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Are Academics' Willing to Change Their Conference Travel Habits for the Sake of the Environment? – The Case of Spain

Iria Lopez-Carreiro[1(✉)] [ID], Andres Monzon[1] [ID], and Oded Cats[2] [ID]

[1] Centro de Investigación del Transporte (TRANSyT), Universidad Politécnica de Madrid, Madrid, Spain
iria.lopez@upm.es

[2] Department of Transport and Planning, Faculty of Civil Engineering and Geosciences, Delft University of Technology, Delft, The Netherlands

Abstract. As concerns about climate change increase, the environmental impact of long-distance travel – including academic conference travel – is coming into focus. Multiple universities have recently started to deploy sustainability policies committed to net-zero targets. However, it remains uncertain today whether academics are ready to embrace such initiatives and transform their practices for the sake of the environment. In this study, we explore the motivational factors behind academics' willingness to limit their conference travel based on a survey conducted in Spain. The results highlight the role played by a set of demographic, socioeconomic, work-related, and attitudinal factors, as estimated by means of an ordered logit model. All else being equal, postdoctoral researchers and individuals who live in single-person households are more likely than others to reduce their travel. In terms of psychological attributes, we detect that individuals with a higher level of green values and more influenced by social norms are more intended to limit their conference trips. Conversely, those who believe that conferences are a driver for professional development are less willing to lower their travel. Our findings can help institutions to identify the segments of academics with a higher (and lower) probability of changing their behaviour towards more sustainable habits.

Keywords: Conference travel · Behavioural change · Climate change

1 Introduction

As concerns about climate change increase, the environmental impact of long-distance travel – and particularly, air travel – is coming into focus. Nowadays, the avion industry is responsible for approximately 13% of greenhouse gas (GHG) emissions from the transport sector and 2% of total anthropogenic GHG emissions [1].

Air travel and aeromobility are culturally at the core of academic life. Academics are often engaged in a wide variety of activities that involve this practice. Among them, attending conferences is considered central [2]. Not only do they provide the appropriate framework for presenting and disseminating one's own work to interested colleagues, but

they are also important settings for establishing (international) collaborations, exchanging knowledge, and building professional networks, among other possibilities. In a globally competitive scenario, conference attendance is seen as a driver for achieving a successful academic career.

However, despite all these opportunities, attending academic conferences is also a carbon-emitting activity [3]. As a result, there is an active and growing debate on the necessity to limit this academic mobility. The environmental impacts arising from conference travel have become a priority issue for the sustainability programmes of numerous universities and research centres. In recent years, these institutions have started to define and deploy policies committed to net-zero targets. Today, although these initiatives aim to encourage more sustainable behaviours among the academic community, it remains uncertain whether individuals are ready to embrace them (for the sake of the environment) and modify their practices. Experts agree that these initiatives to limit the negative effects of conference travel require the involvement and compromise of academics themselves, who should be eager to contribute by changing their conducts.

As highlighted by [4], understanding the factors behind academics' willingness to limit their mobility is key to design effective strategies that influence individuals' decision-making processes towards "greener" habits. Previous literature recognises three main groups of explanatory variables: demographic and socioeconomic attributes, work-related characteristics, and personal attitudes and preferences. Nevertheless, to our knowledge, quantitative research on academics' motivations for reducing their conference travel is still scarce and further investigation is therefore required. This study explores the factors that underpin academics' willingness to reduce their conference travel for the sake of the environment, focusing on the Spanish academic community. Our findings can help universities and research institutions to understand which academic profiles are more (or less) likely to transform their current behaviours for environmental reasons.

2 Methodological Approach

2.1 Survey Design and Data Collection

In this paper, we examine academics' willingness to reduce their conference travel. With this objective, we design a tailor-made survey aimed at identifying a set of explanatory variables determining each individual's intention to change behaviour. Specifically, we consider demographic, socioeconomic, work-related, and attitudinal variables. Based on a detailed review of previous questionnaires with a similar scope, we structure the survey in five parts:

- Part I. Conference travel habits: number of conferences attended per year.
- Part II. Academics' personal attitudes. Based on the review of earlier literature, we select seven factors (environmental concerns, bringing benefits to the scientific community, joy of travelling, personal performance and development, importance of face-to-face interactions, social norms on travel reduction, and ethical responsibility of academics) that might explain academics' willingness to reduce their conference travel for environmental motives. To operationalise these (latent) factors, we adopt

and adapt validated items from prior research. For all the items, respondents are requested to rate their level of agreement on a 7-point Likert-type scale, ranging from "strongly disagree" to "strongly agree".

- Part III. Individuals are directly asked to rate – on a 7-point Likert-type scale – their willingness to reduce their conference travel for the sake of the environment. This represents our dependent variable.
- Part IV. Work-related variables: research field, academic position at university, and effects of the COVID-19 pandemic on (work) travel habits.
- Part V. Demographic and socioeconomic characteristics (gender, age, etc.).

The questionnaire was distributed online between the 15th of June and the 15th of September 2023, targeting academics based in Spain. For the sample recruitment, we combined the following two approaches: (1) distribution of flyers (which included a web-link and a QR code to the questionnaire) during an international conference related to the transport field that was held in Spain, and (2) dissemination of the questionnaire through social media. Prior to the final survey, a pilot survey was conducted.

### 2.2   Analysis of the Survey Outputs

The analysis of the data collected through the online survey comprises three steps. First, a descriptive analysis is developed. Second, an Explanatory Factor Analysis (EFA) is conducted to identify the latent structure underlying the set of attitudinal variables measured through the questionnaire (Part II). And third, the factorial structure revealed is used to develop a discrete choice experiment based on logit specifications. Particularly, given the ordered and discrete nature of the dependent variable, we apply an ordered logit (O-Logit) model to examine the explanatory factors determining academics' willingness to reduce their conference travel for the sake of the environment (Part III of the survey). This methodological approach has been extensively used in transport studies to explore individuals' intentions and behaviours. [5] note the assumption of proportional odds in O-Logit models, according to which the relationship between any pair of outcome categories is assumed to be equal. Therefore, in this investigation, the six cumulative odds ratios obtained from the ordinal measure of the seven levels of willingness are considered identical.

3   Modelling Results and Findings

By September 2023, a total of 208 valid responses were collected. While the sample is not fully representative of the Spanish academic community, it includes a sufficient level of heterogeneity for our modelling purposes.

3.1   Descriptive Analysis: Academics' Willingness to Change Their Habits

In the third part of the survey, individuals are specifically asked to rate their willingness to reduce their conference travel. In general, our results show a positive predisposition on the part of the Spanish academic community: almost a 30% of the individuals reported a 'high' or 'very high' intention of limiting their travel (see Fig. 1).
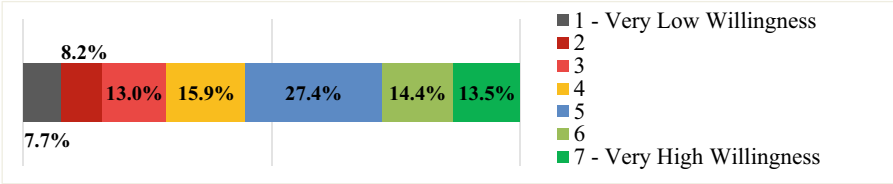
Fig. 1. Part III of the survey: "Are you willing to reduce your conference travel for the sake of the environment?". To answer on a 7-point Likert-type scale: 1 (minimum) – 7 (maximum).

3.2   Exploratory Factor Analysis (EFA)

An EFA is conducted to explore the latent structure underlying the set of attitudinal variables measured through the online survey (Part II), using the SPSSv29 software package. A preliminary analysis of the descriptive statistics reports a good internal consistency of the data and a good sample adequacy. The determinant of the Spearman's correlation matrix shows the absence of multi-collinearity, and the Bartlett's test for sphericity rejects the null hypothesis of an identity correlation matrix. Principal Axis Factoring (PAF), with orthogonal 'Varimax' rotation, uncovers seven attitudinal factors (see Table 1), which correspond to those addressed through the questionnaire (Sect. 2.1). Orthogonal rotation ensures that the latent factors are uncorrelated [6]. The explained cumulative variance of the revealed factors accounts for over 65%, so the underlying structure can be accepted.

Based on the "two-indicator rule" [7], the analysis considers at least two items per factor, and 0.50 is set as the cut-off value to retain the items. The factorial structure obtained is used to develop the subsequent O-Logit model.

Table 1. Rotated factor matrix for attitudinal factors.

Factor (F)	Description	(α)
F1	Environmental concerns	0.890
F2	Bringing benefits to the scientific community	0.854
F3	Joy of travelling	0.834
F4	Personal performance and development	0.735
F5	Importance of face-to-face interactions	0.770
F6	Social norms on travel reduction	0.734
F7	Ethical responsibility of academics	0.732
Cronbach's alpha (α) = 0.785; Kaiser-Meyer-Olkin (KMO) = 0.810; p = 0.000		

3.3   Ordered Logit (O-Logit) Model: Results and Discussion

As a final step, we apply an O-Logit Model to investigate academics' willingness to reduce their conference travel for the sake of the environment in Spain. As mentioned in

Sect. 2, this study focuses on a set of demographic and socioeconomic, work-related, and attitudinal characteristics. First, we develop a series of tests for checking multicollinearity among all the (potential) explanatory variables, and no significant interactions are identified [8]. Then, we run the O-Logit model through the Stata software (version 17). Given that some of the explanatory variables included in the model are categorical, it is necessary to define a base case as a reference to interpret the modelling results correctly (see Table 2). This allows us to determine whether individuals' answers are statistically significant when compared to the base case.

The O-Logit model confirms that, from a statistical viewpoint, academics' willingness to reduce their conference travel for the sake of the environment is determined by a series of demographic and socioeconomic, work-related, and attitudinal variables.

In terms of personal attributes, household structure is the only variable that appears to be significant. We find that, all else being the same, those academics living alone are more likely than others to lower their conference travel for the benefit of the environment. Meanwhile, work-related characteristics seem to play a major role in explaining academics' intention to reduce conference travel. In addressing the influence of the academic position, we recognise that postdoctoral researchers are the most willing to limit their business trips. Our modelling results also show that academics who attend conferences on an annual basis (within Europe) are less likely to limit their conference travel than those who do not attend any conferences. This is consistent with previous investigations that argue that established travel habits are strong constraints to reducing people's mobility [9]. In addition, the impact of the COVID-19 also appears to be significant: academics whose work practices were affected by the pandemic show a greater willingness to reduce their conference travel than those who were not affected. Finally, other two travel-related aspects result relevant. On the one hand, we detect that academics' motivation to travel for meeting new people and visiting new places is indirectly linked with their willingness to lower their trips. On the other hand, the model points out that academics' eagerness to maintain an appropriate work-life balance is directly correlated with their willingness to reduce travelling. In terms of psychological factors, we observe that academics with a higher level of environmental values and who are more influenced by social norms (of travel reduction) are more intended to limit their conference travel. On the contrary, those who believe that conferences are a driver for professional development are less willing to lower their trips for environmental reasons. Unexpectedly, the other four attitudinal factors obtained after conducting the EFA are not significant.

All these findings can assist institutions in foreseeing the segments of academics with a higher (and lower) probability of shifting their behaviour in coming years. This approach is key to comprehensively understand individuals' intentions as a critical step towards the definition of sustainability policies that support a system-wide transformation of practices at the institutional level. Individual changes will only happen if academia at large moves forward in the same direction.

Table 2. Modelling results (O-Logit): Academics' willingness to reduce their conference travel.

-[1]	Variable		Coeff	Std. Error	p-value
D/S	Gender	*Base case: Male*			
		Female	.113	.278	0.685
	Household composition	*Base case: Other[2]*			
		Alone	.485	.357	0.075
W	Academic position at university	*Base case: Other[3]*			
		Post-doctoral researcher	−.680	.300	0.023
	Work involves solving environmental issues	*Base case: No*			
		Yes	.195	.302	0.517
	Travel habits affected by the COVID-19	*Base case: No*			
		Yes	.153	.068	0.026
	Conference attendance on an annual basis[4]	*Base case: No*			
		Yes	−.647	.353	0.067
	Motivation for attending conferences: enjoy meeting new people and visiting new places	–	−.425	.112	0.000
	Motivation for (not) attending conferences: eagerness to maintain an appropriate work-life balance	–	.349	.155	0.024
A	Environmental concerns		1.017	.144	0.000
	Personal performance		−.232	.131	0.078
	Social norms		.405	.102	0.000
	Ethical responsibility		.182	.145	0.207

Number of observations: 208; Log-Likelihood at convergence: −310.818; Log-Likelihood restricted: −387.517; Mc Fadden's Pseudo R^2: 0.1979

[1]D/S: demographic and socioeconomic attributes; W: work-related characteristics; A: attitudinal factors. [2]With roommates/friends, with parents, with partner/spouse, with partner/spouse and child/children, with child/children (single parent). [3]Student, pre-doctoral researcher, and professor. [4]Within Europe

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