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# Validation of an Operationalized Model of Iso-Ahola's Theory of Tourism Motivation: A Case in Point-to-Point Suborbital Space Travel

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## Introduction

The word *space tourism* was first used in 1965 in reference to the public having an opportunity to experience the joy of space flight using military and civil space technology (Rogers, 2001). Since then, seven space tourists have experienced space flight to the International Space Station. The major market for space tourism, though, is suborbital space tourism. The demand for suborbital space tourism is challenging to predict because research focuses on different demographics of potential suborbital space flight tourists. Estimates range from 335 to 58,340 suborbital space tourists per year within 12 years of the first suborbital space flight carrying space tourists (Musselman & Hampton, 2020). Suborbital space tourism is the catalyst to transform the space industry from $340 billion a year to over $1 trillion a year over the next 20 years (Berrisford, 2018; Chang, 2015; Chang, 2020). These estimates reflect suborbital space flight where the space tourist is launched to an altitude higher than 100 km (62 miles) [Karman Line], spends approximately 5 minutes in microgravity, and returns to a location on earth relatively close to the launch location.

This form of suborbital space tourism became reality as Virgin Galactic and Blue Origin launched the first suborbital space flights with passengers in July 2021 (Foust, 2021a, 2021b). The next phase of suborbital space tourism is point-to-point suborbital space tourism where a space vehicle flies above the Karman Line, but travels from one point on earth to another point of considerable distance or circumnavigates the earth. The point-to-point suborbital space tourism market is predicted to be a $20 billion a year market providing motivation for the space industry (Johnson & Martin, 2016; Sheetz, 2019). However, it is the adventure, novelty, and prestige of suborbital space flight which motivates potential point-to-point suborbital space tourists (Ao, 2018; Baugh et al., 2018; Chang, 2017; Olya & Han, 2020; Reddy et al., 2012).

Although the literature supports adventure, novelty, and prestige as the motivation for point-to-point suborbital space tourism, the authors did not discover any previous research assessing point-to-point suborbital space flight within the theoretical foundation of the theory of tourism motivation. The objective of this study is to validate the theory of tourism motivation for use in point-to-point suborbital space tourism research. The study provides participants with a point-to-point suborbital space tourism scenario and asks them to complete a survey based on the theory of tourism motivation. Exploratory and confirmatory factor analyses were used to test the measured items of the survey to see how well they represent the latent constructs (four dimensions) of the theory of tourism motivation.

## Literature Review

Tourism motivation emerged from a transition of motivation research from academia to industry. Tourism motivation, like other motivation theories, is based on psychology, sociology, and anthropology (Fullerton, 2013; Thanabordeekj & Nipasuwan, 2017). However, tourism motivation theories sought to understand what drives tourists to travel as people's travel choices begin with motivation. Several motivation theories were developed to provide the basis for understanding tourists' motivation (Beard & Ragheb, 1983; Crompton, 1979; Dann, 1977; Iso-Ahola, 1982; Khuong & Ha, 2014; Kim et al., 2006; Pearce & Caltabiano, 1983; Yousaf et al., 2018).

The push-pull theory emerged as the most prominent theory of tourism motivation (Klenosky, 2002). Push factors are forerunners to pull factors and provide the initial drive to travel. Push factors explain the motives for travel and are internal and distinctive to the traveler. Pull factors explain what draws a person to a specific travel location or event. Therefore, pull factors are external to the traveler, and explain the choice of a specific tourism location or event


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(Crompton, 1979; Dann, 1977; Jamrozy & Uysal, 1994; Klenosky, 2002; Yousefi & Marzuki, 2015). Dann (1977) and Crompton (1979) provided foundational definitions of push factors. On one end of a spectrum, push factors can be a desire to get away, to escape from life and work environment, to relax, to improve relationships with family/friends, and enable social interactions. On the other end of a spectrum, push factors can be prestige, enhancement of one's ego, and personal assessment. Multiple research studies have used the push-pull theory as the theoretical foundation, however, the research identified specific push factors associated with the traveler or destination, but not to tourism motivation in general (Fodness, 1994). Studies assess travel to particular locations (Correia et al., 2007; Hanquin & Lam, 1999; Yousefi & Marzuki, 2015), exhilarating events, such as rock-climbing, (Albayrak & Caber, 2018; Caber & Albayrak, 2016; Whyte, 2017), or specific demographic groups (Chen & Chen, 2015; Prayag, 2012; Rita et al., 2019). None of the previous studies on space tourism motivation used the push-pull theory as their grounded theory. However, they did essentially identify adventure, novelty, and prestige as push factors for space tourism motivation (Ao, 2018; Baugh et al., 2018; Chang, 2017; Olya & Han, 2020; Reddy et al., 2012). This research was valid and reliable but does not provide a universal framework for tourism motivation.

With the push-pull theory as the foundation, Iso-Ahola (1982) developed the theory of tourism motivation. The theory of tourism motivation separates the push factors into one of four dimensions. The dimensions are assigned based on a horizontal dialectic of escape and seeking, and a vertical dialectic of personal and interpersonal. These four factors segment the spectrum of push factors defined in the push-pull theory. Personal escape is fleeing personal stresses and challenges. Personal seeking is looking for revitalization, prestige, and enhancement of one's ego. Interpersonal escape is fleeing the stresses and challenges of family, friends, and work colleagues. Interpersonal seeking is pursuing interaction with natives of a location or a group of tourists.

Snepenger et al. (2006) operationalized Iso-Ahola's (1982) theory of tourism motivation. They developed a survey with three items per each of the four dimensions of Iso-Ahola's theory. Confirmatory factor analysis demonstrated factor loading of each of the items for each dimension of the theory of tourism motivation. Six different structural equation models were compared to identify the model with the best fit. The model with each of the four dimensions as a separate first order construct was the model with the best fit. Two separate research studies mirroring Snepenger et al.'s (2006) research provided similar results. The model with the four dimensions as separate first order constructs was also the best fitting model (Biswas 2008; Thanabordeekj & Nipasuwan, 2017).

## Current Study

Snepenger et al.'s (2006) model provides a universal framework to assess tourism motivation, however, previous research did not evaluate this model of the four dimensions of theory of tourism motivation as it applies to space tourism. We know of no study using point-to-point suborbital space tourism as a scenario to measure tourism motivation with Snepenger et al.'s (2006) model. The purpose of this study was to validate Snepenger et al.'s (2006) model of the theory of tourism motivation for use in point-to-point suborbital space tourism research. This study focused on examining the measurement model of these dimensions allowing future research to predict external criterion of space tourism related factors.

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# Methodology

## Design, Data Analysis, and Ethics

The study used a quantitative methodology, and a non-experimental, cross-sectional survey design. Data analysis was conducted using exploratory factor analysis (EFA) and confirmatory factor analysis (CFA). All researchers' Collaborative Institute Training Initiative (CITI) certifications on the proper treatment of human participants were current at the time of the study.

## Initial Model Assessment

### *Participants*

Four hundred and thirty-two participants from the United States responded to the survey from Amazon's ® Mechanical Turk ® (MTurk) posted on December 1, 2020. To ensure quality participants, the researchers established minimum participant eligibility requirements for survey participants, which included that participants had to have a human intelligence task (HIT) approval rating greater than 98% and the number of HITs approved had to be greater than 100. Participants were presented with the following statement before choosing to participate in the survey: "We are conducting an academic survey about aviation and space. We need to understand your opinion." MTurk provides access to participants who are diverse across education, demographic, and dispositional variables (Mason & Suri, 2012; Mehta et al., 2019; Sheehan, 2018), and the ability to acquire many samples with results similar to laboratory or offline studies (Buhrmester et al., 2011; Germine et al., 2012; Mason & Suri, 2012). MTurk has previously been used for various aviation-related studies including urban air mobility vehicles (Rice & Winter, 2020; Rice et al., 2017; Ward, 2020). Respondents not from the United States were excluded from the data because this study focused on participants who reside in the United

States. One case with incomplete data was identified during initial data screening. This case could not be resolved with an imputation method. Thirteen cases were removed due to the participant not being engaged as they provided the same response for every item. There was one outlier for age as the participant did not report any age. The participant's age was replaced with average age for all participants. After data screening, 418 cases (236 males, 180 females, and 2 no response) were assessed as valid for data analysis. The participants, on average, were 38.04 (*SD=11.62*) years old. Gender and Ethnicity are summarized in Table 1.

**Table 1**

*Summary of Gender and Ethnicity: Initial Model Assessment*

| Characteristics | Subcategories | Frequency (*n*) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 236 | 56.4 |
| | Female | 180 | 43.0 |
| | Nonbinary | 0 | 0.0 |
| | No Response | 2 | 0.5 |
| Ethnicity | Caucasian | 310 | 74.1 |
| | African descent | 24 | 5.7 |
| | Hispanic descent | 25 | 5.9 |
| | Asian descent | 54 | 12.9 |
| | Other | 5 | 1.2 |
| | No Response | 0 | 0.0 |

### *Material and Stimuli*

A digital consent form was presented to participants. In order to proceed to the survey, they had to agree to the consent form. Following consent, participants were provided brief instructions, and a short definition of space tourism. Then the participants were provided with the following scenario with a map depicting the flight path: "*You will receive one day of pre-launch*


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*training the day before your flight. On the day of launch from Spaceport America in Las Cruces, NM, you will board the suborbital space vehicle. Your suborbital space flight travels around the globe flying over the midwestern United States and past the Great Lakes. The flight proceeds over southern Greenland, Ireland, England, France, Italy, Greece, Israel, Jordan and Saudi Arabia. The flight proceeds between Antarctica and Australia, and over the South Pacific before landing back at Spaceport America."* Participants then indicated their level of disagreement or agreement using a 5-point Likert scale on 12 statements adapted from Snepenger et al.'s (2006) model of the theory tourism motivation (see Appendix). Before data collection, Institutional Review Board (IRB) approval was granted by Embry-Riddle Aeronautical University (IRB approval number 21-042).

***Results***

The purpose of the initial model assessment was to see if the items and latent variables as published by Snepenger et al. (2006) would be valid within a point-to-point suborbital space tourism scenario. Exploratory factor analysis (EFA) was conducted, using maximum likelihood and Promax rotation, to determine the correlation among the observed variables, and validate the factor structure. Promax is an appropriate method for this type of research as it assumes the factors are not correlated but relaxes the rotation to allow the factors to correlate (Byrne, 2016). IBM® SPSS ® 27 was used for EFA. Skewness and Kurtosis values were used to identify the normality of the data. All indicators of latent factors exhibited normal distributions of skewness and kurtosis with the highest values reported for item 2 with a skewness of -1.25 and kurtosis of 2.88 (Sposito et al., 1983). Next, Kaiser-Meyer-Olkin (KMO) value was assessed for measure of sampling adequacy (MSA). Hair et al. (2018) report a KMO of 0.50 as adequate to proceed with data analysis. A value of 0.70 is considered middling, and a value of 0.80 is considered meritorious. A KMO value of 0.825 was reported for this initial EFA. A statistically significant result indicates adequate correlation among the variables to run an EFA (Hair et al., 2018). The reported Bartlett's test of sphericity significance of $p < 0.001$ was acceptable, indicating the variables relate to one another well enough to run a meaningful EFA (Gaskin, 2022).

The initial EFA failed to produce data fitting to the prescribed four latent variables (dimensions) as listed in Table 2. Only three factors were detected (not four), and multiple items cross-loaded onto multiple factors. Therefore, the researchers modified the item descriptions and added one item per latent variable based on an aggregate of research related to tourism motivation (Crompton, 1979; Dann, 1977; Iso-Ahola, 1982; Klenosky, 2002; Pearce & Caltabiano, 1983; Pearce & Lee, 2005). The items were modified to ensure common terminology (e.g., each statement begins with "I" followed by a verb). Snepenger et al. (2006) used a fourth item in the original research as reflected in the model comparisons, however, did not report the description of the fourth item. Therefore, to re-validate Snepenger et al.'s (2006) model, the researchers found it prudent to add a fourth item. The 16 modified items were used in the assessment of the re-specified model and are shown in the Appendix.


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**Table 2**

*Pattern Matrix[a]: Initial Model Assessment*

| Item | Factor 1 | Factor 2 | Factor 3 |
|---|---|---|---|
| Item1 | - | - | 0.669 |
| Item2 | - | - | 0.573 |
| Item3 | 0.638 | - | - |
| Item4 | 0.869 | - | - |
| Item5 | 0.734 | - | - |
| Item6 | 0.805 | - | - |
| Item7 | - | 0.348 | 0.342 |
| Item8 | - | 0.308 | 0.369 |
| Item9 | - | - | 0.574 |
| Item10 | - | 0.770 | - |
| Item11 | - | 0.656 | - |
| Item12 | - | 0.809 | - |

*Note*. Extraction method: Maximum likelihood. Rotation method: Promax with Kaiser normalization.

[a]Rotation converged in 5 iterations.

## Re-Specified Model Assessment

The process to recruit participants was the same for the re-specified model assessment as used for the initial model assessment. However, for the re-specified model, the participants indicated their level of disagreement or agreement on the 16 modified items adapted from Snepenger et al.'s (2006) model of tourism motivation.

### *Participants*

Five hundred and seven participants from the United States responded to the survey posted on MTurk on January 23, 2021. Respondents to the initial model assessment were restricted from responding to the re-specification assessment. Known value replacement was used to impute missing values on reflective items (Hair et al., 2018). Known value replacement relies on the researcher imputing values for reflective scale items given responses to the surrounding items on the scale. Thirty-three cases were removed due to the participants not being engaged as they provided the same response for every item. There was no outlier for age. After data screening, 474 cases (237 males, 231 females, 2 nonbinaries, and 4 no response) were assessed as valid for data analysis. The participants, on average, were 40.34 (*SD* = 13.09) years old. Gender and Ethnicity are summarized in Table 3.

**Table 3**

*Summary of Gender and Ethnicity: Re-specified Model Assessment*

| Characteristics | Subcategories | Frequency (*n*) | Percentage (%) |
|---|---|---|---|
| Gender | Male | 237 | 50.0 |
| | Female | 231 | 48.7 |
| | Nonbinary | 2 | 0.4 |
| | No Response | 4 | 0.8 |
| Ethnicity | Caucasian | 378 | 79.7 |
| | African descent | 19 | 4.0 |
| | Hispanic descent | 21 | 4.4 |
| | Asian descent | 53 | 11.2 |
| | Other | 1 | 0.2 |
| | No Response | 2 | 0.4 |

***Materials and Stimuli***

The process and procedure for participants in the re-specification assessment was the same as described in the initial model assessment, with the exception that participants in the re-specified analysis responded to the modified items.


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***Results***

Exploratory Factor Analysis (EFA) was conducted, using maximum likelihood and Promax rotation, to determine the correlation among the observed variables, and validate the factor structure. IBM® SPSS ® 27 was used for EFA. Skewness and Kurtosis values were used to identify the normality of the data. All indicators of latent factors exhibited fairly normal distributions of skewness and kurtosis with the highest values reported for item 3 with a skewness of -1.22 and item 1 with a kurtosis of 1.22 (Sposito et al., 1983). Next, Kaiser-Meyer-Olkin (KMO) value was assessed for measure of sampling adequacy (MSA). A KMO value of 0.848 was reported for this initial EFA. The reported Bartlett's test of sphericity significance of $p < 0.001$ was acceptable.

Although the initial EFA extracted four factors, it failed to produce a factor structure with a clear grouping of variables. The primary issue was related to items cross-loading onto multiple factors as shown in Table 4. Therefore, an iterative process was conducted, removing one item at a time. The final solution produced a factor structure with a clear grouping of variables. Table 5 presents the factor loading for retained items and Cronbach's Alpha for the four constructs.

**Table 4**

*Pattern Matrix[a]: Re-specified Model Assessment*

| Item | Factor 1 | Factor 2 | Factor 3 | Factor 4 |
|---|---|---|---|---|
| Item1 | - | - | - | 0.706 |
| Item2 | - | - | - | 0.885 |
| Item3 | - | - | - | 0.620 |
| Item4 | 0.391 | - | - | 0.288 |
| Item5 | 0.658 | - | - | - |
| Item6 | 0.937 | - | - | - |
| Item7 | 0.668 | - | - | 0.228 |
| Item8 | 0.961 | - | - | - |
| Item9 | - | 0.945 | - | - |
| Item10 | - | 0.899 | - | - |
| Item11 | - | 0.258 | - | 0.240 |
| Item12 | - | 0.390 | - | - |
| Item13 | - | 0.251 | 0.530 | - |
| Item14 | - | - | 0.768 | - |
| Item15 | - | - | 0.740 | - |
| Item16 | - | - | 0.728 | - |

*Note*. Extraction method: Maximum likelihood. Rotation method: Promax with Kaiser normalization

[a]Rotation converged in 6 iterations.

**Table 5**

*EFA Factor Loading and Construct Reliability: Re-specified Model Assessment*

| Construct | Items | Factor Loadings | Cronbach's Alpha |
|---|---|---|---|
| Personal Escape (PE) | Item1: I feel this would help me get away from my personal environment | 0.629 | |
| | Item2: I feel this would help me escape from my everyday life | 0.966 | 0.771 |
| | Item3: I feel this would result in a change in pace from my everyday life | 0.543 | |
| Interpersonal Escape (IE) | Item5: I feel this would help me escape challenges in my social environment | 0.605 | |
| | Item6: I feel this would help me avoid interactions with others in my everyday life | 0.911 | 0.861 |
| | Item8: I feel this would help me avoid others who annoy me in my everyday life | 0.897 | |
| Personal Seeking (PS) | Item9: I feel this would increase value in myself | 0.908 | |
| | Item10: I feel this would increase my self-worth | 0.926 | 0.762 |
| | Item12: I seek new experiences by myself | 0.385 | |
| Interpersonal Seeking (IS) | Item14: I feel this helps me to meet new people | 0.753 | |
| | Item15: I feel this provides opportunity to be with others of similar interests | 0.742 | 0.793 |
| | Item16: I feel this would allow me to participate in a novel interaction with others | 0.728 | |

*Note*: Adapted from "Modeling Iso-Ahola's motivation theory in the tourism context," by D. Snepenger, J. King, E. Marshall, and M. Uysal, 2006, *Journal of Travel Research, 45*.

For the resultant items and factors, the KMO value is 0.779, and Bartlett's test of sphericity was statistically significant ($p < 0.001$). Convergent validity was adequate as factor loadings were above .5 for all but one item (item 12). Discriminant validity is adequate as there are no cross loading between factors.

Confirmatory factor analysis (CFA) was conducted to assess the measurement model with the four constructs identified in EFA, as shown in Table 2. The CFA model was tested using IBM ® SPSS ® AMOS 27. First, Skewness and Kurtosis values were assessed to evaluate the normality of the data. Acceptable normality values for CFA are between -7 and 7 (Byrne, 2016). The results show Skewness and Kurtosis values for all question items are between -7 and 7, indicating the normality assumption is met. The next step in CFA is to assess model fit. Table 6 shows the initial CFA model did not have good fit with RMSEA or CMIN/df (Byrne, 2016). Therefore, as recommended by Byrne (2016), modification indices (MI) were examined and error terms with high MIs with theoretical context were covaried in an iterative process. Satisfactory model fit for the final model, shown in Figure 1, was achieved as shown in Table 6.

**Figure 1**

*CFA Model*

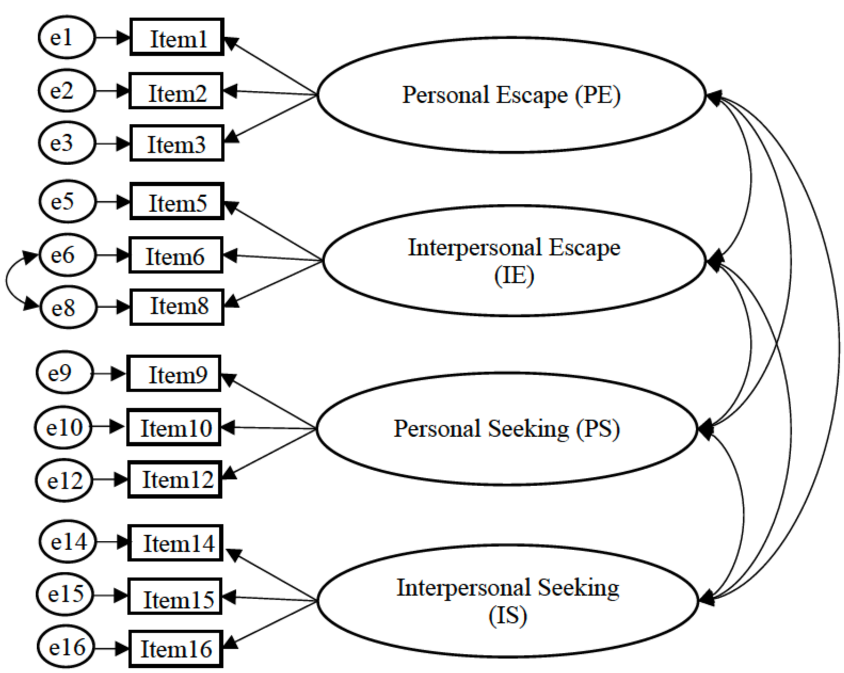



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**Table 6**
*CFA Model Comparison*

| Goodness-of-fit indices | Initial Model | Final Model | Recommended Value | Source |
|---|---|---|---|---|
| CFI | 0.961 | 0.975 | ≥0.95 | Byrne, 2016; Hair et al., 2018 |
| NFI | 0.943 | 0.957 | ≥0.90 | Byrne, 2016; Hair et al., 2018 |
| GFI | 0.951 | 0.962 | ≥0.90 | Byrne, 2016; Hair et al., 2018 |
| AGFI | 0.920 | 0.938 | ≥0.90 | Byrne, 2016; Hair et al., 2018 |
| RMSEA | 0.065 | 0.053 | ≤0.06 | Byrne, 2016; Hair et al., 2018 |
| CMIN/df ($\chi 2$ /df) | 2.999 | 2.323 | $1< \chi 2/df<3$ | Byrne, 2016; Hair et al., 2018 |

With good CFA model fit, the construct validity were assessed. Cronbach's Alpha and Construct Reliability (CR) scores are used to calculate construct reliability. Cronbach's Alpha and CR values for all four factors are greater than 0.7, indicating good construct reliability (Byrne, 2016; Hair et al., 2018; Kline, 2016). Convergent validity and discriminant validity were calculated to assess construct validity. Convergent validity was assessed with factor loadings and Average Variance Extracted (AVE). Satisfactory convergent validity is represented by both factor loadings and AVE equal to or greater than 0.5 (Hair et al., 2018; Kline, 2016). All factor loadings, except item 12, are greater than 0.5. With a sample size greater than 350, a factor loading greater than .30 can be considered acceptable (Dragan & Topolsek, 2014). Additionally, PS has acceptable construct reliability and validity. AVE values for all four factors are also greater than 0.5. Lastly, a comparison between Maximum Shared Variance (MSV) and AVE of each construct was conducted to assess discriminant validity. The MSV for each factor is less than the AVE value of the same factor; therefore, it can be concluded discriminant validity is attained for each factor. These results are listed in Table 7. Supplementary demonstration of discriminant validity is revealed in Table 8, with the square root of AVE greater than the inter-construct correlations.

**Table 7**

*Convergent Validity, Divergent Validity, and Construct Reliability*

| Factors | Items | Factor Loadings | CR | Cronbach's Alpha | AVE | MSV |
|---|---|---|---|---|---|---|
| Personal Escape (PE) | 1 | 0.816 | 0.778 | 0.771 | 0.546 | 0.382 |
| | 2 | 0.813 | | | | |
| | 3 | 0.557 | | | | |
| Interpersonal Escape (IE) | 5 | 0.883 | 0.821 | 0.861 | 0.606 | 0.382 |
| | 6 | 0.725 | | | | |
| | 8 | 0.717 | | | | |
| Personal Seeking (PS) | 9 | 0.924 | 0.799 | 0.762 | 0.597 | 0.260 |
| | 10 | 0.893 | | | | |
| | 12 | 0.375 | | | | |
| Interpersonal Seeking (IS) | 14 | 0.740 | 0.794 | 0.793 | 0.562 | 0.109 |
| | 15 | 0.777 | | | | |
| | 16 | 0.731 | | | | |

**Table 8**

*Discriminant Validity Demonstrated by Inter-Construct Correlations Being Less than the Square Root of AVE (diagonal in bold)*

| | PE | IE | PS | IS |
|---|---|---|---|---|
| PE | **0.739** | | | |
| IE | 0.618 | **0.779** | | |
| PS | 0.392 | 0.510 | **0.773** | |
| IS | 0.330 | 0.156 | 0.289 | **0.750** |

## Discussion

Point-to-point suborbital space tourism is projected to be a viable market for the space industry. The adventure, novelty, and prestige of suborbital space flight motivates potential point-to-point suborbital space tourists. No previous study has evaluated point-to-point suborbital space flight within the theoretical foundation of the theory of tourism motivation. The


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objective of this study was to validate the theory of tourism motivation for use in point-to-point suborbital space tourism research.

Iso-Ahola (1982) proposed the theory of tourism motivation with four dimensions, personal escape, personal seeking, interpersonal escape, and interpersonal seeking. Snepenger et al. (2006) validated an operational model with undergraduate students in the United States using the model to assess these four constructs. Biswas (2008) noted Snepenger et al.'s (2006) disconnects in listing the description for 3-items per construct but running CFA with 4-items per construct. Nonetheless, to validate use of the model in the Indian context, Biswas (2008) conducted research using 3-items per construct based on Snepenger et al.'s (2006) descriptions. Biswas (2008) dropped one item for personal escape and one item for interpersonal seeking due to cross-loading, but validated Snepenger et al.'s (2006) four-dimension model with similar results. Thanabordeekj and Nipasuwan (2017) conducted research similar to Biswas (2008) to validate Snepenger et al.'s (2006) model for Chinese tourists in Thailand. They retained all twelve items (3 items per construct), and validated, via CFA, the four-dimension model had the best fit.

When applied to point-to-point suborbital space travel, the initial model assessment from this research resulted in a model with 3 factors. As noted by Biswas (2008) and this research, Snepenger et al's (2006) CFA models used 4-items per construct despite providing descriptions for only 3-items per construct. These findings led the researchers to modify the item descriptions and add one item for each construct.

The re-specified model assessment resulted in a model with the same four constructs as Biswas (2008), Snepenger et al. (2006), and Thanabordeekj and Nipasuwan (2017). EFA resulted in 3-items per construct, and, with CFA, the four-dimension model demonstrated good model fit with construct reliability and validity.

**Practical Applications**

This research study validated a model that operationalizes the four-dimensions of Iso-Ahola's (1982) theory of tourism motivation. The modified item descriptions from Snepenger et al.'s (2006) original research provide a valid and reliable model for use in future suborbital space travel research. Additionally, this scale can transcend into other tourism research. Finally, this research increases the generalizability of this model as MTurk provides access to a pool of diverse participants across education, demographic and dispositional variables (Mason & Suri, 2012; Mehta et al., 2019; Sheehan, 2018). This increased pool of diverse participants from the sample of United States participants provides for broader generalizability beyond the previous three studies using the initial operationalized model (Biswas, 2008; Snepenger et al., 2006; Thanabordeekj & Nipasuwan, 2017).

**Limitations**

The use of a convenience sampling strategy with MTurk has the potential to introduce selection bias (Vogt et al., 2012). To decrease sampling bias, a generic description of the survey was used to ensure potential participants could assess the nature of the study without the survey being more or less attractive to respondents of a particular demographic or characteristic (Goodman & Paolacci, 2017). The general description provided the study participants the opportunity to participate based on the title and explanation of the survey, payment for survey completion, the perceived survey completion time, and other potential motivational factors.

Additionally, although the personal seeking (PS) dimension achieved acceptable reliability and validity, the authors recognize a lower than optimum factor loading for item 12.

Future research should focus on the reliability and validity of item 12 for potential improvements.

## Conclusion

The purpose of the current study was to validate a model for the four dimensions of the theory of tourism motivation for use in point-to-point suborbital space tourism research. Previous research demonstrated the four dimensions of Iso-Ahola's (1982) theory of tourism motivation (personal escape, personal seeking, interpersonal escape, and interpersonal seeking) can be assessed using structural equation modeling as applied to undergraduate students in the United States, Indians, and Chinese tourists in Thailand. This research furthered the body of knowledge of the operationalized model of four-dimension theory of tourism motivation in United States participants, and the modified item descriptions from Snepenger et al.'s (2006) original research provide a valid and reliable scale for use in future suborbital space travel research.

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## Appendix

### The Original 12 Items (Snepenger et al., 2006) and Re-specified Items

| Latent Variable | Original Model | Re-specified Model |
|---|---|---|
| Personal Escape | 1. To get away from normal environment | [a]1. I feel this would help me get away from my personal environment |
| | 2. To have a change from every life | [a]2. I feel this would help me escape from my everyday life |
| | 3.To overcome a bad mood | [a]3. I feel this would result in a change in pace from my everyday life |
| | - | 4. I feel this would help me avoid the stress in my everyday life |
| Interpersonal Escape | 4.To avoid people who annoy me | [a]5. I feel this would help me escape challenges in my social environment |
| | 5.To get away from stressful environment | [a]6. I feel this would help me avoid interactions with others in my everyday life |
| | 6.To avoid interactions with others | 7. I feel this would help me get away from my social environment |
| | - | [a]8. I feel this would help me avoid others who annoy me in my everyday life |
| Personal Seeking | 7.To tell others about my experience | [a]9. I feel this would increase value in myself |
| | 8.To feel good about myself | [a]10. I feel this would increase my self-worth |
| | 9.To experience new things by myself | 11. I feel this would allow me to participate in a novel event by myself |
| | - | [a]12. I seek new experiences by myself |
| Interpersonal Seeking | 10.To be with people of similar interests | 13. I seek new experiences with others |
| | 11.To bring friends | [a]14. I feel this helps me to meet new people |
| | 12.To meet new people | [a]15. I feel this provides opportunity to be with others of similar interests |
| | - | [a]16. I feel this would allow me to participate in a novel interaction with others |

[a] Items re-specified retained in the model