Emerging Psychological Factors & Student Pilots Resilience During the Pandemic

Graduate Student: Xinyu Lu (Purdue University) Advisor: Chien-tsung Lu (Purdue University)

Abstract: The COVID-19 is entering from the pandemic to an endemic stage in most parts of the world by the time of this writing. Due to the low volume of passenger services between March 2020 and May 2022, manpower demand was dwindled by airlines and simultaneously shape undesirable or appalling moods among flight students due to the *impredecible* timeline of business recovery. To realize the psychological impact and understand how they coped with the challenges generated by COVID-19, this study surveyed flight schools in the United States (U.S.) and compared respondents' perception of health protocols, flight training, human factors, psychological issues, and safety culture to that of Chinese respondents. Cronbach's alpha, correlation coefficients, and Wilcoxon-Mann-Whitney t-test were used to coin instrument consistency, data validity, and correlation among questions before testing perceptional differences. The result discovered that "Stress" "Pressure", and "Fatigue" were the three dominant Human Factors, where "Stress" and "Uncertainty" were the two top psychological issues affecting U.S. respondents during the pandemic time. Moreover, U.S. flight schools were less supportive to wear a face mask in the cockpit but showed a stronger motivation to seek mental/psychological health support and were willing to adapt to new safety and health standards. China's flight schools encountered more disrupted scheduled flight training and check-rides and decreased flight skills due to the stricter health protocols, but flight schools tried as diligently as possible to offer refresher courses during the pandemic.

Literature Reviews

- **Health Protocols on Flight Training** – Both CDCs in China and USA have required people to wear a face mask, keep a physical distance, wash their hands frequently to prevent virus spread, and has encouraged them to get vaccinated to avoid potential severe illness or post-COVID conditions.
- **Specific Operational Challenges due to COVID-19** – Including Recurrency, Safety, Human Factors etc.
- **Human Factors Encountered** – Pilots show decision errors, skill-based errors, perceptual errors during flight operations, and occasionally violating flight rules.
- **Psychological Health Challenges** – A failure to recognize the mental health impacts on the performance of sudden discontinuity may prove costly to capital, compliance, and reputation where no organization defense is erected to limit human factors or liveware failures in aviation activity.
- **Organizational Safety Culture During Pandemic** – Safety culture is essential for the high-consequence aviation industry. Positive aviation safety culture needs the required synergy of a team to promote safety that includes continuous safety risk management and assurance towards organizational goals.
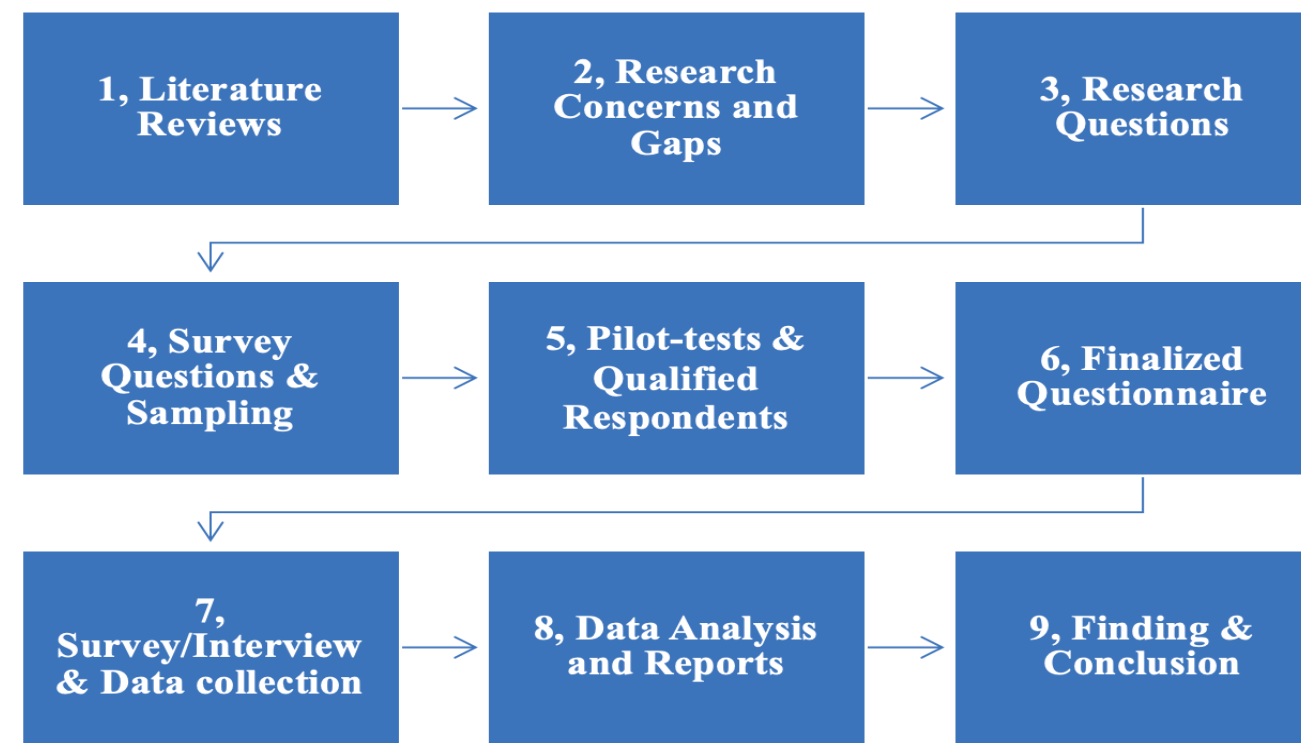
Selected Research Questions

- What Human Factors had affected pilot students' flight training?
- What were the psychological factors affecting pilot students during the COVID-19 pandemic time, and how did pilot students cope with the impact?
- What was the pilot students' perception of safety culture during the COVID-19 pandemic time?
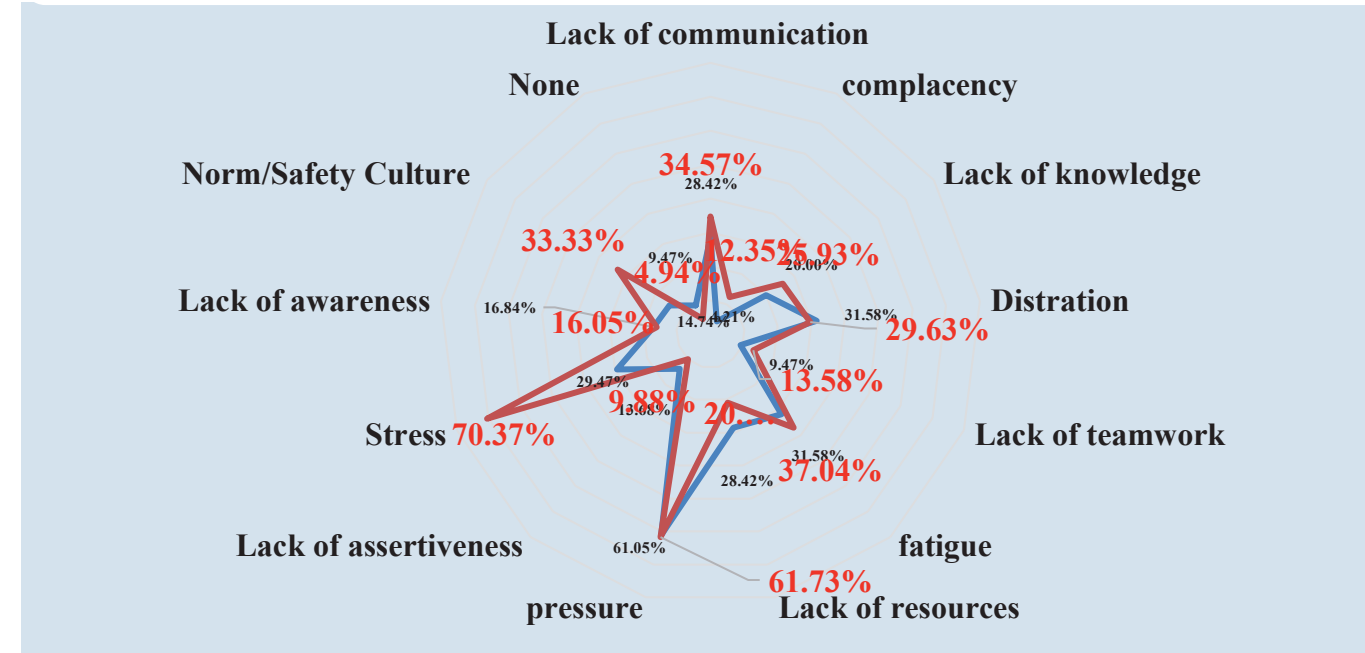
Research Approach

1, Literature Reviews → 2, Research Concerns and Gaps → 3, Research Questions

4, Survey Questions & Sampling → 5, Pilot-tests & Qualified Respondents → 6, Finalized Questionnaire

7, Survey/Interview & Data collection → 8, Data Analysis and Reports → 9, Finding & Conclusion

Findings

Wilcoxon-Mann-Whitney - Two-Sample Assuming Unequal Variances		
Q4.2 It is important to seek mental/psychological health support/consultant if there is a need.		
	China	USA
Mean	4.053	4.346
Variance	1.625	1.079
Observations	95	81
Hypothesized Mean Difference	0.000	
df	174	
t Stat	-1.680	Reject H₀
P(T<=t) one-tail	0.047	
t Critical one-tail	1.654	
Q4.8 I believe my overall mental health condition is good during COVID-19.		
	China	USA
Mean	3.674	3.852
Variance	1.797	1.228
Observations	95	81
Hypothesized Mean Difference	0.000	
df	174	
t Stat	-0.965	Accept H₀
P(T<=t) one-tail	0.168	
t Critical one-tail	1.654	

Cronbach's Alpha of Close-ended Questions - Psychological Factors

Source of Variation	SS	df	MS	F	P-value	F critical
Rows	114.420	80	4.685	1.631	0.015	1.448
Columns	9.877	1	8.328	11.266	0.001	3.960
Error	70.123	80	0.583			
Total	194.420	161		Cronbach's alpha 0.387		

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Number of Likert Scale Questions (K)	2
the sum of individual questions variances ($\sum S_i^2$)	2.278
variance of total score (S_y^2)	2.858
Cronbach's alpha (α)	0.387
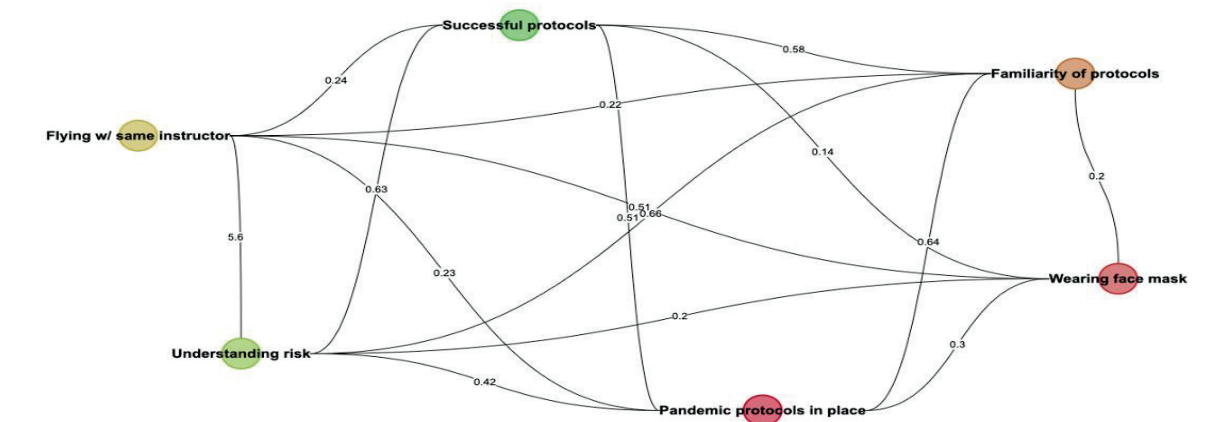
Spearman Correlation Coefficient Matrix – Safety Culture

Q No.	5.1	5.2	5.3	5.4	5.5	5.6	5.7	5.8
5.1 Safety is a priority	1	0.655	0.470	0.710	0.594	0.750	0.293	0.573
5.2 Safety Meeting	0.655	1	0.656	0.660	0.600	0.660	0.080	0.454
5.3 Reporting culture	0.470	0.656	1	0.633	0.599	0.612	0.190	0.428
5.4 Just culture	0.710	0.660	0.633	1	0.427	0.653	0.185	0.510
5.5 Informed culture	0.594	0.600	0.599	0.427	1	0.666	0.203	0.499
5.6 Learning culture	0.750	0.660	0.612	0.653	0.666	1	0.265	0.599
5.7 Refresher course	0.293	0.080	0.190	0.185	0.203	0.265	1	0.487
5.8 Safety commitment	0.573	0.454	0.428	0.510	0.499	0.559	0.487	1

Diagram 3
Pearson Correlation Coefficient of Likert Scale questions in Safety Culture Section.
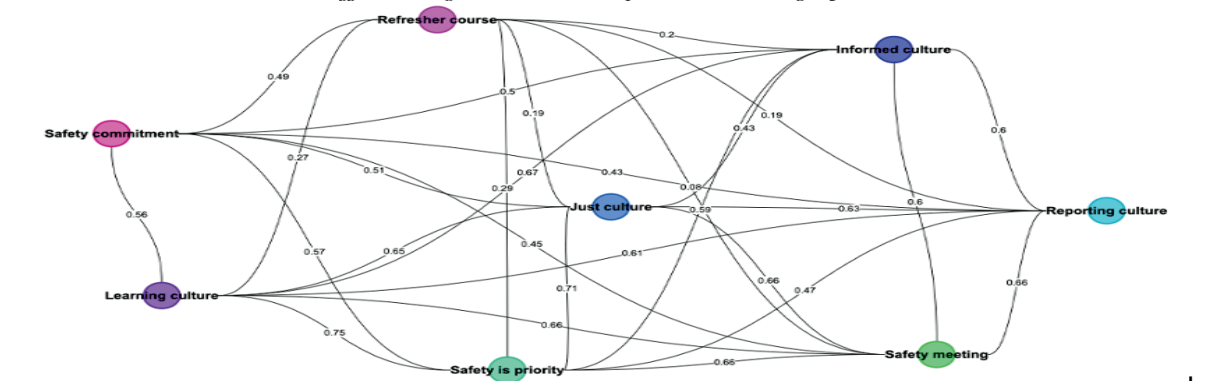
Conclusion

The result shows that "stress" "pressure", and "fatigue" were the three dominant Human Factors, where "Stress" and "Uncertainty" were the two top psychological issues affecting respondents during the pandemic time. Following the descriptive statistics, the researchers revisited previous studies on China's flight schools to obtain two datasets and compared them. Using two sample Wilcoxon-Mann-Whitney t-test (unequal variances) among collected data of each section, the result showed that U.S. flights schools: 1) were more supportive to wear a face mask in the cockpit regardless of the narrative comments, 2) showed a stronger motivation regarding seeking mental/psychological health support if there was a need, and 3) were more willing to adapt to new safety and health standards. On the other hand, respondents of China's flight schools showed a perception of 1) more disrupted scheduled check rides, 2) decreased flight skills due to the reduction of flight training, and 3) available refresher courses during the COVID-19 pandemic time.

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