Available online at www.sciencedirect.com

ScienceDirect

Transportation Research Procedia 00 (2018) 000–000

Transportation Research Procedia

www.elsevier.com/locate/procedia

World Conference on Transport Research - WCTR 2019 Mumbai 26-31 May 2019

Evaluating Passenger Stress at Airports to Enhance Passenger Experience

Duarte Amorim da Cunha[a], Bruno Aguiar[a], Rosário Macário[a,b], Vasco Reis[a]

[a] *CERIS, Instituto Superior Técnico, Universidade de Lisboa, Avenida Rovisco Pais 1, 1049-001 Lisboa, Portugal*
[b] *TPR, Faculty of Applied Economics, University of Antwerp, Prinsstraat 13, 2000 Antwerpen, Belgium*

Abstract

Airports are looking for new revenue sources. Airlines are cutting on services, providing great services and charging the airlines suitably, this option may not be suitable in a near future. Reducing services and costs may be difficult since is unpopular with passengers and airlines. Non-aeronautical revenue development has been a focus of airport managers and passenger experience gained more importance in airport managers' concerns. Providing a good experience to the passenger is an encouragement for his return, since airports now compete and with other transport modes, making it a differentiator. Airports can become more autonomous and provide arguments for future investments if passengers have low complaints.

There are several situations that stand out as sources of stress for passengers; Crowded airports can create conditions that can produce an emotional tension that is not only understandable but considered as natural. Changes or unpredictable events are events that cause a stressed response by people, often due to a lack of control of the situation, which affect biorhythms causing somatic and psychosomatic effects (superficial breathing, increase the heartbeat, chest pressure, muscle tension, abdominal pain and excessive sweating).

As an initial approach to evaluating passenger stress at airports, a preliminary survey to point out stress in airports and in the whole airport passenger process, in order to give the airport manager the necessary information to take action and enhance their experience. The results corroborate current literature and pave the way into continuing research considering each stage and different strategies to improve the passenger experience.

Peer-review under responsibility of WORLD CONFERENCE ON TRANSPORT RESEARCH SOCIETY.

Keywords: Transportation, Airport, Anxiety, Passenger Experience

Peer-review under responsibility of WORLD CONFERENCE ON TRANSPORT RESEARCH SOCIETY

1. Introduction

Airports have changed over the past years. New airline business models, more open skies allowing new routes and entrance of other airlines in formerly monopolized routes, as well as privatization of airports and the arrival of new stakeholders, along with the rise of the internet and the constantly connected and informed passenger changed the airport business in many ways. Hence, airports are now competing by attracting a mix of routes and airlines, and by giving passengers the best airport experience to attract and capture passengers as, in Europe, more than 65% of passengers have a choice of 2 or more airports they can fly from or fly to. With this, airports are focusing harder on passengers, moving from a B2B model to a B2C model, enhancing passenger experience through efficient operations, more and better services, as well as other creative concepts.

For many people, an airport terminal can be a stressful, hectic and claustrophobic environment, particularly in days of great movement and especially for people with physical or psychological limitations. Airport experiences are increasingly dominated by technology-based services, while interpersonal, intrapersonal and personalized human interaction service has been forgotten. For many passengers, including elderly and persons with reduced mobility, new technologies can pose a real challenge to its use, where most of these passengers depend assistance when faced with them.

Our research aims in identifying variations in stress levels in the whole airport process that the passenger undergoes, in order to give the airport manager, the necessary information to take action and enhance the experience for passengers.

In chapter 2, we present an overview on passenger stress in air transportation.

During our research, before going to a case study approach on a specific airport, we started with a broad survey to passengers to gather data on declared preferences of passengers' experience in the general airport environment. The survey methodology and results are presented in Chapters 3 and 4.

Finally, in the last chapter, we draw up some conclusions taking into consideration the conducted literature review and our survey results and present the additional steps to be made on our research.

2. Passenger Stress in Air Transportation

The socio-psychological experience of passengers is not necessarily based on airport facilities. Thrill of travel, anxiety and fear of flying, and joy and sorrow of reencounters and farewells can intensify the passengers' emotions. Several studies argue that the passenger experience in an airport should be viewed from three perspectives: sociological, psychological and service marketing (Huang, Xiao, & Wang, 2018).

The stress experienced by passengers throughout the airport terminal is an important aspect of passenger experience. In an airport terminal, both arriving or departing passengers go through a process that has different phases that can increase stress levels, to which airport managers need to take actions in order to make the passage smoother. So, identifying the stages where the stress levels increase the most can help airport managers identify the critical stages and define strategies to improve the passenger experience. But it is not only in the airport terminal that stress levels may arise. The journey to the airport can also increase the stress levels, specially if the quality of the transportation services does not allow a quick and undisturbed journey to the airport, so passengers can arrive on time.

Air travel stress is composed by three factors: angry reactions to other passengers; lack of trust that airlines/airports will ensure the passenger's comfort and safety and, above all, uneasy reactions to adverse travel events (Bricker, 2005). Most commonly, the most stressful stages or areas in the departing process are: the journey to the airport, security and border control, followed by check-in and boarding gates; and for arranging passengers: border control, baggage reclaim and connections, followed by debearding areas and customs. In this list, it is possible to see that the most stressful stages are the ones where passengers are not in control of their own time, and are waiting for someone to service them, normally in a crowded environment or in a queue. The most stressful phases of the departing process coincide with the perception the passenger has of the process as three milestones are considered for them: check-in; security; and boarding (Liu, Usher, & Strawderman, 2014). The passenger departing and arriving processes are depicted in figure X, with indication of the stages where the stress and/or anxiety levels are higher.

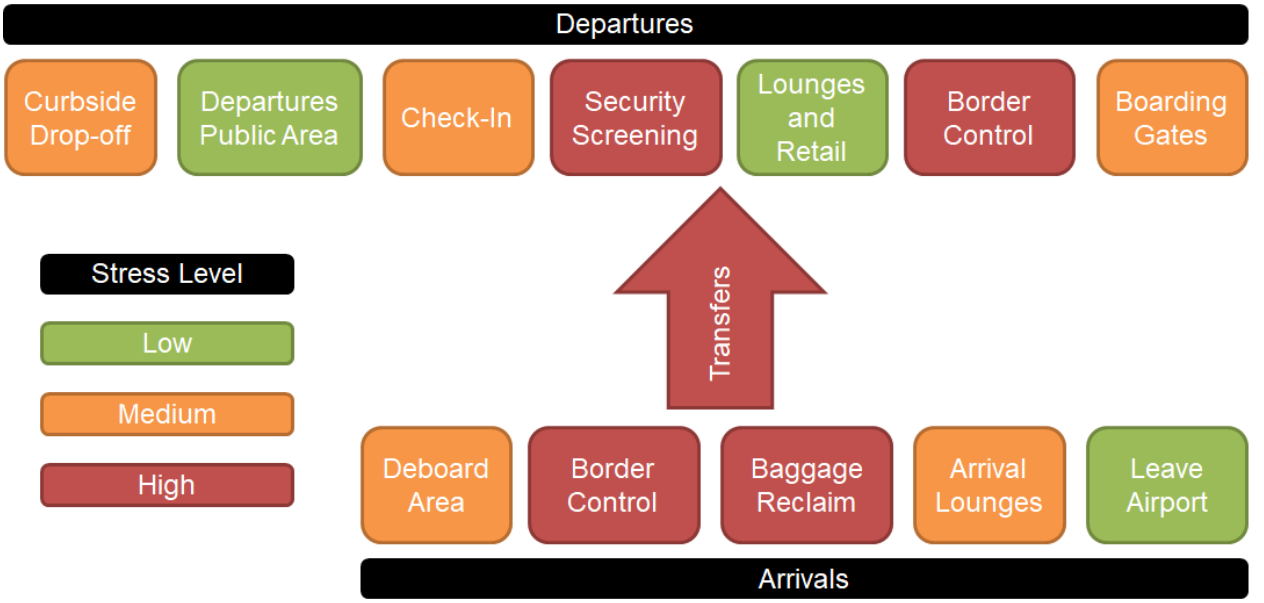


Figure 1 Departure and Arrival Passenger Proccess and stress level in each stage (Based on Lähteelä et al. (2014)

A study indicates that airport experience is different from costumer and tourist experience, since it is mainly associated to functional experience and service personnel, instead of memorable feelings (Wattanacharoensil, Schuckert, Graham, & Dean, 2017).

The experience a passenger undergoes in an airport terminal depends on the familiarity he has with the airport itself, or if he is an experienced traveler or not (Schultz & Fricke, 2011). Hence, frequent flyers tend to have a better experience than other groups of passengers.

The Guidelines for Passenger Services at European Airports (Lähteelä et al., 2014) considers an approach consisting of 3P's – Premises, Processes and People. The balance between them is crucial. The infrastructure must be functional but must provide a good ambience and appeal the costumer at the same time. Airport terminals needs to be clean, nice-looking, with perceptible paths in which passengers move around, and maintain the identity of the airport surroundings. The way passengers move around the airport must be fluid and predictable, avoiding disturbances or difficulties to the passenger. The information shown in the airport is vital for all the processes run smoothly, directing passengers throughout the infrastructure in a fluid way and giving them information, they can understand correctly. This is also affected by the people who work at the airport, who provide services to the passengers, who must treat passengers with respect, consider different cultures and personalities, and communicate with passengers in the same language as them, as passengers expect to receive valuable information from airport staff and to be efficiently processed by them (Fodness & Murray, 2007).

Airport Experience is a concept not new in scientific literature. Passenger satisfaction has been examined using service and operational management theory and in Sociology the sense of space has been applied to airports to explain the passengers' perception (Wattanacharoensil et al., 2017). In Psychology, the stress level and frustration of passengers are the bearings of airport or air travel anxiety which, in its turn, is related with health problems (McIntosh, Swanson, Power, Raeside, & Dempster, 1998).

3. Methodology

3.1. Participants

The population studied consisted of 286 individuals. At the time of the data collection, the individuals' age ranged from 20 to 80, and the mean being 48 (M=48.44, SD=14.001), where 54% are under 50 years and the remaining 46% are over 50 years. Regarding gender, 175 (61%) were male and 111 (39%) were female.

In this research group, 95 (34%) the travel purpose was "Leisure / Vacations", 156 (54%) was "Business" and the remaining 35 (12%) was "Visit Family / Friends". According to the survey, 3 traveled with children only, 26 with adults and children and 63 with adults only, and the remaining traveled alone. Regarding the baggage, 144 traveled with hold and hand baggage, 92 with hand baggage only and 6 with hold baggage, and the remaining with no baggage. Regarding the use of new technologies, the majority of the participants (96%) consider that the new technologies facilitate the check in process. Regarding the check in, 28% made it at the airport check-in desk, 66% online and 6% at airport Kiosk and Bag Drop-off desk.

3.2. Survey

The survey was divided into several distinct sections. The first section as a categorization of the traveler, age, gender, purpose of the trip, type of baggage, company, as they do check in. The second section was focused on performing tasks at the airport, when they arrive at the airport, when they make purchases, when they go to the dining area. The third section concerns the personal experience in the different areas of the airport, such as check-in, security, boarding, airport in general focusing on issues such as temperature, information available, routes and other issues. Finally, the fourth section focuses on the characteristics of the subjects, if they consider anxious, if they prefer another type of transport compared to the airplane, if they take some type of medication before the trip and levels of stress / anxiety before and during the trips.

3.3. Data Collect Procedure

From the 286 surveys collected in 2017, a database was built in the SPSS (Statistical Package for the Social Sciences) Software for Windows version 22.0.0.

Data were processed using the SPSS software with a significance level of 5% ($\alpha = 0.05$).

Aiming to meet the objectives proposed in this research, the first technique used for the data treatment was made through a descriptive analysis, where all variables studied were determined: sample, mean, median, standard deviation, minimum and maximum values.

In order to check the accuracy and validity of the instruments and, more precisely, of the items that constituted the same ones, the Cronbach Alpha test was used.

The inferences were tested according to the normality and homogeneity where the Kolmogorov-Smirnov test and the Levene test were used (Maroco, 2007).

In the comparison between groups, the parametric test was performed to compare populations from independent T-Student samples to check whether their assumptions were confirmed, the assumptions of Normality and Homogeneity (Maroco & Bispo, 2005), otherwise the non-parametric test was used to compare Populations from Mann-Whitney independent samples. This comparison was made to determine if there were significant differences (Maroco, 2007).

4. Results and conclusions from data analysis and survey limitations

4.1. Airport in general

Analyzing the overall values of the different areas of the airport, we were able to assign average values of response for each area taking into account the experience of the participants of the survey, where the greatest value is the most positive value, and the lowest value the most negative value.

Table 1 - Average level of experience in the different areas of the airport

Did you arrive at the airport earlier than indicated by the airline / travel agency?	[At the Curbside]	[At the Check-In Area]	[At Security]	[At Boarding Gates]	When you arrive at your destination, do you rush to the baggage claim?
1,50	**2,30**	**2,27**	**2,18**	**2,42**	**1,50**

Table 2 - Average level of experience regarding the specific variables in the different areas of the airport

Did you arrive at the airport earlier than indicated by the airline / travel agency?	[At the Curbside]	[At the Check-In Area]			[At Security]			[At Boarding Gates]			When you arrive at your destination, do you rush to the baggage claim?
		[Do you rush to Check-In when you arrive at the airport?]	[Do you feel uncomfortable or anxiety at the waiting line?]	[Are you afraid that your hold luggage might be damaged or stolen?]	[Do you rush to Security after Check In?]	[Do you feel uncomfortable or anxiety when at the waiting line?]	[Are you afraid one item of yours might be blocked?]	[Do you hurry to the boarding gate after Security?]	[Do you feel uncomfortable or anxiety when at the waiting line?]	[Do you get anxious or feel uncomfortable when there are unscheduled changes to the flight?]	
1,50	**2,30**	**1,58**	**1,71**	**1,71**	**1,61**	**1,71**	**1,83**	**1,82**	**1,84**	**1,45**	**1,50**

The data analysis shows that at the boarding gates is the area where the participants had a better experience (M=2.42, SD=0.696), and at the security is the zone where the participants had a worse experience (M=2.18, SD=0.726).

Analyzing the variables studied for each specific area, the results show that the variable where the participants have the best results in the variable “At the Curbside” (M=2.30, SD=0.501) and the worst results is in the variable “Do you get anxious or feel uncomfortable when there are unscheduled changes to the flight?” (M=1.45, SD=0.498).

4.2. Anxiety

Comparing people who consider themselves anxious to those who do not consider themselves anxious, compared to how they feel at the airport, significant statistical differences have been identified in two areas, at the curbside (p=0.036) and at the check in area (p=0.004).

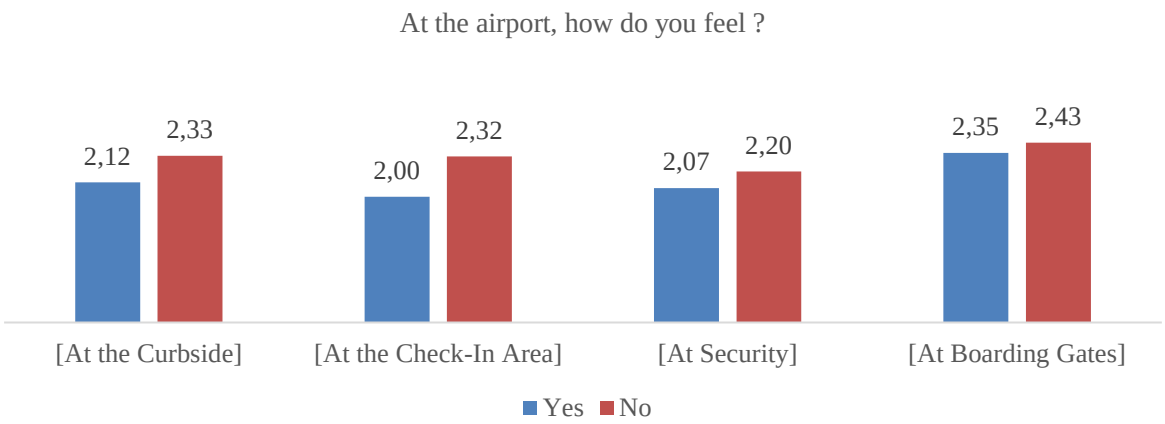


Fig. 2 – Average level of comfort at the airport regarding people consider themselves anxious to those who do not consider themselves anxious

Regarding aspects at check-in, all variables presented significant statistical differences between people considered anxious and non-anxious, “Do you rush to Check-In when you arrive at the airport?” ($p=0.008$), “Do you feel uncomfortable or anxiety at the waiting line?” ($p<0.001$) and “Are you afraid that your hold luggage might be damaged or stolen?” ($p=0.042$).

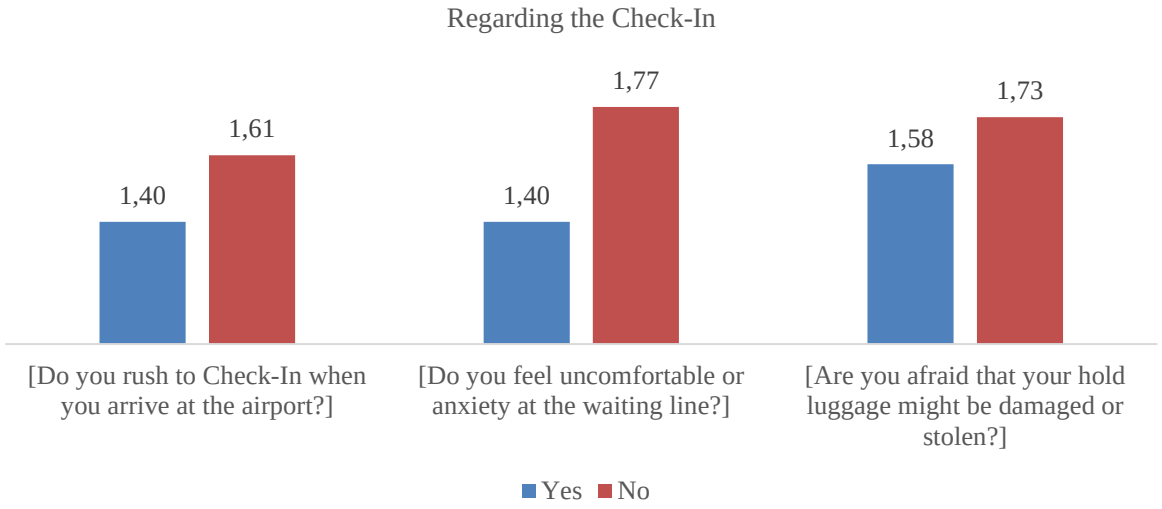


Fig. 3 – Average level of good experience at the Check-In regarding people consider themselves anxious to those who do not consider themselves anxious

Regarding to the moment of security, only one variable found significant statistical differences, “Do you feel uncomfortable or anxiety when at the waiting line?” ($p=0.036$).

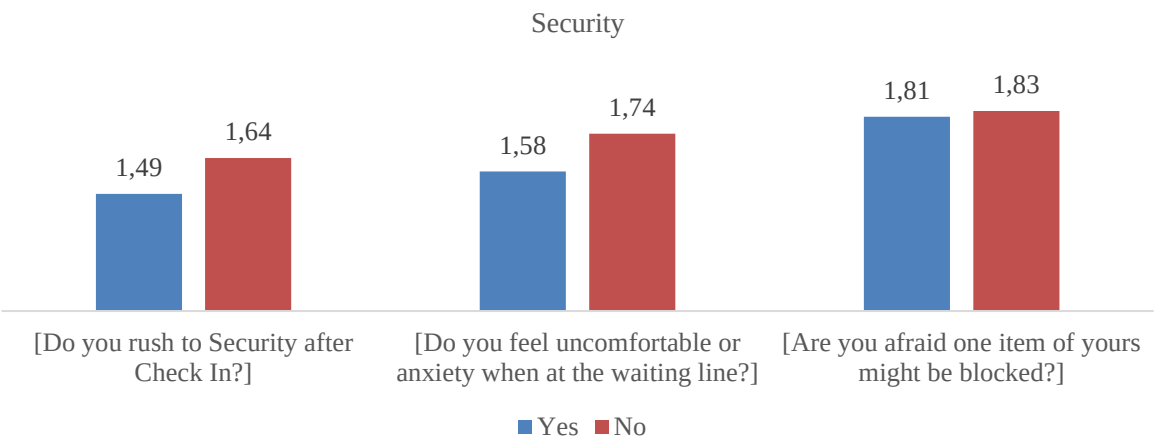


Fig. 4 – Average level of good experience at the Security regarding people consider themselves anxious to those who do not consider themselves anxious

At the boarding, only one variable showed significant statistical differences, “Do you feel uncomfortable or anxiety when at the waiting line?” ($p<0.001$).

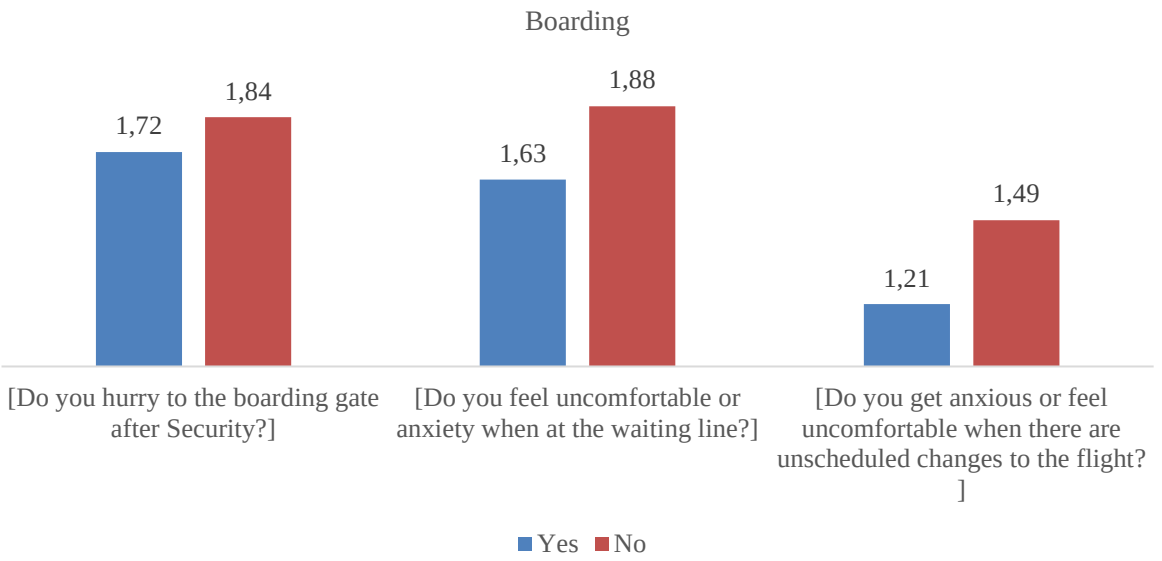


Fig. 5 – Average level of good experience at the Boarding Gates regarding people consider themselves anxious to those who do not consider themselves anxious

Regarding personal aspects, of the six variables studied, significant statistical differences were found in four of them, “Are you afraid of flying?” ($p=0.009$), “Do you get anxious or feel uncomfortable before flying?” (0.002), “Do you prefer any alternative transportation means, even if it would take more time to reach your destination?” ($p=0.001$) and “When you are late for a flight, do you feel anxious or uncomfortable?” ($p=0.016$).

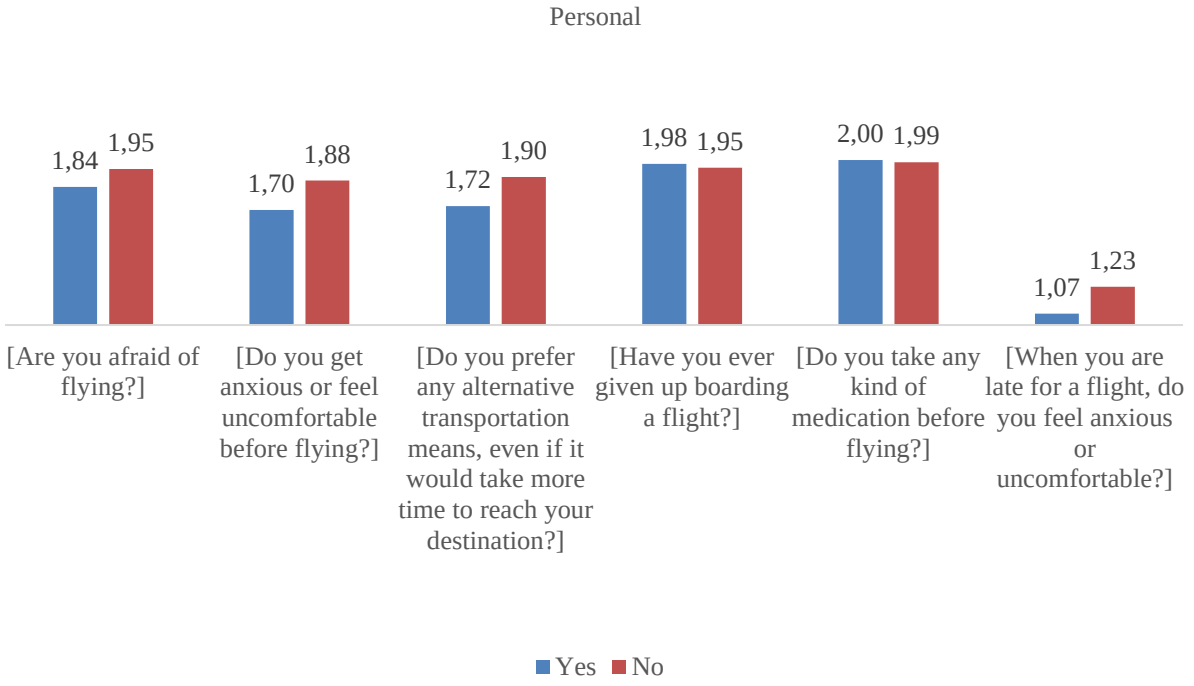
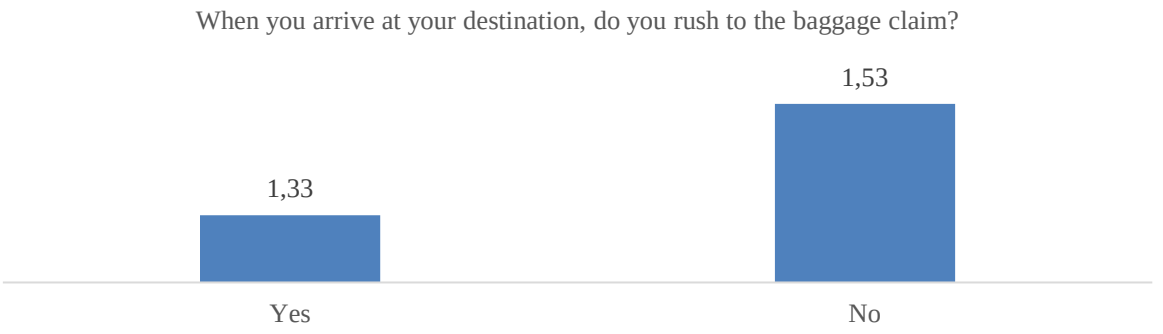


Fig. 6 – Average level of personal variables regarding people consider themselves anxious to those who do not consider themselves anxious

Significant statistical differences were also found in the variable “When you arrive at your destination, do you rush to the baggage claim?” (p=0.012).



4.3. Fig. 7 – Average level of rushing to baggage claim regarding people consider themselves anxious to those who do not consider themselves anxiousImpairment

4.4. Comparing people with physical limitations in only one of the analyzed constructs showed statistically significant differences, “Do you feel uncomfortable or anxiety when at the waiting line? (At Security)” (p=0.001). However, two other variables were found that, although they did not present significant statistical differences, show

a tendency "Do you feel uncomfortable or anxiety at the waiting line? (At Check-in)" (p=0.076) and "Do you feel uncomfortable or anxiety when at the waiting line? (At Boarding)" (p=0.065).Age

Analyzing the age of participants, this study significant differences were found only in one variable "At the Curbside" (p=0.047). Regarding the remaining variables did not found significant statistical differences between people under 60 years and people over 60 years (p>0.05) regarding their experience in the airport.

Analyzing the method of check in, "At the airport check-in desks" is used by the majority of people with over the age of 50 years (59%). The "Online / Mobile Check-In and Bag Drop-off desk" is used by the majority of people with under the age of 50 years (59%). At last "Airport Kiosk and Bag Drop-off desk", with only 18 respondents, is used by the majority of people with under the age of 50 years (61%).

4.5. Gender

Regarding gender, statistically significant differences were found in three variables studied; "At the Curbside" (p=0.007), "Do you take any kind of medication before flying?" (p=0.028) and "When you are late for a flight, do you feel anxious or uncomfortable?" (p=0.003). In these three variables, women presented less positive values compared to the values presented by men.

4.6. New Technology

As previously mentioned, most of the participants consider the use of new technology an enabler check in process. However, the results, show that people who check in online are the ones with the lowest levels of comfort in the Check In area. Significant statistical differences were found in this analysis (p = 0.05)

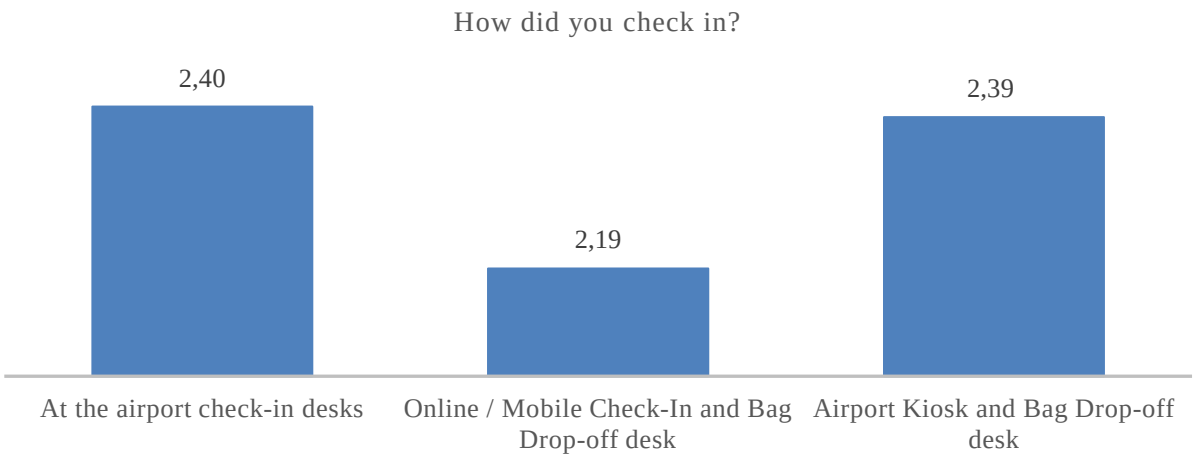


Fig. 8 – Average level of comfort in Check In area regarding the different modes of check in

5. Conclusions and future work

Our research aims in aiding the airport manager in determining the stress factors that influence the passenger experience. Although this paper presents only a first exploratory approach to the problem at hand, the survey results are in line with precious research and existing literature findings.

Globally, the results from our survey show that the milestones in the passenger service, specially when there are waiting lines, are the stages where passengers' anxiety levels increase. The level of uncomfortably or anxiety is higher in key points of the passenger airport process. The higher values were found in Security and the boarding gates area is where passengers have the best experience in the whole airport process, which is in line with Figure 1. Having more discomfort or anxiety in the stages before the boarding area may suggest that arriving at the final stage before boarding can give the passengers a relaxation feeling.

There was a correlation between the level of anxiety passengers felt in the Check-In stage with the fright of having their luggage lost, and at the Security, there was a correlation between the level of anxiety and fright of getting personal items blocked by the Security Screeners. This shows that the loss of control over their luggage and personal items is a factor that influences the experience and is supported by the fact that passengers tend to go directly to the baggage claim area when they arrive at the destination, specially passengers who consider themselves as anxious.

The introduction of new technologies by airports and airlines has been deemed as a success in contributing to a better passenger experience. According to the results, the majority of answers indicated that the use of new technologies facilitates the check-in process, but they are mainly used by younger people or frequent travelers. But on the other hand, the results also show that passengers who used new technologies presented a higher level of anxiety. Nevertheless, the negative correlation between the use of new technologies and arriving to the airport before the indicated time by the airlines shows that the new technologies users tend to arrive later to the airport than the others, to which the increased level of anxiety at the check-in area (baggage drop-off counters) may be influenced by this late arrival. This indicates that, although new technologies are generally well accepted by passengers, there is still room for improvement in this area.

The statistical significance between passengers with reduced mobility and the discomfort or anxiety level when waiting in lines in security, check-in and boarding shows that the visible emergence of services to this group of passengers in airports has been well applied.

Our results also show that passengers are susceptible to unscheduled changes or perturbances to the passenger process, as this variable presented correlation with the level of anxiety in all stages of the passenger process.

To continue our research, we intend to continue to a case study approach focusing on each stage of the passenger process in the airport, in which a passenger survey will be conducted considering different airports with different passenger experience strategies.

6. References

Bricker, J. B., 2005. Development and evaluation of the air travel stress scale. *Journal of Counseling Psychology*, *52*(4), 615–628. http://doi.org/10.1037/0022-0167.52.4.615

Fodness, D., & Murray, B., 2007. Passengers' expectations of airport service quality. *Journal of Services Marketing*, *21*(7), 492–506. http://doi.org/10.1108/08876040710824852

Huang, W. J., Xiao, H., & Wang, S., 2018. Airports as liminal space. *Annals of Tourism Research*, *70*(February), 1–13. http://doi.org/10.1016/j.annals.2018.02.003

Lähteelä, P., Medici, G., Englund, G., Kolatorski, P. A., Van den Dobbelsteen, E., Hentschel, T., … Touret, O., 2014. *Guidelines for Passenger Services at European Airports - The Passenger at the Heart of the Airport Business*. http://doi.org/10.1017/CBO9781107415324.004

Liu, X., Usher, J. M., & Strawderman, L., 2014. An analysis of activity scheduling behavior of airport travelers. *Computers and Industrial Engineering*, *74*(1), 208–218. http://doi.org/10.1016/j.cie.2014.05.016

Maroco, J. & Bispo, R., 2005. Estatística Aplicada ás Ciências Sociais e Humanas – 2ªEdição. Editora: Climepsi.

Maroco, J., 2007. Análise Estatística com Utilização do SPSS – 3ªEdição. Editora: Edições Sílabo, Lda

McIntosh, I. B., Swanson, V., Power, K. G., Raeside, F., & Dempster, C., 1998. Anxiety and health problems related to air travel. *J-Travel-Med*, *Journal-of*(4), 198–204.

Schultz, M., & Fricke, H., 2011. Managing Passenger Handling at Airport Terminals. *Ninth USA/ Europe Air Traffic Management Research and Development Seminar*.

Wattanacharoensil, W., Schuckert, M., Graham, A., & Dean, A., 2017. An analysis of the airport experience from an air traveler perspective. *Journal of Hospitality and Tourism Management*, *32*, 124–135.

http://doi.org/10.1016/j.jhtm.2017.06.003