

[EN-0019] Understanding the effect of alcohol consumption by Airline Passengers in Safety Sensitive Aisles

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Abstract: Alcohol intoxication can potentially hinder passenger egress during an aviation accident. Although the United States Code of Federal Regulations (CFR) prohibits crew members from consuming alcoholic beverages while on duty, there is currently no restriction on the consumption of alcohol by airline passengers seated in a safety-sensitive aisle aboard US air carriers. In order to better understand how the public feels about this issue, a survey was conducted on a population of Aviation Science majors on alcohol consumption by airline passengers found that students educated on the debilitating effects of alcohol were more in favor of greater restrictions and monitoring of alcohol consumption by passengers in exit rows who must perform safety sensitive functions in the event of an emergency than those who had not had the benefit of learning about the dangers.

Keywords: Student perceptions, Alcohol; screening.

1. INTRODUCTION

A fatal accident at Los Angeles International Airport (LAX) on February 1, 1991 involving Skywest Flight 5569 [1], (a part 135 Fairchild Metroliner) and USAir flight 1493 and USAir flight 1493 (a Boeing 737) resulting in the deaths of all the occupants of the Metroliner and twenty-two (22) of the occupants including two crew members of the Boeing 737. An NTSB investigation of the accident determined that the lack of situational awareness on the part of the local controller and the Air Traffic Facility Management's failure to implement redundant procedures called for in the National Operational Position Standards led to the runway incursion and the collision. The report also noted that thirty seven passengers from the Boeing 737 escaped via the right over-wing emergency exit. However, their escape was hindered by a passenger in seat 10-F who was reported to have become unable to perform her duties to open the window or even leave her seat. Later toxicology reports by investigators concluded that alcohol intoxication played a key role in contributing

to the many fatalities following the initial impact [2]. Li and others [3] have determined that intoxicated passengers are less able to recognize hazard, follow direction and egress in a timely manner. In fact, during a personal conversation between the scene investigators and the NTSB Board in 1997, it was determined that one of the passengers on USAir Flight 1493 had a blood alcohol content of 0.24% and was found to have not unfastened his safety belt.

2. CURRENT REGULATIONS

Under Title 14 of the Code of Federal Regulations (CFR), the Federal Aviation Regulations (FAR) Part 91.17 (b) states that passengers that appear intoxicated or under the influence of drugs, unless for an emergency, will not be allowed to be carried aboard a commercial air carrier [3]. Additionally, FAR 121.575(b),(c) states, that domestic air carriers may not serve alcohol to anyone appearing to be intoxicated and may not allow any passenger who is

clearly intoxicated, to board its aircraft [4]. FAR 121.458 (c) states that employees (crew members) cannot use alcohol while performing safety-sensitive functions.

To date there is no requirement restricting alcohol consumption by passengers seated in safety sensitive aisles that may be called upon to perform safety duties in the event of an emergency evacuation of a commercial air carrier. There is little data available testing public opinion on this safety critical subject. More specific surveys and research are required to answer the question posed. However, by looking at existing pilot data not specifically aimed at passenger performance, one can infer that the effects of alcohol are crippling on human performance during aircraft accidents. Hypoxia experienced after a rapid decompression is only worsened by the presence of alcohol in the body, decreasing one's time of useful consciousness and survivability. Li et al. [3] suggests that future research is warranted.

2.1 Statement of the Hypothesis

Individuals that have an increased knowledge of the effects of alcohol consumption on motor functioning and increased knowledge of aviation safety factors will be in favor of requiring that passengers seated in safety sensitive aisles aboard commercial air carriers be subjected to the same restrictions on alcohol consumption as flight crew members. In addition, students given additional knowledge on the effects of alcohol via a data sheet will be more conservative (toward greater restrictions concerning alcoholic consumption and impairment levels) in their answers. The null hypothesis is that there is no statistically significant difference between the opinions of the informed and uninformed individuals.

H0: There is no difference between the opinions of informed and uninformed individuals regarding alcohol consumption by passengers in safety-sensitive aisles.

H1: There is a difference between the opinions of informed and uninformed individuals regarding alcohol consumption by passengers in safety-sensitive aisles.

3. RESEARCH METHODOLOGY

4.1 Sample

Surveys were distributed to undergraduate students in aviation science programs at colleges and universities in the mid-Atlantic region of the United States. A total of one-hundred and twenty-seven (127) surveys were collected.

4.2 Instruments

The research design consisted of a static group comparison. The researchers sought to gain students' input on whether requiring passengers seating in safety sensitive aisles aboard commercial air carriers should be subject to the same restrictions on alcohol consumption as flight crew

members (pilots and flight attendants). Half of the students surveyed were given a data sheet that outlined the effects of alcohol on human cognitive response time(s), motor error, judgment and accuracy based on the dosage consumed. The groups were selected randomly from aviation science classes at university campuses where every other student was selected to receive the data sheet while the remaining students simply completed the survey device. In short, one group received learning on the subject matter of the effects of alcoholism and flying while the other group was prevented from receiving this information.

#5: Alcohol should be served on-board domestic Airlines.

#6: All passengers should be screened for intoxication prior to boarding.

#7: Passengers occupying emergency exit rows should be screened for intoxication prior to boarding.

#8: A Blood Alcohol Content of .04 or greater would impair my ability to operate an emergency exit door during an evacuation.

#9: A Blood Alcohol Content of .04 or less would inhibit my ability to operate an emergency exit door during an evacuation.

#10: The current alcohol restrictions on passengers and crew provide a sufficient margin of safety for flight.

#11: Passengers occupying an emergency exit row that may have to perform duties similar to flight crew members during an emergency should meet the same restrictions regarding alcohol consumption as flight crew members.

4. DATA COLLECTION

A pilot Likert-scale questionnaire was developed. The questionnaire included among others the following to which all participants were asked to respond.

Surveys were mailed to faculty in the aviation science departments with specific instructions on how the survey was to be distributed. Instructors were asked to make equal copies of the survey with the data sheet as those without and distributed them equally within the survey population. Some surveys were distributed directly by researchers to the participants. SPSS Science, Inc.TM software was used to perform the statistical analysis of the data.

5. RESULTS

A t-test was used to compare the responses of undergraduate aviation students who were given handouts (Data group), outlining the effects of alcohol on motor functioning against those students not given the handouts, (No Data group). The rating of answers was matched with a numeric value such that “Strongly Agree” was 5 points, “Agree Somewhat” 4 points, “Undecided” 3 points, “Disagree Somewhat” 2 points, and “Strongly Disagree” 1 point.

Figure 1 depicts the distribution from the responses to question #5 of both the “Data” and the “No Data” groups. All 127 responses were valid for this question. The total percentages were as follows: 12.6% Strongly Disagree; 21.3% Disagree; 21.3% Undecided; 37.0% Agree; and 7.9% Strongly Agree. The composite values were as follows: combined mean = 3.06; mode = 4.0. A mean comparison between the two groups found the following: Data Sheet, 3.14; No Data Sheet, 2.98.

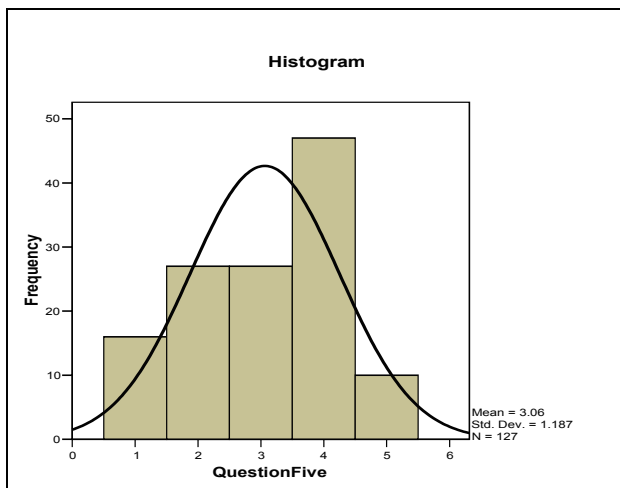


Figure 1 Combined Answers Question #5

Table 1 Group Statistics

Question	Prior Information	N	Mean	Std. Deviation	Std. Error Mean
# 5	1 Not Given Data	64	2.98	1.161	.145
	2 Given Data	63	3.14	1.216	.153
#6	1 Not Given Data	64	2.97	1.221	.153
	2 Given Data	63	3.17	1.212	.153
#7	1 Not Given Data	64	3.81	.974	.122
	2 Given Data	63	3.87	1.171	.148
#8	1 Not Given Data	64	3.47	1.112	.139
	2 Given Data	63	3.38	1.184	.149
#9	1 Not Given Data	64	2.91	1.109	.139
	2 Given Data	63	2.76	1.174	.148
#10	1 Not Given Data	63	3.52	.820	.103
	2 Given Data	60	3.47	.947	.122
#11	1 Not Given Data	63	3.83	.925	.117
	2 Given Data	60	3.52	1.308	.169

Distribution histograms were obtained for all the remaining survey questions 6 through 11. In all cases the combined mean, mode and values for the “Data group” and the “No Data group” were obtained similarly. The group statistics data are shown in Table 1. The Independent T-test data are depicted in Table 2.

Table 2 Independent T-test

Q	Levene's Test for Equality of Variances			t-test for Equality of Means					
	F	Sig.	t	Df	Sig. 2-tailed	Mean Difference	Std. Error Diff.	95% Conf. Interval of the Difference	
								Lower	Upper
5	.118	.732	-.751	125	.454	-.158	.211	-.576	.259
			-.751	124.522	.454	-.158	.211	-.576	.259
6	.823	.366	-.953	125	.342	-.206	.216	-.633	.221
			-.953	124.991	.342	-.206	.216	-.633	.221
7	2.494	.117	-.317	125	.752	-.061	.191	-.438	.317
			-.316	120.298	.752	-.061	.191	-.439	.318

8	.296	.588	.431	125	.667	.088	.204	-.316	.491
			.431	124.245	.667	.088	.204	-.316	.491
9	.159	.691	.713	125	.477	.144	.203	-.257	.545
			.712	124.339	.478	.144	.203	-.257	.545
10	2.215	.139	.358	121	.721	.057	.160	-.259	.373
			.357	116.717	.722	.057	.160	-.260	.374
11	13.97	.000	1.517	121	.132	.309	.204	-.094	.712
			1.504	105.762	.135	.309	.205	-.098	.716

6. DISCUSSION

Question #5: The overall mode response for this question was *Agree* (4.0). This indicates that the survey population does not wish to enforce a complete alcohol ban on all airline passengers as a whole. Upon conducting the t-test to distinguish the two groups from each other, it was found that the data given group was more in favor of alcohol being served on-board airlines than the no data group. This may indicate that the informed group was more interested in applying restrictions only to individuals performing safety functions while on-board the aircraft.

Question #6: Again, the overall mode for this question was *Agree* (4.0) indicating that the survey population supports the idea of passenger screening. Passenger screening would allow air carrier crew to enforce the existing regulation restricting intoxicated passengers from boarding domestic carriers for flight. The “data” group was more in agreement with a group mean of 3.17 while the “no data” group was not in agreement and had a group mean of 2.97. Information regarding error rates, decreased cognitive ability and performance in the data sheet may have influenced the students to respond more favorably to this statement.

Question #7: The mode response for this question was *Agree* (4.0). This question solicited the highest overall mean score of all the survey questions. The overall mean indicated 3.84 as the average response. Clearly, the majority of the population group is for screening of the exit rows. As predicted, the “data group” means exceeded the “no data” given means (3.87 and 3.81 respectively). More students strongly agreed with this statement after reading the informational data sheet.

Question #8: The mode response for this question was *Agree* (4.0). Both groups had almost identical means approaching 3.4. With or without the data, respondents

agreed that a BAC of 0.04 or more would impair one’s ability to egress from the emergency exit. This result is likely due to the student’s knowledge of regulations for crew regarding BAC levels and performance.

Question #9: The mode response to this question was *Disagree* (2.0). The no data given group was less in agreement with this statement than the data given group. Both groups lean toward disagreement but the group given data sheet leans even greater toward disagreement. The “no data” group had more students that agreed with this statement than the “data” group. It is not entirely clear why this may have occurred. The hypothesis predicted that the “data” group would have had more respondents answer *Agree* or *Strongly Agree* due to the material covered regarding error rates with BAC lower than 0.04.

Question #10: The mode response for this question was *Agree* (4.0). Although both groups individually responded closely to the combined mean of 3.5, the “no data” group agreed more (3.52) while the “data” group was less in agreement (3.47). Both groups answered relatively the same regarding their impression of the overall safety of flight. The data given groups response is, however, slightly less supportive of the statement. This is likely due to the influence of the data sheet that exposes the cognitive impairment and increase in error at significantly lower Blood Alcohol Contents (BAC).

Question #11: The mode response to this question was *Agree* (4.0). This question solicited the highest percentage of *Agree* responses (46%) and the highest *Strongly Agree* responses (22.8%) of all the survey questions. Clearly, regardless of information given, the survey population agrees that flight crew requirements regarding alcohol restriction should be applied to passengers that are expected to perform crew duties during an emergency. Based on the responses for Question #8 regarding a BAC of 0.04 and higher, lower numbers were expected from the “no data” group. This was not the case, however. More students in the “no data” group answered that they strongly agreed to this question than the “data” group. Clearly, another determining factor is at play here that is not being measured directly by the survey tool.

7. CONCLUSION

The additional educational literature, though limited, received by the review of the information sheet by the “data” group does appear to affect, though somewhat slightly, that groups’ opinion regarding consumption of alcohol on air carriers. It was clear that the students disagreed more with its use by all passengers after reviewing the data sheet though both groups responded in agreement with the statement regarding the current alcohol restrictions. With the margin of safety being adequate (Question #10), the group that reviewed the data sheet was less in agreement than the group with no additional information.

Both groups were not convinced that a BAC of 0.04 produces enough impairment to affect one’s level of safety onboard a commercial aircraft. Not a single student strongly disagreed with the statement regarding the need for passengers who would be operating the emergency exit doors to comply with the same regulations covering the flight crew (Question #11). Both student groups answered more in agreement for Question #7 addressing the testing for BAC of passengers occupying the exit row seat.

Clearly, the student population surveyed was supportive of limiting alcohol consumption to passengers sitting in emergency exit rows as well supporting testing those passengers’ BAC levels to verify their eligibility to perform required duties. The results from Question #10 are somewhat paradoxical in that it is difficult to tell whether the information sheet was effective or not. However, it is reasonable to infer from the overall data that when passengers are well informed on the debilitating effect of alcohol and the adverse effect that can have during in-flight emergency, they might be more inclined to submit to screening.

8. REFERENCES

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