"The airport does what it wants to do anyways" – qualitative revisiting of the 4-factor model of fairness in the context of aviation research – first results of a focus group study

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Abstract

Annoyance due to aircraft noise is known to be highly impacted by non-acoustical factors such as attitudes, expectations and (mis-)trust towards the airport management. As exposure to noise is generally distributed unevenly, perceived fairness in the relationship between the airport and its residents is assumed to contribute to annoyance judgments. Perceived fairness has even been shown to alleviate the distress of the affected individual in other fields of research (e.g. organizational and justice psychology). However, research on fairness aspects in the context of aircraft noise exposure is scarce. In the framework of the EU-project ANIMA, focus groups with noise-affected residents were conducted around Cologne-Bonn Airport in order to identify relevant aspects of fairness evaluations. Transcripts of the discussions were produced and analyzed using qualitative content analysis. The four-factor structure of fairness (i.e. distributive, procedural, informational, and interpersonal fairness) was brought to life with statements from residents. The relevance of specific factors, such as informational aspects like truthfulness and justification was analyzed based on residents` statements. Recommendations are made to focus on fairness, both for future studies investigating fairness in the context of noise research and airport management measures aimed at establishing a constructive relationship to aircraft noise affected residents.

Keywords: aircraft, noise, focus groups, fairness, justice

1   Background

The comprehensive ANIMA project, in which this qualitative study is embedded, deals with a crucial factor affecting the quality of life of many residents in Europe: aircraft noise. In contrast to other projects that focus on the purely physical reduction of noise from the source, ANIMA focuses on the quality of life of residents living around airports in Europe.

On the one hand, ANIMA aims to analyse current airport noise management efforts and identify those measures that are particularly effective in improving the quality of life of airport residents. ANIMA also aims to gain a deeper understanding of the annoyance caused by aircraft noise. Numerous studies have shown that annoyance is not only influenced by noise intensity, but is also affected by many so-called non-acoustic factors. For an overview see [1].

Research into these non-acoustic factors is yet a further important part of the ANIMA project. Work package 3 of the ANIMA package aims to deepen the scientific understanding of annoyance by exploring the influence of non-acoustic factors and their weighting. In the work package, factors influencing annoyance will be reviewed and their impact on well-being and quality of life will be investigated. Furthermore, new, innovative measures will be developed and identified that help to minimise annoyance and its consequences. In a review by Hauptvogel et al. [2] it was shown that fairness is a central aspect that can significantly influence the perception of annoyance and can also be seen as a foundation stone for the airport's efforts to interact with affected citizens. Four fairness facets of *distributive*, *procedural*, *informational* and *interpersonal* fairness were identified and their relevance was applied to the issue of aircraft noise from existing literature, first of all from the field of organisational psychology, and their relevance was elaborated [3].

Having identified fairness as a key aspect in the management of aircraft noise in Hauptvogel's [2] review, it is important to look more closely at the aspects that make up airport residents' perceptions of fairness. For this reason, this qualitative approach addresses an important link between theory and practice.

2   Method

Four focus groups were conducted between January and February 2020 in the vicinity of the Cologne-Bonn Airport. They were carried out in municipal venues (e.g. schools, civic centres) close to the residents' home. Focus groups as a research instrument can be defined as a "carefully planned discussion to obtain perceptions of a defined area of interest in a permissive, non-threatening environment" [4].

For that reason, focus groups offer the possibility to provide meaningful input and reveal dimensions of understanding that are not possible with quantitative data collection techniques [5]. Main target of focus groups is to generate hypothesis and to foster a general understanding.

The developed discussion guide included questions and prompts designed to address following topics:

- Importance of aircraft noise as a factor impacting the quality of life in comparison to other positive or negative factors in the immediate living vicinity
- Personal associations with the airport to evaluate the current perception and attitude to the airport
- Description of how a good, fair neighbourly relationship with the airport would look like
- Current perceptions of communication and information dissemination related to the airport
- Expectations regarding information (what information, who should provide this information, how should the information be provided)
- Opinion of whether a fair, neighbourly relationship could potentially lead to a shift of the perception of aircraft noise

The participants were recruited with in several ways. The main method was via mailshot (bulk mail). Additionally, flyers were displayed in hair dressers, doctoral offices, pharmacies, parishes, community centers and schools.

In order to compare perceptions of residents differing in the amount of aircraft noise at their homes, several areas were identified prior the recruitment. Focus groups were conducted consisting of five to nine residents, which were either highly (> 55 dBA L_{DEN}) or slightly (< 50 dBA L_{DEN}) exposed to aircraft noise at their homes in an either rural or urban area. If possible, the groups were mixed in age, gender and long-term annoyance due to aircraft noise in order to produce a variety of rich data from different perspectives. To conclude, two focus group with residents of high aircraft-noise exposed areas (rural and urban) and two focus groups with residents of minor aircraft-noise exposed areas (rural and urban) were conducted. This was done purposefully to allow for a variety of different perceptions in terms of other factors like green space areas, other noise sources etc. However, in every area aircraft noise was the predominantly environmental noise source.

- *Group 1* was located in an urban part of Cologne with a high exposure of aircraft noise. Seven out of the ten invited participants showed up. From those seven participants five were female. The mean age was 44 with a range from 17 to 81 years old.
- *Group 2* was located in the rural area a bit outside of Cologne with a rather low exposure to aircraft noise. Nine out of ten participants turned to show up. From those nine participants two were female. The mean age was 45 with a range from 17 to 69.
- *Group 3* was an area in the south of Cologne which is urban and not very affected of aircraft noise. Five out of nine invited participants showed up. From those five participants three were female. The age range was from 37 to 88 with a mean age of 55.
- *Group 4* was an area south-east of Cologne which is mostly rural but highly affected to aircraft noise due to its proximity to the airport. Out of the ten participants invited to the focus group eight did show up. From those eight people four were female. The age ranged from 26 to 74 with a mean of 50.

3   Results

The following are examples of statements from the focus groups that are assigned to the respective sub-facets of the fairness categories. The aim is to find out how relevant certain aspects are and how they are expressed in the context of aircraft noise research.

3.1 Distributive Fairness

Distributive fairness is generally considered to be a concern for the socially equitable distribution of goods, especially in relation to outcomes [6, 7].

Table 1 - Definition and examples of distributive fairness.

Subcategory	Definition	Example
Equity	Outcomes are allocated according to contributions	*"There have already been wishes and suggestions regarding different runways for take-off and landing, that the aircraft noise is better distributed."*
Equality	Outcomes are allocated equally	*"There's quite a spread of departure routes. I suppose it's a compromise, sometimes more burdening those, sometimes more burdening those."*
Need	Outcomes are allocated according to need	*"But I also personally think in areas like here where there are social problems, to have noise on top of that, I think it harms people even more."*

3.2 Procedural Fairness

Procedural fairness can be seen as the fairness of the process that leads to a decision and ultimately to the distribution of goods. Research on procedural fairness distinguishes between different aspects [8-10].

Table 2 - Definition and examples of procedural fairness.

Subcategory	Definition	Example
Process control	Procedures provide opportunities for voice	*"[…] there is somehow no way to proactively contact the affected communities […]."*
Decision control	Procedures provide influence over outcomes	*"[…] taking me seriously and involving me and making decisions with me. I don't feel that."*
Consistency	Procedures are consistent across persons and time	*"I would first say [communication] at regular intervals it would be important to me that it also becomes a certain institutional matter as a result."*
Bias suppression	Procedures are neutral and unbiased	*"The airport follows the law of money."*
Accuracy	Procedures are based on accurate information	*"We even had a measuring vehicle from Cologne Airport parked in front of our door. […] But that didn't help either and the vehicle was always broken apart from that."*
Correctability	Procedures offer opportunities for appeals of outcomes	*No statement made.*
Representativeness	Procedures take into account concerns of subgroups	*"There are different interests [that have to be weighed up], there are the residents, there are those who want to fly, there are those who earn money by flying…"*
Ethicality	Procedures uphold standards of morality	*"There are now medical reports that have even calculated the costs of illness. What does it cost if the population is ill and becomes even more ill and what does it cost to introduce a ban on night flights."*

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3.3 Informational Fairness

However, the addition of a fair process still does not fully reflect the complexity of human perceptions of fairness. Research has found that it also depends on how processes and outcomes are communicated and how people are engaged with [11]. Informational and interpersonal fairness regards to the quality of interaction between involved parties [12]. Informational fairness regards to the quality of explanations and justifications given that explain the procedure applicated in the decision-making process.

Table 3 - Definition and examples of informational fairness.

Subcategory	Definition	Example
Truthfulness	Explanations about procedures are honest	*"Measurements are sometimes taken by the airport. Those are always the days when it's particularly quiet. That's when they fly the other way. I'm absolutely convinced of that."*
Justification	Explanations about procedures are thorough	*"I don't know where I can get an answer. How come Düsseldorf has a night flight ban and Cologne doesn't?"*

3.4 Interpersonal Fairness

The term interpersonal fairness describes the degree in which residents are treated with politeness, dignity and respect [13]

Table 4 - Definition and examples of interpersonal fairness.

Subcategory	Definition	Example
Respect	Enactment of procedures are sincere and polite	*"I think the airport is also a closed-door neighbour, that's how it looks to me. He doesn't open his front door, he stays locked all the time."*
Propriety	Enactment of procedures refrain from improper remarks	*"The attitude is partly hardened and partly disgruntled. I think like talking in a marital dispute, the willingness to talk mitigates something."*

4   Conclusions

This paper highlights the relevance of fairness in the context of aircraft noise research. Based on the review by Hauptvogel et al. [2], in which the different facets of fairness in the context of aircraft noise research were elaborated, this paper first offers insights from qualitative research with residents around the airport in Cologne-Bonn. Four focus groups were conducted with people from high and low aircraft noise regions. First results are presented, in which the various fairness facets are brought to life with concrete statements from airport residents.

From the results, conclusions can be drawn about the relevance of certain fairness aspects. Data indicate that fairness should not only be an important part of airport management in theory, but is also perceived as such by affected residents. Detailed results will be published soon.

Looking into the future, results of this qualitative study can be used to create a psychometric instrument to objectively, reliably and validly measure fairness aspects of airport management and neighbourliness. This will allow quantitative studies to be conducted to further investigate fairness in the context of airport management.

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