.081	4.02
Number of Workers (5 max)	-	-	-0.073	-3.37	-0.101	-6.65	-0.079	-2.04	-	-	-	-	-0.062	-2.13	-	-	-	-	-0.110	-4.77
Lifecycle of Children Within Household *(Base: ...has no children)*																				
…has children, the youngest of which is aged 0-5	0.128	2.42	-	-	0.257	6.24	-	-	0.143	2.30	-	-	0.379	3.77	-	-	0.262	7.84	-	-
…has children, the youngest of which is aged 6-15	0.156	3.42	-	-	0.172	4.81	-	-	-	-	-	-	0.167	1.76	-	-	0.216	6.75	-0.134	-5.06
…has children, the youngest of which is aged 16-21	0.047	1.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-	0.202	5.78	-0.131	-3.19
Lifecycle of Adults Within Household *(Base: ...is aged 34 or younger)*																				
…is aged 35-49	-0.059	-1.69	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.042	-1.84	-0.081	-3.48
…is aged 50-64	-0.066	-1.66	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-0.066	-2.62	-	-
…is aged 65 or older	-0.146	-2.86	0.133	2.50	0.100	2.64	-0.207	-3.25	-	-	-	-	-	-	-	-	-0.078	-2.41	-	-
Household Comparisons																				
Ratio of Number of Drivers to Number of Vehicles	-	-	-	-	-	-	-0.119	-2.17	-	-	-	-	-	-	-	-	0.057	2.73	-0.088	-2.81
Ratio of Number of Workers to Number of Vehicles	-	-	-	-	-	-	0.190	2.15	-	-	-	-	-	-	-	-	-0.126	-5.42	0.198	4.51

Table 2: Leisure Activity Models Results (Continued)

	Entertainment				Recreation				Resting				Sightseeing				Visiting			
	Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities		Daily Short Distance Loyalty		Monthly Long Distance Activities	
	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat	Coeff	t-stat
Season of Year/ Day of Week Variables																				
Household Travel Season *(Base: ...during Summer)*																				
...during Fall	0.118	3.83	-0.128	-3.06	-0.113	-3.02	-	-	-	-	-	-	-	-	-	-	-	-	-	-
...during Winter	-	-	-	-	-0.126	-2.95	-	-	-0.130	-1.73	-	-	-	-	-	-	-	-	0.105	4.01
...during Spring	-	-	-	-	-0.050	-1.54	-	-	-0.087	-1.69	-	-	-0.150	-2.50	0.120	1.80	-0.081	-4.49	0.135	5.69
Household Travel Day *(Base: ...on Weekday)*																				
...on Weekend	0.203	8.49	-	-	0.097	4.36	-	-	0.125	2.83	-	-	0.110	2.17	-	-	0.262	16.62	-	-
Impact of 9/11 *(Base: ...before 9/11)*																				
...after 9/11	-0.128	-4.86	0.173	5.02	-0.036	-1.18	-0.100	-2.93	-0.209	-3.82	0.201	3.77	-	-	-	-	-	-	-0.062	-2.78
Dependency Parameter (Θ)	-8.932 (-50.94)				-5.732 (-37.75)				-12.914 (-34.78)				-14.574 (-29.34)				-5.356 (-64.28)			