Navigating climate awareness in academia: a study of air travel attitudes among international students in Austria

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The urgent need to address climate change has prompted universities to reassess their impact on the environment, as the tension between academic internationalization and sustainability presents a complex challenge on multiple levels; including the organizations themselves, researchers or faculty, and students. The article explores the perceptions and attitudes of international students toward climate change, their personal environmental impact, and their perceptions of internationalization and mobility. To do so a qualitative case study was conducted in Austria (interview study; *n* = 29), including both bachelor's and master's program students. The study aimed to investigate the attitudes of international students toward air travel and identified five distinct types of students with varying levels of awareness and willingness to reflect on their personal impact on climate change. While some students prioritize their personal right to fly and gain experience, neglecting their contribution to climate change, others demonstrate a clear understanding of the need for change. The findings suggest that universities can play a key role in promoting environmental awareness by integrating climate change education into international study programs, providing transparent information about environmental impacts, and incentivizing sustainable mobility. Our aim is to contribute to the ongoing discussions regarding the intersection of higher education, internationalization, and climate change. We emphasize the need for significant institutional changes to address the complexities involved.

KEYWORDS

internationalization, higher education, attitude-behavior gap, travel behavior, climate change awareness, qualitative typology, case study research, Austria

1 Introduction—the complicated relationship between climate change, internationalization in academia and higher education

Do international students recognize their contributions to climate change and are they acting climate change-aware overall? The answer should be clear, as the effects of human-induced climate change have led to a wide range of increasingly catastrophic events and scientific consensus is that mankind needs to limit its emission of CO_2 (Gössling and Dolnicar, 2023). However, overall, the situation is much more complicated, as academics and students are expected to be *hypermobile* (Arsenault et al., 2019) and international mobility is often seen as beneficial to students, with positive effects of student mobility even being discussed at country level (Shields and Lu, 2023). And this mobility depends very often on air travel or other forms of carbon dioxide intense forms of transportation. This creates a somewhat paradox situation, both on a normative as well as behavioral level, as students now need to

navigate two competing demands; limiting the effect one has on climate change and the necessity of academic mobility.

When dealing with this paradox situation, the first more general point to discuss lies with the aspect of climate change. Here it can be argued that the UN are urging nations around the world to take substantive action to combat climate change (Pörtner et al., 2022). This call to action is based on decades of academic research, with more than 196 countries pledging themselves to honor the Paris Agreement to limit global warming (Nunez et al., 2019). Nevertheless, up until now political actual actions are limited and full of compromises (Nunez et al., 2019). As a result, it is expected that research and higher education institutions must increase their awareness and strengthen their efforts to combat the climate crisis (Borgermann et al., 2022).

This brings us closer to academia: Despite this dire global situation, the position of universities and higher education institutions is not straightforward at all (Shields, 2024). As stated before, from a normative perspective, internationalization and mobility are considered essential for academic excellence (Altbach, 2009; Arsenault et al., 2019) and is expected from faculty as well as students. Consequently, many universities and research institutions aim to attract a diverse range of international scholars, researchers and students (Uzhegova and Baik, 2022), and they actively organize events such as conferences, research stays, staff and student exchanges, and international study programs (Nursey-Bray et al., 2019). Most of these activities depend on extensive travel, often via heavily greenhouse gas-emitting planes (Arsenault et al., 2019; Shields and Lu, 2023). This tension between academic internationalization and climate change has resulted in a widespread discussion in the international higher education community, which influences several levels, that affect the organizations, the faculty as well as the students (Attari et al., 2016; Arsenault et al., 2019).

At the organizational level, research and educational institutions are reassessing their ecological impact, taking steps to reduce it, and try to act as role models when it comes to sustainability (Eskander and Istiak, 2022; Filho et al., 2022). Many universities have established guidelines to evaluate and restrict staff travel, substituting on-site events with virtual or hybrid ones, and fostering the creation of an environment that allows for more decentralized research (Filho et al., 2022; Nikula et al., 2022). However, internationalization is still a central goal of higher education institutions and part of their efforts to position themselves in a competitive landscape (Shields, 2024).

When it comes to faculty, the scientific community recognizes the impact of their intensive travels and saw the COVID-19 pandemic as an opportunity to establish a new normal, permanently cutting back on travel and greenhouse gas emissions (Kreil, 2021; Filho et al., 2022). However, individual scholars still report that they are afraid of potential competitive disadvantages if they are not mobile and perceive air travel as intricately tied to doing their work "well" (Kreil, 2021, p. 60).

For students, the situation is somewhat similar problematic, but even more pronounced. While many students are "demanding action, as evident in the agendas and activities of groups such as *Students Organising for Sustainability International* in the UK, the *Young Academy* in the Netherlands, and the Erasmus Student Network in Europe" (Nikula et al., 2022, p. 2), recent surveys indicate that international students, in particular, do not explicitly care about the environmental impact of their travel and greenhouse gas emission. For

example, only about 5.5% of Erasmus students engage in sustainable behavior during their international travels, according to a report by Green Erasmus (2022, p. 26). This supports previous research suggesting that despite the rapid pace of climate change and the potential catastrophes it may bring in the future, many international students view global travel and study abroad experiences as a right rather than a privilege (Reilly and Senders, 2009; Shahjahan and Edwards, 2022).

These findings highlight that tensions between internationalizing higher education and tackling climate change exist at both organizational as well as individual levels and at both levels there are discrepancies and paradoxes (Nikula et al., 2022, p. 6). In the academic field in particular, awareness of climate change is seen as rather high, but this does not consistently translate into a reduction in air travel. At the organizational level, there's a conflict between the aspiration to act as a role model and develop strategies to make universities more sustainable, and the demand for internationalization, together with the socio-professional norm of academic travel in the pursuit of excellence in science. At the individual level, there are societal norms in favor of greenhouse gas emission reduction that are prevalent among highly educated individuals, but these norms conflict with competition in academia and concerns about career disadvantages. Among scientists and students, there are parallels, but there are also differences in perception. Therefore, this paper aims to add to this field of research and address the current research gap in international students' awareness of their contributions to climate change and their corresponding behavior. It is necessary to explore international students' views on climate change, their responsibility with respect to the climate, and how they perceive their academic and non-academic travels in this context.

To gain a deeper understanding of this complex issue, a qualitative case study was conducted in Austria during the winter semester of 2022/2023, focusing on two groups of international students—one attending a bachelor's program at the *Johannes Kepler University of Linz* and one a master's program at the *Paris Lodron University of Salzburg,* that will be presented in article. The second section will provide a short discussion about the state of the research in the field, before section three outlines the study design used, describes the sample in detail, and gives insight into methodology used for analysis. The fourth section will present the empirical findings and provide an in-depth analysis of the data, highlighting the different types of students that could be identified in the case study. The article will conclude by drawing relevant conclusions and offering recommendations on how international study programs may address climate change education and foster an environment that encourages students to be more aware and conscious of their actions in an international setting.

2 State of knowledge and current discussion

In response to the urgent issue of climate change, and partly as a consequence of the flight shame debate, the academic community has initiated a self-reflection process on its greenhouse gas emissions (see, e.g., Nevins, 2014; Attari et al., 2016). Numerous universities are implementing policies to reduce their environmental impact, and research shows that scientists are increasingly mindful of their

international travel (Eskander and Istiak, 2022; Filho et al., 2022). Nevertheless, contradictory routines, actions and argumentation patterns are evident at both organizational and individual levels.

Beyond their traditional role of disseminating knowledge, universities also have a social responsibility in the fight against climate change. This is particularly important as they act as multipliers, training as well as influencing future leaders and policy makers (Eskander and Istiak, 2022, p. 27). As key players, universities have the potential to influence individuals' decision making toward sustainability (Filho et al., 2022, p. 1) and should therefore generally act as role models (Nursey-Bray et al., 2019, p. 15). Many universities have already defined strategies for sustainable development. But in these sustainability guidelines, the topic of air travel is not always explicitly addressed, and concrete measures to reduce air travel are often lacking (Eskander and Istiak, 2022; Nursey-Bray et al., 2019). Moreover, the long-established socio-professional norm of internationalization and the need for personal presence at conferences, project meetings, etc., which often involve air travel, do not seem to be sufficiently questioned within the framework of the university's sustainability policy (Kreil, 2021, p. 57; Schrems and Upham, 2020, p. 9; Shields, 2024). There is still a lack of consideration of how the university encourages, rather than discourages, academic air travel. For example, by recruiting international students and faculty, requiring international experience to secure a position or advance a career, or mandating that business travel be kept as short and economical as possible (Kreil, 2021, p. 3).

When it comes to scientists and academic staff it can be stated, that on an individual level they are also broadly aware of the negative impacts of air travel and take into account the general social norm and the increasing pressure to justify air travel (Shields, 2023), particularly in terms of the purpose of the trip, for both private and business travel (Friedrich et al., 2020, p. 32). At the same time, mobility is often a professional requirement. In any case, scientists have to comply with the social norm of avoiding flight emissions as well as to the socio-professional norm of mobility and internationalization in the context of scientific activity.

According to Kreil (2021, p. 57), academics who reduce flights typically argue that it is important for the reputation of the university and that universities have a role model function, or that they have to make their contribution like everyone else, or that a reduction will be necessary sooner or later anyway. Another argument is based on the assumption that the negative effects on science are overestimated and that a restriction does not automatically lead to an impairment of academic work. Whether a reduction in air travel actually has a negative impact on careers has not been empirically proven. Wynes et al. (2019) were unable to find a significant correlation between career success and air travel in their studies. And this is despite the fact that many higher education and research institutions often boast about their historical tradition of international mobility and sometimes even outright demanding that potential candidates have spent at substantive time period abroad, if they wish to apply for and advanced position (Rivza and Teichler, 2007, p. 459).

Scientists who continue to travel by air despite their high level of climate awareness tend to experience feelings of dissonance, on the one hand they feel justified or even obligated to travel on the other hand they are confronted with the ecological impact of their behavior. According to Schrems and Upham (2020, p. 3), this highlights the barriers to behavioral change, especially when different types of

justification are used to reduce the dissonance. In this context the theoretical model of *denial of control* means that people locate the decision to travel by air not in their power but in external. The choice of air travel is justified by outside factors like limited time and money resources or accessibility or comfort (Schrems and Upham, 2020, p. 6). The necessity of the business trip in the first place is due to professional disadvantages that would otherwise exist, personal interactions (e.g., at conferences, during fieldwork) were also emphasized as a necessity for their work, which cannot be replaced by virtual techniques (Kreil, 2021, p. 54; Nikula et al., 2022, p. 4; Nursey-Bray et al., 2019, p. 15; Schrems and Upham, 2020, p. 7). *Compensation* in the form of benefits can follow a similar line, namely that the reason for the business trip is important for the career, the project or the scientific community. And that society also benefits (Schrems and Upham, 2020, p. 7). *Comparisons* also often help to reduce feelings of guilt. Comparisons with the industry, with colleagues who fly even more often, or with one's own lifestyle, which, apart from flying, is considered sustainable (Schrems and Upham, 2020, p. 8). The feeling of being entitled to these experiences could also be seen in this context (Nikula et al., 2022, p. 4; Reilly and Senders, 2009, p. 257). The *denial of responsibility* emphasizes the small contribution that an individual can make (Nikula et al., 2022, p. 4; Schrems and Upham, 2020, p. 3) and can be tied to the model of self-efficacy quite well. According to Kreil (2021, p. 57), scientists who do not want to see academic flying reduced also argue that this reduction would not make a difference—it would be a "drop in the ocean." Furthermore, they argue that science has a special role in society and can also contribute to sustainability through research, with the freedom of science to be preserved, and with the fact that reductions have already been made and there is no more room for maneuvering without having a negative impact on scientific output. All those arguments brought forward in the last section are based on the assumption of cognitive dissonance, between one's awareness concerning climate change and the actual actions taken. However, the arguments that funnel the concept—denial of control, compensation, comparison as well as denial of responsibility— can be seen in relation to a socio-cognitive framework. Using the terminology of Bandura (1997), these four arguments are an articulation of one's lack of self-efficacy, meaning that climate change related actions may lie outside of one's own abilities.

Accordingly, one overarching argument is the call for systemic change. Reducing academic air travel requires institutional or supra-institutional structural changes, in particular changes in cultural and social norms, adaptation of funding criteria, banning domestic flights, promoting rail travel and investing in virtual communication (Kreil, 2021, p. 54). Schrems and Upham (2020, p. 8) categories the demands for institutional change as facilitations, incentives, restrictions, time flexibility and mindset shift. This ties the whole debate to a second central idea, the concepts of collective efficacy, which can be seen and understood as an extension of the self-efficacy model proposed before. This concept of collective efficacy is based on the idea that change needs to be demanded from academia as a whole and that a change of the current academic framework is possible and necessary (Bandura, 1997, p. 477).

Taking a look at the situation of students, there is a growing body of research that examines their contribution and attitudes toward climate change. Firstly, research in this field shows that while the estimates for the CO_2 footprint is comparatively smaller, than the ones of the faculty, it is still substantial, with an estimate of 14 megatons of

CO^2 per year associated with international student mobility at the end of the last decade – tendency rising (Shields, 2019), with most of the greenhouse gas emissions generated by students who move to high-income destinations (no matter their own origin; Shields, 2019). On an attitudinal level empirical research shows that students in general display a high level of awareness regarding climate change and CO^2 pollution. However, researchers have noted a cognitive dissonance among students in recognizing the need for action to limit the effects of climate change and committing to changes in their personal behavior, particularly with respect to travel and consumption (Green Erasmus, 2022; Kreil, 2021; Nikula et al., 2022). Gössling et al. (2019, p. 7) found that international students fly for various reasons. Particular importance was retrospectively attached to flights that took place in the context of education, flying home to family and visiting friends.

However, studies also point to factors that influence climate awareness and the extent of (academic) air travel. First among those is the attitudinal perception of flying as a privilege: Although flying is presented as a social norm, there are national and international inequalities in this regard. Most flights are taken by socially privileged people in affluent societies (Gössling et al., 2019, p. 2). International students, particularly those from developing countries or regions severely affected by climate change, tend to display a relatively high awareness of climate change (Uzhegova and Baik, 2022; Eskander and Istiak, 2022). There are differences in relation to the relative position of the individuals in the academic setting: Before the COVID-19-pandemic Wynes et al. (2019) compared air travel behavior at different career stages. On the one hand, they showed that early-career academics were responsible for fewer emissions from air travel than senior academics; on the other hand, PhD students and postdocs, who still have more to invest in their careers, may have less scope to forgo mobility.

Additionally, there are institutional and contextual factors at play. Typically, they are tied to discipline, the international vs. national work environment or study context. Concerning these aspects there are different assumptions in literature. While Schrems and Upham (2020) find that sustainability scientists are a group that perceive particularly high levels of cognitive dissonance in relation to their air travel, Wynes et al. (2019) find no association between disciplines or research content and the amount of air travel. Among students, awareness and concern tends to be higher among those studying science and academic subjects rather than practical or applied programs (Eskander and Istiak, 2022). Moreover, international students and those in international study programs exhibit notable differences from their peers. Students participating in international study programs, both short-term and full bachelor's and master's degrees, are more likely to engage in environmental campaigns, use public transportation, and recycle than regular students, but show little willingness to limit their travel behavior (Gössling et al., 2019; Green Erasmus, 2022). Case studies have demonstrated that the level of education on climate change is less important than engagement in climate change relevant actions and workshops (Akrofi et al., 2019).

Additionally, studies show sociodemographic differences, with gender-related one being the most pronounced: The essentialization of mobility for good science intersects with discourses of good parenting and, in the context of heteronormative discourses, mothers are more affected by childcare responsibilities (Cohen et al., 2020, p. 159). At the same time, women seem to be more pro-environmental than men, more aware of the negative impact of flying on the climate and more willing to change their lifestyles (Chan et al., 2019; Rice et al., 2020). However, gender differences are not evident in all countries and obviously vary according to socio-cultural context (Chan et al., 2019).

In summary, there is empirical evidence that the university as an institution is reflecting on its greenhouse gas emissions and taking action to reduce its environmental impact. Despite the growing awareness, there are still institutional inconsistencies between ideals and actual practices. Studies also show that academics feel pressured to balance flight reduction with the demands of their careers, leading to cognitive dissonance and different justifications for flying. A few research findings suggest that flying habits vary depending on career level, subject area, international context and gender. Some studies have also shown contradictions between students' comparatively high climate awareness and their behavior. After examining the current state of research, a more comprehensive view of the tense relationship between higher education, internationalization and climate change from the perspective of students emerges as a research gap. In particular, there is a lack of a differentiated view of students, who prove to be a heterogeneous group, with highly differentiating demands.

This tension can be addressed particularly well with the group of international students, as they are by definition located at the intersection of higher education and internationalization. In any case, this group is also confronted with the question of how to implement their mobility requirements.

To explain these issues, we use the arguments brought forward by Schrems and Upham (2020)—denial of control, denial of responsibility, comparison and compensation (Kreil, 2021)—as well perceived self-efficacy and collective efficacy frameworks as proposed by Bandura (1997). Both theoretical frameworks lend themselves to the analysis of the issue at hand, as it allows them to explore how much students feel the possibility to assess the need to travel as well as act climate change conscious and how they position themselves in the larger collective context of academia, when it comes to climate change related actions.

Accordingly, the objectives of the study are to find out (1) what perceptions and attitudes students of international degree programs have with regard to climate change, (2) how they assess their personal environmental impact and (3) to analyze how they perceive internationalization and their own mobility, especially when it comes to flying and greenhouse gas emissions. The study strives for a differentiated view and aims to develop a typology that helps to understand how climate awareness and mobility behavior interact.

3 Study design and sample

Based on the fact that there is little consolidation about the current state of research in the field it was decided to do a qualitative interview study, that should help understanding the complex situation more and contribute toward the concept of a typology of international students and their air travel related environmental awareness. The ratio behind this was to get a chance to find more in-depth reasonings and provide participants with opportunities to explain and expand on potential mismatches or contradictions, that were highlighted during the literature discussion presented before. This is intended to provide a more sociologically inspired alternative to predominantly descriptive

discussions, such as the case study from Canda (Université de Montréal) on travel patterns by Arsenault et al. (2019) or to large-scale analyzes of register-based mobility data such as those by Shields (2019)), getting insights into specific perceptions and positions.

In light of the aforementioned considerations, a qualitative study design was selected, wherein data collection is conducted through semi-structured interviews and content analysis. Semi-structured interviews were undertaken to allow participants the flexibility to share their individual perspectives and experiences, while also ensuring consistency and comparability across responses through a semi-structured thematic guide. This approach enables both in-depth insights into subjective viewpoints and targeted information relevant to the research questions, which allows to group participants *post-hoc* (Flick, 2021). A content analysis was chosen for data analysis as it provides a systematic and transparent way to identify and interpret key themes and patterns in relation to the research objectives. This allows an interpretation that takes into account both the content related issues raised by Schrems and Upham (2020) and Bandura's (1997) arguments on socio-cognitive processes of perceived self-efficacy.

The sampling strategy is defined by cluster sampling where the units of analysis are initially selected in groups rather than individually (McClintock et al., 1979). The analysis units were selected in several stages of cluster formation and stratification. In the first step, students

from international study programs in Austrian were defined as a case. In the next step, two medium-sized universities in Austria were selected, which were available to us for data collection purposes (e.g., access to courses and classes). In accordance with the logic of cluster sampling, which dictates that a case with maximum variance within the case and the lowest possible variance between the cases should be selected, a bachelor's degree program that focuses on international management and the other for a master's degree program that focuses on leadership in communication were chosen. Finally, one methods course was selected within each of the two programs and all students within each selected course were interviewed (see Figure 1). Both programs target international students, require them to spend time studying abroad after their initial stay at the host university, are taught entirely in English, and emphasize in their mission statements that their students are expected to become leaders and/or internationally active experts in their respective fields. The study involved interviewing eight students from the bachelor's program and 21 students from the master's program.

In terms of age, gender and country of origin, the data source is made up as follows: The age of the respondents ranged from 20 to 36 years. Three of the bachelor students identified as male, five as female. When it came to the master students seven were men, and fourteen were women. While most of the people in the bachelor's program came from Europe (two eastern Europe, five central Europe,

FIGURE 1
Overview of the clustering sampling strategy (own illustration).
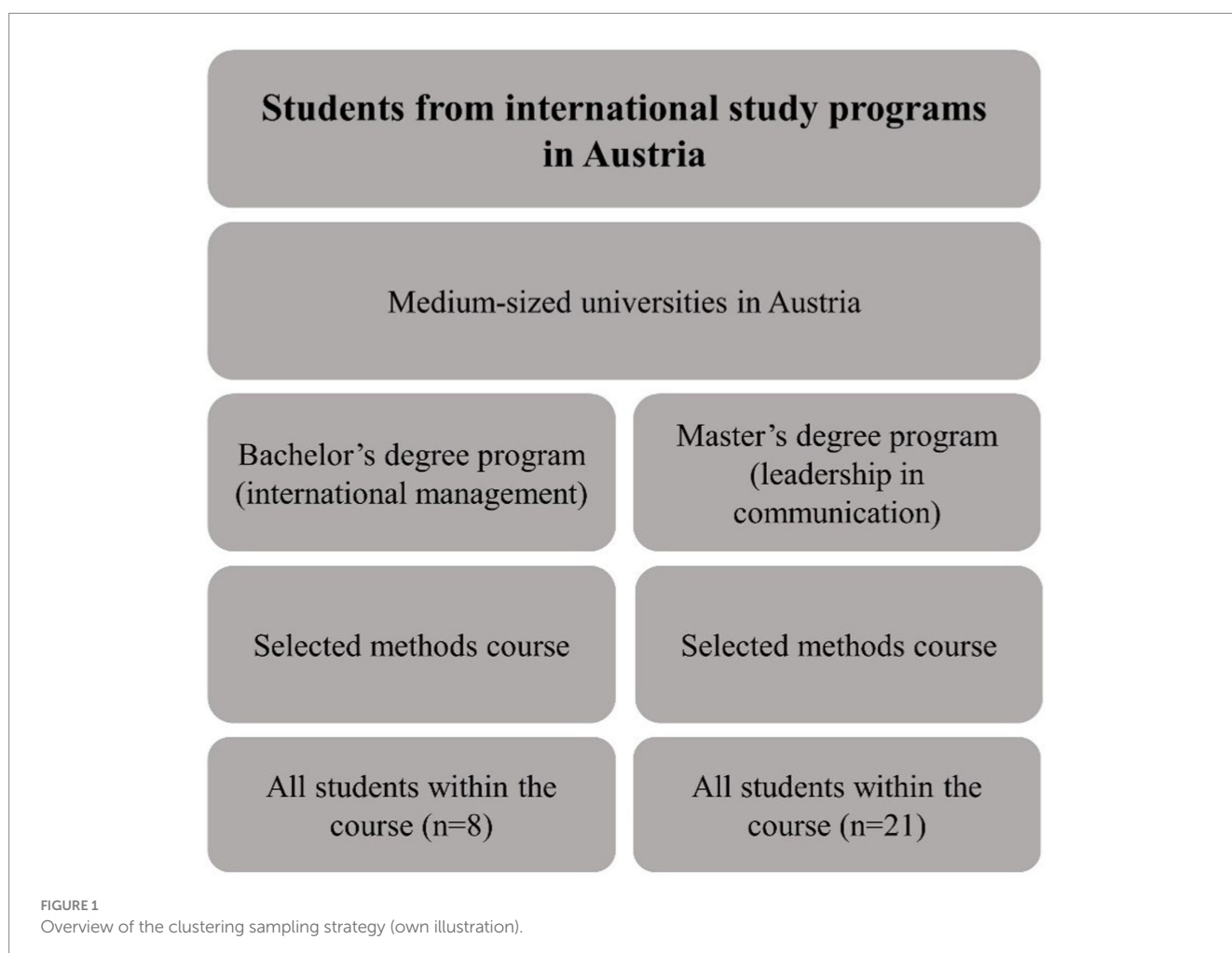
one from Asia), the masters' program had a more diverse class. Around a quarter of them came from Latin America, another quarter from South-East Asia, and a quarter from central to northern Europe. The rest came from the Middle East. One individual was from the United States.

The interviews were conducted using a peer process, where trained student interviewers interviewed the selected group of students to minimize the effect of social desirability. In such a peer interview process, where the interviewers are both insiders, as fellow students, and outsiders, in their role as researchers, thorough theoretical and practical preparation is essential (Buys et al., 2022). It was expected that interviews by the academic staff or professional interviewers may be harmful to get more in-depth answers, however it is acknowledged that this has limited to scope of the interviews.

The selected class for the bachelor's program started their studies in October 2021, so they were in their second year of studies, while the selected class for the master's program started in October 2022, and they were in their first year of the master's program. The interviewees were given the flexibility to choose the time and place for their interviews. Those were competed in the *CAPI—computer assisted personal interviews*—mode and thus the talks were in person. If the interviewees agreed the interviews were recorded via either a smartphone or a laptop pc and then transcribed via a word processor. However, students could also opt out of recording and transcription and instead allowed the interviewers to take notes on the interview instead; thus, it was also allowed to create verbatim summaries of statements. This option was provided to create a setting of trust among the interviewers and interviewees and made sure that the anonymity of participants was respected. Furthermore, all interviewed students had the chance to opt out of the study at any time and decline their participation.

The average length of an interview was around 20 min, with the shortest one taking 10 min, and the longest one 40. Before conducting the study, interviewers were introduced to the interview guide, could prepare themselves for 1 week and could request coaching from the head researchers.

While only a limited number of interviewers requested coaching, all of them had some training on the method in corresponding classes.

A semi-structured interview guide was used, including a consent form that informed participants that their interviews will be used for educational and scientific purposes as well as a metadata sheet to be completed by the interviewers.

On a content level the first question dealt with the *interviewees travel behavior*, before continuing with questions about the *relevance of travel for their personal and professional life, their attitudes toward climate change and flight shaming*. The interviews were wrapped by a *summary* provided by the interviewers, that offered the interviewees a chance to amend their statements or add further information. In addition to the five main questions, which were to be asked in the pre-arranged order, the interviewers were provided with a set of follow-up questions in case the initial answers needed to be elaborated on or were not sufficient (see Table 1).
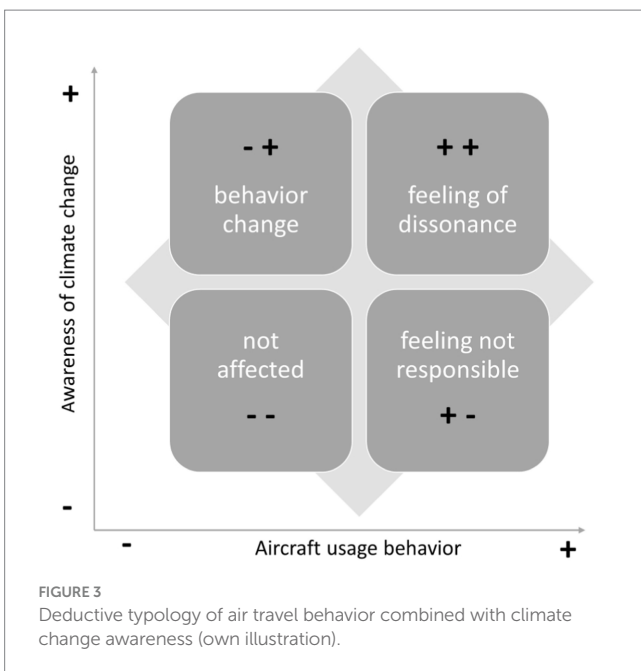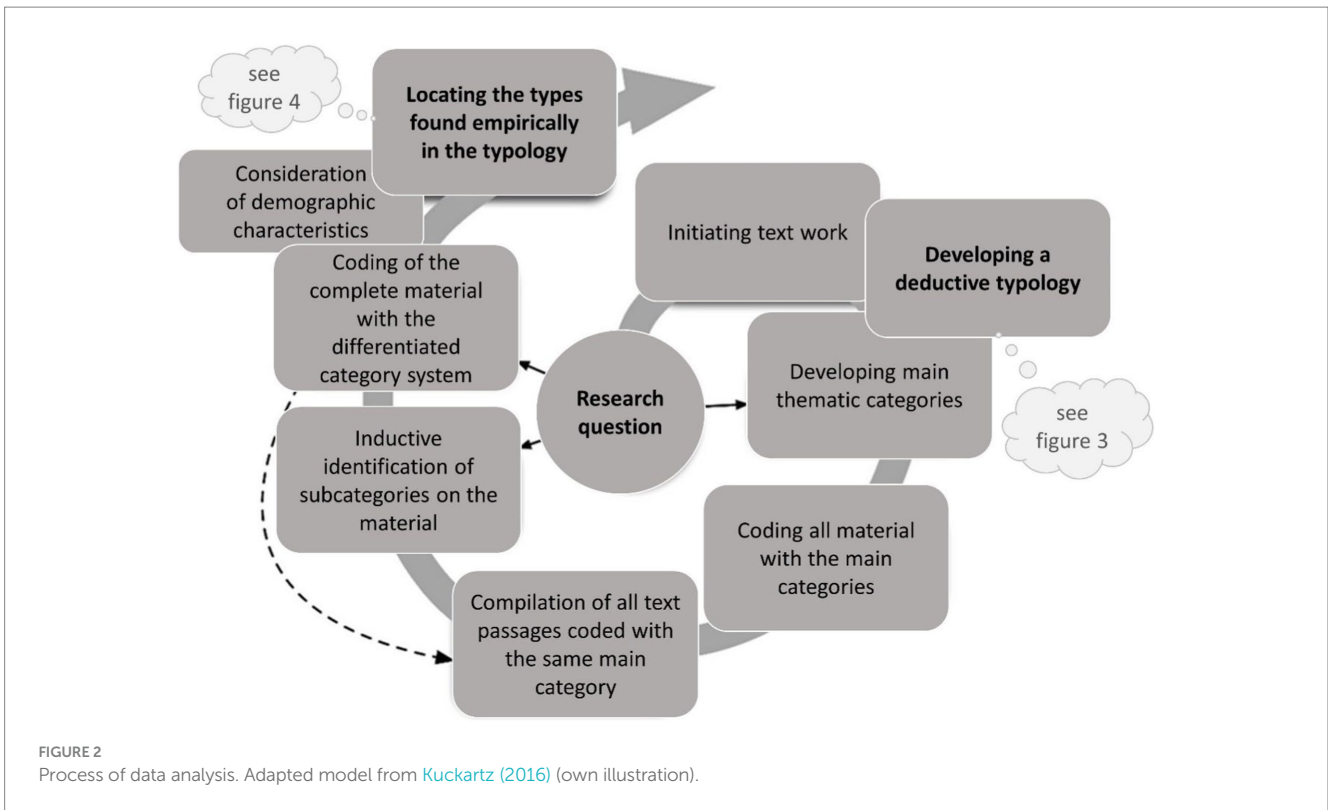
In a first step (for the process, see Figure 2 based on Kuckartz, 2016), initiating text work was carried out on the one hand by reading the interview transcripts and recording initial ideas in memos. On the other hand, the main categories and a deduction-based proto-typology were developed on the basis of the literature and the core content dimensions of the interview guide. Combining the extent of

TABLE 1 Interview questions und underlying dimensions.

Interview questions	Dimensions
Did you take an airplane trip last year? *(Follow up with questions about the reason for and destination of the trip. On the use of continental flights and budget airlines)*	Travel behavior/aircraft usage behavior
Have you ever considered not traveling by air for climate protection reasons?	Attitudes toward climate change
Are your travel behaviors common or uncommon in your social circle? *(Possibly ask what makes the differences)*	Travel behaviors/aircraft usage behaviors
How important is it to you to be able to travel far and wide easily? *(Possibly ask for reasons why/why not?)*	Relevance of travel for personal and professional life
How environmentally conscious would you currently rate your own travel behavior? *(Follow up with questions about attitude changes in recent years and reasons for them)* Are you familiar with the term "flight shame"? Do you think it is justified or not?	Attitudes toward climate change

climate awareness and the extent of airplane use results in four types that follow a four-field logic (see Figure 3). When interpreting and naming the types of the deductive typology, the dimension of the importance of travel for personal and professional life was also taken into account. The entire interview material was then coded with the main categories and the data systematically organized, taking into account the relevant aspects previously identified. Specific responses were categorized based on commonalities, coded accordingly and then compared and contrasted with each other. Subcategories were added inductively and the entire material was worked through again. In the next step, socio-demographic information was also taken into account. Finally, the types developed from the data were discussed in relation to the deductively developed proto-typology (see Figure 4).

The deductively developed typology is presented in detail below. The type with a high level of awareness of climate change and the associated (widespread) avoidance of air travel include people whose behavior corresponds to their attitude. Given the context of the study, it is assumed that this group has frequently modified its travel behavior, so the type is called *behavior change*. Corresponding to Kreil (2021), this type will argue with the role model function of universities and the general need to reduce air travel. Those who are aware of the harmful effects of air travel on the climate and still use airplanes will be confronted with dissonant feelings. Hence the name *feeling of dissonance*. This group attaches great importance to private and/or professional travel. Research (Kreil, 2021; Nikula et al., 2022; Nursey-Bray et al., 2019; Schrems and Upham, 2020) suggests that this group is likely to justify business air travel on the basis of external circumstances (no other choice, professional necessity) and comparisons with others whose contribution to climate change is greater. In the *feeling not responsible* type, behavior and attitude are not contradictory. This group uses airplanes quite naturally and does not consider the contribution of air traffic or their own flying behavior to be climate-relevant. Honnacker (2021) explains that individual actors can evade attribution of responsibility, and hence blame, because individual actions only acquire ecological relevance when aggregated.

FIGURE 2
Process of data analysis. Adapted model from Kuckartz (2016) (own illustration).

FIGURE 3
Deductive typology of air travel behavior combined with climate change awareness (own illustration).

neighboring countries that can be reached easily by train or car. However, according to the logic of the typology, the choice of transport mode would not be based on environmental awareness.
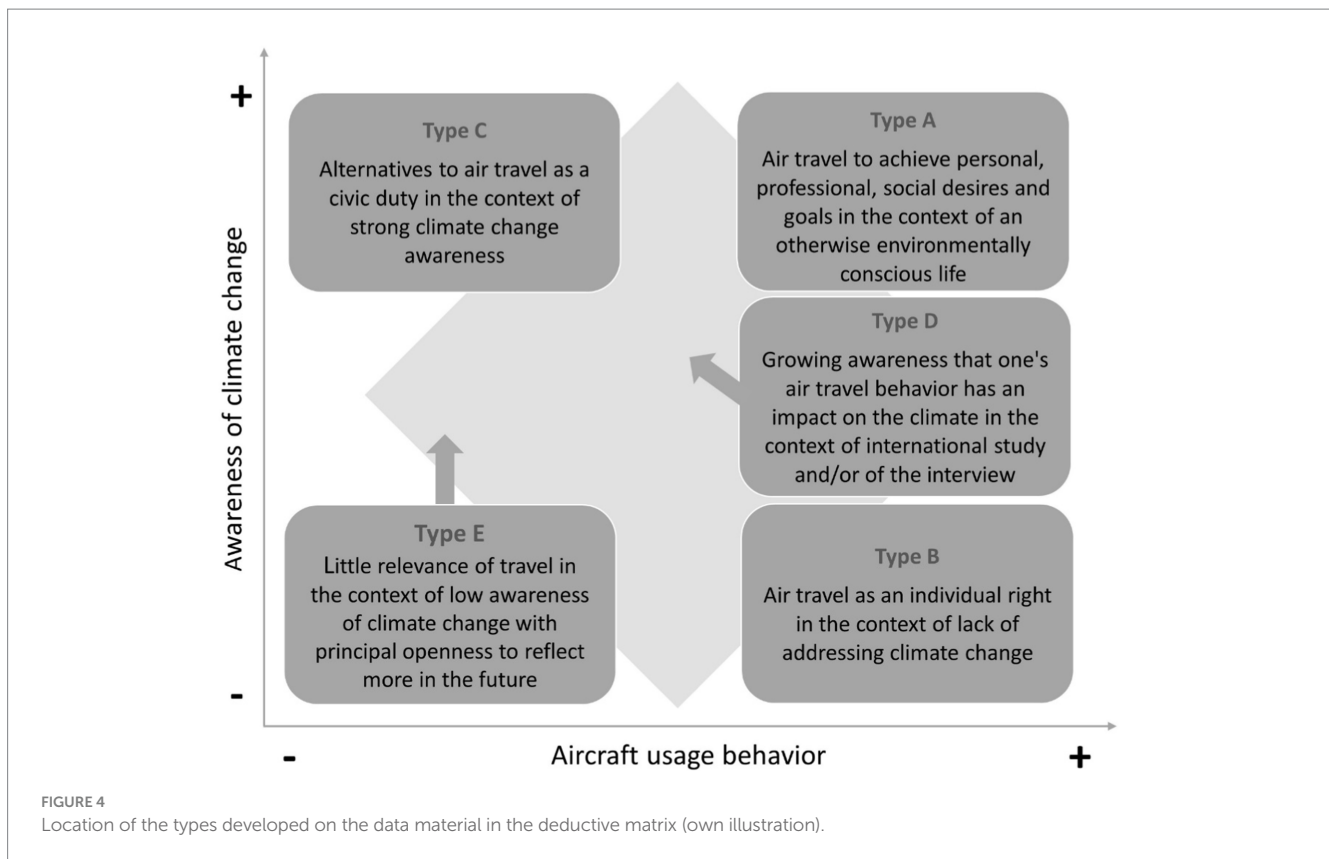
4 Results and classification

With regard to the first research question on perceptions and attitudes toward climate change, the interviews with the international students reveal a wide range: on the one hand there are those who are not concerned about climate change and on the other there are those who are. As well as nuances in between, there are also students who have been made aware through their international studies.

The second research question relates to students' perceptions of their personal contribution to climate change. Some of the students show an attempt to reduce their own carbon footprint through an environmentally conscious lifestyle and political involvement in environmental issues. However, this does not always mean giving up or reducing air travel. Some, however, refuse to take responsibility and believe they have the right to achieve their goals and dreams.

The third research question relates explicitly to personal mobility and air travel. Here, too, the whole spectrum becomes visible. On the one hand, there are those who consciously look for alternatives to air travel and do so, at least within Europe, and those who are less mobile anyway and therefore fly less. On the other hand, there are those for whom flying is very important and who feel they have a right to it, and those who do not want to or cannot give it up but are confronted with the shame of flying.

When the research questions are considered together and the attitudinal and behavioral levels are interwoven, five distinct types of students can be identified based on the interviews, that partly align

Feelings of entitlement to these experiences will also be more common in this group (Nikula et al., 2022; Reilly and Senders, 2009). For the *not affected*, air travel plays no role because they generally have no interest in further or long-distance travel. Their travel behavior is not linked to any climate protection concerns, but these are low. It is unlikely that this group will appear frequently in connection with international students, as a certain degree of mobility is a prerequisite for studying in another country. Those in this group are likely to be from

FIGURE 4
Location of the types developed on the data material in the deductive matrix (own illustration).

with the proto-types developed in the previous section, but provide additional insights (see Figure 4):

(A) The first type of student comes mostly from Africa or South-East Asia and either consciously or unconsciously contributes to actions against climate change, such as protesting against deforestation or promoting sustainable agriculture. This goes hand in hand with the literature from Uzhegova and Baik (2022) as well as Eskander and Istiak (2022), who argued that students from developing countries or regions severely affected by climate change, tend to display a relatively high awareness of climate change. However, this group shows little concern about their (air) travel behavior and sees it as a means to create professional and social bonds and pursue individual dreams, prestige, and stature – which meets the insights from Shields (2024) structural analysis, that students from low income countries who move to high income countries are often also substantially contributing to CO² pollution. On a content level the arguments of the students in this group are somewhat in line with the ones Schrems and Upham (2020, p. 6) provided for professional academics: They do not claim to be in control and there is a compensation to their behavior, at least on an individual level. There is a lack of perceived self-efficacy to act in relation to climate change, when it comes to their own travel behavior. Furthermore, these arguments are in line with Gössling et al. (2019) and Green Erasmus (2022) that there is a group of international students that is engaging with action against climate change, but not willing to change their travel behavior, creating the aforementioned feeling of dissonance:

> Anchor quote: "[Air Travel] improves the quality of life where people travel to pursue dreams, connect, and gain massive achievements... I'm not seeing myself as environmentally

conscious when it comes to traveling... but I want to contribute to a safe world in terms of climate stability."

This group is of interest when it comes to theory building: They see the need for a collective action against climate change, participate in group or societal efforts like protests, but they are not relating their own actions to the problem. There is the fact of compensation at play, individuals in this group argue that their actions lead to individual success that outweigh potential societal consequences. Because of this there is a strong dissonance that can be reported and the match the group "feeling of dissonance" proposed previously.

(B) The second type of student mostly comes from Western and Northern European countries as well as the United States. They are mostly younger, female students, with only one exception being male. They believe in individuality and, especially, their right to travel because it is highly important to them on a personal and professional level. They feel that they cannot be criticized, even if they harm the environment, as their individual enjoyment is more important. They are oblivious of environmental and societal issues at large and become highly emotional, defending their positions. Using Schrems and Upham (2020) terminology it can be stated that they do not feel responsible and even denial their responsibility, when confronted with facts. The attitudes of those students somewhat match the perspective from scientists that Kreil (2021, p. 57) described in her work, who think an individual forfeiting air travels would not make a difference. However, the arguments were mostly tied personal and not necessarily to professional reasons, like in the literature.

> Anchor quotes: (1) "The plane would fly to Australia with or without me... I'm an individual, I want to live my life to the fullest,

and my choices don't matter in the grand picture." (2) "The media says flying is really bad… But everybody flies… It can't be that bad for the environment as everybody does it."

The model of self-efficacy typically targets specific areas of experience or tasks (e.g., science, education, work, politics; see Bandura, 1997). On the one hand, this group does not appear to lack self-efficacy in general, but on the other hand, self-efficacy does not play a role in relation to climate change. The participants who can be assigned to this category do not feel that they lack self-efficacy in relation to climate change or that they even need collective efficacy in academia. From a societal perspective, however, they already see a form of collective efficacy—they argue with the prominence of the issue in politics or in the media. For them, however, the issue of climate change is not linked to their own behavior. From the social-cognitive perspective of Bandura (1997), this shows that this group does not perceive any cognitive dissonance—their positions and actions coincide. For this reason, they neither feel the need to justify themselves excessively nor to change their behavior and are matching the proto-type that feels not responsible. What is of interest here is that the individual arguments tie to their own expectations and desires, showing a very individual centered point of view.

(C) The third type is the counterpart to the second one and consists of comparatively older students, mostly in the master's program, who are well-reflected on their environmental impact and individual behavior. They come from European countries as well as Latin American ones. They are highly aware of the issues of climate change and see hegemonic structures in place that work against substantive change. They see it as their civic duty to act against climate change and bring examples of their personal life, comparing their past actions with their present understanding of the issue. When following the arguments provided by Kreil (2021) in the literature review of this article, there is a clean line between these students and the academics who see behavioral change as necessary and adopt their behavior. Like the academics in the examples provided in the work done by Kreil (2021), this type will argue with the role model function and the general need to reduce air travel. There are particular levels of insight to be recognized in the material, e.g., students of this type are highly critical of their previous behavior.

They highlight that, at least in Europe, it is easily possible to travel without resorting to air travel.

Anchor quotes: (1) "I travel by train. I plan to move from [Country A] to [Country B] for my next study destination via sharing a pick-up [Truck] with my classmates"; (2) "I flew a lot when I was younger. I would sometimes flight-shame myself now."

They have high levels of perceived self-efficacy and acknowledge the need for collective efficacy in society—and in academia in particular—in their fight against climate change. They do not deny their role in climate change, nor do they compare themselves and their behavior to others. They try to make sure that they have as little impact on the climate as possible and match the deductive proto-type of behavioral change based on literature. Here a stronger societal orientation can be found in the arguments.

(D) The fourth group is mostly composed of students from South-East Asia and the Middle East. Before participating in international study programs, they were not too concerned about climate change and the impact of their often-frequent air travel behavior. Their experiences in the programs or even partially during the interviews were argued to be relevant. It seems their experiences during their studies triggered a change in them, as the students in this group did not feel responsible before the interviews or at least felt only some dissonance. However, students forming this group now reflect on the fact that there are more sustainable forms of travel and they could experience the variety of public transport available in Austria or even Europe as a whole. They now recognize the dangers of climate change and believe that individuals can make a difference. There is a shift in behavior that may occur, partly because of socialization experiences (Shields, 2024). However, this result must be seen within the correct scope, as there is no evidence that their behavior changes in the long term and there is some danger of social desirability at play as well.

Anchor quote: "[…] I think my travel behavior is not environmentally conscious. Especially after this interview, I'm a bit ashamed of my answers. I've realized that some people consider other modes of transportation because of the environment, and I didn't even know that."

This shows that the perceived and communicated collective efficacy in the field of academia is very important. Students develop a position concerning climate change and a perceived efficacy, when it comes to dealing with climate change. Here Bandura's model provides a strong insight into the dynamics between institutional goals and the development of individual predispositions.

(E) The final group is not particularly aware of the environmental impact of their travels or of climate change in general. They also do not place much emphasis on travel, either because they have traveled in the past or because they have never considered it as important and see it as more of a necessity. They are open to learning about climate change and there is no clear pattern in terms of their socio-demographics or background. The main point is, that this group neither feels responsible or in control when it comes climate change, but they do compare themselves with others on an attitudinal level. This provides an important indicator insofar, that the issue is not of relevance to all students involved in international study programs and there are still some not affected like proposed in the proto-types derived from literature.

Anchor quote: "I don't think that traveling is that important to me. It's not because of climate change that I don't fly at the moment. I don't really care either way."

They neither show signs of cognitive dissonance, nor do they argue that they have or do not have a responsibility when it comes to climate change. They argue that they are in control of their actions and do not position themselves from a normative position, relying on a pragmatic argument. They stated that they do not act in a climate change inducing way, but also state that this is not tied to ideological, but rather practical aspects. Overall, it seems possible that this group may be open to develop an efficacy-based position on climate change and climate change related behavior, as they are participating in academic field as students, who are expected to understand scientific literature and arguments. However, as they do not favor air travel their impact may be low in general.

5 Conclusion and recommendations

This paper aimed to conduct a qualitative investigation concerning the attitudes of international students toward climate change, their personal environmental impact, and internationalization and mobility. The results of the qualitative case study revealed worrying attitudes toward air travel and its prioritization among most interviewees. While the results cannot be quantified, they align with previous quantitative studies while providing a more nuanced starting point for future studies, which may aim at generalization or quantification.

On a general level, this study highlights a concerning trend: international students, who are being trained as future decision-makers, often lack awareness of the severity of the climate crisis and their own contributions to it. This is in line with other recent findings and arguments found in the corresponding literature like Nikula et al. (2022). Furthermore, many of the findings are in line with the contradicting attitudes found in academia overall and may be tied to the strong idealization of international mobility in academic socialization (Kreil, 2021; Shields, 2024). Nevertheless, it has to be highlighted that it was a qualitative study in a western European country, generalizations should therefore be avoided. However, this point definitely shows the limits of the qualitative research conducted in this work and would warrant a quantitative follow up.

Secondly, using the qualitative methodology inspired by the work of Kuckartz (2016) we were able to identify five distinct groups of students, all of them with different attitudes. Of those, only one group (B), consisting of young, Western, mostly female students, who placed high value on personal enjoyment, showed no reflection concerning their behavior and were dismissive of their impact in climate change. This group is at least somewhat in line with what Kreil (2021, p. 57) described in her study as scientists, who do not want to see academic flying reduced and argue that a reduction would not make a difference, as it would be a "drop in the ocean." This group is mostly defined by their *denial of responsibility,* as they emphasize the small contribution that an individual can make and see their individual needs as more important (Nikula et al., 2022, p. 4; Schrems and Upham, 2020, p. 3). This group could be clearly placed in the inductively created analytical matrix (see Figure 4). There is no cognitive dissonance in their actions, but they neither see an individual responsibility to act in the face of the climate crisis, nor do they acknowledge expert knowledge—as illustrated in the quote in the previous section. They come from a more privileged group that is typically responsible for most CO_2 emissions among international students (Shields, 2024). They follow in some ways previously established patterns about mobility from an academic point of view. They are a prime example of why institutional change and institutional guidelines are necessary and collective efficacy is important, as on an individual level the concept does not target or include them.

Three other groups had varying levels of awareness and willingness to reflect on their impact, either before or after the interviews. Interestingly, some students developed clear positions through reflection, while others only partially engaged with the necessity of action. Here very often the argument is not tied to enjoyment, but more on the necessity and the perceived levels of efficacy are highly divergent—while some groups like C are showing initiative others like those group A do see the need for collective action but are somewhat caught in a cognitive dissonance concerning their own individual action, in other words their own travel behavior. D was originally not

engaged in the topic on an individual level, but because of institutional and circumstantial development may become self-efficacious. This also supports the claims from Kreil (2021, p. 54) that academia overall is in need of institutional or supra-institutional structural changes, in particular changes in cultural and social norms, when it comes to environmental consciousness overall and air travel in particular. The results show however that students need to be included in this discussion and seen as central for any potential change (Shields, 2024), as they get socialized in this context. And this can further both collective efficacy and self-efficacy.

And the final group (E) did not have strong opinions on climate change or travel but was willing to learn more. They provide insight into the fact that there is still a group of students who are not involved in one of the central challenges humanity faces during the 21st century, where also institutions can provide a chance to develop both a problem centric view on the issue, that may result in both collective efficacy and self-efficacy.

Overall, those five different groups of international students with varying levels of awareness and willingness to reflect on their impact on climate change also suggest that universities and higher education institutions can play a crucial role in promoting environmental awareness and sustainability among international students. Accordingly, it can be expected that international study programs, which transparently address the environmental impact of individual mobility and incorporate mandatory courses on climate change into their curriculum may shape students' understanding of their actions in relation to climate change. Also grants and incentives for sustainable mobility could be helpful to create experiences with climate friendly ways of travel, instigating an opportunity for behavioral change. In this context the idea of collective efficacy becomes central as well: Academia as a whole is currently experiencing a paradigm shift on what internationalization can and potentially even should contribute to the field of science. On the one hand it is clear that international mobility is both a gratification and expectation for those active in the field, and our study as well as previous literature highlight this. On the other hand, we can see that there is uncertainty and a gap in understanding how global academia may function when limiting those aspects, no matter if one looks at the organizational level, the level of faculty or students—like we did in our study. Thus, just like Schrems and Upham (2020, p. 8) put it, any changes to academia at all—and this includes international students as well—need to be understood in relation to a deep institutional change, as "*facilitations, incentives, restrictions, time flexibility and mindset shift are necessary.*"

Data availability statement

The datasets presented in this article are not readily available because the dataset consists of qualitative interviews (dialog between two human participants, based on structured questions). Participants did not consent to the sharing of their data in raw form; the consent agreement only included the information that aggregated information and selected, non-identifiable passages may be shared in the context of academic publications. We can NOT share full interview transcripts. Requests to access the datasets should be directed to Dimitri Prandner, dimitri. prandner@jku.at.

Ethics statement

Ethical approval was not required for the studies involving humans in accordance with the local legislation and institutional requirements. Written informed consent for participation was not required as all participants received an information form and were informed about their rights regarding the European GDPR and the Austrian research law (FOG - Forschungsorganisationsgesetz). Participants were assured of their right to withdraw from an interview, refuse to provide information, or even ask for their statements to be deleted/ignored.

Author contributions

DP: Formal analysis, Methodology, Supervision, Validation, Writing – review & editing, Conceptualization, Data curation, Investigation, Project administration, Writing – original draft. KH: Formal analysis, Methodology, Supervision, Validation, Writing – review & editing, Visualization.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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