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Measuring environmentally sustainable tourist behaviour

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ABSTRACT

This study reveals substantial variation in estimates of the proportion of tourists behaving in an environmentally sustainable manner. Results indicate that the variation is explained by (1) definitions of environmentally sustainable tourist behaviour including—or not including—intent to protect the environment and (2) the use of either unprompted open-ended or prompted closed questions. The latter are associated with respondent's tendencies to respond in a socially desirable way, thus artificially inflating the occurrence of environmentally sustainable tourist behaviour by as much as 74 per cent. Unprompted open-ended questions are not susceptible to social desirability bias. Future studies into environmentally sustainable tourist behaviour should measure actual observed behaviour. If this is not possible, unprompted open-ended approaches are recommended.

Introduction

Tourism activity affects destinations in many ways: economically, socially and environmentally. The present study focuses on the environmental dimension of sustainability in tourism. Tourism has a range of well-documented negative environmental consequences (Gössling, 2002; UNWTO & UNEP, 2008). Few governments take regulatory action to prevent such negative effects, possibly

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because it may reduce tourism demand, and simultaneously tourism revenues. Tourism industry also tends not to self-regulate, possibly because implementing environmentally sustainable measures increases operating expenses. Absorbing increased operating cost is particularly challenging for small and medium businesses typical for the tourism industry. Therefore, tourists may represent the most promising target when attempting to increase the environmental sustainability of tourism. Tourists can help to reduce this negative impact by making environmentally sustainable vacation decisions and behaving in an environmentally sustainable manner while at the destination.

In order to learn about environmentally sustainable tourist behaviour and assess the effectiveness of measures targeted at increasing the level of this behaviour by tourists, it is necessary to have clarity on what defines tourist behaviour which is environmentally sustainable. It is also necessary to be able to measure such behaviour validly. It is best, of course, to measure actual behaviour. Often, however, this is not viable either because it would be prohibitively expensive to observe the behaviour of large number of tourists or because there may be ethical considerations preventing such observation. As a consequence, researchers are frequently forced to rely on reported behaviour. It is for this reason that the present paper focuses on reported environmentally sustainable tourist behaviour. Specifically, the paper aims (1) to draw attention to the divergence of estimates about environmentally sustainable tourist behaviour, (2) identify reasons for this divergence and (3) arrive at recommendation to reduce it in future studies.

The paper is structured as follows: first previously used definitions of environmentally sustainable tourist behaviour are reviewed and—based on this review—a justification for the definition underlying the present study is provided. This definition contains intention to protect the environment as a key defining characteristic of environmentally sustainable behaviour. Next, a bibliographical study is conducted which provides insight into how environmentally sustainably tourism has been measured in the past and reveals that estimates about the occurrence of such behaviour vary dramatically. After that, an empirical survey study with 1039 respondents is conducted to determine the causes of this variation. Finally, based on the findings from the empirical study, recommendations about how to validly measure environmentally sustainable tourism in the future are provided.

The significance and key contribution of the present study lies in demonstrating the lack of agreement on the extent to which tourists engage in environmentally friendly behaviour and identifying the key reasons for the wide range of estimates using social psychological theories as the basis of understanding environmentally significant behaviour as well as the causes of socially desirable responding in survey studies.

Furthermore, the study is of theoretical importance because it proposes the first explicit definition of intended environmentally sustainable tourist behaviour. This definition has implications for measurement and for the development of interventions aimed at increasing environmentally sustainable behaviour among tourists. Findings are of immediate practical relevance as they will strengthen the validity of future research into environmentally sustainable tourist behaviour.

Environmentally sustainable tourist behaviour

Environmentally sustainable tourist behaviour is tourist behaviour which does not negatively impact the natural environment (or may even benefit the environment) both globally and at the destination.

A number of different theories offer explanations for environmentally sustainable tourist behaviour. Empirical evidence (Klöckner, 2013; Kormos & Gifford, 2014) suggests that the Theory of Environmentally Significant Behaviour (Stern, 2000) is particularly suitable in this context. This theory postulates that people's personal norms directly affect environmentally sustainable behaviour. Personal norms, defined as the "sense of obligation to take pro-environmental action" (Stern, 2000, p. 3) develop if people are aware of environmental problems (awareness of consequences) and believe to be responsible for alleviating such problems (ascription of responsibility). As opposed to attitudes, moral obligation is believed to remain relatively stable over time (Conner & Armitage, 1998), thus possibly representing a more suitable leverage point for achieving behaviour change.

Studies by Dolnicar and Leisch (2008) and Dolnicar (2010) provide empirical evidence for the association of personal norms and environmentally sustainable tourist behaviour (e.g. saving water,

not littering, switching off the light or air condition and using public transport). Mehmetoglu (2010) shows the predictive power of personal norms for identifying members of the sustainable tourist segment.

Other theories have also proven useful in explaining environmentally sustainable tourist behaviour. For example, Han, Hsu, and Sheu (2010) and Chen and Peng (2012) suggest that perceived behavioural control plays a key role. Perceived behavioural control is a key construct of the Theory of Planned Behaviour (Ajzen, 1985). Goldstein, Cialdini, and Griskevicius (2008) and Schultz, Khazian, and Zaleski (2008) find social norms—another key construct in this theory—to predict environmentally sustainable behaviour in hotels. Recent studies highlight the value of Identity Theory (Stryker, 1968) and Cognitive Dissonance Theory (Festinger, 1957) in the context of environmentally sustainable tourists behaviour. Juvan and Dolnicar (2014) demonstrate that tourists with pro-environmental beliefs who fail to translate these beliefs into behaviour experience psychological tension or guilt, as predicted by Cognitive Dissonance Theory. Withmarsh and O'Neill (2010) find that pro-environmental self-identity is significantly associated with carbon-offsetting behaviour.

In addition, a number of studies have developed scales for the measurement of environmentally sustainable tourist behaviour. For example Smith-Sebasto and D'Costa (1995) and Lee, Jan, and Yang (2013) produced scales including several dimensions of environmentally responsible tourist behaviour which encompass items measuring behaviour and pro-environmental intention.

Environmentally sustainable tourist behaviour is most frequently defined in investigations which study a specific group of people assumed to behave in a particular environmentally sustainable manner. This group of tourists has been given many different names over the years, including green tourists, sustainable tourists, and environmentally friendly tourists. The definitions of this niche segment are as varied as are their names and only few of them use actual behaviour as the key defining characteristic (see Table 1).

Instead, some studies suggest that underlying values are the critical characteristic (Krippendorf, 1987; Perkins & Brown, 2012), others put the *need* for environmental protection at the centre of the definition (Wood & House, 1991) or the fact that people *audit* their vacation behaviour in view of environmental impact (Wood & House, 1991), are *sensitive* to the environment (Poon, 1993), make *efforts* or *want* to protect the environment (Crouch et al., 2005; Dolnicar, 2006), *assign financial value* to operators' efforts to protect the environment (Dolnicar & Long, 2009), or *accept management control measures* at the travel site (Chiu, Lee, & Chen, 2014).

Only a small number of definitions focus on actual behaviour: the behaviour of *demanding* environmentally sustainable tourism (Ioannides & Debbage, 1997), *not going on vacation* at all, making some vacation choices with the specific intention of protecting the environment (Swarbrooke & Horner, 1999), making informed environmentally sustainable vacation choices (Bergin-Seers & Mair, 2009; Miller, 2003) or simply behaving in an environmentally sustainable manner (Dolnicar & Matus, 2008).

An attempt to classify definitions used previously in the sustainable tourism literature leads to the conclusions that they all make one of three assumptions: they either assume (1) that a person's pro-environmental values and beliefs are sufficient to categorise them—and as a consequence their behaviour—as environmentally sustainable, (2) that their intention to protect the environment is sufficient or that (3) the latter two constructs are insufficient and that only behaviour matters, irrespective of values, beliefs and intentions.

It is proposed here that values and beliefs are antecedents of actual behaviour and thus insufficient as defining characteristics of either environmentally sustainable tourist behaviour or of being an environmentally sustainable tourist. Furthermore, it is proposed that intent is a key discriminating feature of different kinds of environmentally friendly tourist behaviour. The Theory of Environmentally Significant Behaviour suggests that pro-environmental values lead to the development of beliefs about environmental threats and responsibility for alleviating these threats (Stern, 2000). Values and beliefs are therefore a critical, but not sufficient defining criterion for environmentally sustainable tourist behaviour. The above propositions are therefore in line with both the Theory of Planned Behaviour (Ajzen, 1985) and the Theory of Environmentally Significant Behaviour (Stern, 2000), the two most widely used social psychological theories for explaining environmentally sustainable behaviour. The Theory of Planned Behaviour postulates that behavioural intention is a direct precursor of behaviour, and the Theory of Environmentally Significant Behaviour suggests that personal norms are a direct

Table 1
Definitions of environmentally sustainable tourists.

Study	Term used	Definition/description
Krippendorf (1987)	The emancipated tourist	"Informed and experienced tourist. . ..with an increasing awareness of the importance of immaterial values such as health, the environment. . ." (p. 74)
Wood and House (1991)	Alternative or responsible tourist	"A tourist with the need to avoid having a negative impact on the destination" (p. 101)
	Good tourist	"Audits himself and his holidays" (p. 102) within the context of the impact on the people and places
Poon (1993)	New tourist	"Sensitive to environment" (p. 115); "See and enjoy, but does not destroy" (p. 145)
Ioannides and Debbage (1997)	Post-fordist tourist	"An independent, experienced, flexible (sun-plus) traveller, who repeats visits and demands green tourism" (p. 232)
Swarbrooke and Horner (1999)	Totally green tourists	"Not take holiday away from home at all so as not to harm the environment in any way, as a tourist" (p. 202)
	Dark green tourists	"Boycott hotels and resorts which have poor reputation on environmental issues" (p. 202) and "pay to go on holiday to work on a conservation project" (p. 202)
	Light green tourists	"Think about green issues and try to reduce normal water consumption in destinations where water is scarce" (p. 202), "use public transport. . . while on holiday" (p. 202)
Dinan and Sargeant (2000)	Sustainable tourist	"Someone who appreciates the notion that they are a visitor in another person's culture, society, environment and economy and respects this unique feature of travel" (p. 7)
Miller (2003)	Green consumers [in tourism context]	"Actively seeking and then using that information [green product information] in the decision-making process for their holiday"(p. 33)
Dolnicar (2004)	Sustainable tourists	Tourists "who care about maintaining and protecting the natural environment at the travel destination" (p. 212)
Crouch et al. (2005)	Environmentally caring tourist	"The efforts to maintain unspoilt surroundings play a major role" (p. 14)
Dolnicar (2006)	Nature conserving tourists	"Want to protect the natural resources and act in a nature-conserving way during their vacation" (p. 237)
Dolnicar and Matus (2008)	Green tourist	"Behave in an environmentally friendly manner when on vacation in a wide range of tourism contexts"(p. 320)
Stanford (2008)	Responsible tourist	Has several dimensions, including "the concepts of respect, awareness, engagement (and taking time to engage), excellence and reciprocity, as well as the harder facts of spending money" (p. 270)
Dolnicar and Long (2009)	Environmentally responsible tourist	"Assigns some value to the environmental responsibility demonstrated by the tour operator" (p. 10)
Bergin-Seers and Mair (2009)	Green tourists	"Are interested in being environmentally friendly on holiday; at times select holidays by considering environmental issues; and are potentially willing to pay extra for products and services provided by environmentally friendly tourism operators" (p. 117)
Mehmetoglu (2009)	Sustainable tourists	Have a "consumption attitude or behaviour that intends to contribute to ecological. . .sustainability in a holiday context" (p. 8)
Mehmetoglu (2010)	Sustainable tourist	"Someone who was [is] concerned about sustainability issues (i.e. of economic benefit to local people" (p. 184)
Wehrli et al. (2011)	Sustainability aware tourist	"Sustainability is among the top three influencing factors while booking vacations" (p.2).
	Ecological type sustainable tourist	"considers in particular ecological aspects to be relevant for sustainable tourism" (p. 2)
Perkins and Brown (2012)	A true ecotourist	"Traveller with strong biospheric values, who expresses greater support for environmental responsibility in tourism, expresses support for green tourism suppliers, feels less entitled to consume resources simply for enjoyment without considering personal impact on environments" (pp. 795–796)
Shamsub and Lebel (2012)	Sustainable tourists	"Those who (1) agree with a code of conduct that recommends how they as visitors should behave, (2) appreciate that their activities have impacts on the environment and tailor their actions accordingly; (3) would like to make economic contribution to the host economy and therefore purchase

(*continued on next page*)

Table 1 (*continued*)

Study	Term used	Definition/description
		local products such as food and crafts" (p.27)
Lee et al. (2013)	Sustainable tourist	"A person [tourist] respects to local culture, conserves natural environment, and reduces interference of local environment" (p.457).
	Pro-environmental tourist	"A person [tourist] voluntarily visits a destination less or none while the spot needs to recover because of environmental damage" (p. 457).
	Environmentally friendly tourist	"A person [tourist] takes action to reduce the damage of a specific destination" (p.457)
	Environmentally responsible behaviour	"any action that alleviates the adverse environmental impact of an individual or group" (p.466)
Chiu et al. (2014)	Environmentally responsible tourist	A tourist who helps limit or avoid damage to the ecological environment

predictor of behaviour. However, empirical evidence shows that neither intention neither personal norm alone guarantee behaviour (Klöckner, 2013; Kormos & Gifford, 2014).

This analysis of prior definitions leads to the conceptual framework shown in Fig. 1. Tourists can either display environmentally sustainable behaviour or not (vertical axis in Fig. 1). And people can either have pro-environmental intent or not (horizontal axis in Fig. 1). Good intentions alone are not enough to qualify as environmentally sustainable behaviour (quadrant 1 in Fig. 1) if they never convert to environmentally sustainable behaviour. The same holds for pro-environmental beliefs and values; on their own they are insufficient to ensure environmentally friendly behaviour (quadrant 2 in Fig. 1). Unintended environmentally sustainable behaviour (quadrant 4 in Fig. 1) does not fully qualify either as it could be accidental. For example it may be cheaper to take the train than to fly. Note, however, that the study of unintended environmentally sustainably tourism is of great interest. Such behaviour could serve as the basis for developing novel approaches to making tourism more environmentally sustainable without any awareness of this on the side of the tourists. Quadrant 3 in Fig. 1 represents the combination of intent and behaviour that fully complies with the definition proposed here: tourists in this quadrant display environmentally sustainable behaviour and they do it because they want to minimise harm to the environment. This implies that the tourists make a conscious decision about displaying this particular behaviour.

The position that both behaviour and intention have to be present for behaviour to be classified as truly environmentally sustainable is reflected in Oates and McDonald's (2014) argument that asking about attitudes or intentions to act in an environmentally sustainable manner does not tell us much about behaviour. "Equally, noting environmental behaviour does not necessarily tell us about environmental attitudes as one person may take a bus between two cities because they are committed to reducing their carbon footprint, but another may take an identical journey because it was cheap" (p. 2). Similarly Stern (2000)—who proposed the Theory of Environmentally Significant Behaviour—defines environmentalism as "the propensity to take actions with pro-environmental intent" (p. 411).

The following definition of intended environmentally sustainable tourist behaviour used in the present study:

> *Intended environmentally sustainable tourist behaviour is when a person makes a vacation-related decision or displays behaviour at the destination that is different from how they would have otherwise decided or behaved for reasons of environmental sustainability.*

To illustrate the implications of the proposed definition: imagine a tourist who initially intends to travel to a long-haul destination, but instead choses a domestic holiday because it is less harmful to the environment. This behaviour complies with the proposed definition because of the intent of the behavioural change to keep negative environmental impact low. But even small changes in behaviour suffice. For example, paying a carbon offset fee when flying. The proposed definition is strict in that the behaviour must be caused by intent to reduce negative impact on the environment. It is generous, however, in that it includes a wide range of behaviour.

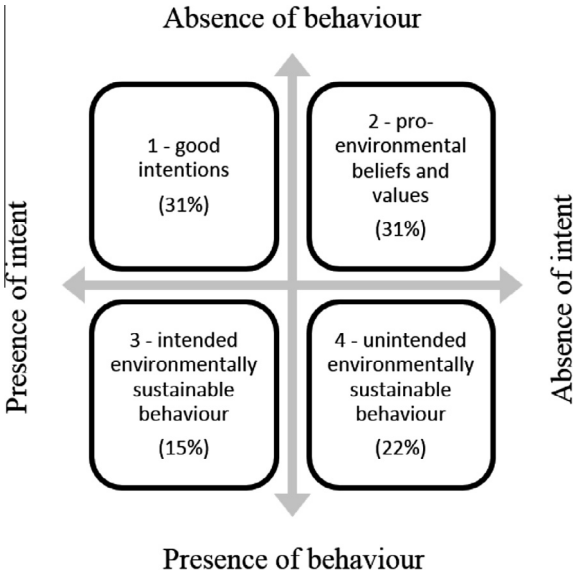

Fig. 1. Environmentally sustainable tourist behaviour and percentage of studies focusing on each quadrant.

Current measures of environmentally sustainable tourist behaviour

To determine how environmentally sustainable tourist behaviour is currently measured, a two phase bibliographical study was conducted. In the first phase, a non-systematic search approach was used through Google scholar to identify highly cited journal articles on environmentally sustainable tourist behaviour and industry reports from key bodies in charge of environmental sustainability of tourism. Next, references cited in these key articles and industry reports were followed up to identify more studies. With this approach a total of 75 studies were identified.

The second phase comprised a systematic search approach within the leading tourism journals. Initially key words used in those 75 studies were extracted and used for a second search. This search was conducted using online versions of the three leading international generalist tourism journals (*Annals of Tourism Research*, *Tourism Management*, *Journal of Travel Research*) and the internationally leading journal specialising on sustainable tourism (*Journal of Sustainable Tourism*). Thirty-four additional studies were identified.

For each of the final 109 articles two pieces of information were extracted, in line with the definition of intended environmentally sustainable tourism proposed above: (1) whether only behaviour or both behaviour and intent were considered, and (2) how information about environmentally sustainable tourist behaviour was elicited.

Stated behaviour and behavioural intention can be measured in two ways. Participants can either be asked to talk—in an unguided manner—about their travel planning or behaviour at the destinations. Throughout this study we will refer to this approach as unprompted, open-ended. Alternatively, respondents can be asked whether or not they have displayed very specific behaviour listed in a questionnaire or read out by the interviewer. Because the behaviour in this case has to be clearly stated, the purpose of the study or the survey question cannot be hidden. Respondents are prompted, thus potentially influencing responses. We refer to this as the prompted closed questioning approach.

Unprompted open-ended questions—or unaided awareness questions—have been found to have a higher association with actual behaviour (Woodside & Lysonski, 1989) and to be less indicative of the survey context which may "signal how respondents should react" (McKercher, Prideaux, Cheung, & Law, 2010, p. 303). Responses to closed questions about socially sensitive behaviour, including

environmentally sustainable tourist behaviour (McKercher & Prideaux, 2011) are more prone to socially desirable responding and may "produce false positive results" (p. 329).

The first interesting finding from the bibliographic study is that—looking at the quadrants in Fig. 1—about one third of studies limits investigations to values or beliefs only and another third uses behavioural intention as defining criterion. Only 37% of studies use actual or reported behaviour as the central construct. Of those studies, only 40% (15% of all reviewed studies) include intention as well as behaviour as defining characteristic, thus complying with the proposed definition of intended environmentally sustainable tourist behaviour.

The analysis of the bibliographical study indicates that the most frequently studied environmentally sustainable behaviour are paying carbon offsets (22%), transport choice (20%), the choice of environmentally sustainable accommodation (18%) and using an environmentally sustainable tourism provider (7%). Less frequently under investigation were behaviour such as recycling, picking up litter, reusing towels and similar.

Furthermore, the bibliographical study reveals that empirical studies of environmentally sustainable tourist behaviour vary substantially in terms of how they measure environmentally sustainable behaviour. This variation causes dramatically different conclusions about the extent to which tourists behave in an environmentally sustainable way.

Viewing only reported behaviour as relevant and using prompted closed questions to learn about them leads to an estimate of 33% of tourists behaving in an environmentally sustainable way. Using the same definition, but asking respondents in an unprompted open-ended manner reduces the estimate to only 5%. Tightening the definition to include both behaviour and intentions leads to an estimate of 20% of respondents behaving in an environmentally sustainable way when prompted closed questions are used and to only 2% if unprompted open-ended questions are used. The maximum difference of the estimated occurrence of environmentally sustainable behaviour caused by difference in definition and questioning method is 37%. It has to be concluded that, collectively as a research discipline, there is little reliable knowledge about tourists' actual environmentally sustainable behaviour.

The bibliographical study—while bringing to light the substantial variation in estimates of environmentally sustainable tourist behaviour—does not offer any explanations of why these substantial differences occur. The search for explanations requires a specifically designed empirical study to be conducted, results of which are reported in the following sections.

The effect of definition, question format and social desirability bias

The results from the bibliographical study—specifically the fact that prompted closed questions lead to substantially higher estimates of environmentally sustainable behaviour—point to the possibility of measurement biases affecting conclusions drawn. A number of experts in sustainable tourism have noted that results from studies on environmentally sustainable tourist behaviour have to be interpreted with care due to their proneness to biases, especially social desirability bias (e.g. Bergin-Seers & Mair, 2009; McKercher & Prideaux, 2011; Miller, 2003). Yet, it remains untested whether biases indeed occur and, if so, how strongly they can affect study findings.

Social desirability bias is the "tendency of an individual to convey an image in keeping with social norms and to avoid criticism in a 'testing' situation" (Hebert, Clemow, Pbert, Ockene, & Ockene, 1995, p. 389). It occurs because people want to create a positive social image or because they hold an overly positive representation of themselves, known as self-deception (Holtgraves, 2004). The tendency for social desirability distorts responses for behaviour which are subject to social expectations (Fisher, 1993). Moscovici's Theory of Social Representations (Moscovici, 1981, 1988) offers a comprehensive framework to understanding the reasons why social desirability biases occur in human communication. Social representations are not static; rather they "exist only in relational encounter, in the in-between space we create in dialogue and negotiation" (Howarth, 2006, p. 68). In the case of survey research the function of socially desirable responses may well lie in the wish of the respondents to represent them as behaving in line with societal expectations. A common approach to check for social desirability bias is to use a social desirability scale, such as Crowne and Marlowe's (1960) 33 items scale.

Studies testing the association of social desirability scores with self-reported behaviour come to different conclusions. Hebert et al. (1995, 2008) find people's reports on dietary habits to be associated with social desirability scales, concluding that "the magnitudes of the biases observed are large enough to be of concern with respect to distorting estimates of effect in epidemiologic studies of diet and health" (2008, p. 232). Similarly, Hartig, Kaiser, and Bowler (2001) find high correlations between social desirability scores and self-reported ecological behaviour (e.g. recycling, donation for pro-environmental reasons, conservation of water and similar); social desirability accounts for 16% of the explained variance of the self-reported ecological behaviour. Armitage and Conner (1999), on the other hand, conclude that "social desirability does not appear to play a role, at least in terms of the TPB [Theory of Planned Behaviour] and food choice" (p. 271). Chao and Lam (2011) find an association with over-reporting of intentions but not behaviour.

More critically, the review of 14,275 health-related studies undertaken by van de Mortel (2008) shows that social desirability bias is rarely even controlled for; fewer than one percent of reviewed studies do so. Among those, findings about the association between social desirability and stated health related behaviour are mixed. Forty-three percent report that social desirability biased results, 45% find no evidence of bias. The author recommends the use of social desirability scales for detecting and controlling social desirability bias.

In the context of environmentally sustainable tourist behaviour, a number of studies mention the possibility that social desirability bias may distort their findings (for example, Bergin-Seers & Mair, 2009; McKercher & Prideaux, 2011; McNamara & Prideaux, 2010; Miller, 2003). However, this assumption remains empirically untested.

To determine empirically the extent to which biases affect results in the specific context of interest to the present study – environmentally sustainable tourist behaviour—a survey study of 1039 respondents (259 from the United States; 253 from Canada, 262 from the United Kingdom and 265 from Australia) was conducted in 2014 using a permission-based internet panel. High-quality permission based internet panels maintain a database of respondents who are representative of the population of a country and have agreed—in principle—to participate in online surveys. For the present study a subset of panel members chosen to be nationally representative for the US, Canada, the UK and Australia (with respect to nationality, gender, age and education level) were invited by email to complete the survey. All invited participants were over the age of 18. At the beginning of the survey they were asked whether they had taken at least one vacation of four days or more in the last 12 months. If they had, they were allowed to continue. If they had not, their participation was terminated. Note that this procedure ensured that invited participants were representative of the population of each of the countries in which the study was conducted. However, given that there is no sampling frame for residents who have taken a vacation in the past year, it is not certain that the sample is representative of that subpopulation. Representativity, however, is not critically important for this study. Even if response biases are shown to affect subsets of populations this represents proof of principle and is concerning in terms of possible validity issues of future studies.

Respondents—who were unaware of the exact purpose of the study—were first asked unprompted open-ended questions about their typical vacation behaviour and invited to list factors which influence their decisions when planning a vacation (for example, costs, quality, safety, environmental impact, etc.). Responses were classified into environmentally sustainable and not environmentally sustainable behaviour. Respondents who mentioned that environmental impact influenced their vacation choices were considered to have pro-environmental intent.

Later, respondents were asked prompted closed questions. Specifically, respondents were asked to indicate for 13 listed factors whether or not they influence their vacation decisions. These 13 factors emerged from the following procedure: ten factors were taken from past studies on the choice of a destination (e.g. Goodrich, 1978; Pike, 2003; SooCheong & Liping, 2002), choice of an accommodation (Dolnicar & Otter, 2003; Lewis, 1985), and studies on the choice of attractions (Pitts & Woodside, 1986). Three factors relating to ethics, social responsibility and environmental sustainability were added by the authors. If a respondent stated that "environmental sustainability" influences their vacation decisions, the respondent was considered to have pro-environmental intent in the context of prompted closed questions.

The effect of definition and question format

Results are reported in Table 2 which compares responses in dependence of question format. When asked about a specific environmentally friendly vacation-related behaviour and how often they have engaged in it, between 16 and 44 per cent of respondents indicate that they have engaged in it either "sometimes" or "always". If an additional criterion is introduced; that of them having to express—again to a prompted closed question—their intent to consider environmental impact when planning a vacation or when on vacation, the percentage drops to between 10 and 22 per cent and if respondents are asked an open-ended unprompted question only, not a single respondents provides an answer which suggest that they do indeed consider the environment in the context of their vacations.

Fig. 2 summarises results: using prompted closed questions increases average reporting of environmentally sustainable vacation behaviour. Using open-ended questions reduces average reporting of such behaviour. Measuring the pro-environmental intent further reduces the number of environmentally sustainable tourists irrespective of the type of questions used.

The effect of social desirability bias

Social desirability bias was measured using Reynold's (1982) scale. Including 13 binary statements it represents "a viable short form for use in the assessment of social desirability response tendencies" (p. 124). Fisher (1993) suggests that social desirability bias occurs only for behaviour which invokes reactions from referent others. Perceived social pressure was measured by asking about the extent

Table 2
Proportions of tourists indicating environmentally sustainable vacation behaviour in dependence of question format.

	% Responding to the items in column 1 with "sometimes" or "always"	% Who—in addition—reported considering "environmental impact" in vacation planning in a prompted closed question	% Reporting environmentally sustainable behaviour and intent in an unprompted open-ended question
Sample size	*N* = 1039	*N* = 1039	*N* = 1039
Do you ever choose *not go on vacation* to avoid causing negative environmental effects?	16%	10%	0%
Do you refuse to go on vacation far from home to minimise transportation related greenhouse gas emissions?	18%	11%	0%
Do you dismiss a particular mode of transport to a destination primarily to avoid air pollution?	34%	18%	0%
Do you refuse to undertake a vacation activity primarily to protect the environment?	33%	17%	0%
Do you refuse to use tourism providers if they do not follow environment protection standards?	42%	21%	0%
Do you use environmentally certified tourism providers?	44%	22%	0%
Do you purchase carbon offsets to compensate your carbon emissions from flying?	21%	11%	0%

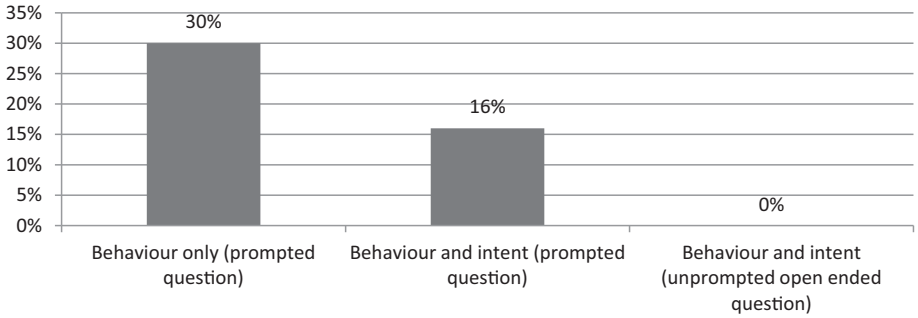

Fig. 2. Average percentage of respondents who report environmentally sustainable tourist behaviour using different question formats and definitions.

to which family and friends value environmentally sustainable tourist behaviour. Responses to these two questions were used as an indicator or a person's tendency to give socially desirable responses in the context of environmentally sustainable tourist behaviour. Responses to the social desirability scale were summed up and final scores varied between 13 and 26; with 13 meaning the lowest level of social desirability bias. The perceived social pressure was measured on a 100 point scale with 0 indicating no perceived social pressure for being environmentally sustainable tourist. Then, groups with different tendencies of socially desirable responding were formed. A respondent was considered to have a low tendency for socially desirable responding if they scored between 13 and 18 on the social desirability scale and between 0 and 12 on the social pressure scale. A respondent was considered to have a medium tendency for socially desirable responding if they scored between 19 and 22 on the social desirability scale and between 24 and 55 on the social pressure scale. A respondent was considered to have a high tendency for socially desirable responding if they scored between 23 and 26 on the social desirability scale and between 62 and 100 on the social pressure scale. All other respondents were excluded from the analysis. This approach ensured the identification of groups of respondents with extremely different levels of reported tendency for socially desirable answers while ensuring a sufficient sample size. Chi-square tests were employed to test the relationship between the social desirability class and reported behaviour. The strength of the relationship is reported with Cramer's V (Field, 2009).

Table 3 shows associations between the different levels of tendency for socially desirable responding and reported environmentally sustainable vacation behaviour based on prompted closed questions. Chi-square tests indicate significant differences for all seven items.

Cramer's V values indicate between low and medium size effects of the tendency of socially desirable responding on reports about environmentally sustainable vacation behaviour. All associations are significant ($p < .002$). Because only respondents from two groups reported to not be going on vacation to avoid causing negative environmental effects, the odds ratio can be used to indicate the effect size of the tendency for socially desirable responding on this behaviour report. The odds of reporting the behaviour "Do you even choose not going on vacation to avoid causing negative environmental effects" are three times higher for a respondent with high than with the medium tendency for socially desirable responding. Note that the item relating to carbon offsetting could be interpreted differently than the other items by respondents given that some airline passengers are sceptical about carbon offsets being environmentally beneficial. Nevertheless the association pattern for this item is the same as the association pattern for other items, suggesting rather that carbon offsetting was interpreted by respondents as being environmentally beneficial.

Fig. 3 illustrates the association between different levels of tendency for socially desirable responding and reports about environmentally sustainable vacation behaviour. As can be seen there is a systematic increase of the proportion of reported environmentally sustainable behaviour with the increased level of the tendency for socially desirable responding. On average only nine percent of respondents with a low tendency for socially desirable responding report at least one of the seven

Table 3
Association between reported behaviour and tendency for socially desirable responding (prompted closed questioning).

Vacation behaviour	Respondents with **low tendency** for desirable responding	Respondents with **medium tendency** for desirable responding	Respondents with **high tendency** for desirable responding	Test results
Sample size	*N* = 43	*N* = 203	*N* = 70	
Do you dismiss a particular mode of transport to a destination primarily to avoid air pollution?	3 (7%)	63 (31%)	39 (56%)	X^2 = 29.749 *p* = .000 Cramer's V = .307
Do you refuse to undertake a vacation activity primarily to protect the environment?	5 (12%)	69 (34%)	37 (53%)	X^2 = 20.192 *p* = .000 Cramer's V = .253
Do you refuse to go on vacation far from home to minimise transportation related greenhouse gas emissions?	1 (2%)	36 (18%)	20 (29%)	X^2 = 12.447 *p* = .002 Cramer's V = .198
Do you refuse to use tourism providers if they do not follow environment protection standards?	7 (16%)	94 (46%)	49 (70%)	X^2 = 31.136 *p* = .000 Cramer's V = .314
Do you purchase carbon offsets to compensate your carbon emissions from flying?	4 (9%)	39 (19%)	27 (39%)	X^2 = 16.078 *p* = .000 Cramer's V = .226
Do you use environmentally certified tourism providers?	6 (14%)	81 (40%)	51 (73%)	X^2 = 40.849 *p* = .000 Cramer's V = .360
Do you even choose not going on vacation to avoid causing negative environmental effects?	0 (0%)	27 (13%)	23 (33%)	X^2 = 24.302 *p* = .000 Cramer's V = .277 Odds = 3[a]

[a] Odds are calculated for groups with medium and high tendency.

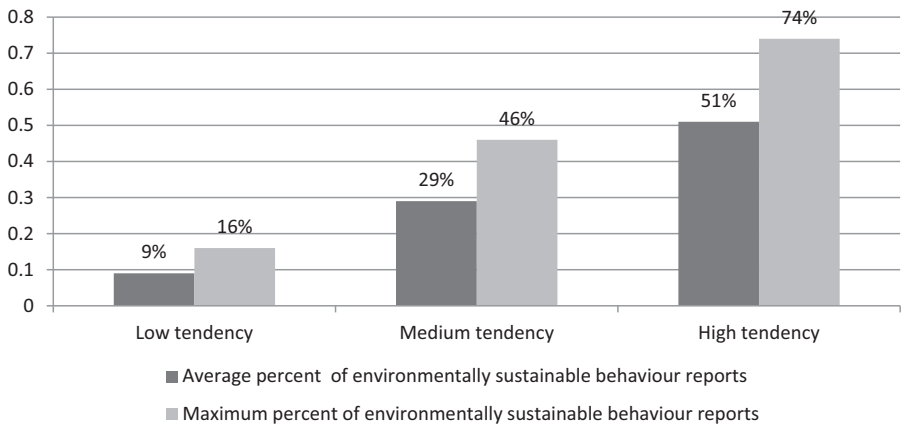

Fig. 3. Percentage of respondents with different socially desirable responding tendencies who report environmentally sustainable tourist behaviour using prompted closed questions.

types of environmentally sustainable behaviour. Among those with a medium tendency 29% do and among respondents with high levels of tendency for socially desirable responding this number increases to 51%. The highest proportion of environmentally sustainable behaviour reports among respondents with medium level of tendency for socially desirable responding is 46% and 74% within the group with high tendency for socially desirable responding.

Results also suggest that certain types of environmentally sustainable tourist behaviour are more prone to social desirability bias than others. For example, about two thirds of respondents with some tendency for socially desirable responding report to choose environmentally sustainable transportation options, refuse tourism providers which have not implemented environment protection standards, choose environmentally certified tourism providers or refuse participating in environmentally damaging tourist activities. But only about one third report to spend vacation close to home, pay carbon offsets or not going on vacation in order to minimise the environmental impact of their vacation.

Results from the empirical investigation confirm the findings from the bibliographical study that both the definition and the method of investigation significantly and systematically affect results about environmentally sustainable tourist behaviour. In addition, the empirical study provides insight—for the first time—into the effect of social desirability bias. Social desirability bias significantly affects self-reported environmentally sustainable behaviour, making the use of prompted closed questions in investigations of such behaviour highly prone to inflation of results.

Conclusion

Any future attempts at modifying tourist behaviour to be more environmentally friendly require a valid measure of environmentally friendly tourist behaviour. Actual behaviour is the optimal measure, but it is not always possible to measure actual behaviour. For example, it may be necessary to study a wide range of behaviours which cannot all be observed or the behaviour of interest has already occurred, or it may simply be unaffordable to observe the actual behaviour of large number of tourists.

The present study sought to contribute to the body of work on environmentally sustainable tourist behaviour—one of the dimensions of sustainability in tourism—by making explicit the substantial variability in estimates of the extent of environmentally sustainable behaviour among tourists and identifying the reasons for the high level of disagreement for the purpose of improving the validity of future research.

Key findings resulting from the bibliographical component of the present study include that (1) actual behaviour—the key construct of interest—is rarely measured, (2) a substantial proportion of studies—about one third—are limited to early antecedents of behaviour, such as values and beliefs, which are known not to directly translate into behaviour, (3) another third of studies investigates intentions to behave in an environmentally friendly way which are also known not to directly translate into behaviour, (4) only one third of studies use actual or reported behaviour as the focal construct. Of those, less than half require tourists to display the behaviour with the intent of protecting the environment. Most critically, (5) estimates about environmentally sustainable tourist behaviour resulting from these past studies vary greatly, with between zero and 44% of tourists seen to behave in this way. The variability of findings is due to differences in the definition of environmentally sustainable behaviour as behaviour only, or a combination of behaviour and behavioural intention as well as the answer format used in the empirical research. The bibliographical study leads to the conclusion that—collectively—tourism research to date has failed to develop generalizable knowledge about environmentally sustainable tourist behaviour.

The empirical study conducted to test the assumption which developed as a consequence of the bibliographical study—namely that definition and survey question format cause the variability in findings—produced results which are remarkably similar to those from the bibliographical study. Table 4 places the equivalent figures next to one another. Prompted closed questions produce higher estimates, especially if only behaviour is used as the focal construct and intention to protect the environment by displaying the behaviour is not a requirement. Unprompted open-ended questions lead to substantially lower estimates with the lowest estimates resulting from this question format and the requirement that not only behaviour be reported but that it be displayed with the intent of environmental sustainability.

Table 4
Proportion of tourists estimated to be displaying environmentally sustainable tourist behaviour.

Vacation behaviour	Average estimate (bibliographical study)	Average estimate (empirical study)
Sample size	$N = 40$	$N = 1039$
Reported behaviour, prompted closed questions	33%	30%
Reported behaviour and intentions, prompted closed questions	20%	16%
Reported behaviour and intentions, unprompted open-ended questions	2%	0%

The empirical study also aimed at identifying reasons for prompted closed questions leading to substantially higher reporting of environmentally sustainable behaviour. Findings point to a systematic and significant association of behavioural reports to prompted closed questions and survey respondents' tendency to respond in a socially desirable way. On average people with a low tendency to respond in a socially desirable way in surveys reported engaging in 42% fewer environmentally sustainable tourist behaviours. The question asking about the use of environmentally certified tourism providers led to the highest difference (59%) between reported behaviour by respondents with a low (14%) and respondent with a high tendency to respond in a socially desirable manner (73%).

These findings have important implications for knowledge development in environmentally sustainable tourism. The use of prompted closed questions—the quickest and most convenient answer format from a researcher's perspective—risks contamination of responses by social desirability bias, thus inflating estimates of reported environmentally sustainable behaviour. Future studies should not rely on such question formats, rather making use of a wider repertoire of methodological options which are less prone to capturing biases, such as behavioural observations or unprompted open-ended questions. If it is absolutely unavoidable to use prompted closed questions, such items should be located in the questionnaire in a way to minimise the possibility of the respondent guessing the purpose of the study as to minimise the perception of social expectations about the behaviour. In addition, items to measure every respondent's tendency for socially desirable responding in the context of environmentally sustainable vacation should be included to control for the potential overestimation of environmentally sustainable behaviour.

At a conceptual level it is critical for future studies to determine whether they are interested in studying intended or unintended environmentally sustainable tourism behaviour. As shown in the present study, empirical results about the extent of environmentally sustainable tourist behaviour vary substantially in dependence of whether or not intent is considered to be a defining characteristic of such behaviour or not. In addition, targeting these conceptually different types of behaviour requires the design of different measures. For example, increasing unintended environmentally sustainable tourist behaviour could be achieved by placing a relatively large recycling bin and a relatively small normal garbage bin in holiday apartments. It is likely that guest would react to this infrastructure intervention by increasing recycling, but not necessarily for the benefit of the environment, but, instead, to reduce the number of times they need to go and empty the bin. Increasing intended environmentally sustainable behaviour, on the other hand, requires interventions which will trigger a cognitive process on the side of the tourists which, in turn, will lead to behavioural change. An example would be the provision of facts about the environmental consequences of guests in the holiday apartments not recycling. This knowledge may activate the guests' pro-environmental intentions and lead to the intended behaviour.

The study has a number of limitations. Because of the study design which includes a range of potentially environmentally sustainable behaviours, actual behaviour has not been studied. If feasible, it would be invaluable to replicate the present study with observed behaviour as the reference point. Furthermore, the present study is limited to a small number of behaviours reported to be effective in reducing the environmental burden of tourism. But tourists engage in behaviour other than the ones measured in the present study (e.g. recycling, not littering). Future work should include these other types of environmentally sustainable vacation behaviours in relation to social desirability bias. A possible extension would be into other dimensions of tourism sustainability, such as the social

dimension, which can also be assumed to be prone to triggering socially desirable responses by tourists when asked to self-report.

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