

Influence of socio-cultural factors and gender on waste behaviour of travellers: Insights from 11 touristic destinations in Europe





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Abstract

In the course of a global increase of tourism, the need to deal with waste generation, management and prevention caused by tourism activities requires increased attention. In this regard, tourists' behaviour is a crucial factor for improving the efficacy and efficiency of the waste strategies in place.

Tourists' behaviour has been extensively studied in terms of environmental awareness, while less attention has been given to behaviour and attitudes of tourists in terms of waste generation and prevention. Especially, the socio-cultural and gender component have been hardly addressed in available research. There is some evidence about differences in environmental attitudes and behaviour between tourists from



different countries of origin, just as there is evidence of different attitudes towards the environment between men and women, but these two sets of evidences are not integrated, and certainly not with regard to waste behaviour.

The present study was developed as part of the H2020 project “URBANWASTE” that aims at understanding the influence of tourism on waste management and production and at developing eco-innovative and gender sensitive strategies for waste prevention and management in 11 European pilot cases.

Particularly, this study aimed at analysing and understanding the role and effect of socio-cultural factors (e.g. place of residence, age, education) and gender on ‘waste behaviour’ of tourists; the study includes the tourists’ behaviour at home in comparison to their behaviour on holidays and accounts, hence, also for ‘behavioural gaps’ between home- vs. holiday-behaviour.

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List of abbreviations

ACR+	Association of Cities and Regions for Recycling and Sustainable Resource management
CE	Consulta Europa
WP	Work Package

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D	Deliverable
CoP	Communities of Practices
ICT	Information and Communication Technology
EU	The European Union
EC	European Commission
EASME	European Agency for Small and Medium Enterprises



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1. Introduction

In the course of a global increase of tourism (World Tourism Organisation, 2016) the need to address waste generation and improve waste management related to touristic activities requires increased attention. In this regard, understanding tourists' behaviour is a crucial factor for improving the effectiveness and efficiency of the waste strategies in place. Tourists' behaviour has been comprehensively studied in terms of sustainable or environmentally friendly tourism in general, whereas less attention has been paid to behaviour and attitudes of tourists with regard to *waste generation and prevention* at their travel destination. Especially, the socio-cultural and gender component have been hardly addressed yet in research.

The present study is part of the European research project "URBANWASTE" (www.urban-waste.eu) that aims at understanding the influence of tourism on waste production and management, and at developing eco-innovative and gender-sensitive strategies for waste prevention and management in 11 touristic cities and regions in Europe. This paper aims particularly at analysing and understanding the significance and influence of socio-cultural (e.g. country of residence) and socio-demographic factors (e.g. gender) on 'waste behaviour' of visitors (including tourists and business travellers) to these 11 touristic cities and regions.

The paper is organised as follows. In the next section, a literature review is presented on tourism and waste behaviour. This section ends with the hypotheses which will be tested with data from the 11 cities and regions. In the next section contains a description about the data collection and explains the methodology of the data analysis. The analysis focusses on the waste behaviour itself and the perceived differences in waste behaviour at home and when visiting a city or regions when travelling.discussion and conclusion.....

2. Literature review – Tourism and waste behaviour

In the reviewed literature, tourists' waste behaviour is seen as part of the more general dimension of environmental and/or sustainable behaviour. Waste minimisation is considered as one aspect of sustainable tourism in general, which ranges from buying responsible tourism products and choosing environmentally friendly transport and accommodation, to behaving in an ethical way towards destination communities (Budeanu, 2007). Although environmental issues have been part of tourism research for almost four decades, the research progress on issues such as cultural contexts, individual values, and tourists' behaviours and responsibility is to date qualified as "low", even though the practical importance of this issue for the tourism industry is qualified as "high" and has, hence, "highest" research priority (Buckley, 2012). Other review papers confirm this deficit in the state-of-the-art of research on sustainable tourist behaviour (Lu and Nepal, 2009; Myung et al., 2012; Bâc, 2014; Zolfani et al., 2015).



2.1 Behavioural intentions and actual behaviour

A main theme in available research on tourist behaviour is the relation between behavioural *intentions* and *actual behaviour*. The theory of planned behaviour (TPB), which is often used to investigate this relation, states that *attitudes*, *perceived behaviour control* and all sorts of subjective and personal *norms* determine *behavioural intentions* (see Brown, Ham, & Hughes, 2010). Generally, it is assumed that more positive eco-friendly attitudes are more likely to lead to pro-environmental behaviour and that this relation is moderated by gender, age, education and income (e.g. Leonidou, Coudounaris, Kvasova, & Christodoulides, 2015). However, several other studies point out a gap between behavioural *intentions* and *actual behaviour* (e.g. Ballantyne & Packer, 2011; K. H. Kang, Stein, Heo, & Lee, 2012; Kollmuss & Agyeman, 2002). According to several studies reviewed by Budeanu (2007), overall, tourists are largely aware of environmental problems caused by tourism and have a positive attitude towards efforts to reduce these. However, only a small share of about 10% of them implements this concern into purchasing decisions whereas the majority is reluctant to adjust their behaviour in support of sustainability goals. Budeanu (2007, p. 504) concluded that *“the low level of tourist engagement in sustainable tourism indicates that a good understanding of barriers that prevent tourists from behaving responsibly is still missing”*.

Budeanu (2007) identified two possible explanations for understanding this *gap* between intentions and behaviour in the literature, namely *internal* and *external barriers*. Internal barriers prevent people from purchasing environmentally friendly products and come from individuals' lack of knowledge and ability to understand the consequences of their acts and habits. At holiday destinations decisions are mostly automatic, continuing routines from home and replicating daily lifestyles. These *“lifestyles have their roots in personal preferences, mostly of hedonic nature, and are hardly countered by environmental arguments”* (Budeanu, 2007, p. 503). According to Kim and McKercher (2011) people even join a temporary 'tourist culture' that encourages alternative behaviour which is associated with a relaxation of domestic social norms while on holiday, although it is important to bear in mind that domestic social norms are gendered, with research continuing to provide evidence for an unequal division of domestic labour between women and men, regardless of paid work patterns (Lyonette & Crompton, 2015). Dolnicar and Grün (2009, p. 708) wrote that *“a vacation is a break from everything, where one wants to be selfish and not worry about being responsible”*. Tourists do not seem to practise the same responsibility for the environment at a holiday destination as at home. Probably they feel morally obligated in their own communities (Miller, Merrilees, & Coghlan, 2015). Tourists appear to rather justify behaviour not in line with environmental attitudes than changing their behaviour (Juvan, Ring, Leisch, & Dolnicar, 2016).

External barriers are related to the availability of products and services, the convenience to access these, and the belief that one person cannot make a difference. An important limiting factor for tourist choices is also the availability of financial resources. *“Choosing the annual holiday is a major event for a household, being one of the most important expenses in a year, involving long-term evaluation of options in terms of price, service quality and time. Given the financial implication of holiday expenses, for the average household this is a rational decision, and altruistic arguments pleading for better attitudes and considerations towards locals and nature may not work. Moreover, inconveniences seem to hinder more environmental actions in the long term, while for short-term actions, internal barriers, such as habits and lack of resources, prevail”* (Budeanu, 2007, p. 503).



2.2 Behaviour at home and when travelling

Hence, besides the attitude-behaviour gap, there seems to be a gap between behaviour at home and when travelling. This starts already with the trip to the visitor destination, even people who show high environmental commitment at home are not willing to reduce flights to get to their desired destination (Barr, Shaw, Coles, & Prillwitz, 2010). A few studies look specifically at environmental behaviour of tourists at their travel destination in relation to their environmental behaviour at home (e.g. Barr, Shaw, & Coles, 2011; Bob, 2016; Dolnicar & Grün, 2009; Miao & Wei, 2013; Miller et al., 2015). The general conclusion of these studies is that tourists behave differently at their holiday destination than at home: at home, they behave more environmentally sensitively than at their holiday destination. Interestingly, Barr et al. (2011) found that tourists with high levels of commitment to 'environmentally-responsible behaviour' at home tend to reduce this commitment significantly in a holiday setting whereas tourists with lower levels of commitment at home reduce far less. Another curious finding was discovered by Lee and Moscardo (2005) who investigated guests of an Australian eco-tourism resort. Even though these guests have high levels of environmental concern, not all of them participated in the environmental practices at the resort. A main reason for not participating was a lack of awareness, which is curious when having chosen a destination with an eco-tourism accreditation.

Most studies investigate environmentally friendly behaviour in general and include for instance public transport use, use of towels in hotels, consumption of organic food, avoidance of buying goods with unnecessary packaging, etc. Some studies, nevertheless, look closer at aspects of waste behaviour. Miller et al. (2015), for instance, looked at recycling behaviour of visitors in Melbourne, Australia. Although paper and plastic were frequently recycled in both the home and tourist context, they observed a recycling drop of 16%, which was higher than the drop of other pro-environmental behaviours such as green transport use, energy saving and green consumption. An explanation suggested by Miller et al. (2015, p. 39) is *"that recycling behaviour is institutionalised in the home city, with a convenient, regular, and tightly controlled waste and recycling pick-up service. [...] The same household in a mass tourism destination has no scheduled system and that leaves the household members to their own devices, experiencing moderate rather than high habit carry-over"*.

A study by Bob (2016) looks closer at the recycling of waste among beach tourists in Durban, South Africa. Surprisingly, it was found that a larger share of the respondents was engaged with recycling as a tourist than at home (68% vs. 55%). A possible explanation is according to Bob (2016, p. 9) that *"some of the respondents stated that recycling while travelling was easier since at the accommodation establishments guests are usually encouraged to separate their waste since bins were provided to do so."* This observation is corresponding with a more general conclusion by Dolnicar and Grün (2009) that one of the reasons why tourists behave less environmentally sensitively than they do at home is the lack of infrastructure, which makes it impossible to behave in the same way during their holiday as at home. It seems that convenience to continue the home behaviour is important (Miller et al., 2015) which implies that the lack of infrastructure (or information about it) is also an external barrier for explaining the travelling-home-gap.

2.3 Socio-cultural differences in waste behaviour

Some studies investigated the differences in eco- or environmental-friendly attitude and/or behaviour between tourists from different countries of origin (Hudson & Ritchie, 2001; M. Kang & Moscardo, 2006; Kvasova, 2011; Leonidou et al., 2015) as a proxy for the influence of different cultures on eco- or environmental-friendly behaviour. Kvasova (2011) looked at differences in eco-friendly attitudes and behaviour between Swedish and



Russian tourists in Cyprus. She found no statistically significant differences between these nationalities concerning their eco-friendly *attitudes*, although the Swedish group had a slightly higher average score. However, the Swedish group showed a statistically significantly higher average score than the Russian group in terms of eco-friendly *behaviour*. However, Kvasova (2011) did not test sufficiently whether other characteristics of her sample influenced the differences between the nationalities. In contrast to Kvasova (2011), Leonidou et al. (2015) found that there are differences in eco-friendly *attitudes* between tourists from different nationalities. They found that tourists from Western European countries were more environmentally friendly in their attitudes than Eastern Europeans. As one possible explanation they suggest that Western European countries have stricter environmental laws, more powerful environmental pressure groups and a better established 'green culture', all of which positively influence their citizens' environmental thinking and actions (Leonidou et al., 2015). Another possible explanation is the so called 'postmaterialist hypothesis' which presumes that "as society moves toward widespread material goods, the values of these are decreasing while post-material values are increasing." Considering environmental concern as a post-material value, those might be more widespread in Western European countries than in the less economically developed Eastern European countries (Leonidou et al., 2015, p. 645).

According to the literature review, tourists' behaviour has mainly been studied in terms of sustainable or environmentally friendly tourism in general, whereas behaviour and attitudes of tourists with regards to *waste generation and prevention* at their travel destination and especially the role of *socio-cultural factors* and *gender* have been less in the focus of research.

Therefore, this paper focuses on *waste behaviour of tourists* and *business travellers* (here referred to as "visitors") at their travel destination (in terms of waste generation and recycling/sorting). The paper investigates whether the above summarised findings regarding environmentally friendly behaviour of tourists also apply to waste behaviour, particularly when accounting for socio-cultural and socio-demographic factors (including gender). The following *hypotheses* will be tested:

- (1) Waste behaviour when travelling is influenced by socio-demographic and socio-cultural factors and characteristics of the destination;
- (2) There are two waste *gaps*, a gap between waste attitude and waste behaviour, and a gap between waste behaviour at home and waste behaviour when traveling.
- (3) Both waste gaps are influenced differently by socio-cultural, socio-demographic factors and characteristics of the destination.

3. Methods and data

To investigate the above outlined hypotheses, a *questionnaire survey* and *focus groups* among tourists and business travellers were conducted in 11 European touristic cities and regions in 2016/2017: Florence (IT), Nice (FR), Lisbon (PT), Syracuse (IT), Copenhagen (DK), Kavala (GR), Santander (ES), Nicosia (CY), Ponta Delgada (PT), Dubrovnik Neretva Region (HR), and Tenerife (ES).



3.1 Survey questions and sampling

The questionnaire is based on the hypotheses derived from the literature and it was translated and made available in English, Italian, French, Greek, Croatian, Spanish, Portuguese and German.

The survey was mainly carried out as an online survey (using 'EUSurvey'), only in few cities, such as Nice, Kavala and Lisbon the responses were collected on paper and later transferred to the online system. Local project partners distributed the questionnaires in the case cities and regions. The local partners chose different, locally appropriate dissemination strategies, which might imply some bias; this was considered in the interpretation of the results. The collection took place in two time periods, the first from November 2016 until February 2017 (421 responses), and the second from April until May 2017 (196 responses) to cover different touristic seasons and to increase the response rate. In total, 617 responses have been collected and included in the data analysis (see Table 1).



Table 1: Number of survey responses in each case city

No. of responses per case city	
1 Copenhagen	48
2 Dubrovnik	47
3 Florence	49
4 Kavala	51
5 Lisbon	49
6 Nice	46
7 Nicosia	49
8 Ponta Delgada	69
9 Santander	78
10 Syracuse	70
11 Tenerife	50
12 Other	11
Total	617

3.2 Focus groups

The organisation of the focus groups in the case cities was also conducted by the eleven local project partners. Between January and May 2017 in each of the case cities one focus group with tourists and/or business travellers was undertaken. The focus groups aimed at better understanding the visitors' beliefs and opinions regarding waste behaviour with a focus on gender perception and related behaviours. The focus groups involved 5 to 14 visitors and included both men and women of different countries of residence and background. In total, 27 men and 31 women participated in the focus groups.

A common topic guide was provided for the focus groups in each city, to which the individual case studies could add locally specific questions. Male and female focus group participants were identified and invited by local partners. The method of recruiting varied from city to city, depending on the local tourism context, but required the visitors to not be resident in the case study city.



3.3 Analysis of the survey and focus groups

3.3.1 Variables and statistical analysis of the survey

Table 2 summarises the variables included in the statistical analysis. The variables regarding waste behaviour and description of the gap comprise variables that describe either *behaviour*, such as type of sorted waste fractions, or *attitudes or intentions* towards waste, such as concern about food waste.

Table 2: Variables of the questionnaire survey included in the statistical analysis

Waste behaviour and "gap"		Measurement
Waste behaviour when travelling	How worried are you about food waste during your holidays/visit?	3-point Likert scale
	Total number of sorted waste fractions when travelling	Continuous
	Waste fractions sorting/sorted when travelling - paper / glass / plastic packaging / metal packaging / Organic / Electric waste / Medical waste / Green waste / Other / None	Yes/no per fraction (multiple choice)
	Cluster by type of behaviour when travelling (<i>see below</i>)	Categorical
Waste "gap" home vs. travelling	When travelling, do you take care about your waste <i>production</i> as you do at home?	3-point Likert scale
	When travelling, do you take care about your waste <i>management/sorting</i> as you do at home?	3-point Likert scale
	Waste fractions sorting/sorted when travelling and at home - paper / glass / plastic packaging / metal packaging	Yes/no per fraction (multiple choice)
	Difference in total number of sorted waste fractions when travelling vs. home	Negative/ no gap / positive gap
Explanatory variables		Measurement
Socio-cultural and socio-demographic factors	Gender	Male/female
	Household size (number of persons per household)	Ordinal
	Number of children	Ordinal
	Age (age groups)	Ordinal
	Education (3 levels)	Ordinal
	Foreign/domestic visitor surveyed	Foreign/domestic
	Region / OECD recycling index for country of residence (<i>see below</i>)	Categorical



Characteristics of destination	Share of foreigners among surveyed visitors	Ordinal
	Case city	Categorical
	Reason for trip (Business, Leisure, Visiting family / friends, Other)	Categorical
	Type of accommodation (Hotel, Hostel, B&B / Airbnb, Own second home, Relative's / friend's place, Other (incl. camping site))	Categorical
	Quality of information on waste management and collection in the visited case city according to respondents	5-point Likert scale

In order to assess the role of the *country of residence* of the visitors for their waste behaviour when travelling (hypothesis 1) and with regards to the travelling-home-gap (hypothesis 3), the countries of residence of the respondents were attributed a category based on their geographical region (within / outside Europe) and based on the country's share of recycling/composting¹ (OECD, 2015). The countries were accordingly categorised as follows (see *Table 3*):

- Group 1 – Western/central Europe / OECD recycling index = 1: Sweden, Belgium, Netherlands, Austria, Germany, Switzerland (*n*=80)
- Group 2 – Northern/western Europe / OECD recycling index = 2: Denmark, Norway, Ireland, United Kingdom, France, Italy (*n*=181)
- Group 3 – Eastern/south-eastern Europe / OECD recycling index = 3-4: Finland, Estonia, Poland, Bulgaria, Romania, Albania, Bosnia and Herzegovina, Croatia, Serbia (*n*=41)
- Group 4 – Southern Europe / OECD recycling index = 3-4: Greece, Malta, Portugal, Spain (*n*=140)
- Group 5 – all from outside Europe / mixed OECD recycling index (*n*=53)

The initial analysis of the dataset was conducted by using descriptive statistics for characterisation of the data, identification of outliers and data entry errors as well as data representation.

The core statistical analysis investigated the three above outlined hypotheses. In order to – besides socio-demographic and socio-cultural factors – control for possible further explanatory factors of waste behaviour, such as the travel destination, the type of accommodation or the purpose of the trip, these were also included in the analysis (see *Table 2*).

For analysing the above outlined relationships with regards to waste behaviour when travelling and the travelling-home-gap we used the *bivariate statistical tests Chi-square and Kruskal-Wallis H* to identify significant relationships. The tests were conducted using SPSS and XLSTAT. We used these simple forms of statistical analyses to look for empirical relationships between a wide variety of variables describing waste behaviour *and* attitudes. The data set did not allow for using multivariate analyses due to the diversity and the amount of

¹ Here referred to as "OECD recycling index": >50% = 1, 35-50% = 2, 10-35% = 3, <10% = 4.



respondents, which restricts the use of control variables. Also, the questionnaire itself was not designed to produce data for this kind of analysis.

Waste behaviour when travelling was analysed based on the different individual variables (see *Table 2*) as well as based on “types” of waste behaviour/attitude. For identifying such “types” of waste behaviour/attitude we applied *SPSS' TwoStep clustering* incorporating the survey questions:

- How worried are you about food waste during your holidays/visit?
- When travelling, do you take care about your waste production as you do at home?
- Total number of waste fractions sorted when travelling.

The derived clusters (types of waste behaviour) were likewise included in the bivariate tests.

3.3.2 Analysis of the focus groups transcripts

All focus groups were audio recorded and transcribed into English for ease of analysis. Transcripts were anonymised and participants identified by case study and gender (M/F)

The transcripts were thematically analysed by comments made on gendered home waste practice, and gendered waste behaviour when travelling compared to at home. The different responses to the questions by men and women were also analysed.

The results of the focus groups have subsequently been integrated with and contextualise the findings from the survey.

4. Results

4.1 Characteristics of the survey respondents

Among the respondents 52% are female and 48% are male. A wide variety of ages is included in the survey, however 67% of the respondents are in the age group 25-54. 12% are in the age group 18-24 and 21% are older than 54. There is a high share of highly educated people; 44% have a master's degree or PhD, whereas only 16% fall in the category with high school as highest level of education.

A majority (58%) of the respondents visited the city for leisure purposes; 18% visited the city as part of a business trip and 17% were visiting family or friends. The remaining 7% had 'other' reasons to visit the case cities. 56% of the respondents stayed in a hotel, 17% in friends' or relatives' homes and 10% in a B&B (including Airbnb). The remaining respondents stayed in other types of accommodation such as a hostels, camping sites or second homes.

In total the respondents come from 39 different countries of residence, but nearly 20% refused to answer the question about their country of residence. Countries with large numbers of respondents are Italy and Spain (both 12%), France (9%), the United Kingdom (8%), Germany and Greece (both 7%). 9% of the respondents come from countries outside Europe such as Canada, China or the US.



It is important to note that 30% are domestic visitors, residing in the same country as the case city. However, the share of domestic visitors varies largely between the case cities. Kavala has the highest share of domestic visitors (73%), followed by Santander and Nice (both 67%) and Florence (57%). In the other case cities the share of domestic visitors is below 50% or even zero such as in Nicosia. These numbers might, however, to some extent be owed to the different survey sampling strategies the case cities applied.

4.2 Responsibility for waste with regards to gender

The survey was designed to assess waste behaviour at home and when travelling for the household level and not for individual persons. Therefore, conclusions regarding behavioural differences by gender are difficult to obtain. However, regarding the main responsibility for waste in a household, the results show a significant difference ($p < 0.05$) between men and women: *Men* are more likely to be *not responsible*, 62% of the respondents who stated to be not responsible are male. This is also confirmed by the focus groups in which 11 of 27 male participants believed that women were initiators of waste sorting and minimisation at home.

There were some noted differences between how women and men claimed to recycle or manage waste when travelling away from home. In particular, the issue of peer pressure was again raised in connection with young men, particularly where travelling in groups: *'There's a certain level of misguided macho to it. I certainly won't be the softy that goes over to the bin. Otherwise the others would say "you're whipped"'* (male, Denmark). Other gendered behaviour from 'home' seems to be transferred when 'away': *'A man has his domain, and he brings this with him on holiday'* (male, Denmark), and: *'As we have a pushchair with us, it's easier to drag rubbish around with us'* (woman, Denmark). Some women respondents gave having more time and being more relaxed as a reason for recycling more on holiday.

4.3 Waste behaviour when travelling

For analysing people's waste behaviour when travelling, we initially conducted a *cluster analysis* in order to identify patterns of certain types of waste behaviour when travelling. By means of the cluster analysis, six clusters ranging from "bad" (cluster 1) waste behaviour when travelling (not at all worried about food waste / care less about waste production than at home / mean of total sorted fractions = 1.42) to "good" (cluster 6) waste behaviour when travelling (really worried about food waste / care same about waste production as at home / mean of total sorted fractions = 3.13) were identified.



Exploring the relationship between the six waste behaviour clusters and socio-demographic and socio-cultural factors reveals significant relationships² ($p < 0.05$) only for the share of foreign visitors surveyed at each destination³:

- Destinations with a share of *>90% of foreign visitors* surveyed (Nicosia, Copenhagen, Lisbon) have comparably least respondents (5.1%) in the worst behaviour cluster 1, and the second highest share (52.6%) of respondents in the two best behaviour clusters, 5 and 6.
- Destinations with a comparably *low share (30-50%) of foreign visitors* surveyed (Florence, Nice, Santander) have comparably most respondents (23.8%) in the worst behaviour cluster 1, and the lowest share of respondents (44%) in the two best behaviour clusters, 5 and 6 (see *Figure 1*).

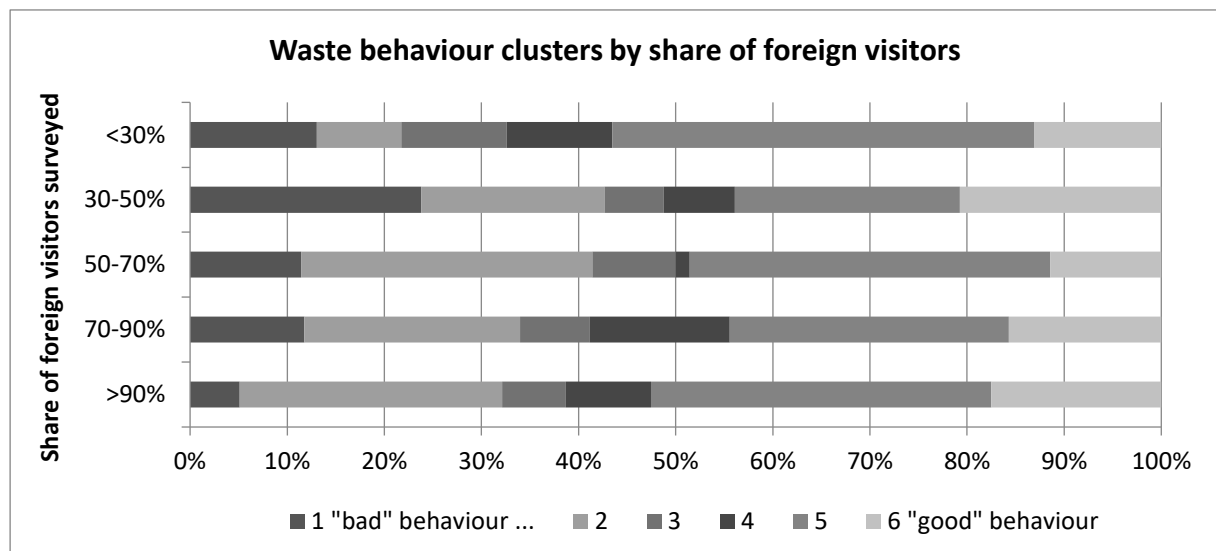


Figure 1: Clusters of waste behaviour when travelling by share of foreign visitors

In addition to the analysis of waste behaviour when travelling by clusters, we conducted *bivariate analyses* between certain attributes of waste behaviour when travelling – concern about food waste, sorting of fractions – and socio-demographic and socio-cultural factors as well as characteristics of the visited city (case city).

In terms of socio-cultural and socio-demographic factors we found only few statistically significant relationships with little influence on waste behaviour when travelling:

- Respondents with higher education levels sort significantly more waste fractions (mean=2.44) than people with low education (mean=2.01).

² The Chi-square test between the clusters and the visited city (case city) does not meet the assumption due to a too high number of cells (25.8%) with expected count less than 5, therefore the results are excluded.

³ 2 cells (6.7%) have expected count less than 5.



- Visitors from southern Europe (Greece, Malta, Portugal, Spain) score highest for sorting metal packaging when travelling compared to visitors from eastern and south-eastern Europe (Bulgaria, Estonia, Poland, Romania, Finland, Albania, Bosnia and Herzegovina, Croatia, Serbia) who score lowest.

As also the results based on the waste behaviour clusters (see above) show, the share of foreign visitors surveyed at the destination has significant influence on certain attributes of waste attitude and behaviour when travelling (see *Figure 2*):

- Destinations with a comparably low share (0-50%) of foreign visitors surveyed (Florence, Nice, Santander, Kavala) have the highest share of respondents (ca. 28%) who are “not at all worried” about food waste when travelling,
- In contrast, at destinations with a very high share (>90%) of foreign visitors surveyed (Nicosia, Copenhagen, Lisbon) only 12.3% stated that they are not worried.

Furthermore, there are significant differences between the travel destinations regarding certain attributes of waste behaviour when travelling (see *Figure 2*):

- *Ponta Delgada* has the highest share of respondents (42%) who are “really worried” about food waste; in contrast, *Syracuse* has the by far lowest share in this group with only 13%. *Dubrovnik* on the other hand, has the highest share of respondents (34%) who are “not at all worried” about food waste, whereas *Lisbon*⁴ has with 4.1% the by far lowest share in this group.
- Accordingly, we found also differences regarding the number of sorted waste fractions and different types of waste sorted: visitors to *Dubrovnik* score overall the worst for sorting waste. The other case cities show mixed results for sorting waste, which might indicate differences in the sorting facilities or information. *Ponta Delgada*, *Lisbon* and *Santander* achieve comparably high overall scores for sorting waste.
- Interestingly, *Syracuse* (representing the only case city with a medium share (50-70%) of foreign visitors surveyed), shows overall low scores for sorting, however, it scores significantly highest for sorting *glass* (68.6%), but is among the lowest for sorting *paper* (31.4%); which might again give some indication regarding the available waste sorting facilities or the quality of information on waste management in Syracuse.

⁴ The results for Lisbon have to be carefully interpreted as the questionnaire survey was mainly carried out among guests of eco-friendly hotels, i.e. these guests possibly have above-average environmental values. Accordingly the surveyed visitors in Lisbon rate the quality of information on waste management and collection second best after Copenhagen, whereas the waste workers rate the waste management efficiency only mid-range,

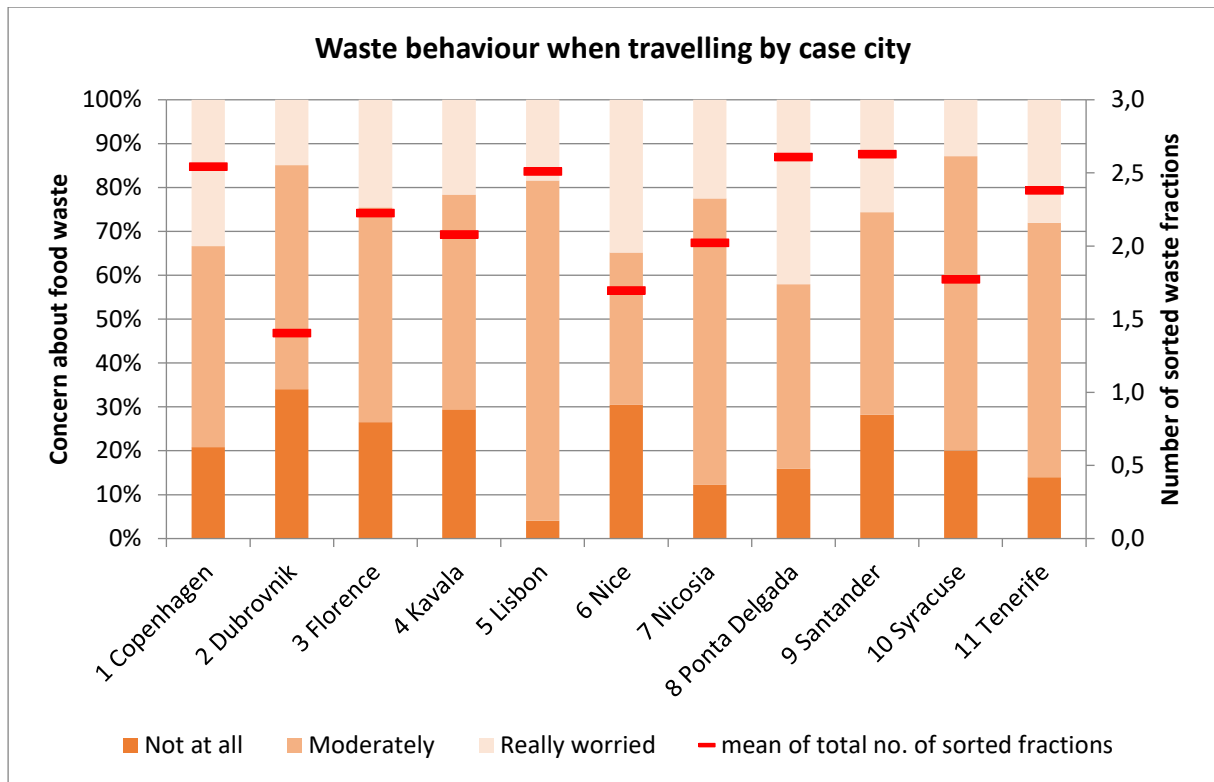


Figure 2: Waste attitude (concern about food waste) and behaviour (number of sorted fractions) when travelling by case city

A further interesting observation is that visitors staying in Bed & Breakfast or Airbnb accommodations show the significantly highest share of sorting glass; at the same time, most of the B&B / Airbnb guests are located in *Syracuse* (38%), hinting once more towards the waste sorting facilities / information there.

4.4 Waste behaviour “gap” home vs. travelling

4.4.1 Defining the waste behaviour “gap”

In the literature it has been suggested that tourists behave differently when they are on holiday in comparison to their behaviour at home. In the survey, various questions were included to identify this “gap”. The respondents were asked if they, when travelling, do take care about their waste *production* and *management/sorting* as they do at home. Both of these questions refer to attitudes. The results are displayed in *Figure 3* and show that both regarding waste production and waste sorting 40% of the respondents showed that there is a negative gap between their waste attitude at home and when travelling. That is, these respondents take care less about waste production and sorting when travelling. Remarkably, a small share of 5% of respondents state that they take care more about their waste production and waste sorting when travelling.

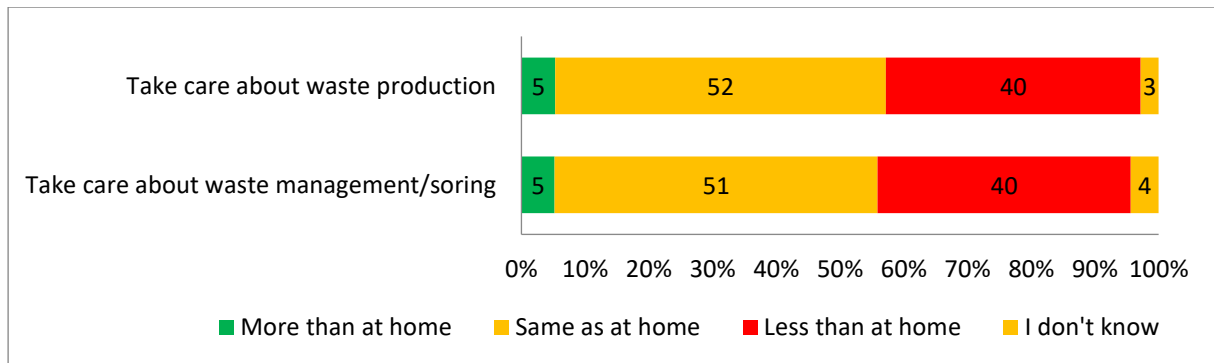


Figure 3: Share of respondents that take care of their waste production / sorting less, same or more when travelling than at home (N=617).

A second way of defining this gap was to ask the respondents which waste fractions they sort at home and which waste fractions they sort when travelling. This behavioural comparison is represented in Figure 4, which clearly shows that all waste fractions are sorted less when travelling than at home. 17% of the respondents state that they do not sort their waste when travelling (compared to even also 9% at home). Figure 4 also shows that the gap is relatively large regarding electronic, medical and green waste, which seems logical as these waste fractions are less likely to be disposed when travelling.

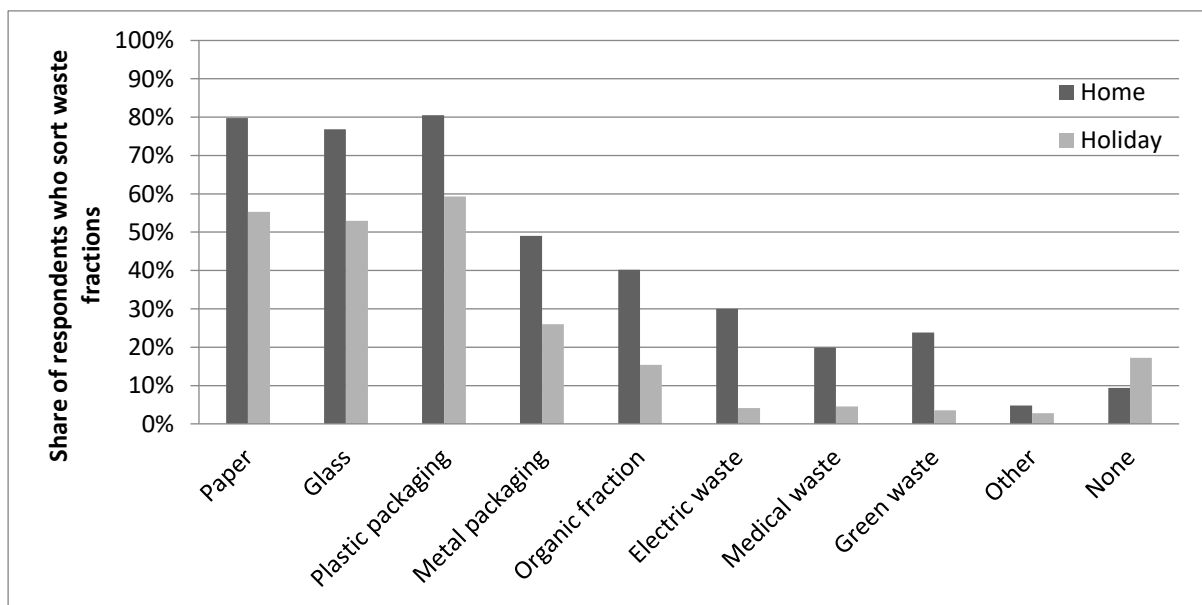


Figure 4: Share of respondents that sort waste fractions at home and when travelling (n=604)

For assessing the travelling-home-gap regarding the sorted waste fractions the following approach was used. Firstly, we only selected the paper, glass, plastic and metal packaging waste fractions because these are the most common ones. Secondly, we counted how many of these four fractions the respondents sorted at home and when travelling. Finally, we defined the gap by subtracting the number of waste fractions sorted when travelling



by the number of waste fractions sorted at home. When the number of waste fractions sorted at home exceeds the number of waste fractions sorted when travelling, there is a negative gap. *Figure 5* shows the results of this analysis: 32% of the respondents did not have a numerical waste fractions gap, i.e. they sort the same number of the **ef**-waste fractions (but not necessarily the same waste fractions) at home and when travelling. However, 57% have a negative waste fractions gap ranging from -1 to -4 fractions. 11% have a positive waste fractions gap, i.e. these respondents claim to sort more of the four major waste fractions when travelling than at home.

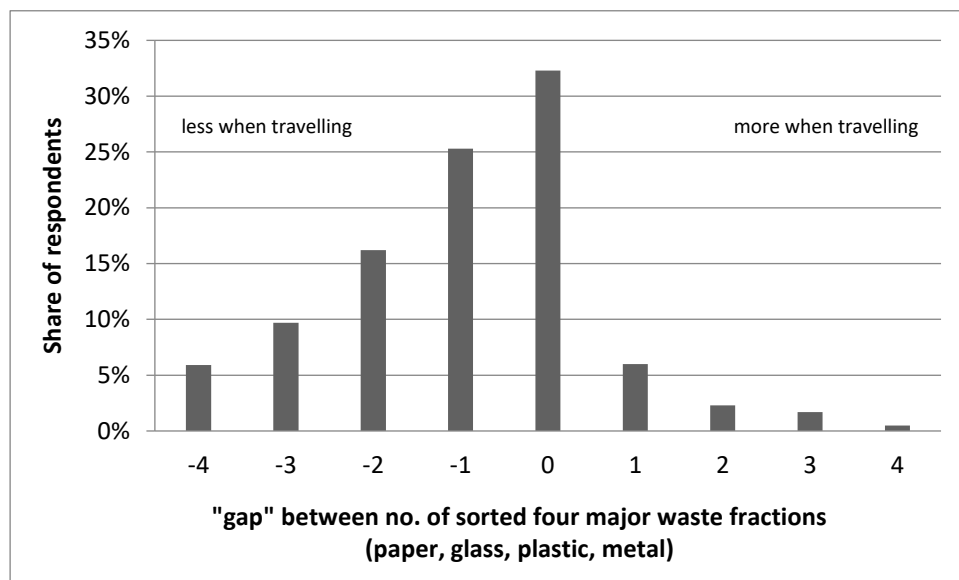


Figure 5: Numerical waste fractions gap among paper, glass, plastic and metal packaging fractions (n=604)

When comparing the results of the numerical waste fractions gap with the results of *Figure 3*, more respondents have a negative numerical gap (measured in waste fractions) than when being asked about taking care of waste management/sorting (57% vs. 40%). Correspondingly, the group that has no numerical waste fractions gap is smaller than the group that stated taking care about waste management/sorting the same way when travelling as they do at home (32% vs. 51%). These results correspond with the literature, both regarding the existence of the gap between *intentions/attitudes and actual behaviour* and the gap between *behaviour at home and when travelling*.

4.4.2 Explaining the waste behaviour “gaps”

Subsequently, it has been investigated if and how these gaps are related to socio-demographic and socio-cultural factors of the respondents and the characteristics of the travel destination (case cities). The waste gap has been identified by three variables:

- The before mentioned questions about taking care of (1) *waste production* and (2) *waste management/sorting* when travelling compared to home and
- (3) the *waste fraction gap* with three values: negative gap, no gap and positive gap.



In terms of socio-demographic and socio-cultural factors, we found only a few significant relationships ($p < 0.05$) regarding the travelling-home-gap:

- In the case of taking care of waste production when travelling compared to home there is a significant relationship with *age*. With increasing age people are more likely to take care about waste production the same way when travelling as they do at home.
- The *region-OECD* variable is significantly related to caring about waste production and waste management/sorting. However, a distinct pattern is not derivable.
- Visitors from Northern, Western and Central Europe are more likely to have a negative gap than visitors from Southern and Eastern Europe, as shown in *Figure 6*. A possible explanation is that the Northern, Western and Central European countries have a higher recycling index than Southern and Eastern European countries, therefore visitors from the latter countries may have a smaller gap as they also sort less at home. This seems to confirm the 'post-materialism hypothesis' (see literature review).

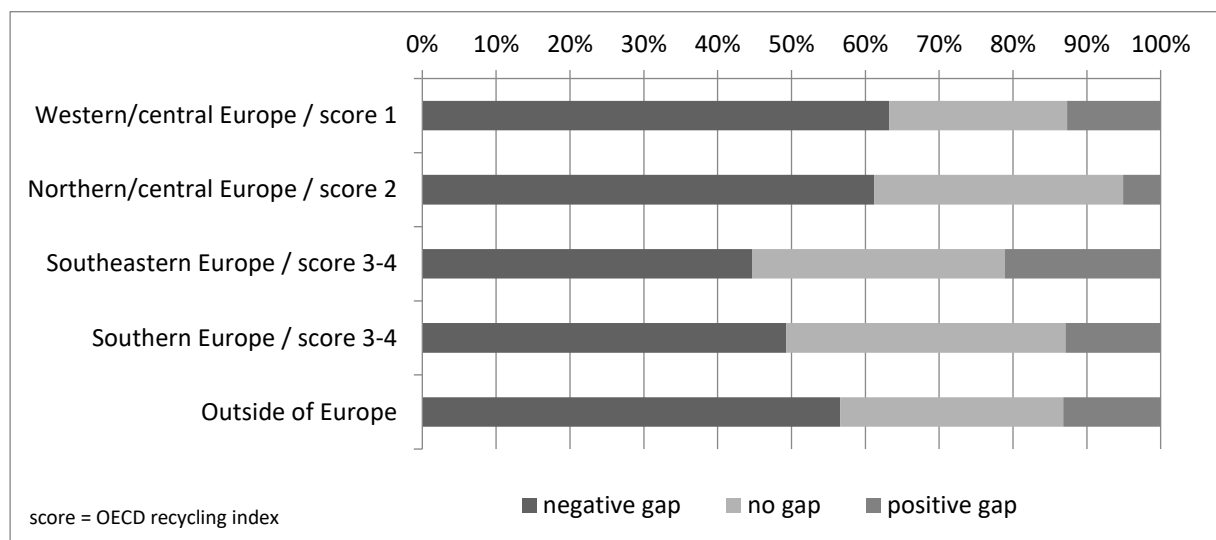


Figure 6: Numerical waste fractions gap of visitors of different regions of residence (n=478)

We also found significant relations between the three gap variables and the case city. Ponta Delgada, Nicosia and Nice are the only cities in which the share of visitors admitting that they *take care less about waste production and waste management/sorting* when travelling than at home exceeds 50%. In the other cities this share ("taking care less than at home") is lower than 50% (see Figure 7); in Lisbon, Kavala and Tenerife it is even below 34%, indicating that respondents in these cities may either have a relative high level of pro-environmental attitude or a not very good behaviour at home.

Looking at the *waste fractions gap*, however, shows that in Syracuse 78% of the respondents have a negative gap. Also Lisbon with a negative waste fractions gap of 56% stands out, but mainly because of the huge difference between this gap and the share 'less' on both 'caring' variables (23% and 17% respectively). For both Lisbon and Syracuse seems to apply that there is a relative large *gap between attitude and behaviour*.

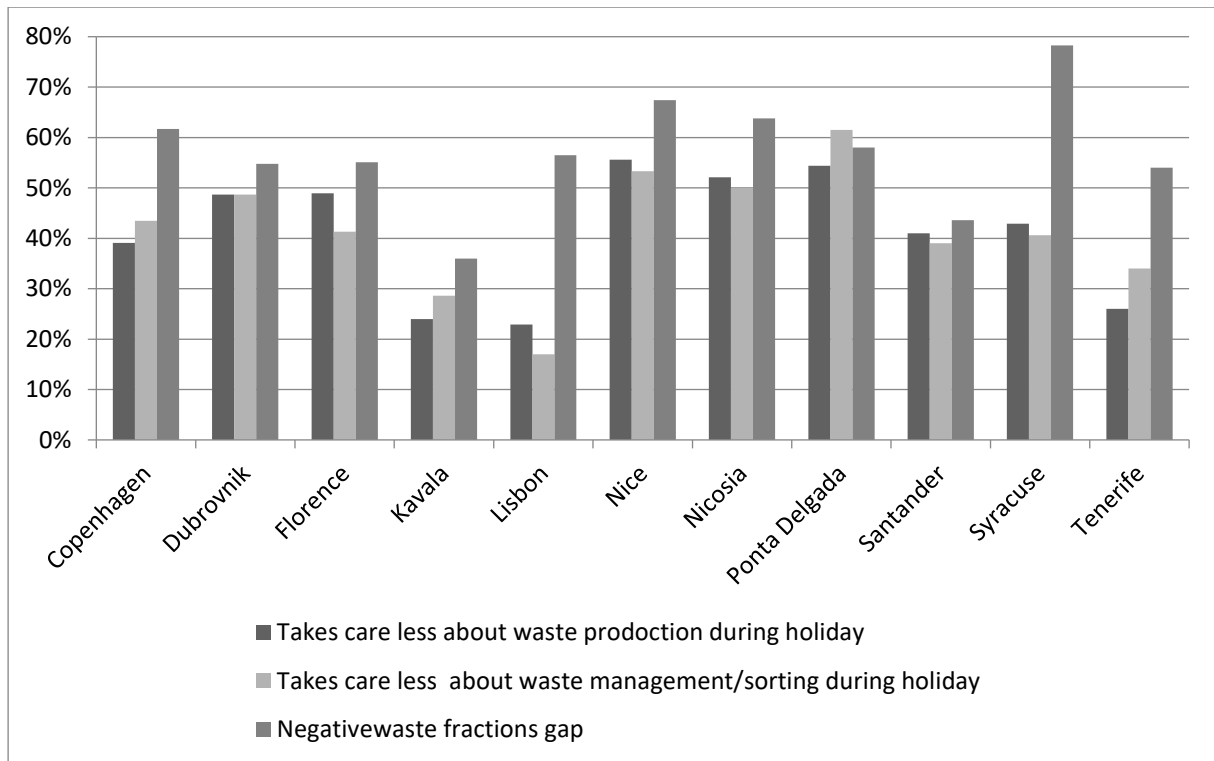


Figure 7: Comparison of negative gap values between case cities (n=589, n=579, n=593)

There are also significant relations between the share of foreign visitors surveyed in the case city and the waste fractions gap. The destination with 50-70% of foreign visitors surveyed (Syracuse) shows the highest share of negative waste gap (78%), while Kavala, which has the lowest share of foreign visitors surveyed (27%), has also the lowest share of negative waste gap (36%). Syracuse has a share of 87.5% of visitors from Northern, Western and Central Europe (incl. Italy), which show high OECD recycling indexes (see Table 3), i.e. good home behaviour and might therefore lead to a big gap if the performance when travelling drops notably, for instance caused by a lack of facilities or information.

Table 3: Visitors' place of residence by region and OECD recycling index

	Western/ central Europe / score 1	Northern/ central Europe / score 2	Southeastern Europe / score 3-4	Southern Europe / score 3-4	Outside of Europe
Copenhagen	20.5%	36.4%	4.5%	11.4%	27.3%
Dubrovnik	7.1%	28.6%	57.1%	3.6%	3.6%
Florence	10.9%	63.0%	2.2%	8.7%	15.2%
Kavala	2.3%	0.0%	13.6%	79.5%	4.5%
Lisbon	25.0%	42.5%	0.0%	17.5%	15.0%
Nice	3.0%	75.8%	6.1%	9.1%	6.1%



Nicosia	25.0%	30.6%	13.9%	22.2%	8.3%
Ponta Delgada	27.6%	8.6%	3.4%	31.0%	29.3%
Santander	4.3%	21.4%	4.3%	67.1%	2.9%
Syracuse	25.0%	62.5%	6.3%	4.2%	2.1%
Tenerife	27.5%	50.0%	2.5%	20.0%	0.0%

The low waste fractions gap of Kavala can probably be explained by the overall low score of waste sorting of Kavala visitors both at home and when travelling, which makes it less likely to have a large waste fractions gap. Also the fact that in Kavala the majority of the visitors are domestic makes a large waste fractions gap unlikely because waste management practices in one country are more likely the same than between countries, and Greece has also a low OECD recycling index. The significant relationship between the variables foreign/domestic visitors and negative/no/positive gap confirms this assumption.

There is also a relationship between the waste fractions gap and the *type of accommodation* where visitors are staying. Visitors who are staying at a hotel, hostel or B&B/Airbnb are more likely to have a negative waste fractions gap than visitors who stay at their own second home, their relative's or friend's place or a camping site.

5. Discussion

The number of responses collected from the survey can overall be considered sufficient for the analysis, however, the limited number of responses for each case city (in some cases hardly 50 responses, see Table 1) limits explanatory power when looking at the cities individually. A further limitation concerns the eight different languages in which the survey was made available, allowing on the one hand to reach out to a broader group of visitors, but on the other hand creating the potential for inaccuracies in the detailed understanding of some questions and also differences in cultural understanding. The sample also shows an overrepresentation of highly educated people. Furthermore, the survey sampling was conducted differently in each city, which might to a certain extent be a source of bias that has, however, been considered in the interpretation of the results. Regarding the focus groups, it is important to note that for visitors to volunteer over an hour of their time to discuss waste management when on holiday, or otherwise travelling away from home, indicates a degree of interest in waste practice or minimisation that may well not be reflective of the general tourist population. Differences in practices of recruitment to the focus groups, which varied between interviewing overseas students staying for a year (Nice), interviewing visitors to one case study city from a neighbouring city (Copenhagen), and interviewing tourists staying only in eco-hotels (Lisbon, as already mentioned), means that the results are not comparable between case study cities.

Nevertheless, the data allows for some novel insights into waste behaviour of travellers that have to the knowledge of the authors not yet been addressed in that form in previous research.



5.1 Travel destination's role for waste behaviour

Overall it appears that the characteristics of the travel destination and the share of foreign visitors are most crucial for the visitors' waste behaviour. Moreover, the data confirms previous findings showing that women more often take the responsibility for waste management in a household. Focus group discussions suggest that this gendered domestic division of labour is, to some degree, imported into tourist behaviours.

It appears that a higher share of foreign visitors indicates comparably better waste behaviour than a higher share of domestic visitors. This is to some extent confirmed by the focus groups and other work done in the URBAN WASTE project (de Luca et al., 2017).

However, as the statistical analyses conducted do not allow accounting for multivariate relationships, we cannot exclude that the differences in waste behaviour are (also) explained by other factors, e.g. the waste facilities or information in the cities, and not merely by the share of foreign visitors. Discussions in the focus groups suggest that one explanation for a drop in recycling away from home is due to either a lack of recycling facilities available, as the following examples from visitors to Dubrovnik illustrate. A man from Slavonski Brod in Croatia thought that tourists to Dubrovnik could not recycle as well as at home as facilities were not available – or due to a lack of awareness as to what these are. Two women from the US found a lack of information which would have helped them to recycle, while a man from Split in Croatia thought that owners of holiday accommodation needed to be explicit about how to dispose of waste.

The results show, furthermore, when looking at food waste concern and sorting of waste when travelling, that at some destinations (case cities), visitors show either an overall good behaviour (e.g. Ponta Delgada) or an overall rather bad behaviour (e.g. Dubrovnik), whereas at other destinations no "general" visitor behaviour can be determined.

Explanations for different kinds of waste behaviour of visitors appear to be related to the waste facilities/information in place and "home" behaviour predisposition, but possibly also the characteristics of the destination: For instance, Ponta Delgada is a "nature destination" which people visit for enjoying the environment; this suggests that those people might also be more concerned about waste. Moreover, more than 35% of the respondents in Ponta Delgada were from countries with a high OECD recycling index, i.e. with a good predisposition.

5.2 'Home-predisposition' and waste behaviour when travelling

In contrast, visitors in Dubrovnik are among those with the poorest waste behaviour when travelling; at the same time, with a share of more than 57% of the surveyed visitors, Dubrovnik has by far most visitors from eastern/south-eastern Europe, which is one of the groups with the lowest OECD recycling index (see *Table 3*). Hence, visitors might to a certain extent "import" bad home habits (but see also above for one reason for a lack of recycling being the lack of facilities in situ).

This home-predisposition is very relevant for assessing the travelling-home-gap, because the gap might be bigger among – foreign – visitors coming from very well performing countries, and thus at destinations with a high share of foreigners surveyed, as the cases of Ponta Delgada and Syracuse show. Ponta Delgada shows an overall good waste behaviour among its visitors, but more than 50% of the respondents admit to take care less than at home;



Syracuse performs well in some areas of waste behaviour, but not good at others and shows at the same time the highest negative waste fractions gap. Hence, it also seems that respondents from well-performing countries might be more willing to admit to take care less when travelling, confirming the attitude-behaviour-gap.

Obviously, the country of residence and its established waste sorting/recycling practices (here represented by the OECD index) influence people's behaviour when travelling. People travel with their habits, as the discussions on gendered home waste behaviour also illustrate.

5.3 Sorting facilities and information

Among others, the case of Syracuse illustrates that waste sorting facilities and information might be decisive, as the differences in sorting paper and glass and the big travelling-home-gap show. Both Dubrovnik and Syracuse are assessed lowest by the surveyed visitors regarding the quality of information on waste management and collection; and the waste workers in both cities consider waste management efficiency also very low (de Luca et al., 2017).

In summary, the results confirm two kinds of "gaps": Firstly, there is an obvious difference between waste behaviour when travelling compared to home, and secondly, there seems to be a gap between attitude and actual behaviour, at least regarding behaviour when travelling.

6. Conclusions

In this paper we examined the waste behaviour of visitors in 11 touristic cities and regions in Europe. We used a questionnaire survey and focus groups. To date largely based on anecdotal and case study evidence from a comprehensive preceding literature review, we expected to find differences in waste behaviour related to different socio-demographic and socio-cultural characteristics of the respondents (including gender differences and country of residence) and the waste sorting infrastructure of the destination. The literature, furthermore, suggests that people have a different waste behaviour when they are travelling compared to their waste behaviour at home.

From the survey data we could find differences in waste behaviour between the 11 cases. High levels of waste sorting were found among the visitors of Santander and Ponta Delgada, whereas visitors of Dubrovnik and Nice sorted their waste least. Surprisingly, we hardly could find any relationship between waste behaviour and socio-demographic variables. Except, the literature suggests that men take less responsibility than women, which is also confirmed by the focus groups and the questionnaire data.

Socio-demographics are not significantly related to waste behaviour, but sometimes to attitudes about waste behaviour.

Our results confirm that there is a gap between *attitudes* and *behaviour*. In general people state that they have a positive attitude to waste sorting, but in reality (behaviour) they often do not behave accordingly. Besides this attitude-behaviour-gap, the data confirmed a *gap between waste behaviour at home and waste behaviour when travelling*, in line with hypothesis 2. This gap is significantly related to the different cities, indicating that differences in waste sorting infrastructure and/or information may explain differences in the waste behaviour of the visitors. However, also the country of residence of the visitors is significantly related to the travelling-home-



gap indicating that waste behaviour at home (waste sorting habits /culture at home) influences the extent of the gap. Most likely the gap can be explained by both the waste infrastructure at the travel destination *and* the waste behaviour at home. For instance: bad infrastructure and bad home waste behaviour results in a small gap, but bad infrastructure and good home waste behaviour results in a large gap. Consequently, travel destinations with a high share of visitors from well performing countries of residence tend to show a higher gap, because behaviour drops more than in case of visitors from bad performing countries of residence. This cautions against using the size of the gap in isolation as an indicator of waste behaviour of tourists, as each gap comprises different characteristics which need to be explained in the context of the host city and the place of residence for the tourist.

This conclusion has implication for policy which needs to be aware of and take into account this complexity.

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