This article was downloaded by: [Bibliotheek TU Delft], [Maarten Kroesen]
On: 07 June 2012, At: 01:01
Publisher: Routledge
Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK

Journal of Sustainable Tourism
Publication details, including instructions for authors and subscription information:
http://www.tandfonline.com/loi/rsus20

Exploring people's viewpoints on air travel and climate change: understanding inconsistencies

Maarten Kroesen [a]

[a] Department of Policy and Management, Faculty of Technology, Delft University of Technology, Delft, Netherlands

Available online: 07 Jun 2012

To cite this article: Maarten Kroesen (2012): Exploring people's viewpoints on air travel and climate change: understanding inconsistencies, Journal of Sustainable Tourism, DOI:10.1080/09669582.2012.692686

To link to this article: http://dx.doi.org/10.1080/09669582.2012.692686

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: http://www.tandfonline.com/page/terms-and-conditions

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

Journal of Sustainable Tourism
iFirst 2012, 1–20

Routledge
Taylor & Francis Group

Exploring people's viewpoints on air travel and climate change: understanding inconsistencies

Maarten Kroesen*

Department of Policy and Management, Faculty of Technology, Delft University of Technology, Delft, Netherlands

(*Received 29 August 2011; final version received 3 May 2012*)

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

This study aims to objectify people's subjective viewpoints toward air travel and climate change. Using an online questionnaire, a series of statements about aviation and the environment were scored by 491 subjects in the Netherlands. Through factorization of the response patterns six distinct viewpoints on aviation and climate change are revealed and identified as integration, ignorance, denial, necessity, guilt and indulgence/fatalism. Each viewpoint is shown to be associated with fitting levels of air travel behavior and general environmental awareness. As in previous research, it is shown that air travel behavior does not significantly correlate with general environmental awareness. Notable differences were found, however, between those subjects under 30 years old and those over 30 years old: the older group were much more likely to claim both necessity and indulgence/fatalism as a reason for flying. The results add to our understanding of attitude-behavior inconsistency by revealing how people from their own standpoints reconcile and/or prevent possible inconsistencies between certain air travel behaviors and pro-environmental attitudes. Practically, the viewpoints offer more effective sustainability discourses, and point to several new policy measures to remove the "sting" from the denial position by enhancing the credibility of the "rationalization of lifestyle" discourse.

Keywords: air travel; climate change; environmental attitudes; Q-factor analysis; quantitative research; behavioural studies

Introduction

Air travel has grown at an average annual growth rate of 6% by volume over the last 50 years, with an overall increase of nearly tenfold in the same period, from approximately 500 billion revenue passenger kilometres in 1960 to 4900 billion in 2010. Assuming a future growth rate of approximately 5% annually, the major aircraft manufacturers expect that the market will again more than double in size by 2030 (Airbus, 2010; Boeing, 2010).

Presently, aviation accounts for a relatively small percentage of the total worldwide anthropogenic greenhouse gas emissions. Gössling & Peeters (2007) have estimated aviation's contribution in 2005 in the order of 3.4%–6.8% (the range being a result of the consideration of radiative forcing). However, given the projected growth, which outpaces annual fuel efficiency improvements (Lee et al., 2009), its share can be expected to increase substantially in coming decades (Dubois & Ceron, 2006).

*Email: m.kroesen@tudelft.nl

ISSN 0966-9582 print / ISSN 1747-7646 online
© 2012 Taylor & Francis
http://dx.doi.org/10.1080/09669582.2012.692686
http://www.tandfonline.com

Following the IPCC's recommendations to reduce global emissions by 50%–85% by 2050 (using 2000 as baseline year) in order to prevent "dangerous anthropogenic interference with the climate system", the International Air Transport Association (IATA) aims to reduce aviation emissions by 50% compared to 2005 levels. However, many commentators question whether this net reduction is achievable (Bows & Anderson, 2007; Scott, Peeters, & Gössling, 2010). Several major airlines actually foresee a doubling of emissions by 2050 (AGD Group, 2009 cited in Scott et al., 2010).

Given the expected growth of aviation and the likely marginal effects of new aircraft technology, tourist researchers generally emphasize the need for behavioral change, e.g. less air travel, longer stays, reducing the distances traveled and shifts toward more sustainable travel modes. From this behavioral focus arises a need to understand air travelers' attitudes toward aviation and climate change. Such knowledge can provide the basis for the design of more effective sustainability discourses (Hobson, 2002).

Recognizing the limited applicability of general theories seeking to explain pro-environmental behavior (see Stern, 2000) previous research in this area has largely been qualitative in nature using focus groups or in-depth face-to-face interviews (Barr, Shaw, Coles, & Prillwitz, 2010; Becken, 2004, 2007; Cohen & Higham, 2011; Cohen, Higham, & Cavaliere, 2011; Dickinson et al., 2010; Hares, Dickinson, & Wilkes, 2009; Higham & Cohen, 2011; Lassen, 2010; McKercher, Prideaux, Cheung, & Law, 2010; Miller, Rathouse, Scarles, Holmes, & Tribe, 2010; Randles & Mander, 2009). This body of research provides a rich overview of people's attitudes toward climate change, their views on the environmental impacts of their flying behavior and the various arguments they use to qualify and rationalize their behavior. The present research continues this research by examining the ways in which the beliefs, emotions and arguments as observed in people's communications are integrated in coherent viewpoints on aviation and climate change.[1] Specifically, a Q-factor analysis is used to identify common patterns in people's attitudes. This quantitative technique has proven useful in revealing subjects' perspectives on a range of different topics (see Brown, 1980).[2]

Revealing people's holistic viewpoints on aviation and climate change has practical and scientific merits. Practically, the viewpoints provide clues about how different clusters of travelers should be approached, which policies they would support and how they may be "educated" into more sustainable lifestyles. Theoretically, the viewpoints can reveal the (socially) viable strategies which people employ to reconcile the often observed contradiction between pro-environmental beliefs and actual behavior, commonly referred to as the value-action gap (Blake, 1999) or attitude-behavior inconsistency (Gross & Niman, 1975) in academic literature. Generally, researchers invoke other concepts to explain the observed discrepancy, yet few studies have sought explanations in subjects' own constructions of reality. Investigating subjects' own lines of reasoning can, therefore, contribute to the further development of theory on air travel behavior.

Background and research focus

Although belief in climate change has dropped recently, polls still show that the majority of people believe that climate change is happening (78% in a recent survey of UK citizens [Cardiff University, 2010]). This belief, however, does not readily translate into people's air travel behavior. A straightforward explanation is that travelers are generally unaware of the impacts of their air travel behavior on the climate, an observation made by several initial studies assessing people's attitudes on this topic (Becken, 2004, 2007; Gössling, Bredberg, Randow, Sandström, & Svensson, 2006). Yet, more recent studies suggest that people are becoming more aware of the environmental impacts of their flying behavior (Gössling,

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Haglund, Kallgren, Revahl, & Hultman, 2009; Higham & Cohen, 2011). Nevertheless, even with high levels of awareness, it is generally found that these beliefs do not enter into the decision to fly.

A stream of research has uncovered the arguments which people use to relieve themselves of any dissonance between their air travel behavior and pro-environmental attitudes, like externalizing responsibility, scientific skepticism, belief in a technological fix, distrust in authorities, or claiming to have a sustainable lifestyle in other areas of life (Barr et al., 2010; Becken, 2004, 2007; Cohen & Higham, 2011; Cohen et al., 2011; Dickinson et al., 2010; Hares et al., 2009; Higham & Cohen, 2011; Lassen, 2010; Miller et al., 2010; Randles & Mander, 2009). These arguments are also reflected in general barriers which people perceive to engage with climate change and climate change mitigation strategies (Lorenzoni, Nicholson-Cole, & Whitmarsh, 2007; Semenza et al., 2008; Stoll-Kleemann, O'Riordan, & Jaeger, 2001).

While this body of qualitative research has stayed close to subjects' understandings of the issue, the unstructured nature of the resulting discourse prevents a systemic analysis of people's viewpoints. For example, previous research has stressed that a strategy of denial may underlie people's responses to various arguments (Becken, 2007; Stoll-Kleemann et al., 2001). It remains unknown, however, how this strategy actually manifests itself and/or whether multiple strategies of denial may exist, each with a distinctive emphasis on different arguments. Or, whether in fact strategies exist which are entirely different from a denial strategy, but which are nonetheless effective in reconciling any cognitive gap between people's air travel behavior and their attitudes toward climate change. Finally, a systemic analysis also provides the opportunity to study the relationship between the various existing viewpoints and people's actual air travel behavior, which would indicate the limits of each viewpoint in supporting and/or legitimizing certain behavior.

Method

Q-technique and sample

Different quantitative techniques exist to cluster people into homogenous groups with similar scoring patterns in relation to a set of statements. These include cluster analysis, latent profile/class analysis and Q-factor analysis. The present study employs a Q-factor analysis to classify respondents.[3]

The main goal of a Q-analysis is to identify *shared* perspectives on a topic of interest. Therefore, in contrast to standard factor analysis, a Q-factor analysis involves the factorization of the transposed data matrix, where cases represent the various items/statements and variables represent respondents. Hence, it involves the correlation and factorization of (within-person) response patterns instead of (between-person) items. Thus, if two respondents respond in a similar way to a set of statements, their response patterns will correlate (indicating that they share a similar perspective) and they will end up in the same factor. By merging the various response patterns (respondents) who load on the same factor (weighted by their respective factor loading), a factor array emerges that reflects the response pattern of a hypothetical person loading perfectly on that factor. These ideal response patterns then reflect the frames of mind on the topic at hand (Brown, 1980).

Q-factor analysis was originally introduced by Stephenson in a letter to *Nature* in 1935 (Stephenson, 1935). In 1953, Stephenson (1953, p. 1) put forward "Q-methodology" as a "set of statistical, philosophy-of-science and psychological principles". The present study follows these principles, but deviates in one important respect. Whereas Q-methodological procedures prescribe the use of a forced-distribution, subjects in this study were allowed to

freely score the various statements. The discussion section will include a reflection on the implications of this choice on the study's results.

A Q-study starts with the identification of what has been termed a "concourse", referring to the population of subjective statements communicated about a given topic (Stephenson, 1978). While, in theory, the variation contained in statements of opinion is infinite (in principle, one can say anything about a topic), in practice, what is actually communicated about a given topic is limited. Therefore, a sample can be drawn from the concourse that adequately captures the variation it contains.

To identify the concourse, statements were selected from previous qualitative studies (Barr et al., 2010; Becken, 2004, 2007; Cohen & Higham, 2011; Cohen et al., 2011; Dickinson et al., 2010; Hares et al., 2009; Higham & Cohen, 2011; Lassen, 2010; Miller et al., 2010; Randles & Mander, 2009) and from an online discussion forum.[4] The range of settings in which the statements were expressed (focus groups, face-to-face interviews and an online discussion forum) provided confidence that the resulting concourse would accurately reflect people's everyday communications about aviation and the environment. In total, 168 statements were sampled from the sources mentioned above.

To arrive at a manageable and representative set of statements (the so-called Q-sample), the statements were inductively grouped into 11 themes: climate change, personal impacts, environmental behavior, motivations for flying, fatalism, feelings of guilt, government intervention, industry discourses, externalizing responsibility, alternatives and future consumption. Next, statements within each theme were selected until the variation contained within each particular theme was adequately covered. This led to the selection of 36 statements, presented in Table 1. The items were randomized in the questionnaire and measured on 7-point scales from strongly disagree (1) to strongly agree (7).

Although the definition of themes and the assignment of statements to the themes may be somewhat arbitrary, these procedures are merely to ensure that the heterogeneity of the sample of statements it maximized (Brown, 1980). It is assumed that should a different conceptual structure be imposed a similar comprehensive sample would result. The final criterion is that all subjects (holding different viewpoints) have those statements at their disposal through which they can effectively communicate *their* viewpoint.

Travel and offset behavior, travel purpose and environmental attitude

To measure air travel behavior subjects were asked to indicate the number of return flights they had made in the past 12 months. To arrive at a more precise measure of respondents' air travel behavior the question was split into five distance categories: within Europe, just outside Europe (e.g. Canary Islands, North Africa, Turkey), medium distance (e.g. US, Kenya or India), long distance (e.g. Thailand, the Caribbean, South-Africa) and very long distance (e.g. Indonesia, Australia, Chile). Based on crude assumptions of the average distance traveled within each category (2.000, 5.000, 14.000, 20.000 and 32.000 kilometers, respectively), a single measure of the total distance traveled by plane (in the last year) was derived.

Next, those respondents who had indicated to have flown in the past year were asked to indicate the number of flights that had a business purpose as well as the number of flights where they had chosen to offset the related carbon emissions.

A final set of questions measured subjects' environmental attitude with the New Ecological Paradigm scale using 5-point scales (Dunlap, 2008; Dunlap, Van Liere, Mertig, & Jones, 2000). This scale was also applied by Mair (2011) to assess its association with carbon offset behavior. Its 15 items were combined into a single measure of general

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

environmental attitude, yielding a somewhat low, but sufficiently high reliability estimate (Cronbach's Alpha) of 0.74.

Respondents

The previously described measurements were included in an online questionnaire. This questionnaire was constructed together with undergraduate students during a course on research methods and statistics and served the purpose of training students in formulating research and survey questions and performing and interpreting statistical analyses. The students who participated in the course invited (Dutch) friends and family via an email containing the link to the online questionnaire.

The survey was conducted in the Netherlands in June 2011. Although instructions were given to the students to invite people evenly from different age groups as much as possible, age strongly followed a bimodal distribution in the final sample with a mean age of 21 years in the younger group (<30 with 347 useable responses) and 53 years in the older group (>30 with 144 useable responses). Of course, these peaks in the distribution represent friends, who have the same age as the students, and family members (e.g. parents), who are a generation older, respectively. In addition to this bias, highly educated people were strongly overrepresented in the sample as a whole; 87.3% of the sample either had a college/university degree or was enrolled in college/university.

Given the earlier mentioned biases the results should not be generalized toward a general population. It should be noted, however, that the main aim of a Q-study is not to reach generalizations about a population of people, but instead about a population of viewpoints. In this respect, it was expected that subjects' past flying behavior would be most influential in forming the existing viewpoints. The strong variation in this variable provided confidence that at least the main viewpoints would be revealed.

Given the bimodal distribution of age in the sample, it was decided to analyze the two (relatively homogenous) subsamples separately. It was expected that merging the two samples would result in a loss of relevant information.

Results

Air travel behavior

Descriptive statistics of respondents' air travel behavior are presented in Table 2. In line with previous findings, it shows that a minority of the sample consumes the majority of the trips.

Older subjects who made five or more trips (19.5% of the sample) were responsible for 75.9% of the total consumption in return flights. This figure conforms nicely to the Pareto principle or so-called "80–20 rule" that applies to many domains in business and logistics. In line with this principle 80% of the sales (trips) can be attributed to 20% of the consumers (air travelers). The distribution is less skewed for the younger subsample. Here, 20% of the respondents ($N = 69$) made 57.9% of the journeys. The difference with the older subsample can be attributed to the low number of business journeys in the younger sample.

While the older sample on average flies more than the younger sample, the younger sample is actually more mobile if only leisure trips are considered (presented in the last two rows of Table 2). These results corroborate findings of Shaw and Thomas (2006) that the new generation of young people already gets accustomed to a frequent flyer lifestyle early in adulthood.

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Q-factor analyses

Q-factor analyses were run separately for the younger and older sample. In the older sample, a principal component analysis revealed that relatively little additional variance could be explained after the extraction of six factors. In the younger sample, it was found that little additional variance could be explained after the extraction of just four factors.

To achieve simple structure the factors in each solution were rotated using the varimax method. After rotation 95.1% of the respondents in the older sample ($N = 137$) and 89.6% of the respondents in the younger sample ($N = 311$) loaded significantly on at least one factor. Factor scores were predicted using the regression method resulting in standardized scores. The factor arrays, each representing a different viewpoint on aviation and climate change, are presented in Tables 1 and 4 for the older and younger sample respectively.

Respondents were classified based on the factor loadings. Factor loadings greater than $1.96 \times 1/\sqrt{36} = 0.33$ were identified as significant (Brown, 1980). However, given that this is not a particularly high factor loading many respondents loaded significantly on more than one factor. The choice was, therefore, made to assign each respondent to the factor on which he/she loaded highest, representing the viewpoint the respondent identified most strongly with. In Tables 3 (older sample) and 5 (younger sample) factor membership is cross-tabulated against the other variables included in the questionnaire.

In the following, the factors are interpreted based on the results presented in Tables 1 and 3–5. In interpreting the factors, an attempt is made to identify the intrinsic logic of each factor/viewpoint; its overall line of argument. This logic should be able to account for its observed positions on (the majority of) the statements.

Following the interpretation strategy outlined above the factors in the older sample were identified as: (A) integration, (B) ignorance, (C) denial, (D) necessity, (E) guilt and (F) indulgence. With several minor differences factors A, B, C and E were reproduced in the younger sample. In the next section, the factors revealed in the older sample are described, followed by the factors from the younger sample.

The older sample

Factor A: integration

Respondents expressing this viewpoint (30% of the sample) successfully integrated their pro-environmental attitudes with their flying behavior. Subjects moderately agree with the statement that the climate changes under the influence of man (1, read as: statement 1 in Table 1) and are aware of the contribution of their flying (6). Subjects in this factor fly very little or not at all (8) and therefore feel little tension between their flying behavior and their concern for climate change. Indeed, the median number of returns flights made in this cluster equals 1 (Table 3). Respondents claim that considerations with respect to climate change play a significant role in the decision to fly (13).

Subjects in this factor believe the government should do more about climate change (22). They are sympathetic towards increasing taxes on flying (23) and even toward setting a maximum quota on the annual number of flights one is allowed to make (24). To them the massive use of cheap trips is highly polluting and untenable in the long term (33). According to this viewpoint, radical societal change is necessary to deal with climate change (36). Subjects claim to have an ecologically sound lifestyle (9), but still express a (moderate) desire to reduce their own consumption (34).

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Table 1. Factor arrays of older sample (standardized scores)

No.	*Statement*	Factor *A*	*B*	*C*	*D*	*E*	*F*
1.	I believe the climate changes under the influence of man.	0.6	1.3	–0.2	1.3	0.5	1.2
2.	Assuming that the climate indeed changes this is probably a natural process.	0.1	–1.1	1.7	–1.4	0.4	–0.7
3.	I am well informed about the problem of climate change.	0.8	–0.6	0.6	–0.3	0.5	0.0
4.	The climate problem is not as urgent as other problems (e.g. worldwide poverty).	–0.9	–0.5	0.7	–0.2	–1.0	–0.6
5.	Probably the effects of climate change will only become visible in dozens of years.	0.2	–0.2	0.9	0.4	–0.3	–1.1
6.	I know what the contribution of my air travel behavior is on the total carbon emission associated with my consumption.	2.1	–1.8	1.7	0.0	–0.4	0.6
7.	I never really thought about the effects of my flying behavior on the climate.	–1.8	1.4	–0.7	–1.3	0.5	–0.7
8.	I fly very little (or not at all). For me it is easier to save in other areas.	2.0	1.0	–0.4	–1.6	–0.8	–2.4
9.	Compared to others I have an ecologically sound lifestyle.	0.8	–0.3	–0.3	0.3	–0.6	0.1
10.	I mainly contribute to the environment through local actions (e.g. cycling, buying ecological products or reducing energy use at home).	0.9	0.8	–0.3	0.6	0.2	0.4
11.	Nowadays flying is affordable for many people. The price plays an important role in my decision to fly.	–1.0	2.0	–0.1	–1.0	0.8	0.6
12.	Flying will probably become more expensive in the future. We should enjoy it while we still can.	–1.2	0.2	–0.4	–0.5	–1.9	0.7
13.	I do not include considerations with respect to climate in my decision to fly.	–1.6	1.8	–0.1	0.9	0.3	–0.7
14.	I like flying.	–0.2	0.5	1.2	–2.0	1.6	1.2
15.	Visiting far countries is part of my lifestyle.	–1.9	–1.4	–0.1	–0.1	1.1	1.1
16.	To perform well at work, it is necessary that I fly.	–1.1	–2.2	–0.4	2.0	0.4	–1.1
17.	It is already too late to prevent climate change.	–1.1	–0.5	–0.9	–1.0	–2.2	0.8
18.	My contribution is as a drop in the ocean. There is not much I can do.	–0.8	0.2	–0.5	0.5	–1.5	–0.7
19.	I can do little to change my flying behavior.	–0.8	–0.1	0.0	1.3	–0.3	–1.5
20.	Sometimes I feel guilty about the effects of my flying behavior on the environment.	–0.5	–1.6	–1.1	–1.1	1.7	0.4

(Continued on next page)

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Table 1. Factor arrays of older sample (standardized scores) *(Continued)*

No.	*Statement*	Factor *A*	*B*	*C*	*D*	*E*	*F*
21.	My philosophy is in conflict with my flying behavior.	–1.0	–1.4	–1.3	–0.1	1.5	0.3
22.	Government action to address climate change is insufficient.	0.9	0.2	0.3	–0.1	–0.2	1.4
23.	The government should set a maximum quota for the number of flights a person is allowed to make each year.	0.6	–0.9	–2.1	–1.5	–2.2	0.0
24.	The government should tax flying more and invest the revenues in the development of clean technologies.	1.0	–0.4	–1.5	0.6	0.8	–0.4
25.	I believe the government abuses environmental problems to increase tax revenues.	0.1	0.0	1.2	–1.4	–0.4	–0.6
26.	I believe the contribution of air traffic to the total carbon emissions is relatively small compared to car traffic or the bio-industry.	–0.6	0.1	1.1	–0.6	0.0	–0.2
27.	The aviation industry is a driver behind the national and global economy.	0.3	0.4	1.5	–0.2	0.6	–0.2
28.	New technology will most likely be developed that will help us mitigate climate change.	0.0	0.6	0.9	0.0	0.8	–0.6
29.	The government should stimulate "green" flying. Individual citizens are powerless.	0.3	1.1	–0.4	1.0	0.0	0.1
30.	The Netherlands already is a clean and environmentally friendly country. Other countries can still achieve a lot in reducing their CO2 emissions.	–0.3	–0.1	1.2	1.6	0.0	–2.0
31.	Flying is the only option to cover large distances.	–0.5	0.3	1.9	1.5	–1.9	2.8
32.	By investing in the European high-speed train network a shift from air to rail may be accomplished.	0.6	1.0	–0.5	0.3	0.9	0.0
33.	The massive use of cheap trips for short holidays or city trips is highly polluting. Eventually, we cannot afford this anymore.	1.3	–0.1	–1.1	0.6	0.5	0.6
34.	I find it important to reduce my consumption.	0.8	–0.8	–0.3	0.1	0.4	0.4
35.	The continuous growth in consumption is the most important barrier for sustainable development.	0.8	0.7	–1.3	0.1	0.3	0.4
36.	Radical societal change is necessary to deal with the climate problem.	0.8	0.5	–0.8	1.0	0.2	0.5

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Table 2. Number of trips (return flights) in past 12 months

Older sample ($N = 144$)							
Number of return flights	0	1	2–4	5–9	10–49	>50	Total
% of respondents	27.1	25.7	27.8	10.4	5.6	3.5	100.0
% of total trips ($N = 649$)	–	5.7	18.3	14.3	18.0	43.6	100.0
% with a business purpose	–	5.4	25.2	64.5	74.4	95.0	69.0
Younger sample ($N = 347$)							
Number of return flights	0	1	2–4	5–9	10–49	>50	Total
% of respondents	24.8	27.1	38.6	6.6	2.9	0	100.0
% of total trips ($N = 753$)	–	12.4	47.8	18.2	21.5	0	100.0
% with a business purpose	–	5.3	6.9	12.4	1.9	–	6.6
Leisure trips							
Number of return flights	0	1	2–4	5–9	10–49	>50	Total
% of old sample ($N = 144$)	32.7	36.1	25.0	4.2	2.1	0	100.0
% of young sample ($N = 347$)	27.1	27.4	36.6	6.1	2.9	0	100.0

All in all, subjects in factor A are concerned about the environment that is also reflected in their above-average score on the NEP-scale (52.5). In this factor, people's attitudes and travel behaviors are well-integrated.

Factor B: ignorance

Subjects in this factor (comprising 22% of the sample) strongly believe that humans are responsible for climate change (1 and 2), but at the same time, claim to be poorly informed about the problem of climate change (3). Also, they claim not to be aware of the contribution

Table 3. Cross-tabulation of factor membership and variables of interest (older sample)

	Factor							
Variable[a]	*A*	*B*	*C*	*D*	*E*	*F*	*Sample*	*Sign.*[b]
N	43	32	23	15	12	12	144	–
% female	49	50	22	33	67	58	44	0.11
Age (mean)	56.0	49.3	50.0	53.3	48.5	51.6	52.5	0.00
% income above 3500 euro	24	24	63	47	25	36	33	0.03
Number of return flights in past 12 months (median)	1	1	4	4	4	3	1.0	0.00
Distance (kilometer) traveled by plane in past 12 months (median)	1000	4500	16,000	39,500	21,000	20,000	7000	0.00
% who choose to offset carbon emissions for at least 1 flight in past 12 months	14	0	13	0	8	33	10	0.04
Number of return flights in past 12 months with business purpose (median)	0	0	1	3	0	1	0.0	0.00
New Ecological Paradigm (theoretic range: 15–75) (mean)	52.5	49.8	44.8	51.7	52.6	53.3	50.5	0.00

[a]Means are reported in the case of normally/symmetrically distributed variables and medians in the case of skewed/non-normally distributed variables.
[b]Parametric tests (ANOVA) were performed for testing differences in means in the case of normally/symmetrically distributed variables, non-parametric tests were performed for nominal variables (chi-square test) and for testing differences in medians in the case of skewed/non-normally distributed variables (Kruskal–Wallis test).

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

of their flying behavior on the total carbon emissions related to their consumption (6), nor have they really considered the effects of their flying behavior on the climate (7). Like subjects in factor A, subjects in this factors claim to fly little (8), which is again supported by their actual flying behavior (Table 3). Overall, it seems that whatever dissonance exists between their flying behavior and their concern for the climate, it is resolved through a strategy of ignorance. While acknowledging the effects of human activity on the climate, subjects in this factor reduce the dissonance by claiming to be ignorant of the effects of their own behavior.

Consistent with this strategy of ignorance subjects do not feel guilty with respect to their flying behavior (20 and 21), nor do they feel the need to reduce their consumption (34). Insofar as there is any need to reduce consumption, subject delegate the responsibility to the government (29).

With a median figure of 4,500 kilometers flown in the past 12 months subjects in this factor fly slightly more than those in factor A (Table 3). While, compared to subjects in factor A, subjects in factor B have less doubt that human-induced climate change is happening (1 and 2), the average general environmental concern as indicated by the NEP-scale is lower than in factor A.

Overall, subjects in factor B are less environmentally conscious and adopt a strategy of ignorance with respect to the effects of their flying behavior.

Factor C: denial

In contrast to subjects in the previous two factors, subjects in factor C (16% of the sample) do not claim to fly little or not at all (8). Again, this is consistent with subjects' actual behavior which shows that the median number of flights of subjects assigned to this factor equals 4 (Table 3).

Subjects in factor C acknowledge the impacts of their behavior (6 and 7), but resolve any tension by denying climate change (1). If the climate does indeed change, they believe it to be a natural process (2). According to this viewpoint, climate change is not as urgent as other problems (4). All in all, subjects are very skeptical about climate change.

In line with the strategy of denial subjects strongly oppose government regulation in the form of taxes (24) or a quota on flights (23). Subjects are quite critical of the government and believe it actually abuses environmental problems to increase tax revenues (25).

The aviation industry's lines of argument as identified by Gössling and Peeters (2007) most strongly resonate in this factor. Subjects believe air transports' contribution in terms of carbon emissions to be relatively small compared to other industries (26), they view the industry as a driver behind national and global economic development (27) and believe that new technology will probably be developed to mitigate climate change (28).

The cross-tabulation of the factors with the other variables of interest (Table 3) shows that subjects in factor C are mostly men (78%) with high incomes (63% earns more than 3500 euro per month). Compared to the other factors, subjects in this factor are least concerned about the environment.

Summarizing, subjects' lack of concern for the environment in this factor is consistent with their air travel behavior. A strategy of denial is used to prevent any inconsistency between attitude and behavior.

Factor D: necessity

Subjects in factor D (10% of the sample) belief the climate changes under the influence of man (1) and acknowledge the impacts of their flying behavior (7). Like factor C, subjects do

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

not claim to fly little or not at all (8), which is consistent with their actual behavior (again the median number of return flights equals 4). Subjects in factor D resolve the inconsistently between their flying behavior and their concern for the climate by emphasizing that flying is necessary to perform well at work (16). In line with this claim, the median number of flights with a business purpose equals 3 (Table 3).

This viewpoint externalizes responsibility by emphasizing that the government should stimulate green flying (29), that other countries (besides the Netherlands) can still achieve much in reducing their emissions (30) and that there are no alternatives to flying (31).

Although subjects feel little need to reduce their own consumption (34), they moderately agree with the statement that the massive use of cheap trips is highly polluting (33) and that radical societal change is necessary to deal with climate change (36).

Similar to factor C, subjects in factor D are mostly men (67%) with high incomes (47% earn more than 3500 euro per month) (Table 3). With a median of 39,500 kilometers subjects in this factor flew the most in the past 12 months. While subjects have a relatively high score on the NEP-scale (51.7), this attitude is not reflected in their flying behavior.

To conclude, subjects in this factor posit flying as a work-related necessity and therefore see no possibility to align their flying behavior with their concern for the climate.

Factor E: guilt

Subjects assigned to this factor (8%) like to fly (14). In fact, they stress that visiting far away countries is part of their lifestyle (15). Subjects in this factor do not claim to fly little (8), which, again, is consistent with their actual flying behavior (the median number of trips made in this factor equals 4).

Subjects slightly agree with the statement that the climate changes under the influence of man (1), but do not rule out the possibility that it is actually a natural process (2). However, the feelings of guilt in this factor (20 and 21) show that subjects perceive a strong inconsistency between their flying behavior and their pro-environmental attitudes. In fact, these feelings of guilt can be regarded as subjects' means to resolve the inconsistency between their behavior and their pro-environmental attitude.

Subjects in this factor are moderately in favor of increasing taxes on flying (24), but strongly oppose setting a quota on the number of annual flights (23). They also express faith in technology to mitigate climate change (28 and 32).

Surprisingly, although subjects in this factor accept personal responsibility, they are not strongly motivated to reduce their consumption in the future (34).

The majority of the subjects in factor E are women (67%) (Table 3). Subjects in this factor have a relatively high average score on the NEP-scale (52.6), which is not reflected in their air travel behavior.

All in all, subjects in this factor acknowledge that their flying behavior is inconsistent with their pro-environmental attitudes, but have no effective strategy to reconcile this inconsistency other than feeling guilty about their behavior.

Factor F: indulgence/fatalism

Similar to subjects in factor E, subjects assigned to factor F (8% of the sample) like to fly (14) and stress that visiting far away countries is part of their lifestyle (15), which also corresponds with their flying behavior (the median number of trips made in this factor equals 3, Table 3).

Subjects believe that humans are responsible for climate change (1 and 2), but react fatalistically by claiming that it is already too late to prevent climate change (17). This

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

orientation goes together with a strategy of indulgence; "we should enjoy flying while we still can" (12).

While subjects in this factor feel slightly guilty about their flying behavior (24 and 25), they also externalize responsibility by stressing that government action to address climate change is insufficient (22). Again, subjects feel little need to reduce their consumption (34).

Compared to the other factors, subjects in this factor express the highest concern for the environment as indicated by an average NEP-score of 53.3 (Table 3). Yet, this attitude is not reflected in their air travel behavior.

To conclude, subjects in this factor are environmentally conscious, but at the same time react fatalistically. This attitude reliefs them of having to change their behavior to align it with their concern for the environment and actually supports a strategy of indulgence.

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

The younger sample

Tables 4 and 5 present the factor arrays of the younger sample and the cross-tabulation of factor membership with the other variables of interest, respectively. Given that the factors in the younger sample reproduce (to a large extent) the factors found in the older sample, the discussion of the results will mainly focus on the differences. To highlight these, those factor scores for which the absolute difference between the factors equals or is greater than one standard deviation are presented in bold (see Table 4). In addition, statistics that differ significantly between two respective factors are also marked (Table 5).

With a correlation coefficient of 0.80, the first factor in the younger sample correlates strongly with factor C (denial) in the older sample. The percentage assigned to this factor in the younger sample (31%) is almost twice as high as the percentage assigned to it in the older sample (16%). Based on the differences in the factor scores, it can be observed that price plays a more important role for younger subjects (11). This can be explained by the fact that the average income in the younger sample is much lower than in the older one. Another notable difference is that for young subjects in the denial factor visiting far away countries is a (self-proclaimed) part of their lifestyle, whereas this was not the case for the older sample (15). Subjects in the younger sample fly less than their older counterparts in factor C, but the differences in medians are not significant. Their mean score on the NEP-scale (44.9) is also not significantly different from older subjects (44.8). Overall, the findings support the notion that a substantial portion of young adults is already accustomed to a frequent flying lifestyle (Shaw & Thomas, 2006) and that they use a strategy of denial to prevent inconsistencies between their air travel behavior and any environmental beliefs.

The second factor in the younger sample reproduces factor A (integration) in the older sample; the correlation coefficient between the factor scores equals 0.81. In the young sample, 29% of the respondents are assigned to factor A, corresponding well with the percentage assigned to it in the older sample (30%). Observing the differences in factor scores, price, again, plays a more important role for younger subjects (11). In addition, whereas older subjects support a maximum quota on flights, younger subjects resist such measures (23). Again, younger and older subjects do not significantly differ in their air travel behavior. Younger subjects in factor A have a relatively high score on the NEP-scale (49.2) compared to the young sample as a whole, but significantly lower than their older counterparts in factor A (52.5). To conclude, with several differences in factor scores a consistent portion of the population across the two generations can be assigned to factor A.

The third factor in the younger sample correlates strongly (0.77) with factor B in the older sample, which was labeled as "ignorance". 16% of the young subjects are assigned to this factor, somewhat less than the percentage assigned to it in the older sample (22%).

Table 4. Factor arrays of younger sample (standardized scores)

No.	*Statement*	Factor *C*	*A*	*B*	*E*
1.	I believe the climate changes under the influence of man.	–0.2	0.9	1.3	1.7
2.	Assuming that the climate indeed changes this is probably a natural process.	1.1	–0.1	–1.2	–1.0
3.	I am well informed about the problem of climate change.	0.8	0.8	–1.6	0.8
4.	The climate problem is not as urgent as other problems (e.g. worldwide poverty).	0.7	–0.3	–1.0	–1.4
5.	Probably the effects of climate change will only become visible in dozens of years.	0.1	–0.2	1.0	–0.9
6.	I know what the contribution of my air travel behavior is on the total carbon emission associated with my consumption.	0.7	1.2	–2.5	0.1
7.	I never really thought about the effects of my flying behavior on the climate.	–0.1	–1.3	2.5	–1.0
8.	I fly very little (or not at all). For me it is easier to save in other areas.	–0.4	2.4	–0.2	–2.4
9.	Compared to others I have an ecologically sound lifestyle.	–0.4	1.2	–0.6	–0.5
10.	I mainly contribute to the environment through local actions (e.g. cycling, buying ecological products or reducing energy use at home).	–0.4	0.9	–0.5	1.0
11.	Nowadays flying is affordable for many people. The price plays an important role in my decision to fly.	1.0	0.7	0.8	0.7
12.	Flying will probably become more expensive in the future. We should enjoy it while we still can.	0.3	–1.6	0.7	–0.5
13.	I do not include considerations with respect to climate in my decision to fly.	1.2	–0.2	1.8	–0.2
14.	I like flying.	1.3	0.3	0.2	1.0
15.	Visiting far countries is part of my lifestyle.	0.9	–2.1	–0.9	2.6
16.	To perform well at work, it is necessary that I fly.	–0.3	–2.1	–1.6	0.5
17.	It is already too late to prevent climate change.	–0.4	–1.3	–0.7	–1.3
18.	My contribution is as a drop in the ocean. There is not much I can do.	0.7	–0.4	0.5	–1.1
19.	I can do little to change my flying behavior.	0.6	–0.3	–0.4	–0.9
20.	Sometimes I feel guilty about the effects of my flying behavior on the environment.	–1.8	–1.0	–0.9	0.4
21.	My philosophy is in conflict with my flying behavior.	–1.9	–1.1	–0.4	0.6
22.	Government action to address climate change is insufficient.	–0.8	0.6	0.4	0.9
23.	The government should set a maximum quota for the number of flights a person is allowed to make each year.	–2.3	–1.0	0.2	–1.3
24.	The government should tax flying more and invest the revenues in the development of clean technologies.	–1.9	0.7	0.5	–0.1

(Continued on next page)

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Table 4. Factor arrays of younger sample (standardized scores) *(Continued)*

No.	*Statement*	Factor *C*	*A*	*B*	*E*
25.	I believe the government abuses environmental problems to increase tax revenues.	0.5	–0.5	–0.6	–1.2
26.	I believe the contribution of air traffic to the total carbon emissions is relatively small compared to car traffic or the bio-industry.	0.9	–0.5	–0.4	–0.3
27.	The aviation industry is a driver behind the national and global economy.	1.4	0.3	0.2	0.4
28.	New technology will most likely be developed that will help us mitigate climate change.	1.0	0.3	0.5	–0.1
29.	The government should stimulate "green" flying. Individual citizens are powerless.	–0.5	0.7	1.0	1.0
30.	The Netherlands already is a clean and environmentally friendly country. Other countries can still achieve a lot in reducing their CO2 emissions.	1.0	0.1	–0.1	–0.3
31.	Flying is the only option to cover large distances.	0.8	–0.8	1.3	0.4
32.	By investing in the European high-speed train network a shift from air to rail may be accomplished.	–0.1	0.9	0.4	0.3
33.	The massive use of cheap trips for short holidays or city trips is highly polluting. Eventually, we cannot afford this anymore.	–1.1	0.7	0.2	0.2
34.	I find it important to reduce my consumption.	–1.2	0.4	–0.7	0.6
35.	The continuous growth in consumption is the most important barrier for sustainable development.	–0.5	1.0	0.0	0.3
36.	Radical societal change is necessary to deal with the climate problem.	–0.6	0.6	0.7	0.9

Younger subjects more strongly emphasize that they never really thought about the effects of their air travel behavior on the climate (7). In addition, in contrast to their older counterparts, they believe the effects of climate change will only become visible in dozens of years (5). Hence, younger subjects conceptualize climate change as a more distant threat and are (even) more ignorant of their own contribution than the older subjects. The air travel behavior of younger subjects is again not significantly different from that of the older ones in this factor. In sum, the ignorance factor seems to be smaller in the younger sample, but those who do belong to it (in the younger sample) claim a higher level of ignorance than their older counterparts.

The fourth factor in the younger sample correlates with factor E (guilt) in the older sample, but less strongly (0.57) than the previous three factors with their counterparts. Of the young respondents, 14% belong to this factor, slightly more compared to the older sample (8%). Younger subjects in this factor are more convinced that human-induced climate change is actually occurring (1 and 2) and are less ignorant of the effects of their own behavior (7). Still, they feel less guilty about their behavior than their older counterparts (20). This can be explained by the strategy of younger subjects to externalize responsibility toward the government (22 and 29), something that could not be observed among the older

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Table 5. Cross-tabulation of factor membership and variables of interest (younger sample)

	Factor					
Variable[a]	*C*	*A*	*B*	*E*	*Sample*	*Sign*[b]
N	106	101	57	47	347	–
% female	25	37	54	51	38	0.00
Age (mean)	21.3[c]	20.9[c]	20.5[c]	22.3[c]	21.2[c]	0.01
% income above 1000 euro	19[c]	8[c]	11[c]	26[c]	16[c]	0.02
Number of return flights in past 12 months (median)	2	1	2	3	1	0.00
Distance (kilometer) traveled by plane in past 12 months (median)	8000	2000	5000	17,000	5000	0.00
% who choose to offset carbon emissions for at least 1 flight in past 12 months	3[c]	4[c]	4	17	5[c]	0.00
Number of return flights in past 12 months with business purpose (median)	0[c]	0[c]	0	0	0[c]	0.26
New Ecological Paradigm (theoretic range: 15–75) (mean)	44.9	49.2[c]	48.6	53.8	48.2[c]	0.00

[a]Means are reported in the case of normally/symmetrically distributed variables and medians in the case of skewed/non-normally distributed variables.
[b]Parametric tests (ANOVA) were performed for testing differences in means in the case of normally/symmetrically distributed variables, non-parametric tests were performed for nominal variables (chi-square test) and for testing differences in medians in the case of skewed/non-normally distributed variables (Kruskal–Wallis test).
[c]Percentage, mean or median is significantly different ($p < 0.05$) from respective statistic in older sample (Table 3).

subjects in this factor. Respondents' air travel behavior is again similar to that of their older counterparts. To conclude, younger subjects in the guilt factor are more convinced about human-induced climate change, but accept less personal responsibility than older subjects: they externalize part of the responsibility toward the government.

It can be concluded that the structure of subjectivity with regard to aviation and climate change is more complex among older subjects than among younger ones. Two older sample specific factors were revealed: necessity and indulgence. The lack of the necessity factor in the younger sample is obvious: younger subjects simply do not have to travel by air for work-related purposes. The reason for the absence of the indulgence factor is less straightforward. One plausible explanation, however, is that the fatalistic/cynical position in this factor (i.e. "it is already too late to deal with climate change") is one which needs time to develop. Empirical evidence in favor of this explanation has been reported by Agger, Goldstein, and Pearl (1961), who found that political cynicism increases with age. It seems plausible that a similar relationship holds for environmental cynicism.

Discussion

This section relates the findings to previous research on attitude-behavior inconsistency, and discusses the limitations of the current study.

The analysis shows that there is no association between general environmental awareness and air travel behavior. The Spearman's rank order correlation between the distance traveled by air and the NEP-scale in the sample as a whole equals 0.057 (n.s.), a result consistent with Holden and Linnerud (2011) who also found no significant relationship between the two variables.

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

In the 1970s, much research focused on explaining inconsistencies between people's attitudes and their behaviors (Gross & Niman, 1975; Schuman & Johnson, 1976; Wicker, 1971). A range of factors have been identified which either attenuate the attitude-behavior relationship or, in addition to attitudes, influence behavior. The present study adds to this research by revealing how subjects from their own standpoint resolve inconsistency between, in this case, their air travel behavior and their concern for the climate change. Guilt and indulgence, for example, effectively reconcile the two. Due to these "counterintuitive" factors (i.e. high environmental awareness and high consumption of air trips) there is no relation between environmental attitude and air travel behavior in the sample as a whole.

This result can be placed in the context of Billig's (1987) rhetorical approach to social psychology, which posits that attitudes are not merely reflections of a person's inner psyche, but represent positions taken in public debate. The social viability of these positions depend on their degree of consistency (an inconsistent viewpoint is easily attacked by others), but is not a necessary condition for its "survival". The guilt factor illustrates this. Within this factor subjects actually acknowledge their inconsistency (statement 21: "My philosophy is in conflict with my flying behavior"). This acknowledgement does not lead, as many cognitive consistency theories (implicitly) assume, to an insurmountable psychological tension, but actually forms a powerful argument in relation to the other viewpoints, e.g. to those who ignore or deny the discrepancy. It is as if to say "I am inconsistent, but you are even more inconsistent given that you do not even acknowledge your inconsistency". In sum, there is plenty of scope for people, as argumentative beings, to resolve inconsistency between attitude and behavior to the point that a defensible viewpoint can be formed and communicated. Within this process acknowledging inconsistency can even be a successful strategy in developing a defensible viewpoint.

Several limitations and related directions for future research can be identified. The first relates to the sample of the study, which poorly reflects the general population of Dutch citizens. Due to the large variation in air travel behavior in the sample (a variable which strongly correlates with the varying viewpoints) there is confidence that at least the main viewpoints are revealed. Nevertheless, given the bias in education level, it might be that some viewpoints among people with a low education level have been missed. It is also reasonable to expect that the proportions assigned to each factor are different in the general population. The proportion assigned to the necessity factor (those who fly often for work-related purposes) is likely to be smaller in the general population. To address these questions, the present study should be repeated using a probability sample.

The second limitation and research direction relates to the use of separate (Likert) scales to let respondents score the varying statements. As mentioned previously, the conventional procedure in Q is to use a forced distribution in which subjects have to rank-order the varying statements on a single scale (Stephenson, 1936). This procedure assumes that measurement and the ascription of meaning (by respondents) are processes that cannot be separated; meaning arises when all statements are measured in interaction. It can be counter-argued, however, that the statements of the concourse are already in interaction (inline with Billig's rhetorical approach). The empirical analyses also show that coherent and clearly interpretable factors can be extracted on the basis of freely scored statements. Nevertheless, an interesting research direction would be to use a forced distribution and examine whether other or more distinct factors would emerge.

Conclusions and implications for practice

Six viewpoints toward aviation and climate change were revealed via Q-factor analysis: (A) integration, (B) ignorance, (C) denial, (D) necessity, (E) guilt and (F) indulgence.

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

These results add to our understanding of attitude-behavior inconsistency by revealing how subjects from their own standpoint reconcile or prevent inconsistencies and can be used in practice to design more effective sustainability discourses.

If the more mobile segments are compared (C, D E and F), the denial factor, which denies personal responsibility, is the most popular viewpoint to rationalize high consumption behavior. In both samples, it is more than twice as large as the guilt factor, which does accept personal responsibility. Its popularity may be explained by speculating that denying responsibility is, in a psychological sense, less taxing than accepting it. However, its argumentative strength vis-à-vis the other factors may form an additional/alternative explanation. This will be clarified below.

The position taken by national governments of high-income countries with regard to the environmental effects of aviation reflects the more general sustainability discourse they have adopted, qualified by Hobson (2002) as the "rationalisation of lifestyles" discourse. According to this, individuals should be able meet their own consumption needs while also taking into account the environmental impacts of their actions. Thus, this discourse does not question consumption as such (and actually reinforces it), but only requires that consumption is made "rational" by making people aware of the environmental consequences of their consumption and/or internalizing environmental externalities into the prices of goods through taxes (the European Trading Scheme can, therefore, be seen as an institionalization of this discourse).

According to Hobson (2002) the "rationalization of lifestyles" discourse puts undue weight on the individual, thereby deflecting attention from companies that largely determine the environmental performance of production chains. More generally, it can be argued that by legitimizing consumption on the one hand (consumption is good) and delegitimizing it on the other (consumption leads to environmental destruction) the "rationalization of lifestyles" discourse is self-contradictory. It may be speculated that the denial factor draws its strengths from these limitations. In the end, given the self-contradictory nature of the government's discourse (i.e. the exemption of businesses and the double stance toward consumption), there is just cause to distrust the government and their environmental policies.

Should this line of reasoning prove correct (which requires additional empirical research to assess), an effective solution in getting the "sting" out of the denial position lies in developing more internally consistent sustainability discourses. According to Hobson (2002), a discourse revolving around social justice may be more in line with lay people's perceptions. A transformation to such a discourse would be difficult, however, as it directly undermines the foundations of our (capitalist) society. As an alternative to a total discursive shift, strategies and policies may be pursued which would enhance the credibility of the "rationalization of lifestyle" discourse. For example, instead of (or in addition to) taxing air travel, governments could become much more active in directly affecting the chain of production by providing incentives to develop more sustainable aircraft technologies. In addition, the double stance toward consumption could be countered by developing codes of "appropriate" flying behavior for civil servants. By showing leadership on this issue the currently ambiguous line between "good" and "bad" (too much) consumption would become clear. The codes may be (voluntarily) adopted by businesses and eventually seep through to people's private lives.

Notes

1. A viewpoint is defined as an interrelated set of attitudes (arguments and feelings).
2. The study of attitudinal patterns (instead of single attitudes) has also been suggested by Dickinson and Dickinson (2006) who advocate a social representations approach to the study of (pro-environmental) behavior.

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

3. A Q-factor analysis has two advantages over cluster analysis. The first is that the factor analysis is theoretically and mathematically better founded than cluster analysis. In effect, it is less susceptible to sampling fluctuations, which, in turn, enhances the reproducibility of the results. The second advantage is that factor analysis allows subjects to be (moderately) associated with a number of types or with no type at all, while cluster analysis assumes that subjects are always maximally associated with one type and not with other categories. This assumption is unlikely to hold empirically. Given these advantages factor analysis is to be preferred over cluster analysis. Comparing factor analysis and latent class analysis it can be concluded that similar to factor analysis, latent class analysis (as a model-based classification technique) is mathematically well founded. Latent class models, however, become very complex with large numbers of indicators (>30), which, in effect, can lead to identification problems. Factor analysis, on the other hand, does not suffer from this problem. Overall, a Q-factor analysis is therefore deemed the most suitable method for this research.
4. http://forum.fok.nl/topic/979193/1/25 (last accessed on August 29, 2011).

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Notes on contributor

Maarten Kroesen is an Assistant Professor at the Section of Transport and Logistics at Delft University of Technology, the Netherlands. He has published numerous papers on the psychological effects of aircraft noise in the residential environment. His current research interests cover people's perspectives on climate change and aviation, modeling fairness in choice experiments and advanced statistical methods (Q-methodology, latent class models and hierarchical linear models).

References

Agger, R.E., Goldstein, M.N., & Pearl, S.A. (1961). Political cynicism-measurement and meaning. *Journal of Politics, 23*(3), 477–506.

Airbus. (2010). *Global market forecast 2010–2029*. Retrieved from http://www.airbus.com/en/corporate/gmf2010/.

Barr, S., Shaw, G., Coles, T., & Prillwitz, J. (2010). A holiday is a holiday: Practicing sustainability, home and away. *Journal of Transport Geography, 18*(3), 474–481.

Becken, S. (2004). How tourists and tourism experts perceive climate change and carbon-offsetting schemes. *Journal of Sustainable Tourism, 12*(4), 332–345.

Becken, S. (2007). Tourists' perception of international air travel's impact on the global climate and potential climate change policies. *Journal of Sustainable Tourism, 15*(4), 351–368.

Billig, M. (1987). *Arguing and thinking: A rhetorical approach to social psychology*. Cambridge: Cambridge University Press.

Blake, J. (1999). Overcoming the "value-action gap" in environmental policy: Tensions between national policy and local experience. *Local Environment, 4*(3), 257–278.

Boeing. (2010). *Current market outlook 2011-2030*. Seattle: Boeing. Retrieved from http://www.boeing.com/commercial/cmo/.

Bows, A., & Anderson, K.L. (2007). Policy clash: Can projected aviation growth be reconciled with the UK Government's 60% carbon-reduction target? *Transport Policy, 14*(2), 103–110.

Brown, S.R. (1980). *Political subjectivity: Applications of Q methodology in political science*. New Haven: Yale University Press.

Cardiff University (2010). *Energy futures and climate change survey 2010*. Retrieved from Retrieved August 29, 2010 from http://www.ipsos-mori.com/Assets/Docs/Polls/climate-change-still-high-on-publics-agenda-topline.pdf

Cohen, S.A., & Higham, J.E.S. (2011). Eyes wide shut? UK consumer perceptions on aviation climate impacts and travel decisions to New Zealand. *Current Issues in Tourism, 14*(4), 323–335.

Cohen, S.A., Higham, J.E.S., & Cavaliere, C.T. (2011). Binge flying. Behavioural addiction and climate change. *Annals of Tourism Research, 38*(3), 1070–1089.

Dickinson, J.E., & Dickinson, J.A. (2006). Local transport and social representations: Challenging the assumptions for sustainable tourism. *Journal of Sustainable Tourism, 14*(2), 192–208.

Dickinson, J.E., Robbins, D., & Lumsdon, L. (2010). Holiday travel discourses and climate change. *Journal of Transport Geography, 18*(3), 482–489.

Dubois, G., & Ceron, J.P. (2006). Tourism/leisure greenhouse gas emissions forecasts for 2050: Factors for change in France. *Journal of Sustainable Tourism, 14*(2), 172–191.
Dunlap, R. E. (2008). The new environmental paradigm scale: From marginality to worldwide use. *Journal of Environmental Education, 40*(1), 3–18.
Dunlap, R.E., Van Liere, K.D., Mertig, A.G., & Jones, R.E. (2000). Measuring endorsement of the new ecological paradigm: A revised NEP scale. *Journal of Social Issues, 56*(3), 425–442.
Gössling, S., Bredberg, M., Randow, A., Sandström, E., & Svensson, P. (2006). Tourist perceptions of climate change: A study of international tourists in Zanzibar. *Current Issues in Tourism, 9*(4-5), 419–435.
Gössling, S., Haglund, L., Kallgren, H., Revahl, M., & Hultman, J. (2009). Swedish air travellers and voluntary carbon offsets: Towards the co-creation of environmental value? *Current Issues in Tourism, 12*(1), 1–19.
Gössling, S., & Peeters, P. (2007). "It does not harm the environment!" An analysis of industry discourses on tourism, air travel and the environment. *Journal of Sustainable Tourism, 15*(4), 402–417.
Gross, S.J., & Niman, C.M. (1975). Attitude-behavior consistency–review. *Public Opinion Quarterly, 39*(3), 358–368.
Group, A. (2009). *A sectoral approach to addressing international aviation emissions*. Retrieved August 29, 2009 from http://www.agdgroup.org/pdfs/090609_AGD_Discussion_Note_2.0.pdf
Hares, A., Dickinson, J., & Wilkes, K. (2009). Climate change and the air travel decisions of UK tourists. *Journal of Transport Geography*.
Higham, J.E.S., & Cohen, S.A. (2011). Canary in the coalmine: Norwegian attitudes towards climate change and extreme long-haul air travel to Aotearoa/New Zealand. *Tourism Management, 32*(1), 98–105.
Hobson, K. (2002). Competing discourses of sustainable consumption: Does the "rationalisation of lifestyles" make sense? *Environmental Politics, 11*(2), 95–120.
Holden, E., & Linnerud, K. (2011). Troublesome leisure travel: The contradictions of three sustainable transport policies. *Urban Studies, 48*(4), 1–20.
Lassen, C. (2010). Environmentalist in business class: An analysis of air travel and environmental attitude. *Transport Reviews, 30*(6), 733–751.
Lee, D.S., Fahey, D.W., Forster, P.M., Newton, P.J., Wit, R.C.N., Lim, L.L., et al. (2009). Aviation and global climate change in the 21st century. *Atmospheric Environment, 43*(22-23), 3520–3537.
Lorenzoni, I., Nicholson-Cole, S., & Whitmarsh, L. (2007). Barriers perceived to engaging with climate change among the UK public and their policy implications. *Global Environmental Change-Human and Policy Dimensions, 17*(3 and 4), 445–459.
Mair, J. (2011). Exploring air travellers' voluntary carbon-offsetting behaviour. *Journal of Sustainable Tourism, 19*(2), 215–230.
McKercher, B., Prideaux, B., Cheung, C., & Law, R. (2010). Achieving voluntary reductions in the carbon footprint of tourism and climate change. *Journal of Sustainable Tourism, 18*(3), 297–317.
Miller, G., Rathouse, K., Scarles, C., Holmes, K., & Tribe, J. (2010). Public understanding of sustainable tourism. *Annals of Tourism Research, 37*(3), 627–645.
Randles, S., & Mander, S. (2009). Aviation, consumption and the climate change debate: Are you going to tell me off for flying? *Technology Analysis and Strategic Management, 21*(1), 93–113.
Schuman, H., & Johnson, M. P. (1976). Attitudes and behavior. *Annual Review of Sociology, 2*, 161–207.
Scott, D., Peeters, P., & Gössling, S. (2010). Can tourism deliver its "aspirational" greenhouse gas emission reduction targets? *Journal of Sustainable Tourism, 18*(3), 393–408.
Semenza, J.C., Hall, D.E., Wilson, D.J., Bontempo, B.D., Sailor, D.J., & George, L.A. (2008). Public perception of climate change: Voluntary mitigation and barriers to behavior change. *American Journal of Preventive Medicine, 35*(5), 479–487.
Shaw, S., & Thomas, C. (2006). Social and cultural dimensions of air travel demand: Hyper-mobility in the UK? *Journal of Sustainable Tourism, 14*(2), 209–215.
Stephenson, W. (1935). Technique of factor analysis. *Nature, 136*, 297.
Stephenson, W. (1936). The foundations of psychometry: Four factor systems. *Psychometrika, 1*(3), 195–209.
Stephenson, W. (1953). *The study of behavior: Q-technique and its methodology*. Chicago, IL: University of Chicago Press.
Stephenson, W. (1978). Concourse theory of communication. *Communication, 3*(1), 21–40.

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012

Stern, P.C. (2000). Toward a coherent theory of environmentally significant behavior. *Journal of Social Issues, 56*(3), 407–424.

Stoll-Kleemann, S., O'Riordan, T., & Jaeger, C.C. (2001). The psychology of denial concerning climate mitigation measures: Evidence from Swiss focus groups. *Global Environmental Change, 11*(2), 107–117.

Wicker, A.W. (1971). Examination of other variables explanation of attitude-behavior inconsistency. *Journal of Personality and Social Psychology, 19*(1), 18.

Downloaded by [Bibliotheek TU Delft], [Maarten Kroesen] at 01:01 07 June 2012