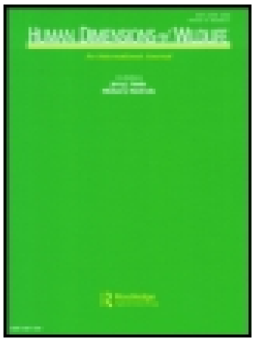

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Does recreation specialization affect birders' travel intention?

Maria De Salvo[a], Giuseppe Cucuzza[a], Renzo Ientile[b], and Giovanni Signorello[a]

[a]Department of Agriculture, Food and Environment (Di3A) and Centre for the Conservation and Management of Nature and Agroecosystems (CUTGANA), University of Catania, Catania, Italy; [b]Centre for the Conservation and Management of Nature and Agroecosystems (CUTGANA), University of Catania, Catania, Italy

ABSTRACT
Using data from a survey of Italian birdwatchers, we examined whether recreation specialization affects birders' travel intention through a two-dimensional framework based on the "behavior" and "skills, knowledge, and commitment" constructs. The model was estimated through a partial least squares structural equation "spread" model. We implemented a second-stage analysis, using a seemingly unrelated regression (SURE) model to identify which birder characteristics, attitudes, and preferences significantly affected the path scores. The findings demonstrated a significant and positive relationship between recreation specialization and birders' travel intention, and offer evidence that birders' behavior and skills, knowledge, and commitment were statistically significant lower hierarchical order constructs of recreation specialization. The intensity of these connections varied according to the birder's profile, the source of information used to choose the destination site and the reasons behind the choice of site for birdwatching.

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Birdwatching; recreation specialization; travel intention; PLS-SEM; SURE model

Introduction

Recreation specialization is a useful construct to investigate heterogeneity in preferences and behavior among direct users of wildlife resources (J. H. Lee & Scott, 2004). Bryan (1979) defines recreation specialization as "a continuum of behavior, from the general to the particular" – with novices or infrequent participants at one end of the continuum, and avid and habitual participants at the other end – and suggests uni-dimensional frameworks for its measurement (e.g. Martin, 1997; Shafer & Hammitt, 1995). Conversely, Scott and Shafer (2001a) assert that uni-dimensional frameworks are unable to explain the complex relations among behavior; attitudes, skills, and knowledge; and the commitment involved in wildlife outdoor activities. Recreational specialization is more than just a variable to measure the intensity of involvement – it is "a process that entails a progression in how recreationists participate in and view the activity over time" (Scott & Shafer, 2001a). Recreation specialization is a multifaceted construct that includes behavioral (e.g. participation), cognitive (e.g. skills, commitment), and even affective aspects (McFarlane, 2004; Needham et al., 2013). Following Scott and Shafer (2001a), recreation specialization is now prevalently measured in terms of: (a) past experience (or recreationists' behavior), (b) centrality to life (or skills and knowledge), and (c) commitment (or investment in a leisure activity) (Beardmore et al., 2013; J. H. Lee & Scott, 2004; Scott et al., 2005; Scott & Thigpen, 2003).

CONTACT Maria De Salvo mdesalvo@unict.it University of Catania, Catania, Italy

Birdwatching is a specialized wildlife-based recreation activity. Birders progress to higher stages of involvement the longer they participate in birdwatching, and consequently modify their behavior (Hvenegaard, 2002; S. Lee et al., 2014; Lessard et al., 2018; Maple et al., 2010; Martín et al., 2017; Ribeiro et al., 2017; Shen et al., 2019; Suni, 2017; Vas, 2017; Wilkins et al., 2019). It is reasonable to assume that recreation specialization is an antecedent to birders' travel intention. The literature demonstrates that several aspects are focal in determining behavioral travel intention, such as attitude, personal benefit, state of the local economy, identity, subjective norm, place image and attachment, and tourism-related business (Martín et al., 2017; Ribeiro et al., 2017; Shen et al., 2019). The role of recreation specialization in travel intention has been under-investigated, even though predicting birders' travel intention in relation to their level of specialization is focal to supporting decision makers and managers to punctually design strategies and actions in natural sites to meet the intentions and preferences of birders. Wildlife managers appreciate the importance of human dimension information and the need to integrate it into their decision-making (Miller & McGee, 2001). A few studies suggest that the potential recreational demand for birding sites depend on birders' level of specialization (Czajkowski et al., 2014; Edwards et al., 2011). However, these studies do not consider the multidimensional nature of birdwatching recreation specialization, and examine it through only one variable or a few variables that refer to specific aspects of the birders' specialty, such as number of visits, number of bird species that the birder is able to identify, membership in a birding club, or equipment value.

In this article, we verify whether and how much birders' recreation specialization affects travel intention. To test this influence, we formulate and estimate a multidimensional recreation specialization model, and detect which birder factors significantly affect path-estimated coefficient scores. Based on insights by previous studies addressing factors explaining heterogeneity among birders (e.g. Cheung et al., 2017; J. H. Lee & Scott, 2004; Maple et al., 2010; Sali et al., 2008; Vas, 2017), we consider birders' socioeconomic characteristics, type of information used to identify destination choice, and site quality motivations behind the destination choice. We analyze how these variables moderate significant interactions.

Our empirical analysis is based on data collected through a survey administered in the period December 2017 to January 2018 to a sample of birders affiliated with EBN Italia – the largest Italian membership organization for active birders.

Related Literature and Specific Research Questions

Since the seminal paper of Scott and Shafer (2001a), several studies have analyzed the multidimensional nature of recreation specialization in birdwatching by using as main dimensions birders' behavior, skills and knowledge, and commitment (Eubanks et al., 2004; J. H. Lee & Scott, 2004; Miller et al., 2014; Scott et al., 2005; Scott & Thigpen, 2003). McFarlane (1994) and McFarlane and Boxall (1996) also proposed a multi-dimensional model; however, their model is based on centrality to life, economic commitment, and the respondent's past experience. Hvenegaard (2002) instead formulated a two-dimensional approach that excludes the last dimension. In Appendix A of the online supplementary materials, we report a table that synthesizes the main studies on this topic.

In most prior studies, respondents were grouped based on their responses to specialization indicators. Birders were generally discriminated using cluster analysis, frequently in combination with principal component analysis (Hvenegaard, 2002; McFarlane, 1994; McFarlane & Boxall, 1996; Miller et al., 2014; Scott et al., 2005; Scott & Thigpen, 2003). J. H. Lee and Scott (2004) used a multivariate model with confirmatory scopes based on covariance-based structural equation modeling (CB-SEM) to demonstrate that behavior, skills and knowledge, and commitment were moderately related constructs. However, these dimensions do not always interact and mutually reinforce; recreation specialization progression does not occur in a "lock-step" fashion (Scott & Shafer, 2001a). J. H. Lee and Scott (2004) also demonstrated that previous dimensions do not characterize recreation specialization equally. Their findings suggested that skills and knowledge better determine recreation specialization in birdwatching than do the other two dimensions. Empirical evidence suggests that the level of specialization influences variability among groups of birders in terms of the desired setting attributes, awareness, knowledge, conservation attitudes, information used to make site destination decisions, and behavioral, motivational, and economic aspects (Cole & Scott, 1999; Eubanks et al., 2004; Hvenegaard, 2002; Lessard et al., 2018; Maple et al., 2010; Martin, 1997; McFarlane, 1994; Miller et al., 2014; Scott & Thigpen, 2003; Shipley et al., 2019). Different specialization groups assign different values to the social benefits accruing from the recreation experience, and different marginal values to destination attributes (C. K. Lee et al., 2010; Steven et al., 2017).

Relationships among key aspects involved in the concept of recreation specialization become more complex because of the existence of moderating and mediating effects.[1] Tarrant et al. (1997) demonstrated the mediating effect of general environmental attitudes and the moderating effect of knowledge on the relationship between values and specific attitudes. Some studies (e.g. S. Lee et al., 2014; Lessard et al., 2018; Maple et al., 2010; Moore et al., 2008; Sali et al., 2008; Wilkins et al., 2019) point out that demographics – such as age, gender, educational level, area of residence, current and childhood community size, and marital status – play a key role in explaining differences in birdwatchers' participation, commitment, motivations, conservation involvement, and influence of socialization.

Other studies examined empirical linkages between recreation specialization in general and other aspects that may have a relevant role in assessing participation in birdwatching. In particular, Barbieri and Sotomayor (2013), Cheng and Tsaur (2012), S. Lee and Scott (2013), Needham et al. (2013), and Tsaur and Liang (2008) investigated the relationships between recreation specialization and serious leisure dimensions. Cheung et al. (2017) explored the influence of recreation specialization on birdwatchers' pro-environmental attitudes and ecologically responsible behavior.

Travel intention as an outcome of recreation specialization has been rarely investigated. Based on birding travel blogs data from five English-speaking countries, Vas (2017) examined birdwatchers' preferences for trip destination. His specialization framework, based on two qualitative and two quantitative steps, sought to define birders' profile and understand what birders seek when selecting a birdwatching destination, segments birders with regard to their level of specialization, and counts which words are most frequently stated by birders on the blogs. The results in Vas (2017) were consistent with those of Hvenegaard (2002) and Hvenegaard and Dearden (1998). More specialized birders traveled further and spent more, yet were only willing to pay significant amounts if they considered the birdwatching experience worth the money. Interesting insights also arise from studies on other wildlife outdoor recreation activities. For example, by combining constructs from serious leisure and recreation specialization, Suni (2017) examined the relationships between leisure activity seriousness and travel intention for hunting tourism, and demonstrated that personal commitment, career progress, and effort have a positive effect on willingness to travel. Hunters who considered hunting an important leisure activity sought to increase their knowledge and develop their skills, and were more likely travel abroad to hunt wildlife.

Based on the related literature, this article sought to answer three specific research questions. The first research question (**Q1**) explored whether individual dimensions (e.g. birders' behavior, skills and knowledge, and commitment) characterize recreation specialization equally. J. H. Lee and Scott (2004) found that skills and knowledge represented recreation specialization for birders better than do other individual dimensions. We examined whether these dimensions were significant for Italian birders. The second research question (**Q2**) investigated whether and how much birders' travel intention was affected by recreation specialization. Finally, the third research question (**Q3**) identified which factors significantly affect path coefficient scores at individual level. To address these questions, we developed a two-stage analysis. The first stage assessed a multidimensional model for investigating aspects related to Q1 and Q2. The second stage explored issues related to Q3.

Methods

In the first stage analysis, we estimated a multidimensional model by means of a PLS-SEM approach (J. F. Hair et al., 2016; Garson, 2016; Ramayah et al., 2016; Rigdon, 2012; Shiau et al., 48).[2] In particular, we implemented a second-order reflective-reflective (Type I) 'spread' hierarchical component model (HCM) (Lohmöller, 1989) to connect lower (or first) -order constructs (e.g. birders' behavior, skills and knowledge, and commitment) with a higher (or second) -order construct (recreation specialization) and to test the effect of recreation specialization on travel intention. PLS-SEM is a nonparametric multivariate data analysis approach that combines principal component analysis with path analysis to simultaneously estimate direct, indirect, and moderating effects. PLS-SEM enables the moderation of complex relationships involving a variety of constructs and indicators (Hair et al., 2019; Sarstedt et al., 2019; Wold, 1985), and reliably estimates complex models with many constructs, indicator variables, and structural paths, using only a few observations and without imposing particular distributional assumptions on data (Hair et al., 2019; Sarstedt et al., 2019). PLS-SEM estimates causal paths among any number of "blocks" of variables, where each "block" (or construct) corresponds to a latent variable. Latent variables were not measured, but inferred as a linear combination of indicators (or items or manifested variables) that were directly measured.

Recently, high-order constructs (or hierarchical) models have gained popularity (Hair et al., 2018). Sarstedt et al. (2019) showed that hierarchical models are able to simplify the modeling of path relationships, better face the "bandwidth-fidelity dilemma" (Cronbach & Gleser, 1965)[3] and "jangle fallacy" (Coleman & Cureton, 1954),[4] and reduce collinearity among formative indicators. To estimate path coefficients, it was necessary to consider: (a) the measurement model's specification of lower-order constructs; (b) the relations between the high-order construct and its sub-dimensions (e.g. low-order components); and (c) the approach used to identify the high-order construct. Figure 1 presents the constructs on which our theoretical model is built.

To represent the multidimensional nature of birdwatching specialization, we built a two-dimensional[5] model based on: (a) skills, knowledge, and commitment (SKC) and (b) behavior (B) constructs. These sub-dimensions represented the lower-order constructs (LOCs) and were assumed to be reflectively measured by several items. This assumption implies that each indicator is caused by the corresponding latent variable, and a that a strong correlation between the two variables exists (Hulland, 1999). In contrast, recreation specialization (RS) represents the higher-order construct (HOC). Following J. H. Lee and Scott (2004), we assumed also for the HOC a reflective measurement model. The theoretical model had a reflective-reflective (Type I) nature (Sarstedt et al., 2019). In this model, known as a "spread" or "hierarchical common factor" model (Lohmöller, 1989), LOCs are strongly correlated with each other, and the HOC is a latent abstract construct that explains correlations between several related yet distinct LOCs (Hair et al., 2018). As Figure 1

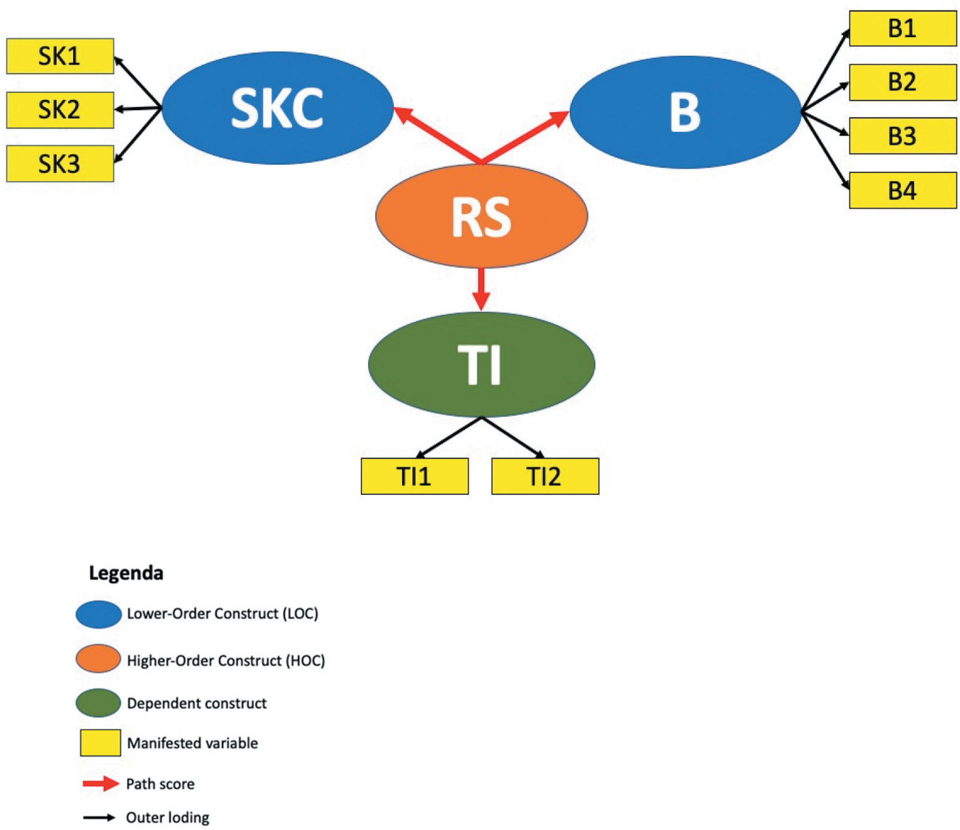

Figure 1. Theoretical model. Note: SKC = skills, knowledge, and commitment; RS = recreation specialization; B = behavior; TI = travel intention; SKC1 = ability to identify a high number of bird species; SKC2 = years of experience; SKC3 = economic value of birdwatching equipment; B1 = traveled distance to reach favorite site; B2 = maximum traveled distance; B3 = number of birding trips in a typical month; B4 = monthly traveled distance for birdwatching; TI1 = maximum distance the birder is willing to travel to reach favorite site; TI2 = maximum distance the birder is willing to travel to see a new species.

shows, recreation specialization is supposed to be an antecedent of birders' travel intention (TI). Given that it concerns measurement of LOCs (Table 1), the skills, knowledge, and commitment construct was measured with three items that asked birders to identify more than 101 species of bird species by sight (without a file guide) or by sound (SK1), the birder's years of experience (SK2), and the economic value of the birder's owned birdwatching equipment (binoculars and telescope) (SK3) (Cheung et al., 2017; J. H. Lee & Scott, 2004; Scott et al., 2005). The behavior dimension was represented by four items: the average traveled distance to visit the birder's favorite site (B1), the maximum distance the birder travels to undertake birdwatching (B2), the average number of birding activities in a typical month (B4), and the average monthly distance traveled by the birder for birdwatching (B5). The measurement model of travel intention was based on two items that expressed the maximum distance that the birder was willing to travel to reach his or her favorite site (TI1) or to see a new bird species (TI2).

To estimate parameters, we followed Hair et al. (2018) and adopted the repeated-indicators approach, the factor weighting scheme algorithm, and the mode A procedure to assess indicator weights (see Appendix B in Supplementary Materials for more details). As a result of using standardized data for the indicators, the estimated path parameters ranged between -1 and 1, meaning that path coefficients close to +1 or -1 imply, respectively, a strong positive or strong negative relationship between the two constructs. The closer the parameter to zero, the weaker the relationship. Given the nonparametric nature of PLS-SEM, to test the significance of path coefficients and outer loadings, we used a bootstrapping procedure (Hair et al., 2018) with 10,000 bootstrapping samples.

In the second-stage analysis, we adopted a seemingly unrelated regression (SURE) model (Greene, 2003) to regress estimates of the path scores at individual level obtained in the first stage analysis against variables related to the birder's characteristics, sources of information used to identify the destination choice, and motivations. The SURE model consisted of several regression equations, where each has a dependent variable and potentially different regressors, incorporating correlation in un-observables across equations for a given individual (Greene, 2003; Zellner, 1962). This is specified as:

$$y_{in} = \beta_0 + \sum_{m=1}^{M} \beta_{mi} x_{min} + \varepsilon_{in} \tag{1}$$

where y_i is the i-th path coefficient score for the n-th individual (with $i = 1, \ldots, 3$), β_0 is a constant term, x_{imn} is the value of the m-th regressor in the i-th equation for the n-th

Table 1. Dimensions and items.

Dimensions	Items
Skills, knowledge, and commitment (LOC_1)	SKC_1: Ability to identify a high number (more than 101 species) of bird species by sight (without a file guide) or sound SKC_2: Years of experience SKC_3: Economic value of birdwatching equipment purchased or owned (binoculars and telescope)
Behavior (LOC_2)	B_1: Traveled distance to reach favorite site B_2: Maximum traveled distance B_3: Number of birding trips in a typical month B_4: Monthly traveled distance for birdwatching
Travel intention (Y_1)	TI_1: Maximum distance the birder is willing to travel to reach favorite site TI_2: Maximum distance the birder is willing to travel to see a new species

individual, β_{mi} is the coefficient that expresses the relation between y_{in} and x_{imn}, and ε_{in} is the error term. It is assumed that $E[\varepsilon_i \varepsilon_j \mid X] = \sigma_{ij}$.

Among the regressors (x_{min}) of equations (1) and (2) we included variables related to the birder's profile suggested by our literature review (see S. Lee et al., 2014; Sali et al., 2008). Regarding the relation between recreation specialization and travel intention, we limited our investigation to mediators which could be focal in the design of natural resources management strategies, such as sources of information used to identify destination choice and motivations that justify the destination choice. The SURE model was estimated using the feasible generalized least squares method.

The empirical analysis was based on a sample of Italian birders. The target population comprised members of EBN Italia – the largest Italian membership organization for active birders. Founded in 2001, this network currently has more than 1,000 members. A link to an online questionnaire designed with the LimeSurvey application was sent by e-mail to the EBN mailing list on December 2017. The response rate, after one month, was 14%. A total of 169 useable surveys were returned. This sample size appears suitable according to the literature (J. F. Hair et al., 2016).[6] Table 2 reports the summary statistics of the sample.

Table 2. Summary statistics.

Variable		Mean	Median	Min	Max	SD[(a)]	Kur[(b)]	Skew[(c)]
User demographics								
Age	(in years)	47.00	49.00	15.00	75.00	14.62	0.73	0.39
Male	(1 if yes)	0.88		0.00	1.00			
Educational level	(in years)	14.97	16.00	5.00	21.00	3.65	0.46	0.54
Employed	(1 if yes)	0.68		0.00	1.00			
Residence:								
• Northern Italy	(1 if yes)	0.73		0.00	1.00			
• Center Italy	(1 if yes)	0.13		0.00	1.00			
• Southern Italy	(1 if yes)	0.14		0.00	1.00			
Birder's attitudes and preferences								
Respondent shares sightings on multimedia platforms or social networks	(1 if yes)	0.91		0.00	1.00			
Respondent signals the sighting of ringed birds	(1 if yes)	0.92		0.00	1.00			
Respondent participates in national bird festivals/events	(1 if yes)	0.45		0.00	1.00			
Respondent participates in international bird festivals/ events	(1 if yes)	0.02		0.00	1.00			
Respondent prefers birdwatching alone	(1 if yes)	0.45		0.00	1.00			
Respondent prefers birdwatching with family	(1 if yes)	0.23		0.00	1.00			
Respondent prefers birdwatching with other birders	(1 if yes)	0.32		0.00	1.00			
Preferred place for birdwatching:								
• Internal wetlands	(1 if yes)	0.70		0.00	1.00			
• Coastal wetlands	(1 if yes)	0.59		0.00	1.00			
• Beaches	(1 if yes)	0.38		0.00	1.00			
• Woodland	(1 if yes)	0.48		0.00	1.00			
• Countryside	(1 if yes)	0.62		0.00	1.00			
Sources of information to identify destination choice								
Magazines and specialist journals	(1 if yes)	0.22		0.00	1.00			

(*Continued*)

Table 2. (Continued).

Variable		Mean	Median	Min	Max	SD(a)	Kur(b)	Skew(c)
Specialized websites	(1 if yes)	0.50		0.00	1.00			
Social networks	(1 if yes)	0.43		0.00	1.00			
Word of mouth	(1 if yes)	0.67		0.00	1.00			
Other sources	(1 if yes)	0.22		0.00	1.00			
Motivations that justify destination choice								
Probability of observing new species	(1 if yes)	0.74		0.00	1.00			
Probability of observing rare species	(1 if yes)	0.60		0.00	1.00			
Probability of observing permanent species	(1 if yes)	0.17		0.00	1.00			
Probability of observing migratory species	(1 if yes)	0.59		0.00	1.00			
Probability of observing numerous species during the same excursion	(1 if yes)	0.73		0.00	1.00			
Possibility of using sighting huts	(1 if yes)	0.83		0.00	1.00			
Proximity to place of residence	(1 if yes)	0.43		0.00	1.00			
Degree of naturalness of site	(1 if yes)	0.66		0.00	1.00			
Probability of meeting other birdwatchers	(1 if yes)	0.12		0.00	1.00			
Probability of observing numerous species during the same excursion	(1 if yes)	0.73		0.00	1.00			
Possibility of using sighting huts	(1 if yes)	0.83		0.00	1.00			
Proximity to place of residence	(1 if yes)	0.43		0.00	1.00			
Degree of naturalness of site	(1 if yes)	0.66		0.00	1.00			
Probability of meeting other birdwatchers	(1 if yes)	0.12		0.00	1.00			
User skills and knowledge, commitment, and behavior								
Experience	(in years)	20.30	18.00	1.00	55.00	14.21	0.82	0.48
Ability to identify bird species by sight (without a file guide) or sound:								
• Low (less than 30 species)	(1 if yes)	0.05		0.00	1.00			
• Medium (between 31 and 100 species)	(1 if yes)	0.26		0.00	1.00			
• High (more than 101 species)	(1 if yes)	0.69		0.00	1.00			
Birdwatching equipment purchased or owned	(in euro)	2,091.04	2,000.00	5.00	10,000.00	1,666.19	1.58	0.91
Average birding trips	(n./month)	29.65	8.00	1.00	3,300.00	252.56	168.32	12.96
Average distance traveled for birdwatching	(km/month)	318.05	200.00	0.00	6,000.00	576.77	58.14	6.65
Maximum traveled distance	(km/trip)	977.92	400.00	0.00	13,075.00	1,713.92	22.57	4.29
Average traveled distance to reach favorite site	(in km)	49.95	20.00	0.00	500.00	74.58	17.01	3.60
Travel intention								
Maximum willingness to travel to reach favorite site	(km)	51.09	30	0.00	1,000.00	99.24	6.32	52.67
Maximum willingness to travel to see a new species	(km)	243.79	150	100.00	500.00	149.22	0.61	1.19

(a)Standard deviation; (b) excess kurtosis; (c) skewness. Note: the dataset presents no missing values for any included variables. The number of observations equals 169. Median, standard deviation, excess kurtosis, and skewness are reported for continuous variables.

Results

PLS-SEM estimates were obtained through SMART-PLS software (Ringle et al., 2015).[7] Figure 2 reports the strength and significance of the path coefficients and outer loadings estimates. The significance assessment was built on bootstrapping standard errors for calculating t-values for the inner and outer parameters.

Outer loadings were all significant ($p < .001$), except for the variable related to ability to identify bird species, which had a lower significance level ($p < .01$). The findings suggested that the number of identifiable bird species, years of experience, and economic value of birdwatching equipment were significant reflective measures of the skills, knowledge, and commitment construct, as demonstrated in previous similar analyses (Cheung et al., 2017; J. H. Lee & Scott, 2004; Scott et al., 2005; Vas, 2017). Proxy variables of travel distance (kilometers traveled to visit favorite site and maximum kilometers traveled for birdwatching) were confirmed to be reflective measures of birders' behavior. Similarly, maximum willingness to travel to reach a preferred site and see a new species were good proxies of birders' travel intention.

The path coefficients were also significant ($p < .001$), except the parameter for the relationship between recreation specialization and travel intention. In this case, the path coefficient was positive and significant ($p < .01$). Given that path coefficients ranged between -1 and 1, the findings suggested that LOCs showed an equal and relevant relation with recreation specialization (> .70). This result contrasts the findings by J. H. Lee and Scott (2004), who obtain a higher effect for skill and knowledge with respect to the behavior and commitment dimensions. Recreation specialization was a significant antecedent of travel intention, even if the strength of this relation suggested, on average, a weak relationship between these two constructs (.31). Table 3 reports the PLS-SEM estimates for each

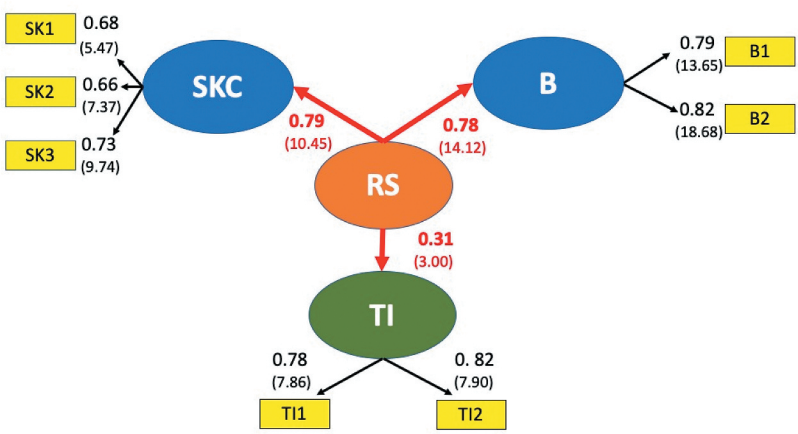

Figure 2. Paths model estimates. Note: For each arrow, standardized outer loadings (in black) and path coefficients (in red) are reported. t-values are in parenthesis. SKC = skills, knowledge, and commitment; RS = recreation specialization; B = behavior; TI = travel intention; SKC1 = ability to identify a high number of bird species; SKC2 = years of experience; SKC 3 = economic value of birdwatching equipment; B1 = traveled distance to reach favorite site; B2 = maximum traveled distance; TI1 = maximum distance the birder is willing to travel to reach favorite site; TI2 = maximum distance the birder is willing to travel to see a new species

parameter based on the original sample, mean and standard deviation of the estimates calculated on 10,000 bootstrapped samples, and *t*-statistic (Henseler et al., 2009).

Standard deviation estimates suggested higher variability at individual level for the relation between recreation specialization and travel intention (.11) with respect to the variability of the relation between recreation specialization and its LOC constructs. At individual level, the LOC path coefficients scores were negatively and strongly correlated with the HOC (r = -.999), given that they are reflective measures of the HOC construct. Table 4 reports the SURE estimates obtained through STATA 16. The table summarizes how the relationships between indicators of specialization and travel intentions were moderated by various demographic factors, motivations, and setting preferences.

The estimates highlight that, for the birder's profile, two main aspects explain path coefficient variability: age and gender. The coefficients were significant ($p < .001$) and indicated a positive relation with the path coefficient between skills, knowledge, and commitment and recreation specialization and, oppositely, a negative equal effect in the relationship between behavior and recreation specialization.

The variables that positively affected the relationship between recreation specialization and travel intention included the use of social networks to identify the destination choice ($p < .05$) and the motivations on choice destination related to site's biodiversity ($p < .001$).

Discussion and Conclusion

Our analysis enabled a better understanding of how different recreation specialization dimensions affect each other, and whether and how much they influence birders' travel intentions. This article also highlighted the existence of significant mediating effects caused by facets of involvement in birdwatching that the literature had already identified as key determinants. The findings indicated that both skills, knowledge, and commitment and behavior are significant LOCs of recreation specialization. On average, these LOCs showed an equal and relevant relation with recreation specialization (Q1). This result contrasts with the findings by J. H. Lee and Scott (2004), who obtained a higher effect for skills and knowledge with respect to the behavior and commitment dimensions. Our estimates confirmed the hypothesis that birders' travel intentions were directly influenced by recreation specialization dimensions (Q2). However, behavior measures were both travel related. This limitation may have influenced our results and deserves further investigation. The results related to Q1 and Q2 emerged at an average level. The path scores varied among birders with different profiles, attitudes, habits, and preferences. The factors explaining path score variability (Q3) suggest that different elements act in different ways. Age modified the importance of skills, knowledge, and commitment as a sub-dimension of recreation specialization. For older birders, the path

Table 3. Bootstrapping path coefficient estimates statistics.

Relationship	Original sample	Sample mean	Standard deviation	*t*-statistic
Recreation specialization → skills, knowledge, and commitment	0.78	0.79	0.06	13.39
Recreation specialization → behavior	0.79	0.78	0.08	10.09
Recreation specialization → travel intention	0.31	0.34	0.11	2.89

Table 4. SURE model coefficient estimates.

	RS → SKC		RS → B		RS → TI	
	Coef.	z	Coef.	z	Coef.	z
Age	−0.01**	−2.63	0.01**	2.59		
Male	−0.64***	−4.94	0.63***	4.94		
Social networks[(a)]					0.27*	1.93
Motivation related to site's biodiversity[(b)]					0.19***	3.21
Constant	0.92***	5.26	−0.90***	−5.23	−0.64***	−3.66
RMSE	0.57		0.56		0.91	
R^2	0.17		0.17		0.09	
χ^2	34.14***		33.86***		17.91***	

Note: Dependent variables are the path coefficient score estimated at individual level. SKC = skills, knowledge, and commitment; RS = recreation specialization; B = behavior; TI = travel intention. Reference constant: (a) other sources; (b) other motivations. * $p < .05$; ** $p < .01$; *** $p < .001$.

score was higher than for younger birders. This confirms J. H. Lee and Scott (2004) result for this sub-sample of birders. In contrast, for younger birders, the contribution of behavior to recreation specialization was more relevant. Similarly, male birders showed higher path coefficient scores between skills, knowledge, and commitment and recreation specialization, whereas, for female birders, the relation between behavior in recreation specialization was higher in terms of magnitude. The "gendered" nature of birdwatching was confirmed by our analysis (S. Lee et al., 2014; Sali et al., 2008).

These findings imply that specialization level should be differently measured according to birders' age and gender. For male and older birders, indicators related to the skills, knowledge, and commitment should be used, whereas for younger and female birders, variables proxying behavior were more appropriate. This means that specialized birders can be segmented into at least two groups that differ in terms of demographics: one group included "behavioral-oriented" birders and another group of "skills, knowledge, and commitment–oriented" birders.

Relative to recreation specialization and travel intention, we estimated that an increase in birders' specialization level implies a positive effect on travel intention in terms of willingness to travel further; that is higher for birders who use a social network to identify their destination choice, instead of other sources. The effect of recreation specialization on travel intention also depends on the motivations behind the destination choice. Birders who were interested in observing new, rare, permanent or migratory species, and birders who were interested on the number of species display a magnitude of the relationship that is higher than the average value. These findings imply that, at a generic birding site, less specialized visitors visit prevalently from the local district, while specialized birders may travel greater distances. This key evidence should encourage natural resource managers to invest in strategies to promote recreation at birding sites, and enlarge the catchment area to attract more specialized birders. According to the results, the use of social networks should be privileged, instead of other types of communication. Specific services for specialized groups of birders should be implemented to attract this segment of potential recreational demand, as these groups receive higher recreational benefits and are willing to travel greater distances to reach the birdwatching site. Activities aimed at conservation and populating sites with rare species should be implemented to increase the catchment area of the birdwatching sites and extend the local economic effects.

In conclusion, the theoretical framework formulated in this article can be used to understand the behavioral features and individual drivers of birdwatching in Italy. Evidence that birders' specialization positively influences their travel intention can be usefully employed in many circumstances, for example: (a) integrating human dimensions into wildlife management decision-making to improve the effectiveness of conservation policies and programs; (b) enhancing the estimation of potential birdwatching demand; (c) establishing pricing policies and fee program development; (d) predicting birders' responses to fee changes, and determining or altering birder price expectations; and (e) supporting local community leaders and event organizers in differentiating their efforts to attract distinct segments of birdwatchers.

Notes

1. Moderation emerges when the effect of one variable on another variable depends on the value of a third variable. In contrast, mediation occurs when the effect of one variable on another variable is mediated by the presence of one or more variables.
2. PLS-SEM, as well as the most popular CB-SEM, is a second-generation statistical model to analyze complex relationships among constructs. In Appendix B of the online supplementary materials, we illustrate the main differences between the two SEM models and offer a short presentation of PSL-SEM.
3. This dilemma results from the trade-off between the use of measures that cover the majority of variation in a trait (domain-level measurement) and the use of measures that assess a few specific traits (facet-level measurement) more precisely (Hair et al., 2018).
4. This phenomenon describes the influence that two scales called with different names measure different constructs (Hair et al., 2018).
5. This two-dimensional model was supported by a preliminary factorial analysis. We unified skills and knowledge and commitment, and analyzed both as a unique construct.
6. The minimum sample size in PLS-SEM should be equal to 10 times the largest number of formative indicators used to measure a single construct, or 10 times the largest number of structural paths directed at a particular construct in the structural model.
7. In Appendix C of the online supplementary materials, we present the criteria and statistics used to evaluate the performance of the PLS-SEM.

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