African Journal of Hospitality, Tourism and Leisure. ISSN: 2223-814X

Themed Issue: Advances in Geographical Studies on Tourism

Investigating The Environmental and Avi-Values and Birding Behaviour of Gauteng's Youth

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How to cite this article: Conradie, N. & Van Zyl, C. (2021). Investigating the Environmental and Avi-Values and Birding Behaviour of Gauteng's Young. African Journal of Hospitality, Tourism and Leisure, 10(5):1695-1710. DOI: **https://doi.org/10.46222/ajhtl.19770720-187**

Abstract

South Africa, specifically Gauteng has a rich bird biodiversity, making it an ideal ecotourism destination, which can foster local economic development and create job opportunities. Yet birding habitats are under severe threat in this province. Thus, enthusiasm for birds amongst the residents of this province is touted as a means to promote a groundswell of support for preserving bird habitats in Gauteng. As such, it is crucial to encourage support for birds, bird habitats and avitourism within the youth of the province. Therefore, this research study sought to determine if environmental and avi-values, alongside promoting pro-environmental behaviour could encourage Gauteng's youth to adopt pro-bird behaviours. A multi-stage sampling approach was used to collect data from 5 488 secondary school learners (aged 13–17 years). Exploratory factor analyses (EFA), confirmatory factor analyses (CFA) and structural equation modelling (SEM) were employed to test these relationships. The SEM-results revealed that enjoyment of birds and the natural environment is a critical focus area that enhances the likelihood of pro-environmental and avi-behaviour. Environmental education in the form of an intervention programme amongst the youth is recommended for bird biodiversity, bird habitats and, therefore, avitourism in the province to be fostered.

Keywords: Environmental values, avi-values, avitourism, birding, youth, Gauteng, South Africa

Introduction

The COVID-19 virus and associated lockdown caused severe economic damage. Not only to the South African economy, but to the global one as well. Tourism in South Africa was one of the most severely hit sectors (Rogerson & Rogerson, 2020). The UNWTO´s (2021) purposes to accelerate economic recovery for the tourism sector through innovation, education, and investments. That said, it is hoped by some that the 'Great Reset' will result in the promotion of sustainable – and locally driven – rather than global mass tourism (Gössling, Scott & Hall, 2021). In that regard, avitourism is recognised as an important form of sustainable niche tourism, attracting attention from government, tourism policy makers and industry role-players alike (Rogerson, Simango & Rogerson, 2013). It is argued that avitourism can drive local economic development, job creation and enhance community development (Conradie, 2010; Conradie, van Zyl, & Strasheim, 2013; Pahlad & Procheş, 2021). At the same time avitourism is presented as a viable option for the protection and conservation of natural resources, being described as one of the most ecologically sound and sustainable versions of wildlife tourism (Biggs, 2013; Connell, 2009; Dismas, Mbilu & Rija, 2021; Newsome, Dowling & Moore, 2005; Scott & Thigpen, 2003; Sekercioğlu, 2002).

On that note, South Africa, home to over 951 bird species, with 117 of Southern Africa's endemic and near-endemic species are also represented, is ideally suited for avitourism, in both rural and urban settings (Conradie, 2010; Nicolaides, 2013; Pahlad & Procheş, 2021). Although most provinces in South Africa offer their own unique birding experiences, Gauteng is the most promising in terms of domestic avitourism potential. As Gauteng is heavily modified by mines, quarries, airports, industries, roads, commercial zones, residential property and the like, it is underrated as a birding destination (Marais & Peacock, 2008). But the province also features bird habitats in the form of farmlands, multiple waterbodies, protected areas, natural land, a large variety of landscapes, insects, invertebrates and flora (Duckworth & Altwegg, 2021; Robinson, Mearns & McKay, 2021). The famous urban forest of Gauteng is a significant bird habitat with trees in city parks, streets and suburban gardens bird and wildlife havens (Symes, Roller, Howes, Lockwood & van Rensburg, (2017). Consequently, Gauteng has an exceptionally high bird diversity (Marais & Peacock, 2008). Thus, birdwatching in Gauteng is urban or "peri-urban in character" with Gauteng suburbanites awaking to a daily chorus of birdsong (Nicolaides, 2013:3). At the same time, Gauteng is the economic heartland of the country, home to millions of people, a number of which are middle class or elite, making it a natural source market of domestic tourists (Stats SA, 2016; McKay, 2017).

However, avitourism is dependent on the natural resource base, which in Gauteng is under threat due to incessant environmental degradation, climate change and pollution (Kruger-Franck, 2019). Consequently, the protection and conservation of birds and their natural habitat such as the Blesbokspruit wetland system, is imperative to protect birds, bird habitat and to promote the area for avitourism opportunities (Conradie, 2017; McKay, Ndlopfu & Ahmed, 2018; Robinson et al., 2021; Tustin & Conradie, 2016). Unfortunately, pervasive consumerism has resulted in people forming habits and social practices that are resource-intensive, which degrade the natural environment (De Beer, Dreyer & Loubser, 2017; Van As, Du Preez, Brown & Smit, 2012; Watkins & Aitken, 2020). As a result, the Worldwide Fund for Nature's Living Planet index, noted a continuous decline, on average 68% between 1970 and 2016, in monitored wildlife populations (WWF, 2020). Hence, sustainable resource utilisation must be promoted to ensure that the natural resources are kept intact. In that regard, it is essential that young people embrace the values of sustainability as the enhancement of environmental values and behaviour of young people has been identified as long-term approach to promote pro-environmentalism (Goodwin, Greasley, John & Richardson, 2010; Grønhøj & Thøgersen, 2017; UNWTO, 2021). Within this context the conservation values, habits and attitudes of the youth need to be assessed.

In general, values are considered crucial for understanding personal attitudes and behaviour (Uitto & Saloranta, 2010). Values, therefore, form the basis upon which behaviour is grounded (Higham & Carr, 2002). Thus, several researchers have emphasised the importance of environmental values shaping environmental behaviour (Boeve-de Pauw & Van Petegem, 2013; Kagawa, 2007; Kim & Stepchenkova, 2020; Littledyke, 2008; Pedro & Pedro, 2010; Zsóka, Szerényi, Széchy & Kocsis, 2013). The more strongly individuals subscribe to environmental values, the more likely they are to engage in pro-environmental behaviour (Steg & Vlek, 2009). The Tbilisi Declaration, UNESCO's Tbilisi Intergovernmental Conference – perhaps the most widely recognised goals, objectives, and guiding principles of environmental education - highlighted the encouragement of environmental attitudes, which means "a set of values and feelings of concern for the environment and the motivation for actively participating in environmental improvement and protection" (UNESCO, 1978). Greater awareness of environmental value systems is required to promote the adoption of sustainable lifestyles (Sibbel, 2009).

This study adopted the term 'environmental and avi-values' from the domain of environmental education and applied to the context of birds and their habitats. 'Environmental and avi-values' refers to 'deeply rooted, abstract motivations that guide, justify or explain attitudes, norms, opinions and actions regarding birds and bird habitats' (Davidov Schmidt & Schwartz, 2008; Rokeach, 1973; Schwartz, 1992). As children will have a major influence on the future state of the natural environment (including birds and bird habitat), innovative ways of interactive learning about environmental sustainability and engagement at school level are essential. Thus, the aim of this research was to determine the effect of environmental and avi-values on pro-environmental behaviour and birding experiences. To that end, this article commences with a literature review on sustainable avitourism, the conceptualisation of the constructs 'environmental and avi-values' and 'pro-environmental behaviour' and apply it to a tourism context. An empirical research design and method was applied, followed by the SEM model results, the interpretation of the results and the value thereof in the conclusion.

Literature review

Birding is one of the fastest growing niche tourism markets around the globe, in part because avitourism provides an opportunity for an economic return (Chen & Chen, 2015; Dismas et al., 2021; Steven, Morrison & Castle, 2014). In this review of literature, the following is discussed, namely a) the birding / avitourism context within which the research was applied and b) conceptualisation of the two constructs, 'environmental and avi-values' and c) 'actual pro-environmental and avi-behaviour' followed by d) the relationship between these constructs.

Importance of avitourism

Definitions of 'avitourism' given in the literature include birding or birdwatching. Birdwatching is a form of a recreational outdoor activity which involves searching for, observing, identifying, and enjoying viewing birds in their natural habitats (Biggs, 2013; Biggs, Turpie, Fabricius & Spenceley, 2011; Cheung, Lo & Fok 2017; Cobar, Borromeo, Agcaoili & Rodil, 2017; Sekercioğlu, 2002). Birds are observed or studied either with the naked eye or through visual enhancement equipment, such as binoculars, cameras, tripods, spotting scopes, as well as specialised audio equipment, to identify, capture images (bird photography) and bird song (Cobar et al., 2017; Istomina, Luzhkova & Khidekel, 2016). Backyard birding otherwise known as watching birds around the home is the most common form of birding, but many avid birders take trips away from home making them avitourists, which is a more active form of birding (Kim, Keuning, Robertson & Kleindorfer, 2010).

Avitourism is a component of ecotourism since it is deemed to contribute to the goal of enhanced conservation through ecotourism (Chen & Chen 2015; Sekercioğlu, 2002). Avitourism is also recognised as a sustainable form of tourism due to its economic, social, and conservation value (Chen & Chen, 2015). Furthermore, the birdwatching market forms a large sub-segment within ecotourism and the broader nature-based tourism industry (Biggs, 2013; Kim et al., 2010; Newsome, 2017; Rogerson, Simango & Rogerson, 2013; Sekercioğlu, 2002). Thus, it has great growth potential.

Environmental and avi-values

Values are originally defined as "centrally held and enduring beliefs that guide actions and judgements across specific situations and beyond immediate goals to more ultimate end-states of existence" (Rokeach, 1968:159). Furthermore, Schwartz and Bilsky (1987) and Schwartz (1992) have advanced the understanding of values in the field of social psychology. Based on earlier studies of human values and wide cross-cultural studies, Schwartz (1992:4) defined values as "concepts or beliefs, pertain to desirable end states or behaviours, transcend specific

situations, guide selection or evaluation of behaviour and events, and are ordered by relative importance". Values are also defined as "deeply rooted, abstract motivations that guide, justify or explain attitudes, norms, opinions and actions" (Davidov et al., 2008:3). According to Wiernik, Ones and Dilchert (2013:830), 'environmental values' is "the priority the natural environment is assigned in making choices, justifying actions, and evaluating events and people" (based on Schwartz, 1992).

For the purpose of this research 'environmental and avi-values' is defined as: 'Deeply rooted, abstract motivations that guide, justify or explain attitudes, norms, opinions and actions regarding birds and bird habitats. Therefore, for this research, 'environmental and avi-values' leading to actual pro-environmental and avi-behaviour was investigated and applied to the birding/ avitourism context. In terms of youth, education plays a key role in promoting n values, mind-sets, and behaviour regarding natural resource sustainability. While 'environmental and avi-values' denotes the learners' affective disposition towards birds and bird habitats in the future, it is increasingly recognised that pro-environmental behaviour (actions) are essential for decreasing environmental problems and to promote sustainable lifestyles (De Groot & Steg, 2010).

By applying the term 'environmental and avi-values' from the environmental education domain and employ it in a birding context, a novel approach to research was taken. The two-dimensional model of ecological values (2-MEV model) formalised as "environmental values are determined by one's position on two orthogonal factors, a biocentric dimension that reflects conservation and the protection of the environment (Preservation or P); and an anthropocentric dimension that reflects the utilisation of natural resources (Utilisation or U)" (Wiseman & Bogner, 2006). The 2-MEV was adapted for the current study, measuring the preservation of birds and bird habitat versus the utilisation of the natural environment resulted as the two main factors (Conradie, 2017).

Pro-environmental (PEB) and avi-behaviour

Personal day-to-day behaviour that protect and care for the environment is referred to as 'pro-environmental behaviour' (De Groot & Steg, 2010; Osbaldiston & Schott, 2012). According to Ramkissoon, Mavondo and Uysal (2018), people who adopt PEB consciously manage their behaviour to minimise the negative impacts of their actions or enhance the protection or perseveration of the environment. These behaviours are called pro-environmental behaviour, though various terms (e.g., environmental responsible behaviour, environmentally significant behaviour, and actual commitment to pro-environmental behaviour) are used interchangeably. For example, environmentally responsible behaviour is described as "individuals who are knowledgeable and concerned about the environment" (Mobley, Vagias & DeWard, 2010:420) and will therefore "engage in a behaviour that would avoid damage to the environment"(Chiu, Lee & Chen, 2014:879).

In this research, pro-environmental behaviour regarding birds and bird habitats refers to: Behaviour that consciously seeks to minimise the negative impact of actions on the natural and built world (for example, minimise resource and energy consumption that will support the existence of birds, reduce waste production to protect and save birds).

The relationship between 'environmental and avi-values', 'pro-environmental and avi-behaviour'

Environmental values are regarded as crucial determinants of environmental behaviour (Boeve-de Pauw & Van Petegem, 2013). Therefore, the more strongly individuals subscribe to environmental and avi-values, the more likely they are to engage in pro-environmental behaviour (Maurer & Bogner, 2020; Steg & Vlek, 2009). This opinion is supported by Zsóka

et al. (2013), who advocate that changes in environmental and avi-values are necessary drivers for environmental action and might influence pro-environmental behaviour.

Based on this literature discussion, it can be deduced that environmental and avi-values could influence actual pro-environmental behaviour of the youth towards the natural environment, including the birds and their habitat. The method applied to test this relationship are discussed next.

Methods

This empirical research applied multi-stage sampling using school districts in Gauteng, selecting secondary schools and secondary school learners in Grades 8, 9 and 10 to collect primary data. Permission from the Gauteng Department of Education (GDE) was obtained. Four school districts were selected, and 20 secondary schools were purposively chosen from each. Attention was paid to ensure representivity of language, race and socio-economic circumstances. A total of 17 schools agreed to participate in Gauteng (South Africa) (see Table 1). Questionnaires were distributed to all learners in each grade. The researcher and the teachers of participating schools conducted the fieldwork. All ethical principles and protocol were followed when doing research on minors (Bureau of Market Research Ethics Committee, RF005.4). Official permission from the Gauteng Department of Education, consent of school principals, school governing bodies and parents was obtained to conduct the study.

Table 1: Participating secondary schools in Gauteng

Gauteng school district	Secondary school	No of returned questionnaires
District A	School 1	323
	School 2	158
	School 3	517
	School 4	264
District B	School 5	224
	School 6	311
	School 7	79
	School 8	362
	School 9	157
District C	School 10	139
	School 11	425
	School 12	406
	School 13	486
District D	School 14	754
	School 15	362
	School 16	255
	School 17	266
Total	**Total**	**5 488**

The data were obtained from $N = 5\,488$ secondary school learners. The demographic profile of the respondents was: gender (male = 43.7%; female = 55.3%), home language (Afrikaans = 42.1%; African = 39.5%; English = 18.8%).

To measure 'environmental and avi-values' of secondary school learners, the two-dimensional model of ecological values scale (2-MEV model) of Bogner & Wiseman (2006) was slightly adapted for this research. Bogner and Wiseman's (2006) questionnaire battery was

designed to measure general environmental values, including the factors utilisation (U) and preservation (P). The general environmental value statements were adapted for the current study to measure specific values of the learners regarding birds and bird habitat. The measuring scale included 20 environmental and avi-value items (such as 'I save water because it is important for the survival of birds'; 'Various bird species will die out if we do not live in tune with nature'; 'Humans have the right to change natural bird habitats as they see fit') which learners were requested to rate using an agreement Likert scale ranging from 'strongly disagree' (1) to 'strongly agree' (5) (Conradie, 2017).

To measure the actual pro-environmental behaviour of the learners regarding birds and bird habitat, seven items of CHEAKS were adapted to the birding context (Leeming, Dwyer & Bracken, 1995). An additional seven items, promoting pro-environmental and avitourism behaviour, were formulated to measure the actual behaviour of the learners to participate in birding activities and avitourism. After the pilot study, data were analysed, and three items were removed in the final questionnaire. Therefore, 11 items (such as 'I have talked to someone about pollution that causes destruction of bird habitats'; 'I feed birds in our garden'; 'I have visited the local zoo to learn more about birds') represented the self-reported behaviour for those learners who claimed to never, seldom, sometimes, often or always act according to the behavioural descriptors (Conradie, 2017).

To establish validity of the measuring instrument, factor analysis was performed. Confirmatory factor analysis (CFA) was applied for 'environmental and avi-values' construct. The purpose of the CFA analysis was to test whether the factors (utilisation and preservation) found in exploratory research on environmental values could be confirmed in this study (Bogner & Wiseman, 2006). The CFA did not show acceptable fit, and therefore an Exploratory Factor Analysis (EFA) was conducted to explore the underlying structure of the data. An EFA was also applied to the 'actual pro-environmental behaviour' construct. Internal consistency estimates (Cronbach Alpha), composite reliability and discriminant validity was used to confirm reliability of the measuring scales.

Structural equation modelling (SEM) was employed to test the relationship between 'environmental and avi-values' and 'pro-environmental and avi-behaviour'. In order to investigate whether environmental and avi-values contribute to actual pro-environmental behaviour and birding experience, SEM was used to test a conceptual model. Table 2 indicates the research hypotheses that were formulated from the literature review as well as the factors that derived from the EFA conducted for the constructs.

Table 2: Summary of the research hypotheses

Null hypotheses		**Alternative research hypotheses**	
Hypotheses regarding the relationships between' environmental and avi-values' and 'actual pro-environmental and avi-behaviour' (Actual behaviour1)			
H_{01}:	Critical resources are not related to 'actual pro-environmental and avi-behaviour'.	H_1:	Critical resources are related to 'actual pro-environmental and avi-behaviour'.
H_{02}:	Enjoyment is not related to 'actual pro-environmental and avi-behaviour'.	H_2:	Enjoyment is related to 'actual pro-environmental and avi-behaviour'.
H_{03}:	Pro-environmental values are not related to 'actual pro-environmental and avi-behaviour'.	H_3:	Pro-environmental values are related to 'actual pro-environmental and avi-behaviour'.
H_{04}:	Utilisation is not related to 'actual pro-environmental and avi-behaviour'.	H_4:	Utilisation is related to 'actual pro-environmental and avi-behaviour'.
Hypotheses regarding the relationships between 'environmental and avi-values' and 'actual birdwatching behaviour (Actual behaviour2)			
H_{05}:	Critical resources are not related to 'actual birdwatching behaviour.	H_5:	Critical resources are related to 'actual birdwatching behaviour.
H_{06}:	Enjoyment is not related to 'actual birdwatching behaviour'.	H_6:	Enjoyment is related to 'actual birdwatching behaviour.
H_{07}:	Pro-environmental values are not related to 'actual birdwatching behaviour.	H_7:	Pro-environmental values are related to 'actual birdwatching behaviour.
H_{08}:	Utilisation is not related to 'actual birdwatching behaviour.	H_8:	Utilisation is related to 'actual birdwatching behaviour.

The actual results thereof are now unpacked next.

Results of SEM

The results of the confirmatory and exploratory factor analyses conducted for (i) environmental and avi-values and (ii) the exploratory factor analysis for the adapted actual behaviour scale is outlined as well as the SEM results.

Results of the factor analysis: Environmental and avi-values of secondary school learners

The CFA was employed to evaluate whether the factors, preservation (P) and utilisation (U) suggested by Bogner and Wiseman (2006), could fit the data of the current research. The model was evaluated by goodness-of-fit indices. The RMSEA (0.099) indicated that the model fit was not adequate (threshold of ≤ 0.08 indicate acceptable fit). The CFI (0.715) and IFI (0.715) were below 0.90, indicating that the model fit was not adequate (Hu & Bentler, 1999; Hair, Black, Babin & Anderson, 2014). The model presented an unsatisfactory fit with the observed data, and therefore an EFA was conducted.

EFA was applied to responses of the 20-item scale. The KMO value was 0.898, exceeding the recommended minimum value of 0.6 (Kaiser, 1970; Kaiser, 1974), and the Bartlett's test of sphericity (Bartlett, 1954) showed statistical significance, $p < 0.001$, supporting the factorability of the correlation matrix. The PAF method was used to extract the factors, and this was followed by a promax rotation with Kaiser normalisation. The PAF revealed the presence of four factors with eigenvalues exceeding 1, cumulatively explaining 51.80% of the variance in the data. To aid in the interpretation and scientific utility of these four factors, promax rotation with Kaiser normalisation was performed. These four factors were labelled and examples of individual items such as:

(a) *critical resources* (such as 'I save water because it is important for the survival of birds'; 'I save electricity because it could decrease air pollution, which endangers many bird species'),
(b) *enjoyment* (such as 'I enjoy trips to the countryside in order to observe birds in their natural habitat'; 'Sitting at the edge of a pond watching birds in flight is enjoyable'),
(c) *pro-environmental values* (such as 'We must set aside areas to protect endangered bird species'; 'Society must continue trying to solve even the biggest environmental problems that affect birds') and,
(d) *utilisation* (such as 'We need to clear bird habitats in order to grow crops'; 'We must build more roads so that people can easily travel to the natural attractions').

The factors critical resources (0.73), enjoyment (0.78), pro-environmental values (0.81), utilisation (0.74), and demonstrated acceptable internal consistency, all above the 0.7 threshold value, as illustrated by the Cronbach's alpha coefficients. The composite reliability were critical resources (0,787), enjoyment (0.776), pro-environmental values (0.821), utilisation (0.742), which are all above the recommended threshold of 0.7 whereby confirming reliability.

Results of the factor analysis: Actual behaviour of secondary school learners towards birds, the natural environment and avitourism

An EFA was applied to the responses of the 11-item scale. The PAF method was used to extract the factors and this was followed by a promax rotation with Kaiser normalisation. The KMO measure of sampling adequacy (0.927), which was above the recommended threshold of 0.6, and the Bartlett's test of sphericity, which was significant ($p < 0.001$), indicated that a factor analysis was appropriate.

The PAF analysis identified two factors, based on the eigenvalue criterion (eigenvalue > 1), which cumulatively explained 63.27% of the variance. Seven items were found to load on the first factor, which was subsequently labelled as pro-environmental and avi-behaviour, while four items loaded on the second factor, which was labelled birdwatching behaviour. Internal consistency estimates (Cronbach Alpha) were 0.90 and 0.83 for responses to 'pro-environmental and avi-behaviour' and 'birdwatching behaviour', respectively, indicating good internal consistency. The composite reliability was 'pro-environmental and avi-behaviour' (0,894) and 'birdwatching behaviour' (0.896), which are above the recommended threshold of 0.7, thus confirming reliability.

Discriminant validity of the constructs

The HTMT measure of discriminant validity was used to access discriminant validity of the constructs.

Table 1: HTMT analysis

	CR	**EN**	**PEV**	**Util**	**BehActive**	**BehPassive**
CR						
EN	0,588					
PEV	0,654	0,739				
Util	0,188	0,125	0,000			
BehActive	0,457	0,549	0,366	0,205		
BehPassive	0,368	0,540	0,394	0,104	0,800	

Table 1 indicates that all constructs were smaller than the threshold of 0.850. and were thus discriminant valid (Henseler, Ringle & Sarstedt, 2015).

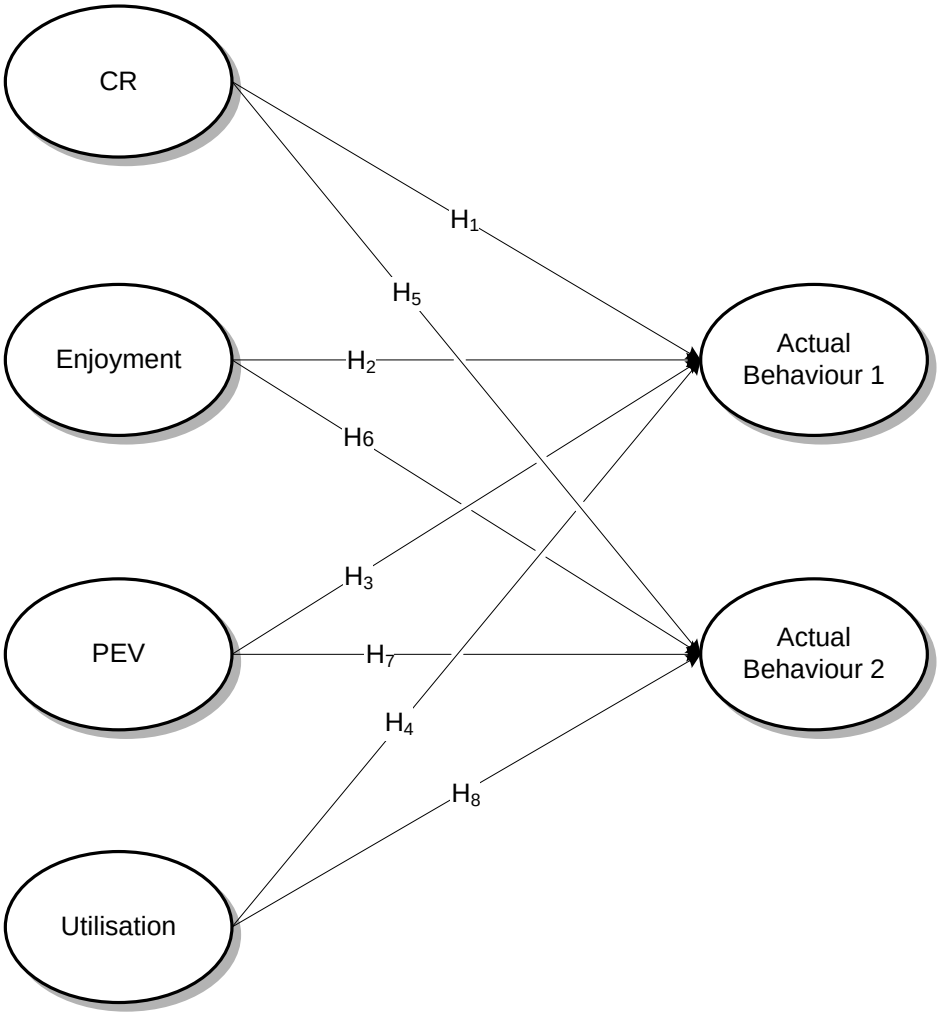
Results of SEM: The relationships between environmental and avi-values and actual behaviour of secondary school learners

SEM was employed to test the set of constructs and indicators in the measurement model, as well as the structural relationships among the constructs (Hair et al., 2010). The measurement and structural model, including the hypotheses are illustrated in Figure 1.

SEM model 1 represented the relationships of 'critical resources', 'enjoyment', 'pro-environmental values' and 'utilisation' with 'pro-environmental and avi-behaviour' and 'actual birdwatching behaviour'. SEM model 1 was evaluated by goodness-of-fit indices. Although the RMSEA (0.058) and RSMR (0.063) indicate acceptable fit (threshold of ≤ 0.08 indicate acceptable fit), the CFI (0.884) and IFI (0.884) were below 0.90, indicating that the model fit was not adequate (Hair et al., 2014; Hu & Bentler, 1999).

In order to improve on SEM model 1, items with low loadings (< 0.5) were deleted from the analysis (D13, D18 and D20). In addition, modification indices were studied, and where theoretically justified (Hair et al., 2014), four additional covariances between residual error terms were included in SEM model 2. Furthermore, the 'enjoyment' and 'pro-environmental and avi-behaviour' constructs were merged due to the identification of multicollinearity (0.898) which resulted in standardised regression weights greater than 1,

leading to difficulty in interpreting the strength of the standardised regression weights (Deegan, 1978).



*CR - Critical resources (i.e. Save water and electricity)
*Enjoyment – Enjoyment of the birdwatching activity
*PEV - Pro-environmental values (i.e. values that reflects conservation and the protection of birds and the natural environment)
*Utilisation – values that reflects the utilisation of natural resources
*Actual behaviour 1 – pro-environmental and avi-behaviour
*Actual behaviour 2 – actual birdwatching behaviour
Figure 1: Hypothesised path diagram (SEM model 1)

The final model was evaluated by goodness-of-fit indices to test whether the proposed model emulates the sample matrix (Hair et al., 2014). Table 3 provides the goodness-of-fit indices of the structural model.

When the structural model was fitted to the data, the goodness-of-fit supported the structural model. The RMSEA (0.057) and SRMR (0.066), indicated acceptable model fit. The CFI (0.907) and IFI (0.907) were just above 0.90, which indicate that the model fit the data. Therefore, the relationships indicated in SEM model was interpreted and represented the research hypothesis that was set. The AIC and BIC also indicated improved model fit (AIC 8297.9 improved to 6480; BIC improved from 9793.7 to 6929).

Table 3: Goodness-of-fit indices: Final SEM model

Model	CMIN (X^2)	df	p	RMSEA	SRMR	CFI	IFI
Goodness-of-fit indices	6344,259	338	0.000	0.057	0.066	0.907	0.907
Indicate acceptable fit	-	-	-	≤ 0.08	≤ 0.08	≥ 0.90	≥ 0.90

Therefore, the relationships in the final SEM model were interpreted and also represented the research hypothesis. When the relationship was statistically significant, the null hypothesis was rejected (Saunders, Lewis & Thornhill, 2016). The standardised regression weights (structural parameter estimates) and the results of the structural model hypotheses of the final SEM model are presented in Table 4.

Table 4: Structural parameter estimates: Final SEM model

Relationships				Standardised regression weights	Outcome Null Hypothesis
H_{01}	Actual behaviour1	<---	CR	0.127***	Rejected
H_{05}	Actual behaviour2	<---	CR	0.046***	Rejected
$H_{02,03}$	Actual behaviour1	<---	PEV & Enjoyment	0.399***	Rejected
$H_{06,07}$	Actual behaviour2	<---	PEV & Enjoyment	0.432***	Rejected
H_{04}	Actual behaviour1	<---	Utilisation	0.226***	Rejected
H_{08}	Actual behaviour2	<---	Utilisation	0.148***	Rejected

*** Significant at 0.1% level of significance (p-value < 0.001)

The results indicated that 'critical resources', had a positive weak relationship with both actual pro-environmental and avi-behaviour (β = 0.13) actual birdwatching behaviour (β = 0.05).

'Pro-environmental values and enjoyment' had a positive relationship (moderate effect) with actual pro-environmental and avi-behaviour (β = 0.40) and actual birdwatching behaviour (β = 0.43).

Furthermore, the results indicated that 'utilisation' had a weak, positive effect on 'pro-environmental and avi-behaviour' (β = 0.23) and 'actual birdwatching behaviour' (β = 0.15).
The main findings regarding structural model hypotheses of the final model are summarised below.

- Since the structural path estimates were statistically significant, the null hypotheses regarding the relationships between 'environmental and avi-values' and actual pro-environmental and avi-behaviour (Actual behaviour1) (H_{023}–H_{026}) were thus rejected:
  - H_{01}: Critical resources are related to 'pro-environmental and avi-behaviour' (Actual behaviour1)
  - $H_{02,03}$: 'Enjoyment and pro-environmental values' are related to 'pro-environmental and avi-behaviour' (Actual behaviour1)
  - H_{04}: Utilisation is related to 'pro-environmental and avi-behaviour' (Actual behaviour1)
- The null hypotheses regarding the relationships between 'environmental and avi-values' and 'actual birdwatching behaviour' (Actual behaviour2) (H_{28}–H_{29}) were also rejected:
  - H_{05}: Critical resources is related to 'actual birdwatching behaviour' (Actual behaviour2)
  - $H_{06,07}$: 'Enjoyment and pro-environmental values' are related to 'actual birdwatching behaviour' (Actual behaviour2)
  - H_{08}: Utilisation is related to 'actual birdwatching behaviour' (Actual behaviour2)

To synthesise, the SEM model outlined a set of relationships, providing an explanation of whether the variables of environmental and avi-values could contribute towards pro-environmental behaviour and actual birding experiences. 'Pro-environmental values and enjoyment' was the most important driver towards both actual pro-environmental and avi-behaviour, as well as actual birdwatching behaviour. Critical resources and utilisation were considered a less important determinant of actual birdwatching behaviour showing a weak effect.

From the discussion of the results the following recommendations are made:

- Environmental education curricula that will encourage changes in values, mind-sets and behaviours of young people, concerning the sustainability of birds and the natural environment should be developed.
- Young people should be encouraged to spend time outdoors, since outdoor activities have been linked to affective components and were found to be a key predictor of pro-environmental behaviour (see Stevenson, Peterson, Bondell, Mertig & Moore, 2013).
- Environmental and avi-values should be strengthened when designing interventions to promote sustainable pro-environmental behaviour (De Groot & Steg, 2009).
- Environmental education and avitourism role players should focus on the affective components (i.e. to raise the avi-values of young people) when developing environmental programmes or interventions, which could ultimately contribute to sustainable birdwatching behaviour.

Implications

To realise the potential of avitourism in Gauteng, the protection and conservation of birds and their natural habitat are imperative. It is evident from the literature that 'environmental and avi-values' as an approach to promote pro-environmentalism and sustainable resource utilisation amongst the youth is necessary to ensure the sustainability of birds and birding. Environmental education of this generation has the potential change behaviour and help protect birds and their habitats.

Research indicates that environmental values are regarded as crucial determinants of pro-environmental behaviour. Therefore, the more strongly individuals subscribe to environmental values, the more likely they are to engage in pro-environmental behaviour. Based on this theoretical view, the aim of this research was to determine the effect of 'environmental and avi-values' on pro-environmental behaviour and birding. An empirical research design and method was applied to reach this aim.

The SEM results of the research on secondary school learners in Gauteng revealed the following significant outcomes:

- 'Critical resources' had a *weak positive relationship* with both actual pro-environmental and avi-behaviour actual birdwatching behaviour.
- 'Pro-environmental values and enjoyment' had a *positive relationship, (moderate effect*) with 'actual pro-environmental and avi-behaviour' and 'actual birdwatching behaviour'.
- 'Utilisation' had a *weak positive effect* on 'pro-environmental and avi-behaviour' and 'actual birdwatching behaviour'.

Resulting from the SEM the following relationships are outlined, which provides an explanation of whether 'environmental and avi-values' could contribute towards pro-environmental behaviour and actual birding experiences. Interestingly, *pro-environmental values and enjoyment* is the most important driver towards both *actual pro-environmental and*

avi-behaviour, as well as *actual birdwatching behaviour*. The results indicated that pro-environmental values and enjoyment of birds and the natural environment indicated the highest likelihood to influence actual behaviour of young people towards birds, the natural environment and avitourism.

A recommendation is made that role-players in conservation education (including interpretation centres at bird sanctuaries, nature reserves and zoos) should improve the *environmental and avi-values* of young people. This is to enhance pro-environmental behaviour towards birds, their natural environment and avitourism. The valuable role education can play is in line with the UNWTO's notion of empowering children and young people through the planned Global Youth Tourism Summit (GYTS). Furthermore, installing environmental hobbies through SMART AP games, promoting the youth to engage in citizen science, such as bird counts and intervention programmes in nature is worth the while. Future research could include the refinement of the model by including, for example, the role of behavioural intention in the model. The model can also be used to test the effectiveness of an intervention programme by using before and after tests in a longitudinal study.

Conclusion

The inter-disciplinary approach followed in the research contributes to both the environmental education domain and the larger tourism sphere. The empirical contribution lies in the SEM model, which indicated that environmental values could enhance the likelihood of pro-environmental and avi-behaviour change, which can be used in the environmental education context. Environmental education in the form of an intervention programme, is needed from a young age. These programmes should inspire the young people of Gauteng to value birds and bird habitat, as they will become environmentally responsible citizens and birders to support both domestic and international avitourism. To practice birding as a hobby might be a powerful solution to reduce loss of bird diversity and habitat, upon which avitourism is built.

References

Biggs, D. (2013). International handbook on ecotourism. In R. Ballantyne & J. Parker (eds.). *Birding, sustainability and ecotourism.* Cheltenham: Edward Elgar: 394–403.

Biggs, D., Turpie, J., Fabricius, C. & Spenceley, A. 2011. The value of avitourism for conservation and job creation: An analysis from South Africa. *Conservation and Society,* 9(1):80–90.

Boeve-de Pauw, J. & Van Petegem, P. (2013). A cross-cultural study of environmental values and their effect on the environmental behavior of children. *Environment and Behavior,* 45(5):551–583.

Bogner, F.X. & Wiseman, M. 2006. Adolescents' attitudes towards nature and environment: Quantifying the 2-MEV model. *The Environmentalist,* 26(4), 247–254.

Chen, L. & Chen, W. (2015). Push–pull factors in international birders' travel. *Tourism Management,* 48, 416–425.

Cheung, L.T., Lo, A.Y. & Fok, L. (2017). Recreational specialization and ecologically responsible behaviour of Chinese birdwatchers in Hong Kong. *Journal of Sustainable Tourism,* 25(6), 817–831.

Chiu, Y.H., Lee, W. & Chen, T. (2014). Environmentally responsible behavior in ecotourism: Exploring the role of destination image and value perception. *Asia Pacific Journal of Tourism Research,* 19(8), 876–889.

Cobar, A.G.C., Borromeo, M.C.B., Agcaoili, J.K.M. & Rodil, A.M.T. (2017). Acute effect of birdwatching on mood states of senior high school students in the physical education

setting. *Ovidius University Annals, Series Physical Education & Sport/Science, Movement & Health,* 17(1), 18–25.

Connell, J. (2009). Birdwatching, twitching and tourism: Towards an Australian perspective. *Australian Geographer*, 40(2), 203–217.

Conradie, N. (2010). *International market potential of avitourism in South Africa*. Unpublished M. Com. Dissertation (Tourism Management). Pretoria: University of South Africa.

Conradie, N., van Zyl, C. & Strasheim, A. (2013). What inspires birders to migrate South towards Africa? A quantitative measure of international avitourist motivation. *Southern African Business Review*, 17(1), 128–167.

Conradie, N. (2017). *A literacy model for sustainable tourism*. Unpublished PhD thesis. Pretoria: University of South Africa.

Davidov, E., Schmidt, P. & Schwartz, S.H. (2008). Bringing values back in: The adequacy of the European social survey to measure values in 20 countries. *Public Opinion Quarterly*, 72(3), 420–445.

De Beer, J., Dreyer, J. & Loubser, C.P. (2017). Environmental issues and risks. In C. Loubser, C.H. Swanepoel & C. Chacko (eds.). *Environmental education and education for sustainability: Some South African perspectives.* Pretoria: Van Schaik: 1–36.

Deegan, J. Jr. (1978). On the occurrence of standardized regression coefficients greater than one. *Educational and Psychological Measurement*, 38(4), 873–888.

De Groot, J.I. & Steg, L. 2009. Mean or green: Which values can promote stable pro-environmental behavior? *Conservation Letters*, 2(2), 61–66.

De Groot, J.I. & Steg, L. 2010. Relationships between value orientations, self-determined motivational types and pro-environmental behavioural intentions. *Journal of Environmental Psychology*, 30(4), 368–378.

Dismas, S.S., Mbilu, J.A. & Rija, A.A. (2021). Behavioural activities of two sympatric bird species and implications for conservation and birding tourism in an urban landscape. *Tanzania Journal of Forestry and Nature Conservation, Special Issue: Embracing Science and Technology in Nature Conservation*, 90(3), 146–155.

Duckworth GD, Altwegg R. (2021). Why a landscape view is important: nearby urban and agricultural land affects bird abundances in protected areas. *PeerJ*, 9:e10719. https://doi.org/10.7717/peerj.10719.

Goodwin, M.J., Greasley, S., John, P. & Richardson, L. (2010). Can we make environmental citizens? A randomised control trial of the effects of a school-based intervention on the attitudes and knowledge of young people. *Environmental Politics*, 19(3), 392–412.

Gössling, S., Scott, D. & Hall, C. (2021). Pandemics, tourism and global change: A rapid assessment of Covid-19. *Journal of Sustainable Tourism*, 29 (1), 1-20.

Grønhøj, A. & Thøgersen, J. (2017). Why young people do things for the environment: The role of parenting for adolescents' motivation to engage in pro-environmental behaviour. *Journal of Environmental Psychology*, 54, 11-19.

Hair, J.F., Black, W.C., Babin, B.J. & Anderson, R.E. (2014). *Multivariate data analysis.* Seventh edition. Harlow: Pearson Education.

Henseler, J., Ringle, C.M. & Sarstedt, M. (2015). A New Criterion for Assessing Discriminant Validity in Variance-based Structural Equation Modelling. *Journal of the Academy of Marketing Science*, 43 (1), 115-135.

Higham, J. & Carr, A. (2002). Ecotourism visitor experiences in Aotearoa/New Zealand: Challenging the environmental values of visitors in pursuit of pro-environmental behaviour. *Journal of Sustainable Tourism*, 10(4), 277–294.

Hu, L. & Bentler, P.M. (1999). Cutoff criteria for fit indexes in covariance structure analysis: Conventional criteria versus new alternatives. *Structural Equation Modeling: A Multidisciplinary Journal*, 6(1), 1–55.

Istomina, E.A., Luzhkova, N.M. & Khidekel, V.V. (2016). Birdwatching tourism infrastructure planning in the Ria Formosa Natural Park (Portugal). *Geography and Natural Resources*, 37(4), 371–378.

Kagawa, F. (2007). Dissonance in students' perceptions of sustainable development and sustainability: Implications for curriculum change. *International Journal of Sustainability in Higher Education*, 8(3), 317–338.

Kaiser, H.F. 1970. A second-generation little Jiffy. *Psychometrica*, 35(4), 410–415.

Kaiser, H.F. 1974. An index of factorial simplicity. *Psychometrica*, 39(1), 31–36.

Kim, A.K., Keuning, J., Robertson, J. & Kleindorfer, S. 2010. Understanding the birdwatching tourism market in Queensland, Australia. *Anatolia*, 21(2), 227–247.

Kim, M.S. & Stepchenkova, S. (2020). Altruistic values and environmental knowledge as triggers of pro-environmental behavior among tourists. *Current Issues in Tourism*, 23(13), 1575–1580.

Kruger-Franck, E. (2019). *Anthropocentric impacts on the ecology and biodiversity of the Natalspruit watercourse and its associated wetlands*. Unpublished MSc. Dissertation (Environmental Management). Pretoria: University of South Africa.

Leeming, F.C., Dwyer, W.O. & Bracken, B.A. 1995. Children's environmental attitude and knowledge scale: Construction and validation. *The Journal of Environmental Education*, 26(3), 22–31.

Littledyke, M. (2008). Science education for environmental awareness: approaches to integrating cognitive and affective domains. *Environmental education research*, 14(1): 1-17.

Marais, E. & Peacock, F. 2008. *The Chamberlain guide to birding Gauteng.* Centurion: Mirafra.

Maurer M. & Bogner, F.X. (2020). Modelling environmental literacy with environmental knowledge, values and (reported) behaviour. *Studies in Educational Evaluation*, 65:1-9.

McKay, T.J.M. (2017). *The adventure tourism industry of South Africa: Organisation, space and structure*. PhD thesis, Faculty of Science, University of Johannesburg (South Africa).

McKay, T., Ndlopfu, V. W. & Ahmed, A.A.Q. (2018). *The Blesbokspruit wetland, South Africa: A high altitude wetland under threat*, Technical Report, Department of Environmental Sciences, University of South Africa.

Mobley, C., Vagias, W.M. & DeWard, S.L. (2010). Exploring additional determinants of environmentally responsible behavior: The influence of environmental literature and environmental attitudes. *Environment and Behavior*, 42(4), 420–447.

Newsome, D., Dowling, R.K. & Moore, S.A. (2005). *Wildlife tourism.* Clevedon: Channel View.

Newsome, D. (2017). A brief consideration of the nature of wildlife tourism. In F.J. Kayeser (ed.). *Wilderness of wildlife tourism.* Oakville, ON Waretown: Apple Academic Press.

Nicolaides, A. (2013). Promoting Avitourism as a special niche area of Ecotourism in South Africa. *African Journal of Hospitality, Tourism and Leisure*, 2(3), 1–16.

Osbaldiston, R. & Schott, J.P. (2012). Environmental sustainability and behavioral science: Meta-analysis of proenvironmental behavior experiments. *Environment and Behavior*, 44(2), 257–299.

Pahlad, R. & Procheş, Ş. (2021). Birdwatching in a southern African context: explaining highlights on bird lists. *South African Geographical Journal*, 1–9. DOI: 10.1080/03736245.2021.1894597.

Pedro, Á.S. & Pedro, V.M. (2010). Developing sustainable environmental behavior in secondary education students (12-16) Analysis of a didactic strategy. *Procedia - Social and Behavioral Sciences*, 2(2), 3568–3574.

Ramkissoon, H., Mavondo, F. & Uysal, M. (2018). Social involvement and park citizenship as moderators for quality-of-life in a national park. *Journal of Sustainable Tourism*, 26(3):341-361.

Robinson, L., Mearns, K. & McKay, T. (2021). Oliver Tambo International Airport, South Africa: Land-Use Conflicts Between Airports and Wildlife Habitats. *Frontiers in Ecology and Evolution*, 9(715771), https://doi.org/10.3389/fevo.2021.715771

Rogerson, C. M. & Rogerson, J. M. (2020). Covid-19 tourism impacts in South Africa: Government and industry responses. *GeoJournal of Tourism and Geosites*, 31 (3), 1083-1091.

Rogerson, C.M., Simango, S. & Rogerson, J.M. (2013). From recreation to niche tourism: The transformation of birdwatching in South Africa. *African Journal for Physical Health Education, Recreation and Dance*, 19, Suppl. 2, 122–137.

Rokeach, M. (1968) *Beliefs, attitudes, and values, a theory of organization and change*. San Francisco, Jossey-Bass. (No. 301.2 R6).

Saunders, M., Lewis, P. & Thornhill, A. (2016). *Research methods for business students.* Seventh edition. Harlow: Pearson Education.

Scott, D. & Thigpen, J. (2003). Understanding the birder as tourist: Segmenting visitors to the Texas Hummer/Bird celebration. *Human Dimensions of Wildlife*, 8(3),199–218.

Schwartz, S.H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. *Advances in Experimental Social Psychology*, 25,1–65.

Schwartz, S.H. & Bilsky, W. (1987). Toward a universal psychological structure of human values. *Journal of Personality and Social Psychology*, 53, 550–562.

Sekercioğlu, C.H. (2002). Impacts of birdwatching on human and avian communities. *Environmental Conservation*, 29(3), 282–289.

Sibbel, A. (2009). Pathways towards sustainability through higher education. *International Journal of Sustainability in Higher Education*, 10(1), 68–82.

Stats SA (Statistics South Africa). 2016. Community Survey 2016, Statistical release P0301. Available at http://cs2016.statssa.gov.za/wpcontent/uploads/2016/07/NT-30-06-2016-RELEASE-for-CS-2016-_Statisticalreleas_1-July-2016.pdf [Retrieved 8 November 2017].

Steg, L. & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29(3), 309–317.

Steven, R., Morrison, C. & Castle, J.G. (2014). Birdwatching and avitourism: a global review of research in its participant markets, distribution and impacts, highlighting future research priorities to inform sustainable avitourism management. *Journal of Sustainable Tourism*, 23(8-9), 1257-1276.

Stevenson, K.T., Peterson, M.N., Bondell, H.D., Mertig, A.G. & Moore, S.E. (2013). Environmental, institutional, and demographic predictors of environmental literacy among middle school children. *PLOS ONE*, 8(3),1–11.

Symes, C. T., Roller, K., Howes, C., Lockwood, G. & van Rensburg, B. J. (2017). Grassland to urban forest in 150 years: avifaunal response in an African metropolis. In Murgui, E.

& Hedblom, M. (Eds.) *Ecology and conservation of birds in urban environments* Springer, Cham: 309-341.

Tustin, D. H. & Conradie, N. (2016). Benchmarking avi-tourism literacy rates among Gauteng school learners. *South African Journal of Business Management*, 47(3), 55–61.

Uitto, A. & Saloranta, S. (2010). The relationship between secondary school students' environmental and human values, attitudes, interests and motivations. *Procedia - Social and Behavioral Sciences*, 9, 1866–1872.

UNESCO (United Nations Educational, Scientific and Cultural Organization). (1978). *Final report: Intergovernmental conference on environmental education*. Tbilisi (USRR), 14-26 October 1977.

UN (United Nations). (2021). IPCC report: *'Code red' for human driven global heating*. Available at https://news.un.org/en/story/2021/08/1097362 [Retrieved 19 August 2021].

UNWTO (United Nations World Tourism Organization). (2021). Global Youth Tourism Summit (GYTS). Available at https://www.unwto.org/europe/global-youth-tourism-summit [Retreieved 19 August 2021].

UNWTO (United Nations World Tourism Organization). (2021). 2nd Edition UNWTO Global Tourism Investment Forum. Available at https://www.unwto.org/2nd-edition-unwto-global-tourism-investment-forum [Retrieved 19 August 2021].

UNWTO (United Nations World Tourism Organization). (2017). *2017 is the international year of sustainable tourism for development.* Available at http://media.unwto.org/press-release/2017-01-03/2017-international-year-sustainable-tourism-development [Retrieved 15 December 2016].

Van As, J., Du Preez, J., Brown, L. & Smit, N. 2012. *The story of life & the environment: An African perspective.* Cape Town: Struik Nature.

Wala, Z. J. (2018). *Birds and people: studies based on citizen science and census data of Greater Gauteng, South Africa*. Unpublished thesis. Cape Town: University of Cape Town.

Watkins, L. & Aitken, R. (2020). The role of young consumers in moving to a sustainable consumption future. In: McNeill, L. (ed.) *Transitioning to responsible consumption and production. Transitioning to Sustainability Series 12*. Basel: MDPI: 169–185.

Wiernik, B.M., Ones, D.S. & Dilchert, S. 2013. Age and environmental sustainability: A meta-analysis. *Journal of Managerial Psychology*, 28(7),826–856.

WWF (World Wild Fund of Nature). (2020). WWF's Living Planet Report 2020 sounds planetary health warning. Available at https://www.wwf.org.za/?32405/WWFs-Living-Planet-Report-2020-sounds-planetary-health-warning [Retrieved 9 August 2021].

Zsóka, Á., Szerényi, Z.M., Széchy, A. & Kocsis, T. (2013). Greening due to environmental education? Environmental knowledge, attitudes, consumer behavior and everyday pro-environmental activities of Hungarian high school and university students. *Journal of Cleaner Production*, 48:126–138.