

# The influence of interpretation on visitors' behaviour in the Kruger National Park

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## Abstract

It is a well-known fact that interpretation influences visitors' behaviour to be more in line with respect for the environment, philanthropic support for conservation and generally environmental sound behaviour. This study made use of two theories, the theory of planned behaviour (TPB) and the cognitive dissonance theory, to examine the influence of interpretation on both attitudes and behaviour within the Kruger National Park. Apart from the confirmation of these theories by means of structural equation modelling, this chapter also empirically confirmed a classification of interpretation by means of an exploratory and confirmatory factor analysis.

**Keywords and phrases:** Theory of planned behaviour; cognitive dissonance theory; interpretation; attitudes; behaviour; national parks, tourism

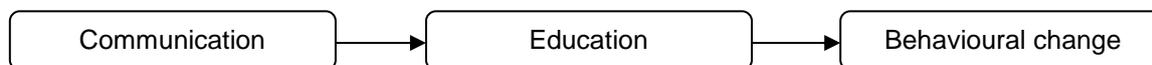
## Introduction

Interpretation has undergone a great deal of development from the time that it was first defined by Tilden (1977), the father of interpretation, as "an educational activity which aims to reveal meanings and relationships through the use of original objects, by first hand experiences, and illustrative media, rather than simply to communicate factual information" (Tilden, 1977:8). Since then, various authors have attempted to define interpretation, and, as a result, different types of constructs were exposed as part of the definition. Authors like Orams (1996), Moscardo (1998) and Ward and Wilkinson (2006) highlighted the term communication in their definitions [e.g. "the communication and learning of

ideas and concepts to convey appreciation for the natural environment" (Orams, 1996:45); "interpretation is communicating the significance of the place people are visiting" (Moscardo (1998:5); and "interpretation is an artful form of communication that rather focuses on ideas and relationships than factual information" (Ward & Wilkinson, 2006:2)]. Before long, interpretation definitions were either centred on visitors that include terms like 'communication', 'understanding', 'significance' and 'changes in perceptions' or centred on management that include terms like 'education', 'appreciation', 'protection' and 'changes in behaviour' (Moscardo & Ballantyne, 2008:239). Comparing all the various definitions of interpretation that

exist, three prominent terms or constructs can be identified to explain interpretation. These are 'communication', 'education' and 'behavioural change'. After careful

consideration, these three constructs can be used to explain the functioning of interpretation as illustrated in Figure 1.



**Figure 1: The functioning of interpretation**

**Source: Author's own figure based on definitions of interpretation**

It is argued that interpretation is similar to the term communication; however interpretation is the preferred term to use within the tourism context (Carmody & Prideaux, 2011:92). Interpretation thus incorporates the various ways in which the destination seeks to communicate with its visitors (Moscardo & Ballantyne, 2008:238). Given that communication can be considered as the transfer of information (Buckley, 2010:316) as portrayed in Figure 1, the received information should be processed to result in learning (Moscardo, Woods & Saltzer, 2004:242). This is better understood by the term 'education', the second construct within the functioning of interpretation. Seeing that learning (i.e. education) involves a relatively permanent change in behaviour (Myers, 2010:287) the last construct in the functioning of interpretation can be regarded as behaviour or a change towards conservation behaviour. Specifically within the ecotourism context, this behaviour or change in conservation behaviour explicitly refers to visitors' actions in the park being more in line with respect to sustain and protect the environment (Tubb, 2003:476) and ultimately one of the goals of interpretation (i.e. to protect resources). Orams (1996:47) also explains that, initially, the interpretation programme facilitates education and learning and then subsequently changes attitudes and behaviour that are more in line with environmentally and ecologically sound behaviour; from passively minimising disturbances on the environment to actively contributing to the health of the environment.

The behaviour explained above is particularly important within South Africa's national parks, as the parks' main objective is to conserve and protect the environment (National Parks Act 57 of 1976). The governing body of South African National Parks' or SANParks' five-year strategic plan explains that the conservation pillar of SANParks is regarded as the basis upon which the other two sub-pillars' programmes and activities (i.e. responsible tourism and constituency building towards a people-centred conservation and tourism mandate) are directed (SANParks, 2014b:24). However, conservation has been quite a difficult task to perform. Public funding to national parks to sustain and protect the environment, and especially SANParks, has decreased in real terms (Powell & Ham, 2008:477; Eagles, 2014:534). To be able to protect the environment therefore requires national parks, and especially SANParks, to see ecotourism management as equally important as conservation management. This is because the tourism function brings about the sustainability of SANParks' conservation performance, seeing that 80% of the income for the national parks is from tourism activities (SANParks, 2013a:5; SANParks, 2014c:12). As a result, SANParks has developed the 2022 Responsible Tourism Strategy that lays a sustainable foundation for tourism to be able to conserve (SANParks, 2013b:3). Different improvement aspects are highlighted in the strategy, such as business tourism, wilderness experiences (like bush braais and walking trails), better food establishments, connecting to communities, beneficial partnerships,

adventure trails, green development and less congestion (SANParks, 2013b:11). Even though these objectives address visitor expectations and are arguably important to obtain revenue for conservation, the service expected by well-educated visitors to national parks (Eagles, 2004:19; Jurdana, 2009:270), is interpretation, which directly contributes to conservation and, surprisingly, is not part of the strategy. Talsma and Molenbroek (2012:2149) explain that eco-tourists' demand is not absolute and changes over time and hence the park needs to adapt to these changing needs. Khan (2003:112), Eagles (2004:19), Jurdana (2009:270) and Kang and Gretzel (2012:442) explain that visitors to national parks are well educated and expect information-rich experiences, hence the importance of interpretation as a means of managing visitors' educational expectations (Saayman, 2009:358). Not only does interpretation fulfil educational expectations, but also leads to a range of benefits such as adding value to the tourism experience, increased satisfaction, loyalty, increased purchasing, increased revenue, visitors spending more time at the national park, encouraging other visitors to visit the park, and providing positive word-of-mouth referrals for the park (Moscardo, 1998:4; Hwang, Lee & Chen., 2005:152; Ham & Weiler, 2006:2; De Rojas & Camarero, 2008:528,533; Zeppel & Muloin, 2008:285; Lee, 2009:741; Ballantyne, Packer & Sutherland, 2011:771; Engelbrecht, 2011:80).

Interpretation is specifically a point of concern in the Kruger National Park since Engelbrecht (2011:75) found that there is a significant gap between what visitors expected and what they have experienced. Established in 1898 (SANParks, 2014a), the Kruger National Park has existed for more than a century. Considering the fact that the Kruger National Park is considered to be the flagship national park, where its activities comprise approximately 74% of all activities performed in SANParks (SANParks, 2011:32), and 85% of SANParks' operational costs are funded from the revenue obtained from this park's

tourism revenue (SANParks, 2013a:5), one can argue that this is specifically a service in which SANParks should invest to fulfil their main objective (i.e. conservation). Furthermore, literature indicates that interpretation leads to a change in behaviour to be more in line with sustaining and protecting the environment. This highlights the importance of interpretation for national parks and hence why Orams (1995:92) explains that an effective interpretation programme may be a means by which nature-based tourism can truly become ecotourism. To assess the need for and importance of interpretation services to be included in the Kruger National Park's services, the aim of this study is to determine whether the Kruger National Park's interpretation services have an impact on visitors' behaviour in support of the park's conservation practices.

### **Literature review**

A very important aspect to consider in using structural equation modelling (hereafter referred to as SEM and discussed later in the method of research) is that this technique is a confirmatory rather than an exploratory technique (Schmidt & Hollensen, 2006:511; Cohen, Manion & Morrison, 2011:693; Malhotra, Baalbaki & Bechwati, 2013:711) which is dependent on derived hypotheses from theory to build and test the model (Hair, Black, Babin & Anderson, 2010:638; Malhotra et al., 2013:712). Hence, this study's outline is constructed in three sections (i) the classification of interpretation; (ii) the theory of planned behaviour; and (iii) the cognitive dissonance theory that explores theory related to interpretation to construct certain hypotheses.

### **Classification of interpretation**

To date there is no single classification of interpretation that is used consistently throughout the literature, and as a result, authors refer to various classifications of interpretation. Those most frequently used include Tilden (1977), Stewart, Hayward, Devlin and Kirby (1998), Kuo

(2002), and Ward and Wilkinson's (2006) classifications. The most simplified classifications, that, in a sense, correspond with one another, are those from Tilden (1977) and Ward and Wilkinson (2006) which respectively referred to 'attended' (i.e. person-to-person such as educational talks) and 'unattended' (i.e. no personal contact such as educational displays) interpretation and 'personal' and 'impersonal' interpretation. These two authors specifically focus on the educational aspect of interpretation. Other authors like Stewart et al. (1998) and Kuo (2002) have provided more complex classifications. Interestingly enough, these authors' classifications also correspond with one another. Stewart et al. (1998:260-261) refer to 'primary' (readily identifiable and promoted to the purpose of conservation message and dissemination of information), 'secondary' (not readily identifiable as interpretation but supplementary to and an integral

feature to enhance the experience of primary interpretation), and 'tertiary interpretation' (not always considered to be interpretation based on its obscurity but impacts the experience of the place). Kuo (2002) on the other hand states that 'hard' (correlates with 'tertiary' and, in a sense, with 'secondary' interpretation based on the fact that these two are not readily identifiable) that refers to physical, regulatory and economic visitor management techniques; and 'soft' interpretation (which correlates well with 'primary' interpretation) that refers to educational messages, can be identified. After careful consideration one can conclude that all these classifications correspond with one another as illustrated in Figure 2.

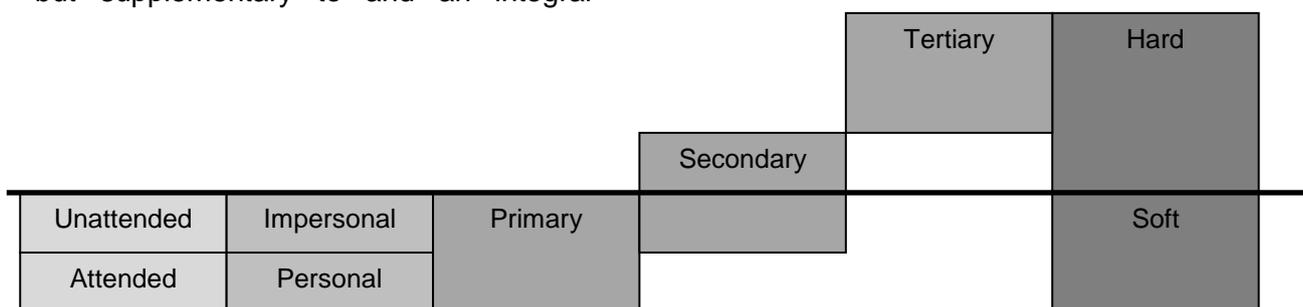


Figure 2: Classifications of interpretation  
 Source: Author's own compilation

As shown in Figure 2, the classifications correspond below the horizontal line based on the educational aspects where 'primary interpretation' or 'soft interpretation' can be conducted either in person (i.e. attended) or not in person (i.e. impersonal). Consequently, the classifications of interpretation that are not readily identifiable as interpretation but still regarded as part of interpretation occur above the horizontal line. The best explanation of interpretation classifications can thus be regarded as the classification by Stewart et al. (1998) and will be used for the purpose of this study. It is important to note, however, that since 'secondary' and 'tertiary interpretation'

corresponds well with 'hard interpretation' these two will be combined together and referred to 'secondary interpretation' for this study. Furthermore, when referring to 'primary' and 'secondary interpretation' one is also referring to the other classifications of interpretation that coincide with this classification.

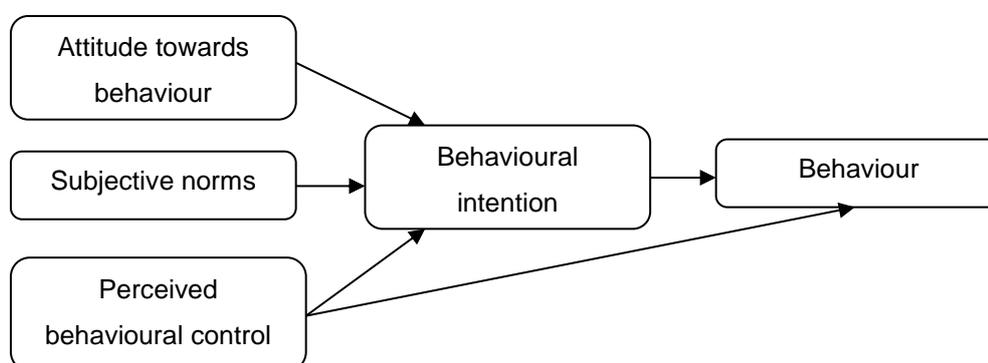
It is common knowledge that interpretation (i.e. a combination of 'primary', 'secondary' and 'tertiary interpretation') influences visitors' actions to be more in line with respect for the environment (Tubb, 2003:476), philanthropic support for conservation and general environmental behaviour (Powell & Ham,

2008:484) and hence a change in behaviour (Moscardo & Ballantyne, 2008:239). General environmental behaviour includes aspects such as donating money for conservation, writing letters to government pertaining to the environment, joining conservation organisations, avoiding the use of certain products due to their impact on the environment, recycling at home, reading about the environment, voting for elected officials due to their support for the environment and attending meetings in the community with regards to the environment (Powell & Ham, 2008:480). One of the theories which explain how interpretation influences behaviour is the theory of planned behaviour (TPB).

2007:87; Sparks, 2007:1182). This is illustrated in the Figure 3.

### Theory of planned behaviour (TPB)

Ajzen's (1991) TPB proposes that attitudes, subjective norms, and perceived control predict behavioural intentions and that behavioural intentions, in turn, determine behaviour (Crisp & Turner,



**Figure 3: The theory of planned behaviour**  
**Source: Ajzen (1991:182)**

In Figure 3, 'attitudes' refer to the degree to which a person has a favourable or unfavourable evaluation of the behaviour in question; whereas the 'subjective norms' refer to perceived social pressure to or not to perform the behaviour; and 'perceived control' refers to perceived ease or difficulty of performing the behaviour and is also presumed to reflect on past experience (Ajzen, 1988:4; 1991:188; Crisp & Turner, 2007:87; Powell & Ham, 2008:472). As indicated by the arrows in the figure, the theory also indicates that 'perceived behavioural

control' and 'behavioural intention' can directly be used to predict behaviour (Ajzen, 1991:184).

Hughes, Ham and Brown (2009:51) found that the TPB approach enables park managers to identify and measure attitudes with regard to a specific behaviour and enables managers to identify why a specific interpretation message did not work. Powell and Ham (2008:484) also found that interpretation not only influenced knowledge, but attitudes and intentions related to pro-

conservation behaviour confirming the TPB. Authors like Lee and Moscardo (2005) and Peake, Innes and Dyer (2009) used the TPB as reference in the design of their studies but did not pertinently measure certain aspects of the theory. Ajzen (1991:206) explains that even though 'attitudes', 'subjective norms', 'perceived control' and the 'intention to behave' reveal different aspects of behaviour, each of these can serve as a point of attack to change behaviour.

Influencing 'subjective norms' and 'perceived control' is a fairly easy task to accomplish with tertiary interpretation in a park (through physical, regulatory and economic visitor managing techniques) since the visitor has no choice to conform to these management requirements to visit the park. A more difficult task to manage or influence through interpretation services is the 'attitudes' of visitors. Specific attention will therefore only be paid to 'attitudes' and 'behaviour' for this study. Attitudes can be deduced from cognitive (e.g. a belief that a behaviour is wrong or appreciation towards a behaviour), affective (e.g. expressions of admiration or increased heart rate) and conative (e.g. intention to encourage others to participate) verbal or non-verbal expressions (Ajzen, 1988:5) that can either be a positive or negative evaluation of the specific behaviour (Ham, 2007:42).

Based on the information above 'attitudes' influence the 'behaviour' of a person according to the TPB and hence the presented hypothesis:

H<sub>1</sub>: Attitudes have an influence on behaviour.

This study investigates the TPB within the interpretation context and hypothesises that interpretation influences 'attitudes' which, in turn, influence 'behaviour' (as presented in H<sub>1</sub>). Considering that interpretation is a combination of 'primary' and 'secondary interpretation', H<sub>2</sub> is presented:

H<sub>2a</sub>: Primary interpretation has an influence on attitudes.

H<sub>2b</sub>: Secondary interpretation has an influence on attitudes.

Seeing as there might be a positive influence from 'attitudes' to 'behaviour' as specified in H<sub>1</sub> and 'interpretation' has an influence on 'attitudes' (H<sub>2</sub>) the following mediating relationship can be concluded:

H<sub>3a</sub>: Attitudes are a mediator between primary interpretation and behaviour.

H<sub>3b</sub>: Attitudes are a mediator between secondary interpretation and behaviour.

Even though the influence from 'attitudes' to 'behaviour' is plausible, the direction between 'attitudes' and 'behaviour' can be reversed since a person's attitudes can be created from his observations of his own behaviour (Crisp & Turner, 2007:91). This effect is known as the cognitive dissonance theory discussed next.

### **Cognitive dissonance theory**

Festinger's (1957) cognitive dissonance theory suggests that (i) dissonance is psychologically uncomfortable and motivates people to achieve consonance; and (ii) in state of dissonance, people will avoid information and situations that might increase dissonance. The term is thus used to describe an uncomfortable feeling that a person may experience when that person holds two or more inconsistent beliefs and then behaves in a way that is inconsistent with the way the person has behaved before where certain situations can either change their behaviour or can rationalise their refusal to change their behaviour (Eunson, 2008:431). People feel terrible when they perform an action (behaviour) that is inconsistent with their attitudes and avoid this dissonance by adapting their attitude to the behaviour (Crisp & Turner, 2007:91). H<sub>4</sub> is thus based on the cognitive dissonance theory:

H<sub>4</sub>: Behaviour has an influence on attitudes.

Little research has been done on the cognitive dissonance theory within the interpretation context that highlights the importance of this approach for future

research. Some of the authors that have attempted this approach but did not test it empirically are Christie and Mason (2003) and Orams (1994; 1995). Christie and Mason (2003:5) explain that cognitive dissonance is achieved when interpretation programmes are designed to challenge the visitor's belief system by putting questions in their mind. Orams (1994:24) specifically refers to a cognitive dissonance example where interpretation communicates the negative impact on the environment when littering in a park when visitors have always done so, in order to create inconsonant elements.

As explained earlier, tertiary interpretation in a park (i.e. part of 'secondary interpretation' for the purpose of this study) unknowingly enables visitors to conform to management requirements through physical, regulatory and economic visitor managing techniques and hence manipulates visitors to perform behaviour. Hence the relationship between

'interpretation' and 'behaviour' can also be hypothesised.

H<sub>5a</sub>: Primary interpretation has an influence on behaviour.

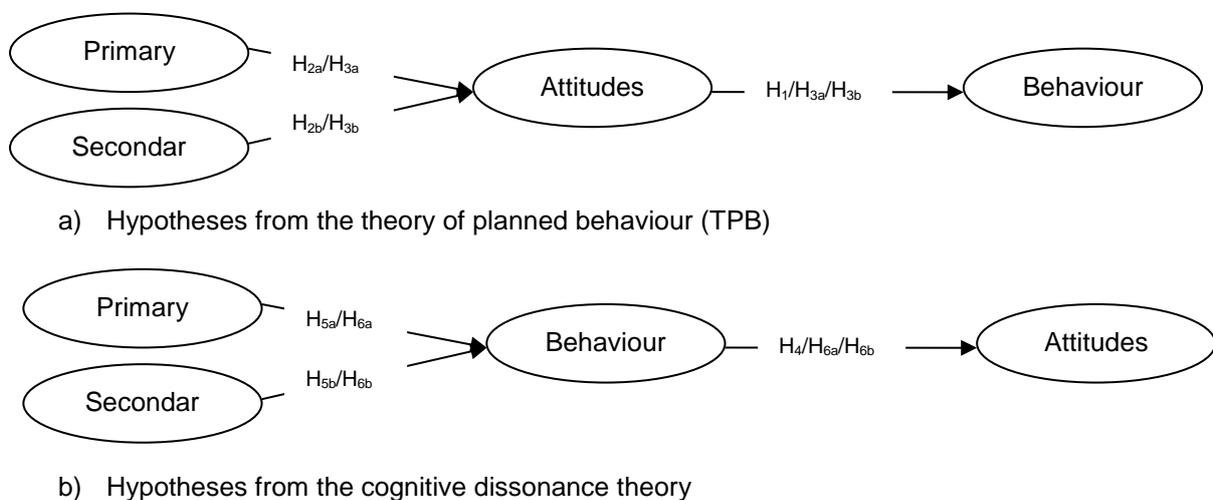
H<sub>5b</sub>: Secondary interpretation has an influence on behaviour.

Considering H<sub>5</sub> and H<sub>4</sub> (the cognitive dissonance theory) the following hypotheses are deduced:

H<sub>6a</sub>: Behaviour is a mediator between primary interpretation and attitudes.

H<sub>6b</sub>: Behaviour is a mediator between secondary interpretation and attitudes.

The hypotheses deduced from the theories above are presented in Figure 4.



**Figure 4: Hypothesised models**

From the literature review, it is reasonable to deduce that interpretation can assist the Kruger National Park to achieve their conservation goals through the TPB as well as, or alternatively through, the cognitive dissonance theory. Not only will the park be able to conserve the environment through interpretation but, as explained earlier, may enjoy other benefits that interpretation leads to such as adding

value to the tourism experience, increased revenue, visitors spending more time at the park, encouraging other visitors to visit the park, and providing positive word-of-mouth referrals.

### Methodology

This study made use of the SEM technique, which is defined as "a

procedure for estimating a series of dependence relationships between a set of concepts or constructs represented by multiple measured variables and incorporated into an integrated model" (Malhotra et al., 2013:710). Albeit similar to estimating a series of multiple regression equations, the SEM is a technique that explicitly takes measurement error into account and estimates what the relationship would be without the measurement error (Hair et al., 2010:637; Malhotra et al., 2013:710) and thus the preferred method to use for this study. Conducting a SEM involves certain steps that, in reality, refer to two phases. Phase one includes the design of the measurement model by means of a confirmatory factor analysis, and phase two includes the structural model which identifies the interrelationships among constructs of the first phase, by means of path analysis (Blanche, Durrheim & Painter, 2006:263; Hair et al., 2010:654; Malhotra et al., 2013:715) and hence discussed in this order in the following sections.

### **Phase one: measurement model**

The following four sections explain the measurement model.

#### **Defining the individual constructs**

As explained in the literature, the latent constructs for this study are 'primary' and 'secondary interpretation' as well as 'attitudes' and 'behaviour' which were measured on two separate Likert scales. The first Likert scale asked respondents to indicate how well they have experienced the park's interpretation services on a scale ranging from 1 = Excellent to 5 = Very poor (hereafter referred to the interpretation scale). The second Likert scale determined visitors' level of agreement with attitudes and behaviour as a result of the experience with the interpretation services in the park where 1 = Strongly disagree to 5 = Strongly agree (hereafter referred to the behaviour scale). The questions or items on both of these scales were designed based on the following authors' work to adhere to

construct validity: Thorndike (1911); Ajzen (1988); Orams (1994; 1996); Lee and Balchin (1995); Moscardo (1998); Stewart et al. (1998); Kuo (2002); Tubb (2003); Frauman and Norman (2004); Madin and Fenton (2004); Hwang et al. (2005); Periera (2005); Reisinger and Steiner (2006); Ward and Wilkinson (2006); Ham and Weiler (2007); Ballantyne, Packer and Hughes (2008); De Rojas and Camarero (2008); Mitsche, Reino, Knox and Bauernfeind (2008); Powell and Ham (2008); Zeppel and Muloin (2008); Lee (2009); Lee, Lee, Kim and Mjelde (2010); Ballantyne et al. (2011); and Henker and Brown (2011).

### **Develop and specify measurement model**

From Figure 4 it is clear that 'primary' and 'secondary interpretation' are the only two latent constructs that are identified as exogenous constructs (i.e. cannot be explained by any other construct or variable) and thus seen as independent variables (Hair et al., 2010:637; Malhotra et al., 2013:713). These two constructs' observed variables are thus referred to as X-variables. Consequently 'attitudes' and 'behaviour' are identified as endogenous dependent latent constructs and observed variables are known as Y-variables (Hair et al., 2010:637; Malhotra et al., 2013:714). Even though the models are specified by theory, sample size and missing data are a great point of concern for a SEM to be performed.

### **Study design**

A few guidelines ensure that the same sample used in the measurement model can be used for the structural model.

### **Sample size and missing data**

Hoyle (2011:43) explains that although it is not clear as to exactly what constitutes a large sample, a sample of approximately  $n = 400$  should deliver satisfactory results for a SEM. Malhotra et al. (2013) however suggest required sample size based on latent constructs, number of measured variables for each latent construct as well

as communalities. For  $\leq 5$  constructs, each more than three measured variables and communalities of at least 0.5,  $n = 200$ ; when  $\leq 5$  constructs, with less than three measured variables or communalities less than 0.5,  $n = 300$ ; and when  $> 5$  constructs, less than three measure variables, and multiple low communalities,  $n = 400$  (Malhotra et al., 2013:717). Considering the fact that communalities cannot be established before the collection of data, Hoyle's (2011) suggestion was considered for the purpose of this study.

This study followed a quantitative research approach by means of a self-administered questionnaire where data was collected in two phases: (i) phase one in the southern region in of the Kruger National park took place in Satara, Skukuza, Lower Sabie, and Berg en Dal rest camps between 27 December 2011 and 3 January 2012; (ii) phase two was carried out in the northern region of the park in Olifants, Letaba, Mopani, Shingwedzi and Punda Maria rest camps from 24 June to 2 July 2012. For both of these phases, fieldworkers were assigned to a specific area in each rest camp for approximately two days to distribute questionnaires. Before distribution began, the fieldworkers were briefed on the goals and the content of the questionnaire and instructed to distribute only one questionnaire per overnight travelling group. The purpose of the study was explained to the potential respondent and assurance given that their participation is voluntary and that they may withdraw from the study at any time. As the distribution of questionnaires progressed through the park fieldworkers were also instructed to distribute questionnaires to potential respondents who had not previously completed a questionnaire. Questionnaires were then captured for analysis of both the northern and southern regions.

Considering that missing data should be remedied before the estimation procedure (Hair et al., 2010:660), cases with missing data were deleted (i.e. listwise or complete case deletion that has missing

data) from the appropriate Likert scales and resulted in  $n = 429$ . Considering Hoyle (2011) and Malhotra et al.'s (2013) suggestion for required sample size this sample size is sufficient for data analyses.

Respondents who participated in this study were predominantly male (58%), an average of 47 years of age, speak Afrikaans (61%), married (78%), live in Gauteng (47%), are well educated [i.e. have a diploma or degree (39%)], earn more than R555 000 annually (31%), drive a 4x4 (37%), initiated the visit to the park themselves (56%), have accompanying children (71%), have an average of 4 people in their travel group, pay for an average of 3 people, own a Wild Card (78%), stay an average of 8 nights in the park, heard about the Kruger National Park through friends and family (60%) and previous visits (63%) and are not members of a conservation organisation (77%).

### **Estimation method**

For the purpose of this study, the Maximum Likelihood estimation (ML) procedure was used within the Analysis of Moment Structures programme (i.e. AMOS). AMOS uses a graphical interface to construct the hypothesised paths (AMOS, 2013). The ML procedure finds a set of free parameters that maximises the likelihood of the data given the specified model (Hair et al., 2010:663; Hoyle, 2011:38) and delivers estimates that are the most precise of the estimates available with minimum variance (Savalei & Bentler, 2006:341; Wang & Wang, 2012:15).

### **Determining measurement model validity**

The validity of the measurement model depends on the (i) construct validity (i.e. convergent and discriminant validity), (ii) reliability and evidence of (iii) goodness-of-fit results [known as the chi-square test that should be non-significant, i.e.  $p > .05$  (Muijs, 2012:377)] (Malhotra et al., 2013:717). This is known as the

confirmatory factor analysis (Muijs, 2012:377).

Convergent validity refers to the extent to which the scale correlates with other measures of the same construct (Malhotra, 2007:287; Zikmund, Babin, Carr & Griffin, 2010:308; Malhotra et al., 2013:720) and discriminant validity refers to a construct that is distinct from other constructs and individual items therefore only load on one latent construct (Zikmund et al., 2010:308; Malhotra et al., 2013:720). Even though a SEM is based on theory (Malhotra et al., 2013:715) and therefore assembled without any prior knowledge from an exploratory factor analysis (EFA) (Schmidt & Hollensen, 2006:513), Stevens (2009:348) explains that the theory can be based on previous empirical research, the current thinking on the particular field, the researcher's own hypotheses about the variables, or any combination of these. The results from an EFA can thus be used as a motivation for establishing the pattern of loadings for a confirmatory factor analysis (Schmidt & Hollensen, 2006:513-414). Based on this, and the fact that this study made use of newly developed Likert scales, the Promax rotation with Maximum Likelihood factoring (i.e. the EFA) was applied first to determine the convergent and discriminant validity before the confirmatory factor analysis (CFA) was performed.

Complying with factor analysis assumptions, the Bartlett's test of sphericity and Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy for both the interpretation and behaviour scales were determined to ascertain whether an EFA could have been conducted for these scales. A factor analysis is appropriate when the Bartlett test for sphericity indicates a  $p$ -value  $\leq .05$  (i.e. significance) (Bartlett, 1954) and the KMO a minimum value of 0.6 (Kaiser, 1970; 1974). Only eigenvalues above 1 were used as guidance to the number of factors to retain. Stevens (2009:332-333) explains that for a sample of 400, loadings of variables should at least be 0.258, but ideally above 0.7 to comply with convergent validity (Hair et al., 2010:709).

Furthermore, the average of the four largest loadings per latent construct is considered reliable when it is greater than 0.60 (Stevens, 2009:333). Hence items with factor loadings above 0.4 (ideally above 0.7), average of the four largest factor loadings above 0.60, and items with high communalities (preferably  $> 0.5$ ) indicated convergent validity, whereas items that did not cross-load, and an indication of discriminant validity, were retained for the CFA.

For the CFA, the average variance extracted (AVE - calculated by dividing the sum of the standardised square loadings with the sum of the standardised square loadings added to the measurement error) should be above 0.5 (Fornell & Larcker, 1981:46; Said, Badru & Shahid, 2011:1099) and correlations between constructs should be below 0.7 (Malhotra, 2007:287) to determine convergent and discriminant validity respectively.

The reliability of each latent construct was also determined by the Cronbach alpha. Both the EFA as well as the CFA should indicate  $\alpha > 0.6$ , since a reliability coefficient below 0.6 indicates that the scale has poor reliability and unsatisfactory internal consistency (Zikmund et al., 2010:306; Malhotra, 2007:285).

The goodness-of-fit measures indicate how well the specified model reproduces the observed covariance matrix among the observed variables (Hair et al., 2010:664). One of the measures is the chi-square test which should be non-significant, i.e.  $p > .05$  (Muijs, 2012:377). Since this test will detect even very small deviations from the data with large samples, other fit indices are also necessary to consult that are not sensitive to sample size (Muijs, 2012:377). A CFI (comparative fit index) closer to 1, RMSEA (root mean square residual) closer to 0 (preferable  $\leq 0.08$ ), a GFI (goodness of fit) above 0.90 and higher values for PNFI (parsimony normed fit index) reveals a good fit for a model (Wang & Wang, 2012:18; Malhotra et al., 2013:718-719).

Among these measures, the least affected by sample size are the CFI and RMSEA.

### Phase two: structural model

The following two sections explain the structural model.

#### Specify structural model

Different from the measurement model, which focused on the relationships between latent constructs and observed variables, the structural model shifts to the nature and magnitude of relationships between latent constructs (Malhotra et al., 2013:721). Since this study examined two theories within the interpretation context which contradict each other (TPB indicates that attitudes influences behaviour, whereas the cognitive dissonance theory states that behaviour influences attitudes), two separate structural models were specified based on the results from the EFA and CFA.

Given that the focal point of the structural model is based on the magnitude and relationships between latent constructs, Pearson's correlations are calculated to describe the strength and direction of the linear relationship between continuous variables (Pallant, 2011:128) before the structural models were developed. The correlation coefficient is indicated by  $r$  that ranges from  $-1$  (perfect negative relationship) to  $+1$  (perfect positive relationship) (Dancey & Reidy, 2004:170; Zikmund et al., 2010:559; Pallant, 2011:128) that also indicate the strength of the relationship. The further the coefficient is from 0 (i.e. the closer to  $-1$  or  $+1$ ) the stronger (positive or negative) the relationship or larger the effect (Hanna & Dempster, 2012:191). According to Cohen (1988:79-81) a small effect is when  $.10 \leq r \leq .29$ ; a medium effects is when  $.30 \leq r \leq .49$ ; and a large effects is when  $.50 \leq r \leq 1.0$ . Even though the correlation coefficient might be statistically significant, the practical significance of large samples necessitates the calculation of shared variance (i.e.  $r^2$ ) to determine practical

significance (Pallant, 2011:125). The larger the degree of overlap, the larger the correlation or the degree to which the two variables overlap and co-vary (Hanna & Dempster, 2012:191). A perfect correlation of 1 will result in a perfect 100% overlap of the two variables (Hanna & Dempster, 2012:191).

#### Determining structural model validity

The same goodness-of-fit measures (i.e. CFI, RMSEA, GFI and PNFI) discussed in measurement validity also apply for determining the validity of the structural model. This time, however, the magnitude of relationships based on the hypotheses is also tested from the structural models.

#### Results

The results of the EFA, CFA, Pearson correlations as well as the SEM are discussed in the following sections.

#### Results of the exploratory and confirmatory factor analysis

Since the results from the EFA can be used as a motivation for establishing the pattern of loadings for the CFA, both the EFA and CFA are discussed next.

#### EFA

To fulfil construct validity, factor analyses was performed on both the interpretation and behavioural items. The factor analysis was performed several times in a process to eliminate items that were not in agreement with construct validity. After several factor analyses, the pattern matrix of the Maximum Likelihood factor analysis with Promax rotation and Kaiser normalisation identified two factors for interpretation, labelled **Factor 1**: primary interpretation and **Factor 2**: secondary interpretation as well as two factors for behaviour, **Factor 1**: attitudes and **Factor 2**: behaviour. For both the interpretation as well as the behavioural EFA's the Bartlett tests revealed  $p \leq .05$  and KMO's of  $.90$  and  $.91$  respectively.

**Table 1: Results from the EFA to test construct validity and reliability**

Items retained for CFA and related factors		Commun.	Loading	Ave. (four highest loadings)	Construct reliability	Mean
<b>Factor: Primary interpretation</b>				.79	.90	3.00
14.7	Geological and climatological displays	.632	.805			
14.8	Educational displays	.629	.798			
14.10	Educational talks, activities and games for children	.561	.780			
14.6	Interpretation activities	.549	.766			
14.5	Auditorium with nature videos	.471	.693			
14.11	Information boards regarding the fauna/flora in the park	.535	.689			
14.9	Information regarding the history of the park	.500	.672			
14.12	Informed staff that can handle any queries concerning the interpretation aspects in the park	.435	.631			
14.4	Bird hides in the park	.310	.411			
<b>Factor: Secondary interpretation</b>				.83	.88	2.15
14.18	Enforcement of park rules and regulations	.804	.929			
14.17	Available route maps with descriptive information	.723	.871			
14.15	Good layout of the park, rest camps and routes	.562	.791			
14.16	Accessibility of the park	.625	.726			
14.22	Lifelike examples of different animals, insects, birds and trees with descriptive data	.449	.646			
14.3	Lookout points in the park	.328	.410			
<b>Factor: Attitudes</b>				.75	.91	3.90
15.6	I am a more loyal supporter of parks	.563	.842			
15.5	My park experience was more authentic (contact was fun, participatory and immediate)	.446	.729			
15.10	I have a stronger viewpoint on conservation issues	.599	.720			
15.14	I encourage family and friends to be more conscious about conservation	.604	.690			
15.17	I have the confidence to express my views concerning conservation on the social media and in conversations	.525	.686			
15.12	I tend to visit more nature-based products	.542	.661			
15.15	I had a better experience/level of satisfaction at the park	.352	.640			
15.2	I implement recycling and energy saving methods at home to lessen my impact on the environment	.404	.612			
15.9	I watch more environmental programmes on television	.514	.611			
15.11	My children are more knowledgeable	.392	.607			
<b>Factor: Behaviour</b>				.82	.88	3.16
15.7	I actively search for information about environmental conservation	.792	.906			
15.8	I do volunteer work for groups that help the environment	.488	.730			

Taking the sample size into consideration ( $n = 429$ ), all the items in Table 1 indicated convergent validity. All the factors have high loadings ( $> 0.6$ ) except for the items 'Bird hides in the park' (.411) and 'Lookout points in the park' (.411) for the factors 'primary' and 'secondary interpretation' respectively. Furthermore all the items indicated an average of item loadings per latent construct above 0.7.

All the items also indicated relative high communalities except for the items 'Auditorium with nature videos' (.471), 'Informed staff that can handle any queries concerning the interpretation aspects in the park' (.435), and 'Bird hides in the park' (.310) for '**primary interpretation**'; 'Lifelike examples of different animals, insects, birds and trees with descriptive data' (.449) and 'Lookout points in the park' (.328) for '**secondary interpretation**'; 'My park experience was more authentic (contact was fun, participatory and immediate)' (.446), 'I had a better experience/level of satisfaction at the park' (.352), 'My children are more knowledgeable' (.404), 'I implement recycling and energy saving methods at home to lessen my impact on the environment' (.392) for '**attitudes**'; and only 'I do volunteer work for groups that help the environment' (.488) for '**behaviour**' which were below 0.5.

The Pattern matrix indicated that none of the items retained cross-loaded, which points towards discriminant validity. As a result of construct validity, 'primary interpretation' had nine items retained for the CFA, whereas 'secondary interpretation' had six items. 'Attitudes' resulted in 11 items whereas 'behaviour' had only two items retained. These results prove that all the latent constructs are over-identified except for 'behaviour' which has two items. To test the reliability of the items retained per latent construct, the Cronbach alphas were calculated and resulted in .90 and .88 for 'primary' and 'secondary interpretation' respectively; whereas the 'attitudes' and 'behaviour's' Cronbach alphas were .91 and .88 respectively.

Lastly the mean values of the latent constructs revealed interesting results. Visitors indicated that they have experienced the park's 'primary interpretation' services fairly (3.00) and the 'secondary interpretation' quite good (2.15) whereas they agreed that their 'attitudes' are a result of the interpretation services (3.90) but felt neutral with regards to the effect of interpretation services on their 'behaviour' (3.15).

## CFA

Since one of the latent factors (i.e. 'behaviour') was under-identified, the CFA was constructed by imposing tau-equivalence. Tau-equivalence requires all factor loadings on a latent construct to be equal (Hair et al., 2010:706) and hence set for this study to 1. The CFA of the items retained from the EFA also resulted in construct validity. The AVE (should be above 0.5) resulted in 0.49 for 'primary interpretation' and 0.56 for 'secondary interpretation'; whereas 'attitudes' were 0.47 and 'behaviour' were 0.65, indicating convergent validity. Correlations between 'primary' and 'secondary interpretation' was 0.29 and between 'attitudes' and 'behaviour' 0.59 proving discriminant validity (should be below 0.7). However, comparing the AVE with discriminant validity [DV calculated as the square root of the AVE (Said et al., 2011:1099)] revealed that the DV is larger than the AVE (should be smaller) for the interpretation as well as the behaviour latent constructs and thus did not indicate discriminant validity.

## Results of the correlations

Table 2 captures the strength and direction of relationships between the latent constructs for the SEM.

Table 2: Correlations between latent constructs of SEM

Linear relationship between latent constructs		R	r <sup>2</sup>	Cov.	Sig.	(N)
Attitudes	Behaviour	.480	.230*	.330	.001 <sup>#</sup>	429
Attitudes	Primary interpretation	-.151	.022	-.082	.002 <sup>#</sup>	429
Attitudes	Secondary interpretation	-.285	.081	-.163	.001 <sup>#</sup>	429
Behaviour	Primary interpretation	-.132	.017	-.095	.006 <sup>#</sup>	429
Behaviour	Secondary interpretation	-.082	.006	-.063	.089	429

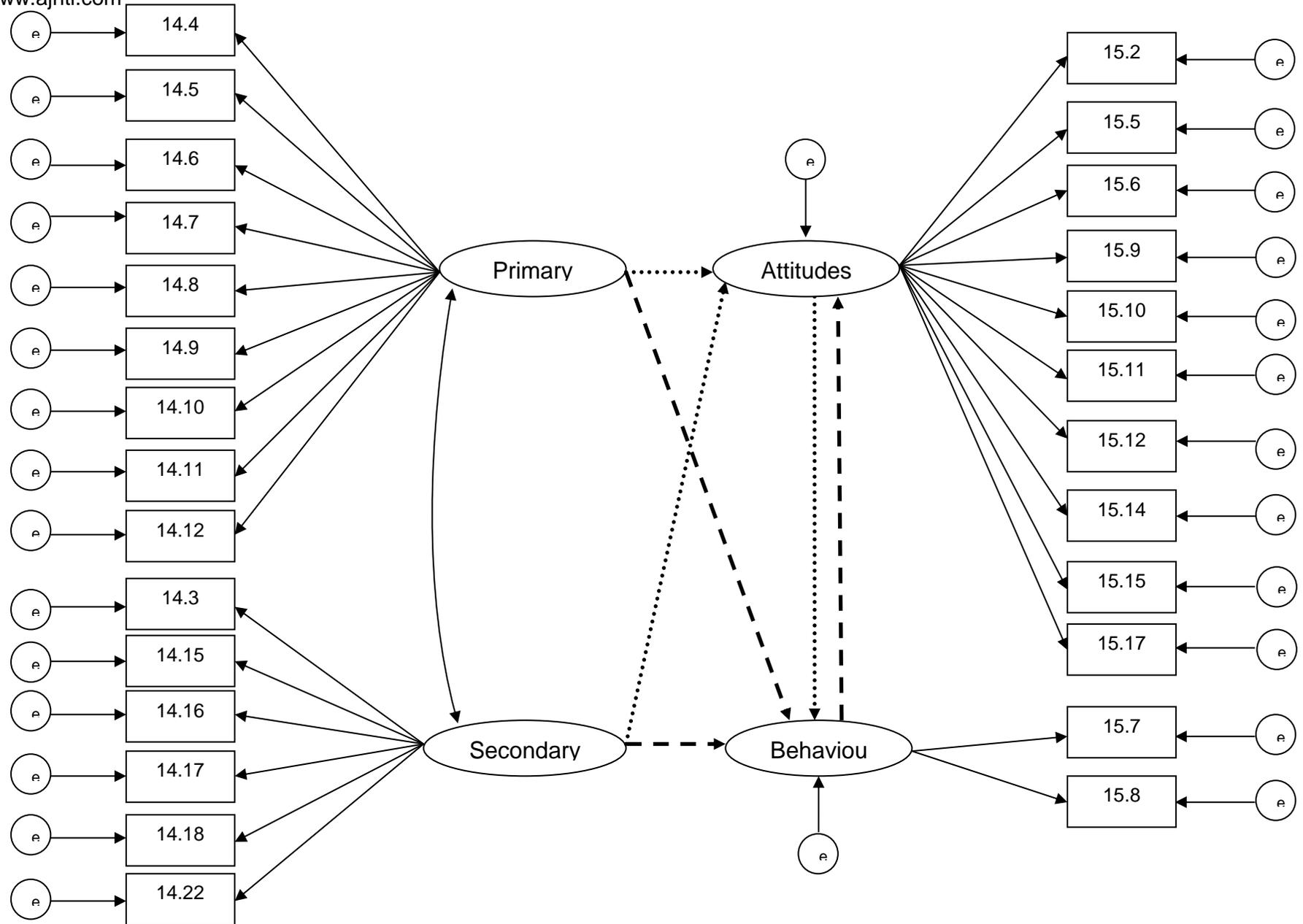
# indicates significant differences ( $p \leq .05$ )

\* $d = 0.2$ : small effect; \*\*  $d = 0.5$ : medium effect; \*\*\*  $d = 0.8$ : large effect

Table 2 reveals that all the relationships between latent constructs are fairly small ( $.10 \leq r \leq .29$ ) except for the medium relationship ( $.30 \leq r \leq .49$ ) between 'attitudes' and 'behaviour' ( $r = .480$ ). 'Attitudes' and 'behaviour' also show the only positive relationship between the latent constructs indicating that as 'attitudes' increase, 'behaviour' will also increase. All the linear relationships between latent constructs indicated statistical significance ( $p \leq .05$ ) except for the relationship between 'behaviour' and 'secondary interpretation'. Even though the results indicate that there are statistical significances, it is important to have a look at the effect sizes (i.e.  $r^2 =$  shared variance) of the latent constructs as this reflects the magnitude of difference between the mean scores (Carter, 2003:637,638). Once again, the only relationship that indicated an effect, which was small ( $d = 0.2$ ), is between 'attitudes' and 'behaviour' ( $d = 0.230$ ) and hence the degree of covariance of .330.

### Results of the structural equation models

Because this study made use of two theories within the interpretation context and based on the results from the EFA and CFA, the following structural models were specified (see Figure 5).



**Figure 5: Structural model**

(Note: ..... indicate the TPB and - - - indicate the cognitive dissonance theory)

### Theory of planned behaviour (TPB)

The results from the structural model based on interpretation and the TPB indicated that  $\chi^2 = 1143.275$ , standard deviation of 347 and statistical significance ( $p \leq .05$ ). All the goodness of fit measures indicated a well fitted model with a CFI of 0.872, GFI of 0.825, RMSEA of 0.073 and 90% confidence interval of .069 to .078; and PNFI of 0.759.

### Cognitive dissonance theory

The structural model from interpretation and the cognitive dissonance theory revealed similar results as the structural model based on the TPB and hence also a well fitted model. Results indicated an  $\chi^2 = 1168.900$  with a standard deviation of 347 and statistical significance of  $p \leq .05$ . The goodness of fit measures revealed that CFI = 0.868; GFI = 0.822; RMSEA = 0.074 and 90% confidence interval of .07 to .079; and PNFI = 0.755.

### Hypotheses

Since the structural models indicated good fit, the results for the hypotheses can be considered to determine the magnitude and relationships between latent constructs. Given that  $H_3$  and  $H_6$  were constructed as mediating hypotheses,  $H_3$  and  $H_6$  are not included in Table 3 but are accepted or rejected based on the results from the hypotheses in the table.

The results in Table 3 indicate that  $H_1$  ( $p = .001$ ) and  $H_4$  ( $p = .001$ ), the hypotheses constructed from the TPB and the cognitive dissonance theory are supported. This was expected from the correlations in Table 2 where  $r = .480$ . Both of these hypotheses indicate that 'attitudes' and 'behaviour' ( $\beta = .584$ ) and 'behaviour' and 'attitudes' ( $\beta = .605$ ) have a positive impact on each other, but different from the correlations, the SEM indicated different standard regression weights ( $\beta$ -value) for the two theories. The only other hypotheses that are supported ( $p \leq .05$ ) are  $H_{2b}$  (influence of 'secondary interpretation' on 'attitudes') for the TPB and  $H_{5a}$  (impact of 'primary

interpretation' on 'behaviour') for the cognitive dissonance theory. Even though these hypotheses are supported, it is interesting to note that these impacts are negative (i.e. the sign in front of the  $\beta$ -values). This implies that 'secondary interpretation' has a negative influence in forming visitors' 'attitudes' ( $\beta = -0.277$ ) and that 'primary interpretation' has a negative influence on visitors' 'behaviour' ( $\beta = -0.091$ ). Unexpectedly, 'primary interpretation's' influence in forming visitors' 'attitudes' (i.e.  $H_{2a}$ ) as well as 'secondary interpretation's' influence on visitors' 'behaviour' (i.e.  $H_{5b}$ ) was negative ( $\beta = -.068$  and  $\beta = -.091$  respectively) and furthermore both  $H_{2a}$  and  $H_{5b}$  are rejected since  $p > .05$ .

Since the only two hypotheses based on interpretation (i.e.  $H_{2b}$  and  $H_{5a}$ ) are accepted; only  $H_{3b}$  ('attitudes' is a mediator between 'secondary interpretation' and 'behaviour') and  $H_{6a}$  ('behaviour' is a mediator between 'primary interpretation' and 'attitudes') can be accepted although the influence from interpretation to either 'attitudes' or 'behaviour' is negative.

Table 3: Results of structural model hypotheses

Hypotheses				Stand. Reg. Weight	Estimate	Sig.
H <sub>1</sub>	Behaviour	←	Attitudes	0.584	0.692	.001 <sup>#</sup>
H <sub>2a</sub>	Attitudes	←	Primary interpretation	-0.068	-0.058	.187
H <sub>2b</sub>	Attitudes	←	Secondary interpretation	-0.277	-0.231	.001 <sup>#</sup>
H <sub>4</sub>	Attitudes	←	Behaviour	0.605	0.497	.001 <sup>#</sup>
H <sub>5a</sub>	Behaviour	←	Primary interpretation	-0.112	-0.115	0.045 <sup>#</sup>
H <sub>5b</sub>	Behaviour	←	Secondary interpretation	-0.091	-0.092	0.1

# indicates statistical significance ( $p \leq .05$ )

## Findings and implications

The following findings and implications can be deduced from the results of this study:

The **first finding** is that interpretation services can partially be classified according to Stewart et al.'s (1998) classification, which classified interpretation into primary, secondary and tertiary interpretation. The results from the EFA as well as the CFA disclosed that '**primary interpretation**' represents aspects such as Geological and climatological displays; Educational displays; Educational talks, activities and games for children; Interpretation activities; Auditorium with nature videos; Information boards regarding the fauna/flora in the park; Information regarding the history of the park; Informed staff that can handle any queries concerning the interpretation aspects in the park; and Bird hides in the park. Even though the results supports Stewart et al.'s (1998) primary interpretation, the results of this study also contradicts the authors' classifications, seeing that the EFA as well as the CFA verified that Stewart et al.'s (1998) secondary and tertiary interpretation should be combined into '**secondary interpretation**'. This is not unexpected, seeing that both of these interpretation services are not readily identifiable or always considered to be interpretation based on their obscurity, but have an impact on the experience with services (Stewart et al., 1998:260-261). The results indicate that 'secondary interpretation' comprises Enforcement of park rules and regulations; Available route maps with descriptive information; Good layout of the park, rest camps and routes; Accessibility of the park; Lifelike examples

of different animals, insects, birds and trees with descriptive data; and Lookout points in the park.

The **second finding** disclosed that visitors to the Kruger National Park are inclined to have positive attitudes towards conservation practices. The factor '**attitudes**' included items with strong viewpoints on matters of conservation. These positive attitudes are, however, not necessarily a result of the park's interpretation services seeing as results indicate that 'secondary interpretation' influenced 'attitudes' negatively as well as 'primary interpretation' with 'behaviour'. These positive attitudes could be a result of the type of visitor to the park. These results confirm research by Tubb (2003) who found that visitors' intentions to engage in certain "environmentally friendly" activities from pre-visit to post-visit did not vary. The positive attitudes of visitors seem to be in line with the fact that visitors to national parks are well educated, expect information-rich experiences and want to learn from the environment (Khan, 2003:112; Shultis & Way, 2006:232; Jurdana, 2009:270; Kang & Gretzel, 2012:442). Alternatively, visitors' attitudes can also be a result of direct experience (Ham, 2007:43) of the park. This is also not different in the Kruger National Park since the demographic profile of visitors indicated that they are well-educated and are repeat visitors with experience of the park and hence confirms research by Khan (2003), Shultis and Way (2006), Ham (2007), Jurdana (2009) and Kang and Gretzel (2012) that visitors to national parks are well educated. The fact that the visitors indicated that they felt neutral with regards to 'behaviour' towards conservation and that Kruger National Park's interpretation

influenced the visitors' 'attitudes' as well as their 'behaviour' confirms that there is a gap within the park's interpretation service, as Engelbrecht (2011) has found. Considering the wide acceptance of interpretation's positive impact on attitudes and behaviour, this matter is a point of concern for the park and leaves room for improvement.

The above two findings implies that since visitors' 'attitudes' are positively inclined towards conservation behaviour, and that interpretation influenced their 'attitudes' and 'behaviour' negatively, the park should make an effort to adjust this discrepancy to rather sustain positive attitudes than to detract from them. Clearly the interpretation services of the park do not fulfil the visitors' educational expectations and the park thus has to deliver an experience that will sustain visitors' attitudes. In view of the fact that 'primary interpretation' is readily identifiable as interpretation; the park should place priority on the development and implementation of 'primary interpretation' to address visitors' educational needs. Complimentary to 'primary interpretation', 'secondary interpretation' should also be developed and implemented as a second priority, as these services impact the experience of 'primary interpretation'. Furthermore, planning for interpretation also involves guidelines as to when the interpretation services or programmes should be re-evaluated. Ham, Housego and Weiler (2005:22), Ham and Weiler (2006:4) and Ward and Wilkinson (2006:223-224) emphasise re-evaluation since it measures the progress or success of interpretation, provides guidelines for improvement of the interpretation programmes, assesses the performance of the staff involved, calculates the economic efficiency, measures the impact on the visitors, demonstrates the benefits of a programme to relevant stakeholders and hence avoids costly mistakes.

In addition to the implication above, attitudes are an internal aspect of visitors that are rather difficult to influence or change with interpretation. Firstly, Ham

(1992) explains that visitors are non-captive and do not need to pay attention and, secondly, the window of communication opportunity (by means of any classification of interpretation) is too brief in many interpretive encounters to realistically expect strong and enduring attitude impacts (Ham, 2007:43). There is ample literature pertaining to effective development of interpretation to capture visitors' attention; however there is a lack in research explaining the importance of developing interpretation for younger markets. Creating and sustaining attitudes towards conservation from a young age will surely create a more responsible future generation with a lot more philanthropic behaviour. The Kruger National Park should therefore not only develop interpretation programmes to fulfil the current market's educational needs, but needs to keep its future markets in consideration. Ward and Wilkinson (2006:150) explain that youth are the most important populations to target, which will not only make a difference to the future of our planet but, through the children, adults can be influenced as well. Tilden (1977:9) recommends that interpretation programmes for children up to the age of 12, should follow a fundamentally different approach to the programmes delivered to adults. Ward and Wilkinson (2006:150-159) agree and state that children have different characteristics from adults (such as the fact that children are energetic, curious, and sensory bound) and suggest different interpretation programmes for different age categories (ages 2 to 6, 7 to 11 and teenagers), since these age categories have different levels of development.

The **third finding** is that 'attitudes' have a positive influence on 'behaviour' and that 'behaviour', in turn, has a positive influence on 'attitudes'. This confirms both Ajzen's (1991) TPB as well as Festinger's (1957) cognitive dissonance theory. These two theories, however, contradict each other. One theory indicates that attitudes impact behaviour (i.e. TPB) and the cognitive dissonance theory indicates the inverse effect (i.e. behaviour impacts attitudes). The results of this study,

however, supported both of these theories. It should be noted here that these theories were not developed within an eco-tourism context and the primary aim of explaining the effect of interpretation but the fact that both theories are supported within the eco-tourism, and especially within the interpretation context, might imply the development of a new theory. Seeing as previous studies have indicated a gap in the expectations and experience of the interpretation services of the park and that the results of this study indicated interpretation's negative influence on both attitudes and behaviour the relationship between attitudes and behaviour as a result of interpretation cannot be supported with certainty. It is thus strongly recommended that this study be replicated at other eco-destinations to confirm whether a new theory can be developed to explain this effect.

## Conclusion

The aim of this study was to determine whether the Kruger National Park's interpretation services had an impact on visitors' behaviour, causing it to be more in line with the park's conservation practices. Results indicated that even though visitors are inclined to positive attitudes towards conservation practices, the park's interpretation services have a negative influence on their attitudes. This once again confirms that the park's interpretation leaves room for improvement and that, if unchanged, this could detract from visitors' positive attitudes, decrease conservation behaviour, with the park being unable to comply with its conservation obligations. This study was the first of its kind to incorporate both the TPB as well as the cognitive dissonance theory to examine interpretation's influence on visitors' attitudes and behaviour. Interestingly, these two theories contradict each other, but both were supported in this study, which leaves room for a new theory to explain interpretation's influence on both attitudes and behaviour in an ecotourism context. It is therefore strongly recommended that this study be replicated

in other eco-tourism destinations to test this influence. Additionally, it is recommended that this study be replicated as a longitudinal study, to empirically test interpretation both before and after implementation, and thus test the effectiveness of interpretation.

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