ATMOSPHERIC TURBULENCE EDUCATION EFFECTS ON FLIGHT ANXIETY

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A PRE-POST SURVEY STUDY EXAMINING THE IMPACT OF TURBULENCE KNOWLEDGE ON FLIGHT ANXIETY

BACKGROUND

Flight anxiety can present itself as a fear of flying or as anxiety related to specific aspects of flying, such as turbulence. Turbulence causes revenue losses through flying avoidance, maintenance costs, delays, reroutes, and injury compensation.

While most flight anxiety resources address plane mechanics and crew routines, they often overlook weather-related factors, despite research showing turbulence being one of the largest anxiety inducing aspects of flying.

OBJECTIVES

1) Investigate whether increased scientific knowledge about the atmosphere and turbulence can reduce flight anxiety.

2) Identify the specific moments during a flight when flight anxiety fluctuates.

3) Explore what participants believe is happening in the atmosphere and to the plane when the plane encounters turbulence and if this changes after viewing the educational video.

METHODOLOGY

A pre-post survey method was used to survey 169 Mississippi State University students attending summer 2024 study-abroad trips.

SURVEY PROCESS

Surveys measured flight anxiety levels at three points during the flight routine using the Flight Anxiety Situations (FAS) Questionnaire (Fig. C).



Figure A: Survey timeline with two surveys; pre-flight survey includes the first three objects.

SURVEY CONTENTS

- The FAS assessed generalized, anticipatory, and in-flight anxiety across 32 situations using a Likert scale.
- The **Wilcoxon Signed-Rank Test** measured the magnitude of differences in the pre and post-video FAS scores using mean ranks.

Questions Included	Pre-Flight Survey	Post-Flight Survey
FAS	✓	✓
Demographics	✓	✗
Trip Background	✓	✗
Flying Experience	✓	✓
Flying Habits	✓	✗
Diagnoses	✓	✗
Personal Turbulence Definition	✓	✓
Turbulence Experience	✗	✓

Figure B: Detailed survey questions included

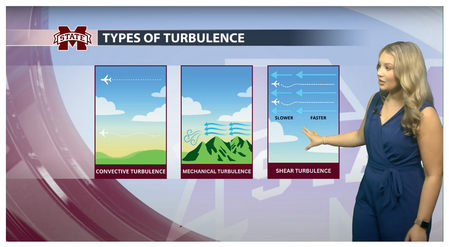
Circle the number which corresponds to your level of anxiety in the situations mentioned. The numbers range from 1 to 5, where 1 = *no anxiety*, 2 = *slight anxiety*, 3 = *moderate anxiety*, 4 = *considerable anxiety*, and 5 = *overwhelming anxiety*.

	Item	No anxiety	Slight anxiety	Moderate anxiety	Considerable anxiety	Overwhelming anxiety
Factor 1: Generalized Anxiety	1. You see an airplane.	1	2	3	4	5
	2. You hear the sounds of planes.	1	2	3	4	5
	3. You read a report about a flight.	1	2	3	4	5
	4. You bring someone to the airport.	1	2	3	4	5
	5. Friends tell you about a flight.	1	2	3	4	5
Factor 2: Anticipatory Anxiety	6. You decide to take a plane.	1	2	3	4	5
	7. You buy a ticket.	1	2	3	4	5
	8. You are on the way to the airport.	1	2	3	4	5
	9. You enter the departure hall.	1	2	3	4	5
	10. You are going through customs for a passport check.	1	2	3	4	5
	11. You are waiting for the boarding call.	1	2	3	4	5
	12. You see planes taking off and landing.	1	2	3	4	5
	13. You hear the sound/noises of jet engines.	1	2	3	4	5
	14. You are walking in the direction of the gate.	1	2	3	4	5
	15. You are going through the security check.	1	2	3	4	5
	16. You are going through the gate.	1	2	3	4	5
	17. You enter the flight cabin.	1	2	3	4	5
	18. The doors are being closed.	1	2	3	4	5
	19. You are informed of the flight safety regulations by the cabin crew.	1	2	3	4	5
	20. The takeoff is announced.	1	2	3	4	5
	21. The engines give full power before takeoff.	1	2	3	4	5
Factor 3: In-Flight Anxiety	22. You are pushed back into your seat.	1	2	3	4	5
	23. You hear some noises during the flight.	1	2	3	4	5
	24. The airplane banks left or right.	1	2	3	4	5
	25. The wings of the plane are moving, shaking.	1	2	3	4	5
	26. The cockpit informs you of the actual altitude or flight-level.	1	2	3	4	5
	27. The sound of the engines decreases.	1	2	3	4	5
	28. The plane starts the descent.	1	2	3	4	5
	29. Air turbulence is announced.	1	2	3	4	5
	30. You are shaken.	1	2	3	4	5
	31. The sound of the engine gets louder again.	1	2	3	4	5
	32. The landing is announced.	1	2	3	4	5

Note: Copyright 1998 by Lucas J. Van Gerwen, The VALK Foundation.

Figure C: Van Gerwen et al. (1999) FAS amended to include factor 1-3 descriptors

VIDEO CONTENTS





1. VAN GERWEN, L. J., SPINHOVEN, P., VAN DYCK, R., & DIEKSTRA, R. F. (1999). CONSTRUCTION AND PSYCHOMETRIC CHARACTERISTICS OF TWO SELF-REPORT QUESTIONNAIRES FOR THE ASSESSMENT OF FEAR OF FLYING. PSYCHOLOGICAL ASSESSMENT, 11(2), 146.
2. SKOLNICK, R. B., SCHARE, M. L., WYATT, K. P., & TILLMAN, M. A. (2012). AVIOPHOBIA ASSESSMENT: VALIDATING THE FLIGHT ANXIETY SITUATIONS QUESTIONNAIRE AS A CLINICAL IDENTIFICATION MEASURE. JOURNAL OF ANXIETY DISORDERS, 26(8), 779–784. HTTPS://DOI.ORG/10.1016/J.JANXDIS.2012.07.006

RESULTS

Results include 45 students with 12 flying phobics, two not having flown before, and 71% that flew with one or more persons on the trip.

FAS scores were totaled to gather sum scores for each participant. Skolnick et al. (2012) provides context to phobic cut off scores(<56).

1) Turbulence education video helped decrease flight anxiety.

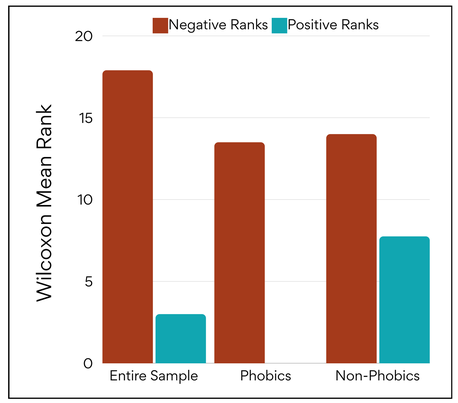


Figure D: Mean rank differences for the three samples (Wilcoxon Signed-Rank Test)

- Post video, 72.5% had lower FAS sum scores and all phobics had decreased anxiety.
- 41.6% of phobics scored out of the phobic range post-video.

2) Pre-flight anxiety surrounding turbulence related situations changed post-video.

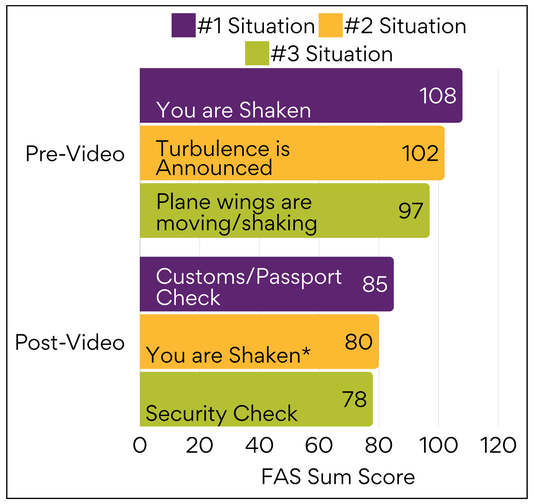


Figure E: Top 3 anxiety inducing FAS situations per the average FAS sum

3) Students' turbulence definitions were more scientifically correct and simplified post-video.

- Most classified turbulence as wind shaking the plane pre-video.
  - 27.9% knew the scientific reasoning of turbulence pre-video.
- Definitions were streamlined post-video, linking wind and pressure changes to turbulence.

KEY TAKEAWAYS

1) Turbulence as a key pre-flight anxiety trigger: Anxiety shifted from turbulence-related fears to other flight-related experiences post-video.

2) Weather education is effective at reducing pre-flight anxiety: Participants with flying phobia saw reduced anxiety while some non-phobics experienced increased anxiety.