



European pilots' perceptions of safety culture in European Aviation

T.W.Reader, A. Parand and B. Kirwan

Future Sky Safety is a Joint Research Programme on Safety, initiated by EREA, the association of European Research Establishments in Aeronautics. The Programme contains two streams of activities: 1) coordination of the safety research programmes of the EREA institutes and 2) collaborative research projects on European safety priorities.

This deliverable is produced by the Project P5: Resolving the Organisational Accident of Future Sky Safety. One of P5's aims is to spread the successful safety culture approach used in Air Traffic Management to other sectors of the Air Transport System, including Airlines. This survey of more than 7000 pilots represents a significant step in this direction.

Programme Manager	Michel Piers, NLR
Operations Manager	Lennaert Speijker, NLR
Project Manager (P5)	Barry Kirwan, EUROCONTROL

Grant Agreement No.	640597
Document Identification	D5.4
Status	Approved
Version	2.0
Classification	Public

Project: Resolving the organizational accident
Reference ID: FSS_P5_LSE_D5.4
Classification: Public



This page is intentionally left blank

Contributing partners

Company	Name
LSE	Tom Reader, Anam Parand
EUROCONTROL	Barry Kirwan

Document Change Log

Version No.	Issue Date	Remarks
1.0	18-11-2016	First formal release
1.1	24-11-2016	Update by NLR (mainly template corrections)
2.0	28-11-2016	Second formal release

Approval status

Prepared by: <i>(name)</i>	Company	Role	Date
Anam Parand	LSE	Principal Analyst	26-08-2016
Checked by: <i>(name)</i>	Company	Role	Date
Tom Reader	LSE	WP5.3 Leader	14-11-2016
Approved by: <i>(name)</i>	Company	Role	Date
Barry Kirwan	EUROCONTROL	Project Manager (P5)	18-11-2016
Lennaert Speijker	NLR	Operations Manager	28-11-2016

Acronyms

Acronym	Definition
ANSP	Air Navigation Service Provider
ATM	Air Traffic Management
CAA	Civil Aviation Authority
EASA	The European Aviation Safety Agency
EU	The European Union
LSE	London School of Economics and Political Science

EXECUTIVE SUMMARY

Problem Area

The aviation industry in Europe has been transformed over recent decades. A combination of global economic changes, changing customer demands, and increases in airlines with alternate business models has made the industry incredibly competitive. In addition, the nature of regulation has changed, with both national and European-wide bodies having a role in industry governance.

Nonetheless, European aviation remains an ultra-safe industry with a highly impressive safety record. Due to the low frequency of accidents and near-misses, and the non-linear relationship between profitability and safety (Madsen 2011), safety culture has become a key indicator for assessing safety practices and susceptibility to safety problems within aviation organisations.

Safety culture refers to the safety-related norms, values, and practices shared by groups managing risk in an organisation (Guldenmund 2000). Within European aviation, safety culture is the cornerstone of an effective safety management system (CAA, 2015), yet within the European aviation industry, there is currently no systematic method or practice of measuring and comparing safety culture amongst pilots.

Description of Work

The aim of this study is to explore perceptions of pilots in Europe on safety culture in their company, and factors that may affect these perceptions. To address this, the project comprised the following three stages.

1. The London School of Economics and Political Science (LSE) adapted a psychometrically established questionnaire tool originally used for measuring safety culture in Air Traffic Management to pilots based in Europe. Items were tailored to ensure relevance to airlines and pertinent safety culture dimensions were added.
2. An electronic version of the survey was predominantly distributed through the European Cockpit Association (ECA) promoting the survey to their member associations via newsletters and social media.
3. Trends and variations in safety culture were compared by different organisational and personal contexts (e.g. type of company worked for, contract type).

Results & Conclusions

A total of 7,239 (14% of the population) commercial pilots in Europe completed the survey. The results show that perceptions of safety culture are generally positive amongst pilots in Europe. However, the survey also reveals significant differences in pilot' assessments of safety culture depending factors such as the type of airlines they work for, or the type of contracts they work to. Pilots working on atypical

contracts, and those working for low cost and cargo airlines, have more negative perceptions of safety culture than their colleagues working under more secure forms of employment and for network carrier airlines. Perceptions of management commitment to safety, staffing and equipment, fatigue and perceived organisational support were not especially positive across the whole sample. For example, over half of the sample of pilots (50.05%) felt that fatigue was not taken seriously within their organisation (while 28.83% neither agreed nor disagreed) and less than 20% agreed that their company cares about their well-being. On the positive side, almost all pilots (93.49%) agreed that their colleagues are committed to safety, 88.45% agreed that they read reports of incidents or occurrences relevant to their work, and the large majority (79.08%) felt prepared to speak to their direct manager if an unsafe situation develops.

Applicability

The report contains important insights for the entire industry, including airlines, regulatory bodies and the European Commission. Several steps are proposed to ensure that the right lessons can be learned from the data, and to maintain the industry's reputation as the safest mode of transport.

TABLE OF CONTENTS

Contributing partners	3
Document Change Log	3
Approval status	3
Acronyms	4
Executive summary	5
Problem Area	5
Description of Work	5
Results & Conclusions	5
Applicability	6
Table of Contents	7
List of Tables	9
List of Figures	11
REPORT SUMMARY	14
Background	15
Method	15
Sample	15
Safety culture results – overview of strengths and weaknesses	17
Safety culture dimensions	21
Safety Culture differences between types of organisation	23
Comparisons of safety culture between companies	25
Comparisons with Air Traffic Management	28
Discussion	29
Conclusions	31
MAIN REPORT	32
1 Introduction	33
1.1. The context	33
1.2. Safety culture: definition and background	33
1.3. Pilot' perceptions of safety culture in the European Aviation industry: the current study	37
1.4. Objectives	37
2 Methods	38
2.1. Safety culture measurement	38

2.2.	Data collection	41
2.3.	Study participants	41
2.4.	Demographic analysis	41
2.5.	Descriptive analysis of survey items	41
2.6.	Group comparisons	43
2.7.	Comparing responses from participants in different airlines	44
3	Results	45
3.1.	Responses	45
3.2.	Demographics	45
3.3.	Reporting item-by-item	56
3.3.1.	Q Section B – Descriptive statistics of all respondents by items in section B of survey	56
3.3.2.	Q Section C – Descriptive statistics of all respondents by items in section C	60
3.3.3.	Q Section D – Descriptive statistics of all respondents by items in section D	63
3.4.	Safety culture dimensions	68
3.4.1.	Dimension Descriptive Statistics & Reliability	68
3.4.2.	Dimension correlations	70
3.4.3.	Between group differences	71
3.4.4.	Correlations	135
3.4.5.	Comparison with ATM (a comparison with published data)	145
4	Discussion and limitations	146
4.1.	Discussion	146
4.2.	Limitations	147
5	Conclusions and recommendations	148
5.1.	Conclusions	148
5.2.	Recommendations	148
6	References	150
7	Appendices	152
7.1.	Appendix 1 Demographic group cross-tabulations	152
7.2.	Appendix 2 Means for dimensions by demographic groups	156
7.3.	Appendix 3 Favourable/Unfavourable Responses by Groups	161

LIST OF TABLES

TABLE 1 PROPORTION OF COMPANY MEAN SCORES BY DIMENSION (FOR COMPANIES WITH =>30 RESPONDENTS)	27
TABLE 2 QUESTIONNAIRE ITEMS & DIMENSIONS	39
TABLE 3 STATISTICAL DEFINITIONS	42
TABLE 4: COMPANY DEMOGRAPHICS.....	45
TABLE 5 PILOTS' COUNTRY BASE.....	47
TABLE 6 NATIONALITY OF RESPONDENTS (EXCLUDES NATIONALITIES THAT MAKE UP LESS THAN 1% OF THE SAMPLE)	50
TABLE 7 PILOT DEMOGRAPHICS	51
TABLE 8 SURVEY SECTION B DESCRIPTIVE DATA	56
TABLE 9 SURVEY SECTION B FAVOURABLE AND UNFAVOURABLE RESPONSES	57
TABLE 10 SURVEY SECTION C DESCRIPTIVE DATA.....	60
TABLE 11 SURVEY SECTION C FAVOURABLE AND UNFAVOURABLE RESPONSES.....	61
TABLE 12 SURVEY SECTION DESCRIPTIVES: PERCEIVED ORGANISATIONAL SUPPORT (N=6893).....	63
TABLE 13 SURVEY SECTION D DESCRIPTIVES: FATIGUE (N=6896).....	64
TABLE 14 SURVEY SECTION D DESCRIPTIVES: SPEAKING-UP (N=6872)	64
TABLE 15 SURVEY SECTION D DESCRIPTIVES: NATIONAL AUTHORITY (N=6841)	64
TABLE 16 SURVEY SECTION D FAVOURABLE AND UNFAVOURABLE RESPONSES	65
TABLE 17 DIMENSION SCALE DESCRIPTIVE STATISTICS AND RELIABILITY	69
TABLE 18 DIMENSION CORRELATIONS.....	70
TABLE 19 MEAN SCORES BY COMPANY TYPE	73
TABLE 20 ANOVA OVERVIEW OF SIGNIFICANT DIFFERENCES BETWEEN GROUPS FOR COMPANY TYPE	74
TABLE 21 MEAN SCORES BY JOB TYPE	88
TABLE 22 ANOVA OVERVIEW OF SIGNIFICANT DIFFERENCES BETWEEN GROUPS FOR JOB TITLE	89
TABLE 23 MEAN SCORES BY MANAGEMENT ROLE	97
TABLE 24 ANOVA OVERVIEW OF SIGNIFICANT DIFFERENCES BETWEEN GROUPS FOR MANAGEMENT ROLE	98
TABLE 25 MEAN SCORES BY TRAINING BACKGROUND	104
TABLE 26 ANOVA OVERVIEW OF SIGNIFICANT DIFFERENCES BETWEEN GROUPS FOR TRAINING BACKGROUND	105
TABLE 27 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY COMPANY ID (FOR COMPANIES WITH =>30 RESPONDENTS)	142
TABLE 28 PERCEPTIONS OF SAFETY CULTURE BY NATIONALITY	143
TABLE 29 PERCEPTIONS OF SAFETY CULTURE BY THE COUNTRY AT WHICH PILOTS ARE BASED.....	144
TABLE 30 CONTRACT TYPE AND AGE	152
TABLE 31 CONTRACT TYPE AND COMPANY TYPE	152
TABLE 32 CONTRACT TYPE AND FLYING EXPERIENCE	153
TABLE 33 CONTRACT TYPE AND TRAINING BACKGROUND	153
TABLE 34 COMPANY TYPE AND TENURE	154
TABLE 35 COMPANY TYPE AND FLYING EXPERIENCE	154
TABLE 36 COMPANY TYPE AND TRAINING BACKGROUND	155

TABLE 37 AGE AND TRAINING BACKGROUND	155
TABLE 38 MEANS FOR DIMENSIONS BY DEMOGRAPHIC GROUPS (JOB TITLE; GENDER; FLYING EXPERIENCE; AGE; TENURE) ...	156
TABLE 39 MEANS FOR DIMENSIONS BY DEMOGRAPHIC GROUPS (COMPANY TYPE; CONTRACT TYPE; PART-TIME OR PART YEAR WORKING; PART-TIMERS AVERAGE PERCENTAGE WORK TIME)	157
TABLE 40 MEANS FOR DIMENSIONS BY DEMOGRAPHIC GROUPS (MANAGEMENT ROLE; TRAINING BACKGROUND)	158
TABLE 41 MEANS FOR DIMENSIONS BY NATIONALITY (FOR NATIONALITIES WITH =>30 RESPONDENTS)	159
TABLE 42 MEANS FOR DIMENSIONS BY COUNTRY BASE (FOR COUNTRIES WITH =>30 RESPONDENTS)	160
TABLE 43 FAVOURABLE/UNFAVOURABLE RESPONSES BY COMPANY TYPE (EXCLUDING OTHER CATEGORY)	161
TABLE 44 FAVOURABLE/UNFAVOURABLE RESPONSES BY CONTRACT TYPE (EXCLUDING OTHER CATEGORY)	168
TABLE 45 FAVOURABLE/UNFAVOURABLE RESPONSES BY TRAINING BACKGROUND (EXCLUDING OTHER CATEGORY)	174

LIST OF FIGURES

FIGURE 1 COMPANY TYPE	16
FIGURE 2 CONTRACT TYPE	16
FIGURE 3 COUNTRY BASE (THIS FIGURE EXCLUDES COUNTRIES THAT MAKE UP LESS THAN 1 % OF THE SAMPLE)	17
FIGURE 4 TOP 5 MOST FAVOURABLE RESPONSES IN SECTION B	18
FIGURE 5 TOP 5 LEAST FAVOURABLE RESPONSES OVERALL IN SECTION B	18
FIGURE 6 TOP 5 MOST FAVOURABLE RESPONSES IN SECTION C	19
FIGURE 7 TOP 5 LEAST FAVOURABLE RESPONSES IN SECTION C	19
FIGURE 8 TOP 5 MOST FAVOURABLE RESPONSES IN SECTION D	20
FIGURE 9 TOP 5 LEAST FAVOURABLE RESPONSES IN SECTION D	20
FIGURE 10 SPIDER GRAPH OF DIMENSION SCALE MEAN SCORES	22
FIGURE 11 MEANS FOR DIMENSIONS BY COMPANY TYPE	23
FIGURE 12 MEANS FOR DIMENSIONS BY CONTRACT TYPE	24
FIGURE 13 MEANS FOR COLLEAGUE COMMITMENT TO SAFETY BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS) ...	25
FIGURE 14 MEANS FOR JUST CULTURE AND REPORTING BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS)	26
FIGURE 15 MEANS FOR STAFF & EQUIPMENT BY COMPANY ID (FOR COMPANIES WITH =>30 RESPONDENTS)	26
FIGURE 16 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY COMPANY ID (FOR COMPANIES WITH =>30 RESPONDENTS)	27
FIGURE 17 COMPARISONS BETWEEN PILOTS AND AIR TRAFFIC CONTROLLERS	28
FIGURE 18 RESPONDENTS PER COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS)	46
FIGURE 19 COMPANY TYPE	47
FIGURE 20 COUNTRY BASE (THIS FIGURE DOES NOT INCLUDE COUNTRIES THAT MAKE UP LESS THAN 1 % OF THE SAMPLE)	48
FIGURE 21 NATIONALITY OF RESPONDENTS (EXCLUDES COUNTRIES THAT MAKE UP LESS THAN 1 % OF THE SAMPLE)	50
FIGURE 22 GENDER	52
FIGURE 23 JOB TITLE	52
FIGURE 24 AGE	53
FIGURE 25 FLYING EXPERIENCE	53
FIGURE 26 MANAGEMENT ROLE	54
FIGURE 27 TENURE IN COMPANY	54
FIGURE 28 CONTRACT TYPE	55
FIGURE 29 TRAINING BACKGROUND	55
FIGURE 30 TOP 5 MOST FAVOURABLE RESPONSES IN SECTION B	58
FIGURE 31 TOP 5 LEAST FAVOURABLE RESPONSES OVERALL IN SECTION B	59
FIGURE 32 TOP 5 MOST FAVOURABLE RESPONSES IN SECTION C	62
FIGURE 33 TOP 5 LEAST FAVOURABLE RESPONSES IN SECTION C	63
FIGURE 34 TOP 5 MOST FAVOURABLE RESPONSES IN SECTION D	66
FIGURE 35 TOP 5 LEAST FAVOURABLE RESPONSES IN SECTION D	67
FIGURE 36 SPIDER GRAPH OF DIMENSION SCALE MEAN SCORES	69

FIGURE 37 MEANS AND ERROR BARS FOR ALL DIMENSIONS BY COMPANY TYPE	72
FIGURE 38 MEANS FOR MANAGEMENT COMMITMENT TO SAFETY BY COMPANY TYPE	75
FIGURE 39 MEANS FOR COLLABORATION & INVOLVEMENT BY COMPANY TYPE	76
FIGURE 40 MEANS FOR JUST CULTURE BY COMPANY TYPE	77
FIGURE 41 MEANS FOR COMMUNICATION & LEARNING BY COMPANY TYPE	78
FIGURE 42 MEANS FOR RISK HANDLING BY COMPANY TYPE	79
FIGURE 43 MEANS FOR COLLEAGUE COMMITMENT BY COMPANY TYPE	80
FIGURE 44 MEANS FOR STAFF & EQUIPMENT BY COMPANY TYPE	81
FIGURE 45 MEANS FOR FATIGUE BY COMPANY TYPE	83
FIGURE 46 MEANS FOR SPEAKING UP BY COMPANY TYPE	84
FIGURE 47 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY COMPANY TYPE	86
FIGURE 48 MEANS AND ERROR BARS FOR ALL DIMENSIONS BY JOB TITLE	87
FIGURE 49 MEANS FOR MANAGEMENT COMMITMENT TO SAFETY BY JOB TITLE	90
FIGURE 50 MEANS FOR COMMUNICATION & LEARNING BY JOB TITLE	91
FIGURE 51 MEANS FOR COLLEAGUE COMMITMENT BY JOB TITLE	92
FIGURE 52 MEANS FOR STAFF & EQUIPMENT BY JOB TITLE	93
FIGURE 53 MEANS FOR FATIGUE BY JOB TITLE.....	94
FIGURE 54 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY JOB TITLE	95
FIGURE 55 MEANS AND ERROR BARS FOR ALL DIMENSIONS BY MANAGEMENT ROLE	96
FIGURE 56 MEANS FOR MANAGEMENT COMMITMENT BY MANAGEMENT ROLE	99
FIGURE 57 MEANS FOR PROCEDURES & TRAINING BY MANAGEMENT ROLE.....	100
FIGURE 58 MEANS FOR FATIGUE BY MANAGEMENT ROLE	101
FIGURE 59 MEANS FOR PROCEDURES & TRAINING BY MANAGEMENT ROLE.....	102
FIGURE 60 MEANS AND ERROR BARS FOR ALL DIMENSIONS BY TRAINING BACKGROUND (OTHER NOT INCLUDED)	103
FIGURE 61 MEANS FOR MANAGEMENT COMMITMENT BY TRAINING BACKGROUND.....	106
FIGURE 62 MEANS FOR COLLABORATION & INVOLVEMENT BY TRAINING BACKGROUND.....	107
FIGURE 63 MEANS FOR JUST CULTURE BY TRAINING BACKGROUND	108
FIGURE 64 MEANS FOR COMMUNICATION & LEARNING BY TRAINING BACKGROUND	109
FIGURE 65 RISK HANDLING BY TRAINING BACKGROUND	110
FIGURE 66 MEANS FOR COLLEAGUE COMMITMENT BY TRAINING BACKGROUND.....	111
FIGURE 67 MEANS FOR STAFF & EQUIPMENT BY TRAINING BACKGROUND.....	112
FIGURE 68 MEANS FOR PROCEDURES & TRAINING BY TRAINING BACKGROUND.....	113
FIGURE 69 MEANS FOR FATIGUE BY TRAINING BACKGROUND	114
FIGURE 70 MEANS FOR SPEAKING UP BY TRAINING BACKGROUND	115
FIGURE 71 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY TRAINING BACKGROUND.....	116
FIGURE 72 MEANS AND ERROR BARS FOR ALL DIMENSIONS BY CONTRACT TYPE (OTHER NOT INCLUDED)	117
FIGURE 73 MEANS FOR MANAGEMENT COMMITMENT BY TYPICAL/ATYPICAL CONTRACT	118
FIGURE 74 MEANS FOR COLLABORATION & INVOLVEMENT BY TYPICAL/ATYPICAL CONTRACT	119
FIGURE 75 MEANS FOR JUST CULTURE BY TYPICAL/ATYPICAL CONTRACT	119

FIGURE 76 MEANS FOR COMMUNICATION & LEARNING BY TYPICAL/ATYPICAL CONTRACT	120
FIGURE 77 MEANS FOR RISK HANDLING BY TYPICAL/ATYPICAL CONTRACT	121
FIGURE 78 MEANS FOR COLLEAGUE COMMITMENT BY TYPICAL/ATYPICAL CONTRACT.....	121
FIGURE 79 MEANS FOR STAFF & EQUIPMENT BY TYPICAL/ATYPICAL CONTRACT.....	122
FIGURE 80 MEANS FOR PROCEDURES & TRAINING BY TYPICAL/ATYPICAL CONTRACT.....	123
FIGURE 81 MEANS FOR FATIGUE BY TYPICAL/ATYPICAL CONTRACT	123
FIGURE 82 MEANS FOR SPEAKING UP BY TYPICAL/ATYPICAL CONTRACT	124
FIGURE 83 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY TYPICAL/ATYPICAL CONTRACT.....	125
FIGURE 84 MEANS AND ERROR BARS FOR ALL DIMENSIONS BY PART-TIME/YEAR & FULL-TIME/YEAR.....	126
FIGURE 85 MEANS FOR MANAGEMENT COMMITMENT BY PART-TIME/YEAR AND FULL TIME.....	127
FIGURE 86 MEANS FOR JUST CULTURE BY PART-TIME/YEAR AND FULL TIME	128
FIGURE 87 MEANS FOR COMMUNICATION & LEARNING BY PART-TIME/YEAR AND FULL TIME	129
FIGURE 88 MEANS FOR COLLEAGUE COMMITMENT BY PART-TIME/YEAR AND FULL TIME	130
FIGURE 89 MEANS FOR STAFF & EQUIPMENT BY PART-TIME/YEAR AND FULL TIME	131
FIGURE 90 MEANS FOR FATIGUE BY PART-TIME/YEAR AND FULL TIME	132
FIGURE 91 MEANS FOR SPEAKING UP BY PART-TIME/YEAR AND FULL TIME	133
FIGURE 92 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY PART-TIME/YEAR AND FULL TIME	134
FIGURE 93 MEANS FOR MANAGEMENT COMMITMENT TO SAFETY BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS)	136
FIGURE 94 MEANS FOR COLLABORATION AND INVOLVEMENT BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS) ...	137
FIGURE 95 MEANS FOR JUST CULTURE AND REPORTING BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS)	137
FIGURE 96 MEANS FOR COMMUNICATION AND LEARNING BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS).....	138
FIGURE 97 MEANS FOR RISK HANDLING BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS).....	138
FIGURE 98 MEANS FOR COLLEAGUE COMMITMENT TO SAFETY BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS) .	139
FIGURE 99 MEANS FOR STAFF & EQUIPMENT BY COMPANY ID (FOR COMPANIES WITH =>30 RESPONDENTS)	139
FIGURE 100 MEANS FOR PROCEDURES AND TRAINING (FOR COMPANIES WITH =>30 RESPONDENTS)	140
FIGURE 101 MEANS FOR FATIGUE (FOR COMPANIES WITH =>30 RESPONDENTS)	140
FIGURE 102 MEANS FOR SPEAKING UP (FOR COMPANIES WITH =>30 RESPONDENTS)	141
FIGURE 103 MEANS FOR PERCEIVED ORGANISATIONAL SUPPORT BY COMPANY (FOR COMPANIES WITH =>30 RESPONDENTS)	141
FIGURE 104 COMPARISON T-TEST BETWEEN PILOTS AND ATM	145

Project: Resolving the organizational accident
Reference ID: FSS_P5_LSE_D5.4
Classification: Public



REPORT SUMMARY

Background

Safety culture refers to the safety-related norms, values, and practices shared by groups managing risk in an organisation (Guldenmund 2000). Within European aviation, safety culture is the cornerstone of an effective safety management system (CAA 2015), yet a modest body of research has focussed on measuring and comparing safety culture as perceived by pilots. To address this, the current study tailored the EUROCONTROL safety culture survey (used for air traffic control organisations) to pilots. This is a survey that has been psychometrically validated in the European Air Traffic Management industry, and used to measure and benchmark safety culture in over 25 countries, with over 20,000 respondents. The survey was administered to pilots working in the European aviation industry. The main purpose was to:

- i. Evaluate pilot observations on organisational safety culture within the European aviation industry
- ii. Identify areas where the industry is strong, alongside areas for improvement
- iii. Compare the experiences of pilots in different sectors, organisations, and personal contexts.

Method

An electronic safety culture survey was developed by the London School of Economics and Political Science (LSE) to pilots working within European aviation. The survey was primarily distributed through the European Cockpit Association (ECA) promoting the survey to their member associations via newsletters and social media.

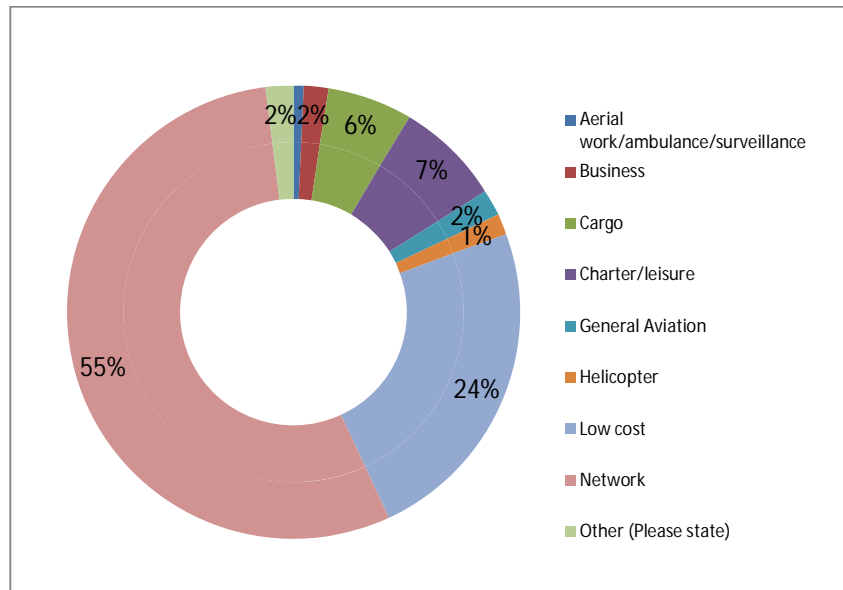
Sample

In total, **7,239 valid responses were received**, which is roughly equivalent to 14% of commercial pilots working in Europe and is statistically representative for the European pilot population (with a 95% confidence level). It should be noted that this high number of respondents makes this the largest safety culture survey of pilots to date in Europe and is a credit to European pilots' commitment to safety.

Most participants were male (96%), aged between 31-50 (62%), with considerable flying experience (44% had greater than 10,000 flight hours and 29% over 5001 flight hours). There was a near equal distribution of Captains (56%) to First Officers (43%), with Second Officers constituting 1%. Most pilots (88%) did not have a managerial role and were trained either through self-funded modular training (42%) or via an airline funded cadetship (24%). Almost half (48%) of the pilots had been in their company for 11 or more years, only 4% had been in the company for less than a year.

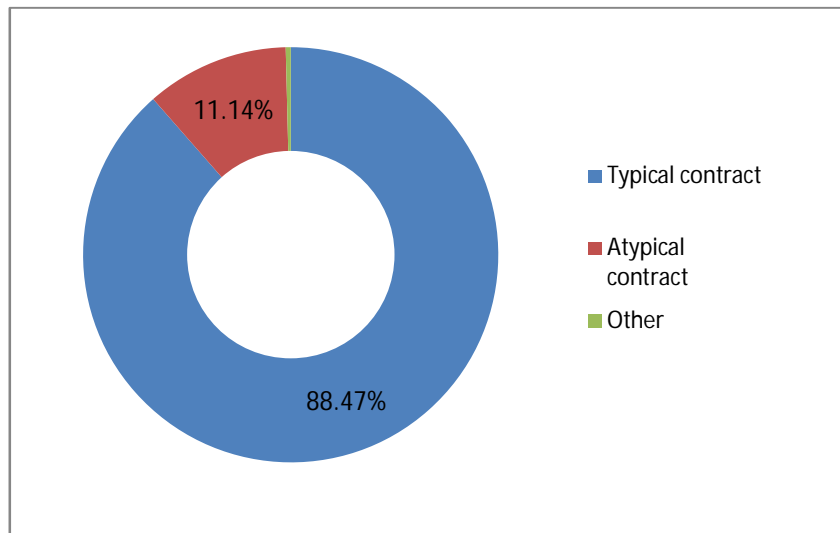
The number of responses greatly varied between the 33 companies. As can be seen in Figure 1, over half of the sample (55%) worked for a Network (e.g. flag/legacy) carrier and almost a quarter (24%) for a Low Cost airline.

Figure 1 Company type



As can be seen in Figure 2, the large majority of pilots (88.47%) had a typical (permanent) contract.

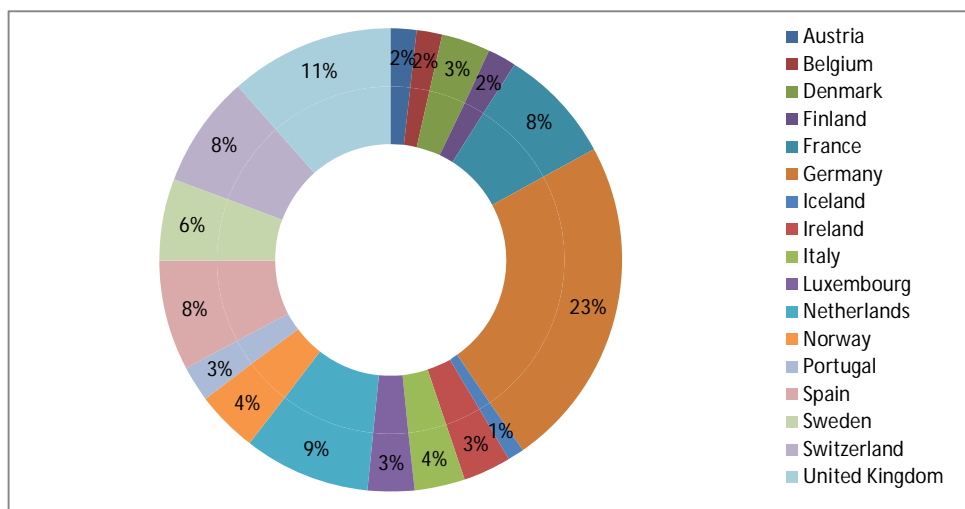
Figure 2 Contract type



Typical contract = permanent contract; Atypical contract = Self-employed, Zero hours, Fixed-term, and Pay-to-Fly contracts.

The figure below demonstrates the countries from which pilots are based. Germany had the most responses (23%). The pilots’ nationalities largely matched the countries where people are based, with some expected divergence.

Figure 3 Country base (This figure excludes countries that make up less than 1 % of the sample)



Safety culture results – overview of strengths and weaknesses

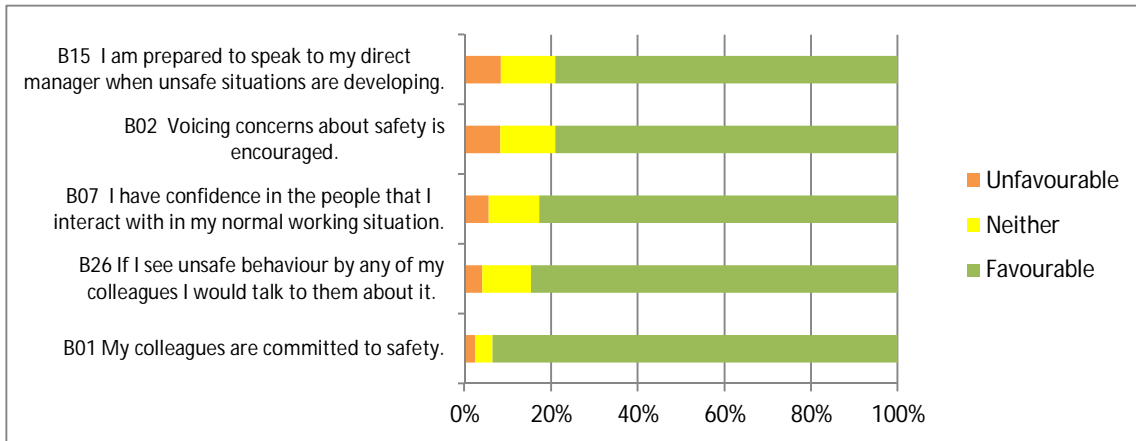
In terms of overall responses to the survey items (including demographic questions), the following observations can be made. On a scale of 1-5 (with 1 being a highly negative response, and 5 being a highly positive response), the mean average response to all survey items (n=58) was **3.49**, and the average standard deviation was .99 (indicating large variation). For the majority of items (59%), response means were above 3.5. For 36%, the response means were between 2.5 and 3.5. For 5% of items, response means were below 2.5. **This indicates that, overall, participants tended to respond to survey items in a positive fashion, however there is clear room for improvement, with some groups of pilots showing negative perceptions of safety culture (e.g. those on atypical contracts) and some survey items/dimensions were responded to in a consistently negative fashion (e.g. fatigue).**

In terms of response patterns to individual items, it is useful to focus on whether participants gave a 'favourable' or 'unfavourable' response to an item within each survey section¹.

Section B of the survey presented relatively general questions on how pilots perceived safety culture in their organization. In terms of response patterns, pilots responded most favourably to the items '*B01 My colleagues are committed to safety*' (94% favourable response). It is also noticeable that pilots felt they could speak to their manager if an unsafe situation developed (79%), and that they were encouraged to voice concerns on safety (79%). The five most favourable responses in section B are reported below. In this graph, green represents a favourable response, yellow a neutral or 'not really sure' response, and orange an unfavourable response.

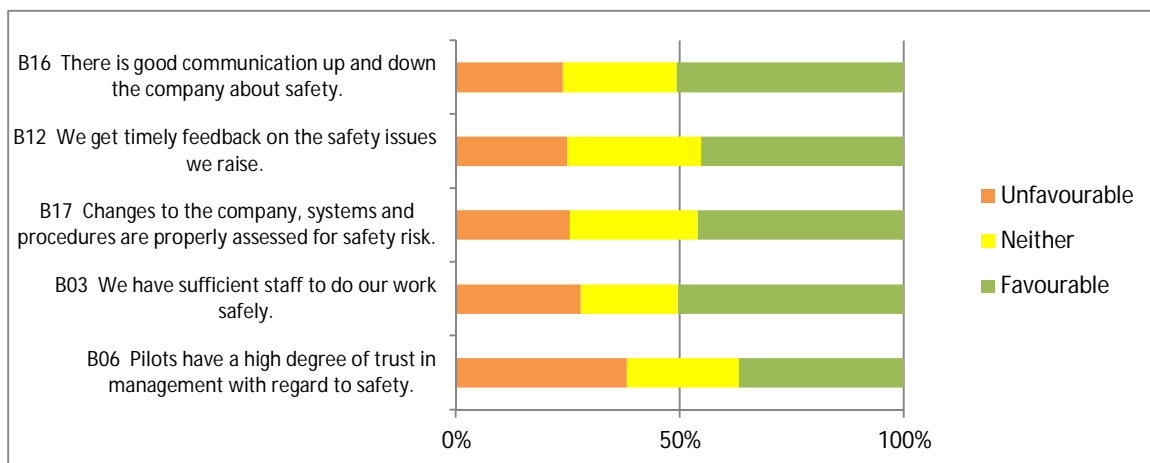
¹ Reverse (negatively) worded items were amended so that the green bar is always a positive answer.

Figure 4 Top 5 most favourable responses in section B



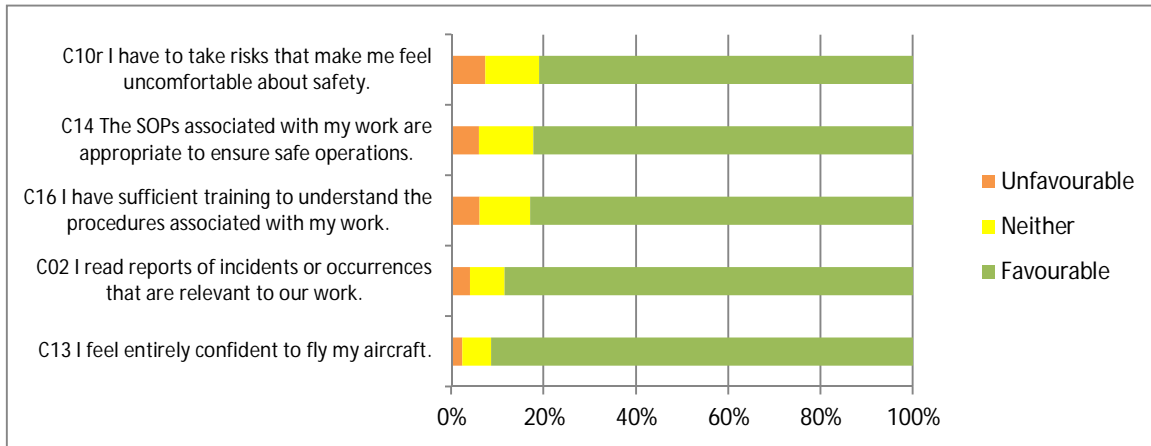
In section B, pilots responded least favourably to the items 'B06 Pilots have a high degree of trust in management with regard to safety' (38% unfavourable). Concerns were also expressed on the *sufficiency of staff to work safely* (28% unfavourable). The five least favourable responses in section B are shown below.

Figure 5 Top 5 least favourable responses overall in section B



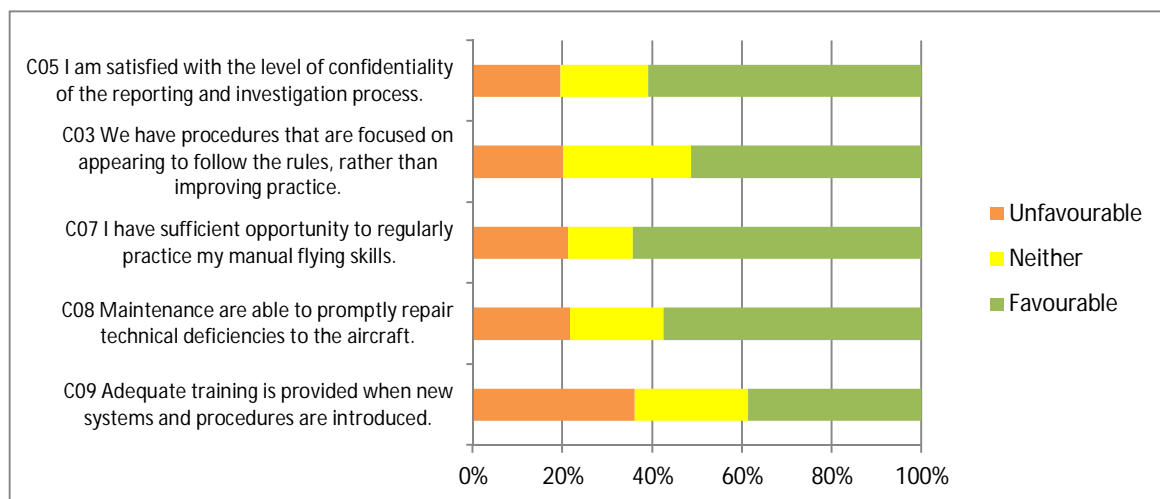
For section C, which refers to safety culture on the more operational aspects of being a pilot, the most favourable item was 'C13 I feel entirely confident to fly my aircraft' (91.47% favourable). In addition, 82% felt *SOPs were appropriate for supporting safe operations*, and 81% *did not feel they had to take risks that made them feel uncomfortable about safety*.

Figure 6 Top 5 most favourable responses in Section C



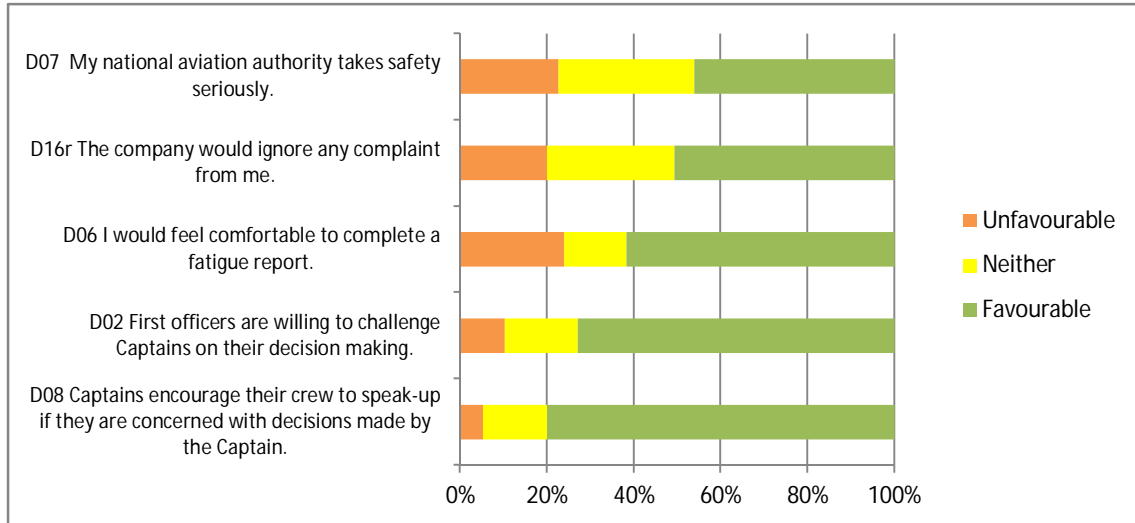
In section C, pilots responded least favourably to the items ‘C09 Adequate training is provided when new systems and procedures are introduced’ (38% unfavourable). Concerns were also expressed on *whether maintenance are able to promptly repair technical deficiencies to aircraft* (21%), and *opportunities for pilots to regularly practice manual flying skills* (21%).

Figure 7 Top 5 least favourable responses in Section C



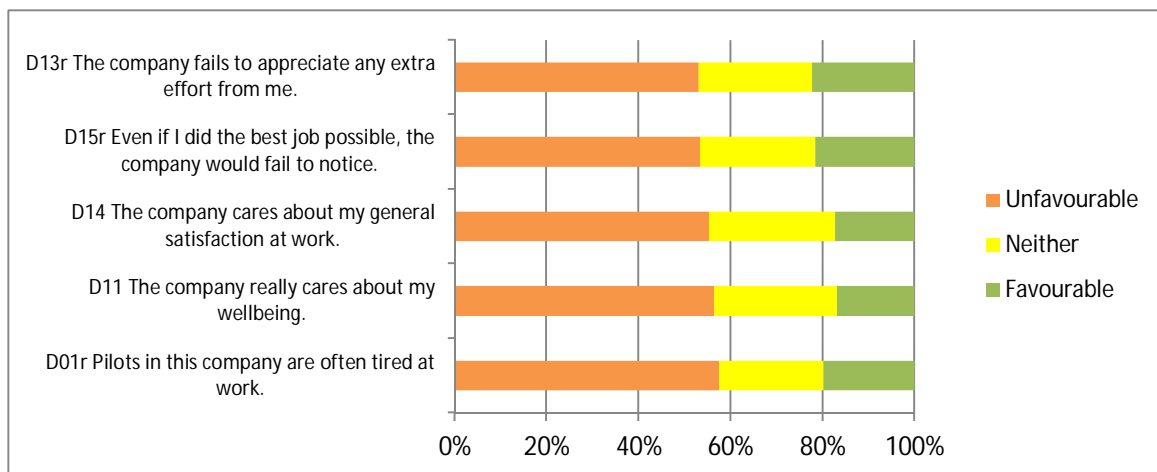
Section D refers to questions on the working life of pilots more generally and how much they feel supported by their organisation. Here, the most favourable response was to the item ‘D08 Captains encourage their crew to speak-up if they are concerned with decisions made by the Captain’ (80% favourable response). It is notable that only 46% agreed that *their national aviation authority takes safety seriously*.

Figure 8 Top 5 most favourable responses in section D



The least favourable response in section D related to 'D01r Pilots in this company are often tired at work' (58% unfavourable). This means that over half of respondents thought that pilots in their company are often tired at work. The graph below also highlights that many pilots do not feel cared for by their organisation (e.g. D11).

Figure 9 Top 5 least favourable responses in section D



Safety culture dimensions

Safety culture is a complex concept, with surveys consisting of multiple items referring to various issues. One of the best ways to make survey results more meaningful and manageable is to break the survey down into its underlying dimensions. The method used in the EUROCONTROL survey is to focus on eight dimensions that together comprise safety culture. These are listed below, along with three dimensions (the last three) which were added to tailor the survey for pilots:

- Management Commitment to Safety
- Collaboration & Involvement
- Just Culture & Reporting
- Communication & Learning
- Colleague Commitment to Safety
- Risk Handling
- Staff and Equipment
- Procedures & Training
- Fatigue
- Speaking up about safety (in the cockpit)
- Perceived Organisational support

To calculate the mean scores on different dimensions of safety culture, groups of survey items were aggregated together (with a mean score being generated) according to the safety culture 'dimension' they related to. This allows for analysis of the safety culture (rather than responses to a single survey item), and for meaningful between-group comparisons to be made. Safety culture assessments often attempt to ascertain whether responses to a dimension are favourable. Although there is no definitive rule for doing this the following interpretation is used here.

If the mean score of a dimension is **under 2.5**, this is considered to be of concern as it indicates most participants responded negatively to an item (thus indicating urgent action should be taken for improvement). If a dimension mean score is between **2.5 to 3.5**, this is open to interpretation as it indicates either conflicting viewpoints, or neutrality, or uncertainty (e.g. participants indicating they '*Neither Agree Nor Disagree*' to safety survey items). Nevertheless, from a safety standpoint, improvement action should also be considered here, especially given the wide variations around the mean values obtained in this survey. A dimension mean score **above 3.5** is generally considered positive, as it indicates most participants responded positively to a survey item. At this level, opportunities for improvement may still be sought, especially where they would support other more negatively rated dimensions,

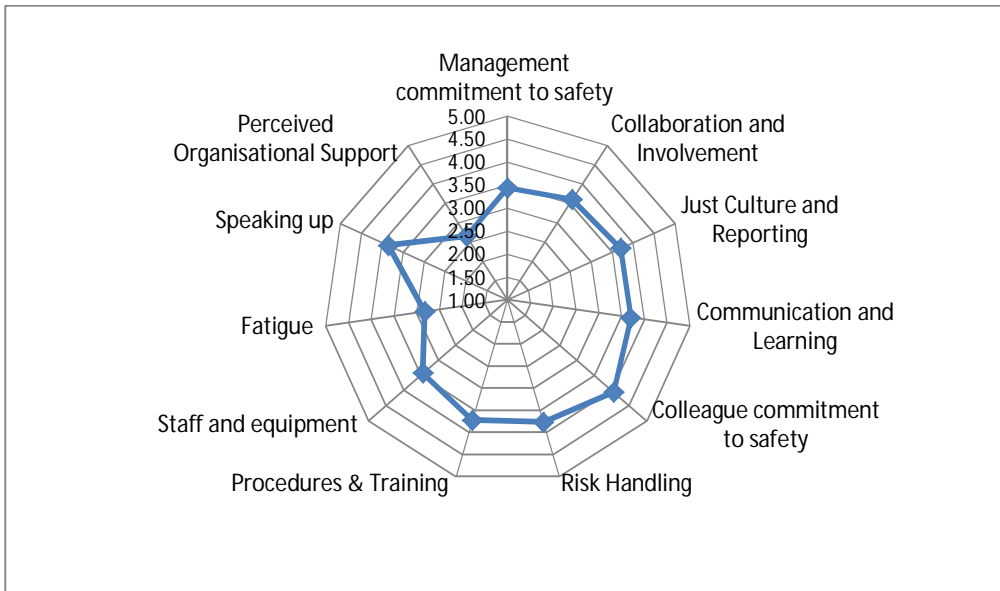
The list in Box 1 and Figure 10 below reports the mean scores for the eleven dimensions included in the survey. It can be seen that the majority of dimension mean scores are above 3.5, indicating an overall positive response from across the sample. Using this approach, the safety culture dimensions can be ranked as follows from positive (green) to neutral/uncertain (blue) to negative (red). Given the varying

standard deviations (i.e. variations of respondents' ratings) around the mean values used below, this merely presents a useful snapshot overview on where things appear satisfactory, where action may be needed, and where there is room for improvement:

Box 1 Safety Culture Dimension Mean Scores

- | | |
|-----|-----------------------------------------|
| 1. | Colleague commitment to safety (4.06) |
| 2. | Speaking up (3.85) |
| 3. | Risk Handling (3.77) |
| 4. | Procedures & Training (3.73) |
| 5. | Just culture and Reporting (3.71) |
| 6. | Communication and Learning (3.71) |
| 7. | Collaboration and Involvement (3.60) |
| 8. | Management commitment to safety (3.44) |
| 9. | Staff and equipment (3.44) |
| 10. | Fatigue (2.82) |
| 11. | Perceived Organisational Support (2.65) |

Figure 10 Spider graph of dimension scale mean scores

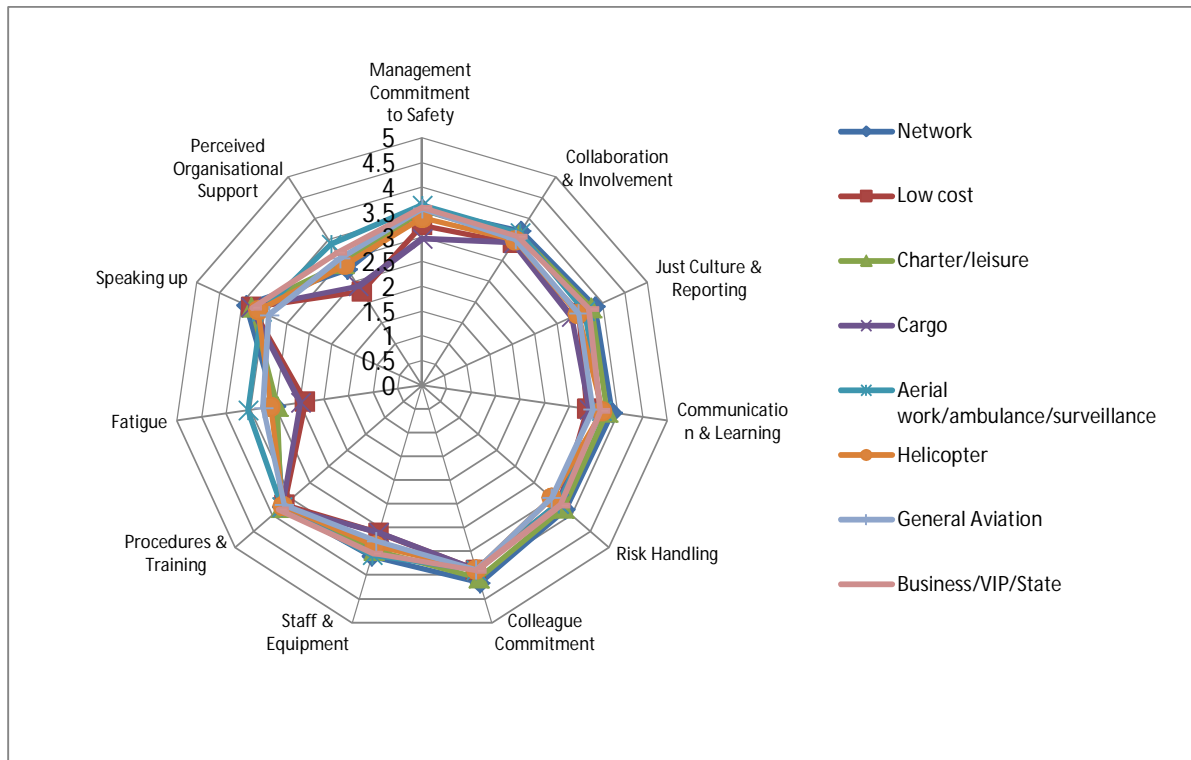


Safety Culture differences between types of organisation

To examine whether pilot responses to the safety culture dimensions were related to the type of organisation worked for or contract type, a number of comparisons were made. There were significant differences ($p < .001$) between pilots working in different types of organisations for ten of the safety culture dimensions. **The common pattern was for safety culture amongst pilots at Low Cost and Cargo airlines to be lower than those at other organisations (e.g. network airlines), see Figure 11.**

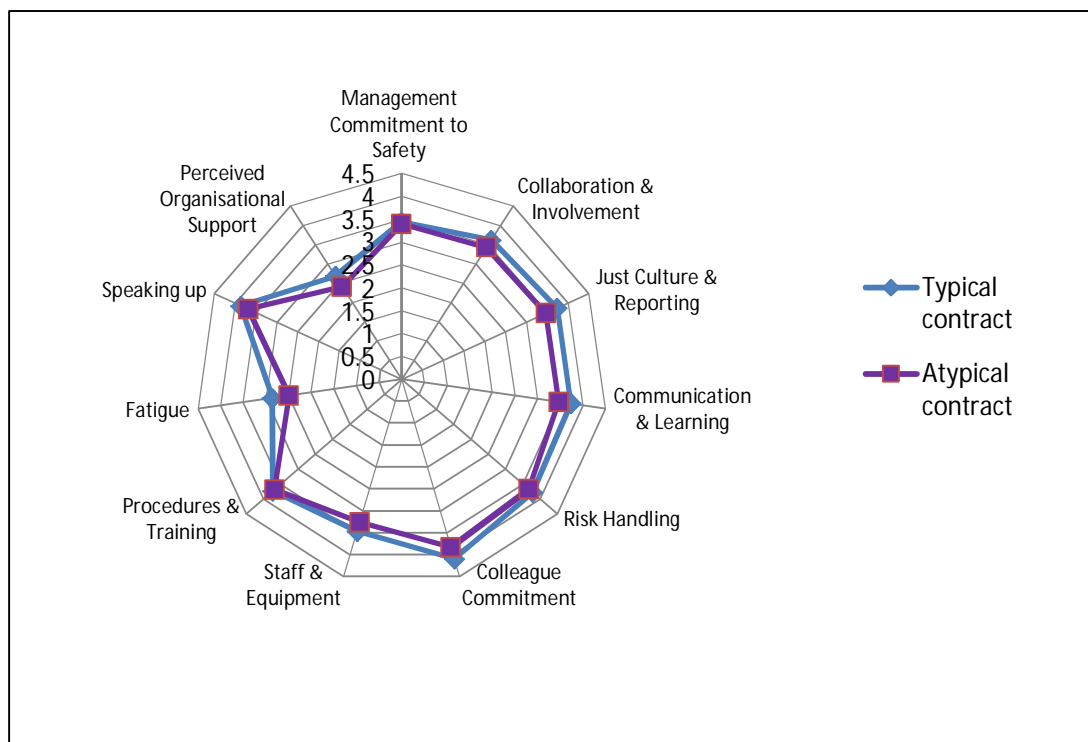
For example, the following statistically significant differences were found: Cargo companies (mean=2.96) reported significantly lower Management Commitment scores than almost all other company types (General Aviation (mean=3.57), Business/VIP/State (mean=3.59), Charter/Leisure (mean=3.54), Low cost (mean=3.23), Network (mean=3.56) at the .001 level of significance. In addition, Low cost reported significantly lower Management Commitment scores than Network and Charter/Leisure.

Figure 11 Means for Dimensions by Company type



In terms of contract type, there were significant differences ($p < .001$) between those on different contracts for all but two (Management Commitment to Safety and Procedures and Training) safety culture dimensions. **The tendency was for pilots with atypical contracts (e.g. zero hours) to view safety culture less positively than those on typical contracts (i.e. permanent contracts),** (see Figure 12). For example, pilots on a permanent contract had significantly more positive perceptions of fatigue (mean=2.86) in comparison to those on atypical (mean=2.49) contracts.²

Figure 12 Means for Dimensions by Contract type



² There is a large difference between the number of pilots on typical (n=6394) and atypical (n=805) contracts.

Comparisons of safety culture between companies³

To further examine the variations in safety culture amongst pilots, we explored whether pilots working at different companies had diverging perceptions of safety culture. It was found that for some safety culture dimensions, scores across companies were relatively similar, and positive. However for others, scores were divergent and heterogeneous. Four dimensions are illustrated below. Please note, companies are anonymised, and company numbers do not map onto a single company. To support interpretation, the two lines on the graph indicate where means are either ≤ 2.5 or ≥ 3.5 .

The figure below reports on Colleague Commitment to Safety, which was positive for most companies. It can be seen that the most positive company mean is 4.48 and the lowest company mean at 3.39. Overall, 94% of companies had a mean score above 3.5.

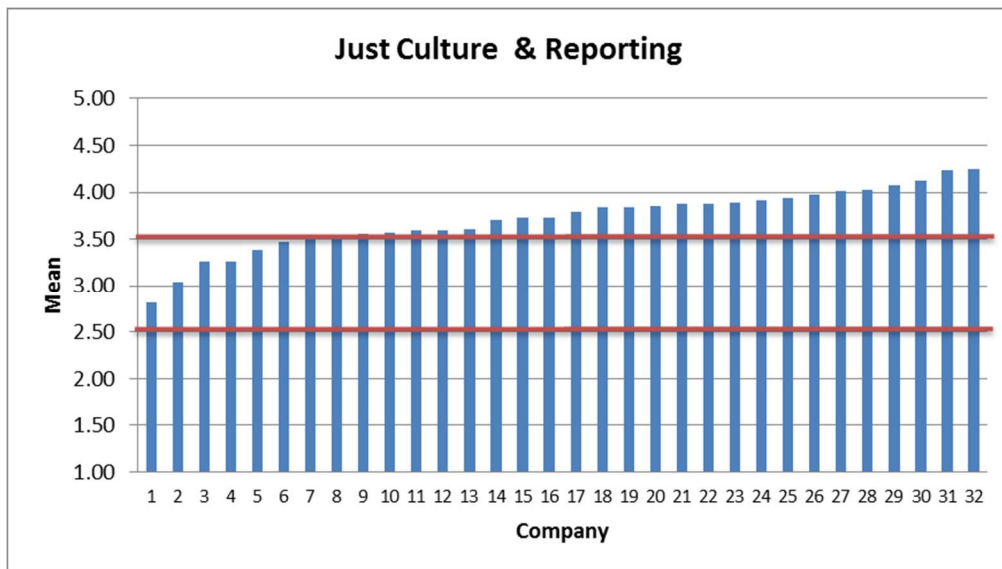
Figure 13 Means for Colleague Commitment to Safety by company (for companies with ≥ 30 respondents)



³ At the outset of this survey it was decided not to identify individual airline companies, as these were not directly sampled, and thus response rates cannot be ascertained.

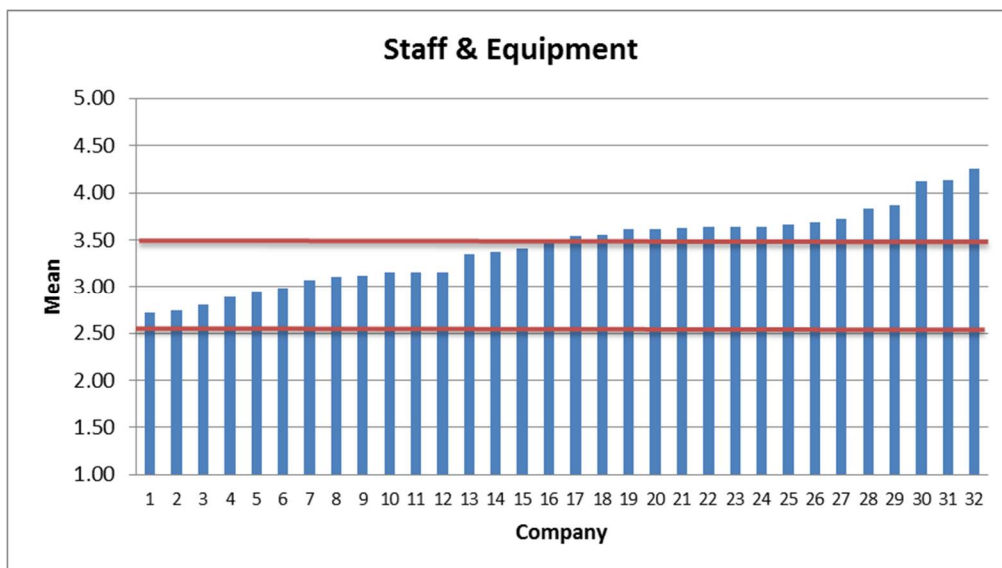
The figure below reports on Just Culture and Reporting, which varies for respondents from different companies. It can be seen that 81% of company mean scores were above 3.5, and the range was 2.81 to 4.24.

Figure 14 Means for Just Culture and Reporting by company (for companies with =>30 respondents)



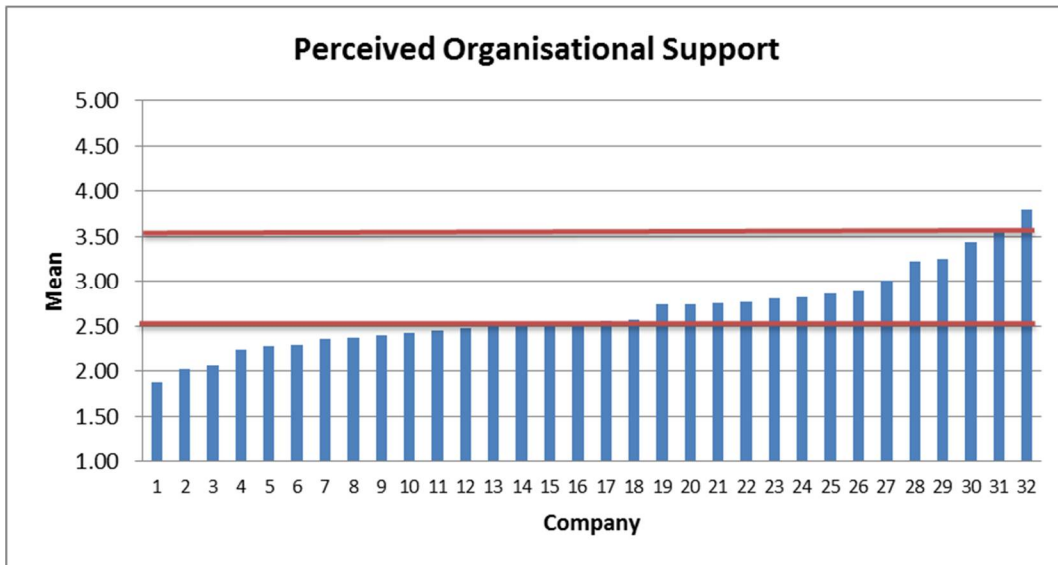
The figure below reports on Staff and Equipment, which varies for respondents from different companies. The most positive mean is 4.26 and the lowest 2.72. Overall, 50% of companies had a mean score above 3.5.

Figure 15 Means for Staff & Equipment by company ID (for companies with =>30 respondents)



The figure below reports Perceived Organisational Support, which is quite low for most respondents from different companies. Forty percent of company mean scores were below 2.5, and the range was 1.88 to 3.80.

Figure 16 Means for Perceived Organisational Support by company ID (for companies with =>30 respondents)



The table below reports on the proportion of companies, by safety culture dimension, with mean scores of 2.5 or lower, between 2.5 and 3.5, and 3.5 or above.

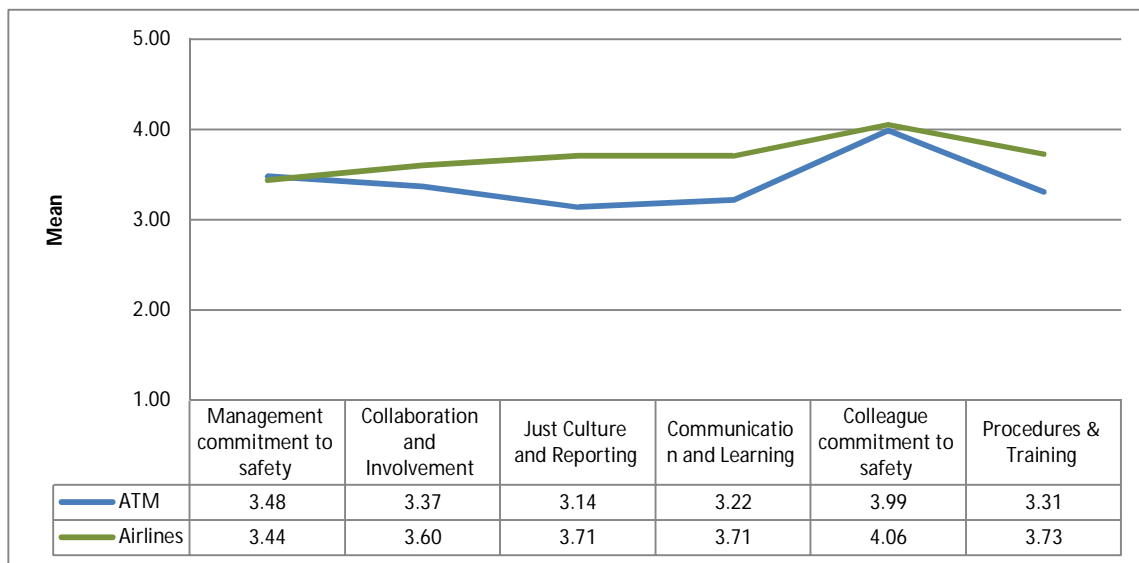
Table 1 Proportion of company mean scores by dimension (for companies with =>30 respondents)

Safety Culture Dimension	% of companies with a mean score of <=2.5	% of companies with a mean score of >2.5 to <3.5	% of companies with a mean score of >=3.5
Management commitment to safety	3	50	47
Collaboration and Involvement	0	38	62
Just Culture and Reporting	0	19	81
Communication and Learning	0	25	75
Risk Handling	0	16	84
Colleague commitment to safety	0	6	94
Staff and equipment	0	50	50
Procedures & Training	0	9	91
Fatigue	25	69	6
Speaking up	0	22	78
Perceived Organisational Support	41	53	6

Comparisons with Air Traffic Management

The figure below reports on comparisons of safety culture mean scores between air traffic controllers and pilots. It utilised previously published data using the EUROCONTROL safety culture survey, with over 5000 controllers, from 17 countries, for six dimensions common to the survey with European pilots (Reader, Noort et al. 2015). As can be seen below, the data from pilots is broadly equivalent to ATM.

Figure 17 Comparisons between pilots and air traffic controllers



Discussion

According to the UK Civil Aviation Authority, a positive safety culture is the foundation of an effective safety management system (CAA 2015). In this study, we measured perceptions of safety culture amongst 7,239 pilots working in Europe. This is equivalent to approximately 14% of the population, and one of the largest ever safety culture studies of pilots working in commercial aviation.

This survey has a sufficient number of responses to enable an overview of safety culture amongst European pilots from across the different nations in Europe and different companies and types of airline.

The one area that is missing from this survey is the follow-up workshops used in other industries (e.g. Air Traffic Management) as part of the full safety culture process, which enable deeper analysis and diagnosis of the reasons underlying the responses. Nevertheless, this is the first time such a pan-European survey has been attempted, and the results paint a coherent picture of the strengths and weaknesses of safety culture amongst pilots in Europe.

The independent authors of this report also consider the results to not be skewed towards a particular group or viewpoint. A wide and diverse sample of pilots completed the survey. There are no extremes, and when averaged, the results are generally positive. This survey has not been used therefore as a 'grievance' survey, and the responses are well-balanced, and represent the views of a substantial sample of pilots working in European aviation.

How is European pilot safety culture, overall?

On balance, perceptions of safety culture amongst pilots working in Europe were favourable. For the majority of items (59%) responses to the survey were above 3.5 (indicating mostly positive perceptions). For 41% of items, scores were below 3.5, indicating mixed or negative perceptions. Furthermore, in terms of safety culture dimensions, the mean scores of 7 dimensions were above 3.5. Four dimensions were between 2.5 and 3.5. This indicates that whilst safety culture is generally perceived positively by pilots, attention is required, and action in several key areas is warranted.

Where is safety culture strong, and where is there room for improvement?

In terms of safety culture dimensions, pilots tend to have concerns over the issues of fatigue management, management commitment to safety, staff and equipment, and perceived organisational support. At an individual survey item level, concerns focussed on trust in management with regard to safety, receiving feedback on safety issues, training, national aviation authorities, and pilots being tired at work. More positively, the vast majority of pilots felt their colleagues were committed to safety, that voicing concerns on safety was encouraged, and that they do not need to take risks that make them feel uncomfortable about safety.

Two areas stand out from the others, namely perceived organisational support and fatigue. This latter dimension refers to the workforce feeling tired and to how fatigue is managed by the company, and human factors research has systematically shown how fatigue has the potential to impact upon operational safety in many industries. Perceived organisational support is a relative newcomer to safety

culture, as researchers have indicated links between this and safety practices (Reader, Mearns et al. 2016). The implication is that where a workforce feels unsupported and unsatisfied with their organization, they feel the organization is not committed to safety, does not recognise the pressures they face, and does not value their contributions to safety. This was particularly the case for pilots on atypical contracts, of whom 39% were aged 30 or under.

Analysis revealed the extent to which pilots who had positive or negative perceptions of safety culture was related to the type of company they worked for (e.g. Cargo, Low Cost, Network Carrier), and their contract with that company (e.g. typical or atypical). **In general, those at Low Cost and Cargo companies, and on atypical contracts tended to view safety culture least positively.** It is important to recognise that the large majority of pilots who responded to the survey were on typical contracts (88.47%). Nonetheless, it is a finding that needs to be considered carefully in light of the fact that more of these types of contracts and business models may be used in the future as competition increases.

The findings additionally showed considerable variation for certain safety culture dimensions between pilots working at different companies. This indicates that safety practices at aviation companies differ, leading to differential beliefs on issues such as the extent to which management is committed to safety, as well as resourcing issues (staffing and equipment). However, because this survey comprises varying samples by company (e.g. we cannot ascertain response rates by company, or verify responses), data relating to individual companies must be interpreted with caution. Lastly, for the dimensions where safety culture was comparable between ATM and pilots, safety culture amongst pilots was generally similar.

What are the next steps?

The industry and its constituents, from the airlines to the regulators, as well as the European Commission, need to consider the results in this report. Overall the news is positive, but there are significant concerns that should be considered. Four ways forward are suggested:

1. One is to convene a series of workshops with pilots, managers and decision makers, to discuss the results and what is beneath them, i.e. what is driving these results, and what could be changed that would bolster safety culture yet still enable European aviation to remain competitive. Such workshops would need representation from Low Cost and Cargo airlines, as well as companies and staff utilising atypical contracts.
2. The results of the survey indicate that pilots across the industry are concerned with fatigue management. Over half did not believe their company takes fatigue seriously. This needs to be addressed by actions undertaken jointly with regulators, airlines and representative bodies, to educate managers and pilots about the potential safety implications and also the necessity to improve this cultural dimension.
3. Given the different perception of safety culture according to the type of contracts under which pilots work, the regulatory authorities should consider how to take this factor into account to

ensure the continued safety of operations. The results from this survey raise questions about the potential impact on safety culture of atypical contracts.

4. On a more strategic level, commercial aviation, as is done in other safety critical industries (e.g. ATM, Oil and Gas), needs to begin systematically measuring and exploring safety culture in commercial aviation companies. The data indicates quite wide variations in perceptions of safety culture according to company, and this might be explored further. For example, within the Future Sky Safety programme of work, several airlines are already embarking on specific safety culture studies. This approach allows the management of such companies, as well as other staff besides pilots, to have their say. If this is achieved, learning on safety culture (e.g. sharing best practices amongst organisations) can begin to occur across European airlines as it already occurs for Air Traffic organisations.

Conclusions

This is the first major independent survey of the safety culture of European pilots, achieving a return rate of more than 7000 pilots. The results show that pilot perceptions of safety culture are generally positive. However, the survey also reveals significant differences in assessment of safety culture depending on factors such as the type of airlines pilots work for, or the type of contract they work to. Pilots working on atypical contracts and those working for low cost and cargo airlines have more negative perceptions of safety culture than their colleagues working under more secure forms of employment and for network carrier airlines. Perceptions of management commitment to safety, staffing and equipment, fatigue and perceived organisational support were not especially positive across the whole sample.

Aviation has the reputation of being the safest mode of transport, and indeed other modes of transport (rail, road and sea) look to the industry to learn how to do safety better. This survey represents a significant learning opportunity for the aviation industry, to reflect on why it is safe, and also where it needs to address certain issues to ensure that it continues to remain safe in the future.

Project: Resolving the organizational accident
Reference ID: FSS_P5_LSE_D5.4
Classification: Public



MAIN REPORT

1 INTRODUCTION

1.1. The context

The aviation industry in Europe has been transformed over recent decades. A combination of global economic changes, changing customer demands, and increases in airlines with alternate business models (Jorens, Gillis et al. 2015) has made the industry incredibly competitive. In addition, the nature of regulation has changed, with both national and European-wide bodies having a role in industry governance.

Nonetheless, European aviation remains an ultra-safe industry. The European Aviation Safety Agency (EASA) report that in European Commercial Aviation, an average of 1.3 accidents (with 64.2 fatalities) has occurred per year since 2005 (EASA 2016). To put this into context, there can be approximately 30,000 flights in European Airspace on a typical summer day, and over 800 million passengers travel per year in the European Union alone. Overall, there are fewer than 0.5 fatal accidents per million flight departures in Europe. In terms of non-fatal accidents, there have been on average 24 non-fatal accidents and 75.8 serious incidents per year since 2005 (EASA 2016). These figures have remained relatively stable, and compare favourably to the rest of the world. This highly impressive safety record can be explained by many factors, for example: technology and airframes, automation, standardisation, safety protocols, regulation, air crew training, working directives, the external environment and the traditionally strong commitment to safety from aviation professionals. Arguably most important has been an industry-wide culture of safety, which has led to and sustained the above efforts to minimise and avoid threats to safety. Indeed, due to the low frequency of accidents and near-misses, and the non-linear relationship between profitability and safety (Madsen 2011), *safety culture* has become a key indicator for assessing safety practices and susceptibility to safety problems within aviation organisations.

Yet, within the European aviation industry, there is currently no systematic method or practice of measuring and comparing safety culture amongst pilots. The current report applies a psychometrically established tool for measuring safety culture in the aviation industry (in air traffic management) to a sample of pilots working in Europe.

1.2. Safety culture: definition and background

Safety culture is a sub-facet of organisational culture (Reason 1997, Clarke 1999, Cooper 2000). It is made up of safety-related norms (or basic assumptions), values, and practices shared by groups (Guldenmund 2000). Simply, it comprises of how people feel (psychological aspects), what they do (behavioural aspects) and how the organisation operates (situational aspects) in relation to safety (Cooper 2000). The concept rose to prominence after the Chernobyl nuclear disaster where it became apparent that the organisation's poor safety culture contributed to the preventable tragedy (International Atomic Energy Agency 1986). Discussions on safety culture often refer to the topic of safety climate, with the terms being used interchangeably. This reflects a long-standing, if not terribly useful, debate on the differences between the two (Zohar 1980). Most commonly, safety climate is considered to be a temporary snapshot of the

current safety culture made up of perceptions and feelings (likened to mood), while safety culture is more stable (and compared to personality) and relevant to group activities and organisational histories (Cox and Flin 1998). Safety climate focuses on managerial prioritisation of safety (Zohar 2010), and culture the safety-related values and practices that more widely permeate the organisation (Reader, Noort et al. 2015). In this study, we focus on the topics covered by safety climate (management commitment to safety), and also a range of enduring practices that are reflect of safety culture (e.g. incident reporting practices, relationships, cooperation with colleagues). Thus, our focus is on safety culture, with the concepts measured within safety climate being subsumed within this theoretical framework.

Safety culture research is common across most high-risk industries. For example, construction (Chinda and Mohamed 2008), offshore environments (Cox and Cheyne 2000), healthcare (Halligan and Zecevic 2011), nuclear power (Lee and Harrison 2000), aviation (O'Connor, O'Dea et al. 2011), air traffic management (Mearns, Kirwan et al. 2013), shipping (Havold 2005), and rail (Clarke 1998). Many methods exist to measure safety culture (e.g. interviews, focus groups, observations), however surveys are most often used (Huber 1991, Reason 1997, Conchie, Donald et al. 2006). Surveys typically involve organisational members responding to questionnaire items that relate to a number of 'latent dimensions': for example the commitment of management to safety, incident reporting practices, fatigue, the support given by an organisation (e.g., resources) to improve safety, communication on safety (Reader, Noort et al. 2015).

Where responses to such dimensions are assessed as shared and positive across an organisation, safety culture is conceptualized as 'strong', and to be a positive indicator of safety. Conversely, negative, opposite or fragmented perceptions tend to indicate a 'weak' safety culture, where responders view safety-related values and practices within the organisation (e.g. on attitudes and behaviours for working when sick or fatigued) as problematic.

Research shows that organisations with a poor safety culture are more prone to accidents, while those with a strong safety culture are more resilient (Clarke 2006). However, this finding has not been demonstrated in the aviation industry, primarily due to very low rate of incident occurrence (e.g. compared to healthcare). Nonetheless, safety culture measurement has become widely used method to gather insight on (e.g. strengths, weaknesses, areas for improvement) the safety practices of employees and managers and organisational safety management strategies.

Safety culture in the aviation industry

Safety culture is a concept deeply embedded within the aviation industry (e.g. airlines, manufacturers, air traffic control). This is due to the recognition that threats to safety will always exist, and that where they manifest they have the potential to be catastrophic (Gill and Shergill 2004). In particular, safety culture issues have been established as a major causal factor in aviation accidents (Aarons 2011), and as a consequence organisations have developed advanced safety management systems. These are "a proactive and integrated approach to managing safety including the necessary organisational structures, accountabilities, policies and procedures" (CAA 2015). Safety management systems comprise of safety policy and objectives, safety risk management, safety assurance, and safety promotion: they are most

effective when “built on a foundation of a positive safety culture” (CAA, 2015, p4). Thus, various tools for measuring safety culture exist across the aviation industry: in Air Traffic Control (Mearns, Kirwan et al. 2013), aircraft maintenance (McDonald, Corrigan et al. 2000, Kim and Song 2016), ground handling (Ek and Akselsson 2007), and for cabin crews (Kao, Stewart et al. 2009). Indeed, due to the high standards established for managing safety in the aviation industry, it has become a model upon which safety management strategies are emulated in other sectors (Kapur, Parand et al. 2016).

In terms of safety culture amongst pilots, relatively few academic studies have focussed on this cohort. A review of 23 studies has shown that most safety culture studies have pertained to military flight crews, and only three on commercial pilots (O’Connor, O’Dea et al. 2011). For example, Evans et al (2007) examined safety climate in Australia. Their survey focussed on the dimensions of ‘Management commitment to safety’, ‘Safety training’, and ‘Equipment and maintenance’ (Evans, Glendon et al. 2007). A survey of 904 pilots found no significant differences between pilots from different company types (e.g. charter, aerial and public transport pilots), and suggested that this was due to the strong professional culture amongst pilots superseding organisational culture (Evans, Glendon et al. 2007), although pilot-specific response patterns were not reported. Research by Gibbons (2006) tested a five-factor model (focussing upon organisational commitment, management involvement, pilot empowerment, reporting systems, and accountability systems) safety culture amongst 503 pilots in a large US airline. Again, pilot response patterns were not reported. Also developing a safety culture metric, Gill and Shergil found that, amongst 172 pilots in New Zealand, ‘pilots’ perceive luck and safety to be the most important factor in aviation safety. However, pilot specific patterns were not reported

A more recent study of an Asia-Pacific Airline with a sample of 417 pilots found the overall safety culture of the airline to be ‘healthy’, with respondents providing positive feedback in issues such as the safety reporting system and company philosophy (Gao, Bruce et al. 2013). More junior staff and those with shorter tenure in the airline were more positive about safety culture, perhaps due to having been less exposed to safety problems. Research using the safety attitudes questionnaire has shown, amongst 163 crews working, that perceptions of safety culture within a single airline can vary considerably (e.g. on management commitment to safety), and that these relate to behaviours in the cockpit (Sexton, Klinect et al. 2001).

In terms of other parts of the aviation industry, a small set research has focussed upon engineers and maintenance crews. For example, showing maintenance engineers to highly value the implementation of safety policies and procedures (in comparison to other staff groups) (Gill et al., 2004), the paradoxical pressures on safety and economic interests experienced by aircraft maintenance staff (Atak and Kingma 2011), that aircraft technicians can have a relatively homogeneous professional sub-culture spanning different organisations (McDonald, Corrigan et al. 2000), and that ground handling staff tend to have quite positive perceptions of safety culture, although less so than estimated by managers (Ek and Akselsson 2007). In Europe, research with pilots has shown that pilots are increasingly working to new and less stable employment contracts, with the implications for safety being unclear⁴.

⁴Jorens, Y., Gillis, D., Valcke, L., & De Coninck, J. ‘Atypical Forms of Employment in the Aviation Sector’, European

Arguably, in comparison to other domains of aviation, the amount of safety culture research that has been conducted with pilots is quite modest. For example, the air traffic management industry (ATM). This is one of the safest components of civil aviation industry, with Air Navigation Service Providers (ANSPs) operating in a single interconnected industry to manage air traffic. ATM performance is based upon having a safe and reliable system, as when mishaps occur (e.g. the Überlingen mid-air collision in 2002) they can be catastrophic. Thus, a strong safety culture (e.g. for incident reporting, learning from near-events, resource management, safety communication, collaboration) is a crucial part of safety management in the ATM industry.

To this end, EUROCONTROL (European Organisation for the safety of air navigation) has instituted a pan-European approach to safety culture measurement in ATM. In partnership with the University of Aberdeen (2006-2011) and the London School of Economics (2012-present), a psychometrically tested measurement tool has been developed for measuring safety culture in European ATM. The survey tool is part of a wide toolkit (e.g. focus groups, observations) that is used to measure safety culture in European ANSPs (e.g. with controllers, engineers, managers). These data are used to monitor for potential problems in an ANSP's safety culture (e.g. comparing data to industry norms), to identify strengths and opportunities for improvement, and to evaluate the impact of organisational change (e.g. over time).

To date, over 25 ANSPs have participated in the programme (with some being surveyed multiple times), with data being gathered from over 20,000 respondents. The programme has received very positive recognition from the ATM sector (as evidence by changes in industry practices and conferences on safety culture) and scientific community, and is currently one of the largest safety culture programmes in the world. In terms of academic safety culture research, the work has shown that i) safety culture can be reliably measured across different countries, ii) ANSPs vary considerably in their safety culture, with factors such as national environments explaining this, iii) management and controllers can develop quite divergent beliefs around safety culture in an ANSP, and iv) safety culture can be meaningfully benchmarked and used to stimulate inter-organisational learning across the industry in Europe.

Yet, at present there is no such programme within any other part of the aviation industry. In particular, there has been relatively little focus on pilots, which is surprising given the inspiration the airline industry has given to other domains in terms of safety management (Kapur, Parand et al. 2016). This study applies the safety culture survey methodology used in ATM to pilots working in the European airline industry.

1.3. Pilot' perceptions of safety culture in the European Aviation industry: the current study

Research within the airline industry indicates the lack of i) a systematic and widespread approach to measuring perceptions of safety culture amongst pilots in the civil aviation industry, ii) a previously validated model for measuring safety culture amongst pilots working internationally, iii) norm data for how individual pilots view safety culture, iv) norm data safety culture in different airlines, and v) a methodology for learning and using safety culture data to improve safety management systems.

To begin this process with pilots, we applied and adapted the well-established safety culture measurement tool used in European ATM to pilots working European civilian aviation. This was to facilitate i) evaluations of pilot observations on organisational safety culture within the European aviation industry, ii) identification of areas where the industry is strong and has opportunity for improvement, iii) comparisons between the experiences of pilots in different sectors, organisations, and personal contexts, iv) the assessment of upward or downward trends in safety culture, v) evaluations between airline pilots and other parts of the industry (e.g. ATM) in order to gather a more holistic picture of safety culture in European aviation, and vi) the establishment of associations between organisational safety culture data and actual safety data.

The current study is the first European-wide safety culture survey of pilots working in the civil aviation industry. It is funded by the European Commission as part of the 'Future Sky Safety' initiative, and was supported by the European Cockpit Association (the representative body of European pilots at European Union (EU) level).

1.4. Objectives

The study aim is to explore perceptions of European pilots on their company safety culture and factors that may affect these perceptions. Specifically, the report intends to:

1. Apply a safety culture measurement tool used in the ATM industry to pilots working in European civil aviation
2. Profile, at the questionnaire-item and dimension level, broad safety culture trends amongst pilots in the European aviation industry
3. Inspect whether there are variations in safety culture according to the characteristics of pilots (e.g. type of company worked for, contract type)
4. Examine whether there are variations in safety culture amongst the companies at which pilots report working
5. Reflect on safety culture data collected from pilots in relation to data collected in Air Traffic Management

2 METHODS

2.1. Safety culture measurement

The study utilised the EUROCONTROL safety culture survey, which has been used extensively and psychometrically validated in European Air Traffic Management. The questionnaire is part of a larger toolkit that is used to measure, understand, and improve safety culture in ATM. The purpose is to measure staff (e.g. operational, management, engineers) assessments and beliefs on safety culture within their Air Navigation Service Provider (ANSP). The survey items underlying the tool were developed through a literature review and qualitative investigation (interviews, focus groups, incident analyses). Data from the survey is used to structure workshops and interviews on safety culture (e.g. to understand specific safety problems), and a prototype version of the questionnaire was tested in four ANSPs in 2008. A larger investigation, with 17 ANSPs and data from nearly 6500 participants was used to establish a measurement model for assessing safety culture across Europe.

For the current study, we adapted the EUROCONTROL safety culture survey to ensure it was relevant for commercial pilots working in European Aviation (Mearns, Kirwan et al. 2013). The process, with the support of the European Cockpit Association, involved consulting a steering group of senior pilots working within a number of airlines. The questionnaire was amended through a series of iterations (e.g. adapting items relating to work in ATM to pilots), with each question being reviewed, amended where appropriate, and tested with a small sample of respondents. In order to address pilot-specific issues, some additional questions were added to the survey. This involved an entirely new demographics section relevant for pilots (e.g. whether they were a pilot or co-pilot), items on fatigue, speaking up and perceived-organisational support, and two additional independent items ('*When I am unwell, I do not go into work.*' and '*My national aviation authority takes safety seriously*'). The focus on this emerged from the (recognised within the industry) importance of fatigue as a factor impacting upon the safe operations of pilots, and the importance of organisations creating an environment where pilots feel supported and are able to raise personal and performance related issues. In addition, item phrasing was amended for the survey audience (e.g. "*people in the organisation*" to "*pilots in this company*").

The final survey comprised a total of 58 items covering eight safety culture dimensions: *collaboration & involvement; just culture & reporting; communication & learning; risk handling; colleague commitment to safety; staff & equipment; procedures & training; and management commitment to safety*. A three-item *fatigue* management scale, a two-item *speaking up* scale and a validated eight-item *perceived organisational support* scale (Eisenberger, Hungtington et al. 1986), along with 14 demographic questions. These are: *nationality; country based in; gender; age; company name; company type; contract type; job title; management role; tenure; training background; flying experience; and aircraft type*. In addition, there were 3 independent items (e.g. '*Safety is taken seriously in this company*').

The questionnaire was predominantly split by general questions about safety culture (Section B in the questionnaire), more specific questions linked to operational safety (Section C) and by questions on the working life of pilots more generally and how much they feel supported by their organisation (Section D).

The full set of study items are reported in the table below.

Table 2 Questionnaire items & dimensions

<p>DEMOGRAPHICS</p> <ul style="list-style-type: none"> ➤ What country are you based in? ➤ What is your nationality? ➤ What is your gender? ➤ What is your age? ➤ What company do you mainly fly for? ➤ What type of company do you work for? ➤ What type of contract do you have? ➤ Do you work part-time or part-year in your current company? ➤ (If PT) What percentage of time do you work, on average? ➤ What is your job title? ➤ Do you have a management role? ➤ How long have you been working in your company? ➤ What is your flying experience? ➤ Please indicate where you first learned to fly as a professional pilot? ➤ What aircraft type do you currently fly?
<p>MANAGEMENT COMMITMENT TO SAFETY</p> <ul style="list-style-type: none"> ➤ My direct manager is committed to safety. ➤ My direct manager takes action on the safety issues we raise. ➤ My direct manager would always support me if I had a concern about safety. ➤ Pilots have a high degree of trust in management with regard to safety.
<p>COLLABORATION & INVOLVEMENT</p> <ul style="list-style-type: none"> ➤ Maintenance are able to promptly repair technical deficiencies to the aircraft. ➤ Good communication exists between Flight Operations and Engineering/Maintenance to ensure safety. ➤ My involvement in safety activities is sufficient. ➤ There are people who I do not want to work with because of their negative attitude to safety. (R) ➤ Pilots who raise safety issues are seen as troublemakers. (R) ➤ Other people in this company understand how my job contributes to safety.
<p>JUST CULTURE & REPORTING</p> <ul style="list-style-type: none"> ➤ Pilots who report safety-related occurrences are treated in a just and fair manner. ➤ Voicing concerns about safety is encouraged. ➤ We get timely feedback on the safety issues we raise. ➤ I am satisfied with the level of confidentiality of the reporting and investigation process. ➤ I am prepared to speak to my direct manager when unsafe situations are developing. ➤ A staff member who regularly takes unacceptable risks would be disciplined or corrected in this company.
<p>COMMUNICATION & LEARNING</p> <ul style="list-style-type: none"> ➤ Information about safety-related changes within this company is clearly communicated to staff. ➤ We learn lessons from safety related incident or occurrence investigations. ➤ I have good access to information regarding safety incidents or occurrences within the company. ➤ There is good communication up and down the company about safety.

<ul style="list-style-type: none"> ➤ I read reports of incidents or occurrences that are relevant to our work. ➤ People in this company share safety related information.
<p>RISK HANDLING</p> <ul style="list-style-type: none"> ➤ Changes to the company, systems and procedures are properly assessed for safety risk. ➤ We often have to deviate from procedures. (R) ➤ I have to take risks that make me feel uncomfortable about safety. (R)
<p>COLLEAGUE COMMITMENT TO SAFETY</p> <ul style="list-style-type: none"> ➤ My colleagues are committed to safety. ➤ I have confidence in the people that I interact with in my normal working situation. ➤ Everyone I work with in this company feels that safety is their personal responsibility.
<p>STAFF & EQUIPMENT</p> <ul style="list-style-type: none"> ➤ We have sufficient staff to do our work safely. ➤ We have the equipment needed to do our work safely. ➤ We have sufficient practical support from our safety manager/department.
<p>PROCEDURES & TRAINING</p> <ul style="list-style-type: none"> ➤ I have sufficient opportunity to regularly practice my manual flying skills. ➤ I feel entirely comfortable to fly my aircraft. ➤ Adequate training is provided when new systems and procedures are introduced. ➤ I have sufficient training to understand the procedures associated with my work. ➤ We have procedures that are politically or legally focused rather than safety or practical focused. ➤ The SOPs associated with my work are appropriate to ensure safe operations
<p>INDEPENDENT ITEMS</p> <ul style="list-style-type: none"> ➤ Safety is taken seriously in this company. ➤ When I am unwell, I do not go to work. ➤ My national aviation authority takes safety seriously.
<p>FATIGUE</p> <ul style="list-style-type: none"> ➤ Pilots in this company are often tired at work. (R) ➤ I would feel comfortable to complete a fatigue report. ➤ The issue of fatigue is taken seriously by this company.
<p>SPEAKING-UP IN THE COCKPIT</p> <ul style="list-style-type: none"> ➤ First officers are willing to challenge Captains on their decision making ➤ Captains encourage their crew to speak-up if they are concerned with decisions made
<p>PERCEIVED ORGANISATIONAL SUPPORT</p> <ul style="list-style-type: none"> ➤ The organization values my contribution to its well-being. ➤ The organization fails to appreciate any extra effort from me. (R) ➤ The organization would ignore any complaint from me. (R) ➤ The organization really cares about my well-being. ➤ Even if I did the best job possible, the organization would fail to notice. (R) ➤ The organization cares about my general satisfaction at work. ➤ The organization shows very little concern for my well-being. (R) ➤ The organization takes pride in my accomplishments at work.
<p>PSYCHOLOGICAL CONTRACT</p> <ul style="list-style-type: none"> ➤ I feel this company reciprocates the effort put in by its pilots

(R)=Reverse (negatively) worded item

2.2. Data collection

The survey was electronic, and managed through the 'Qualtrics' survey platform. It was distributed via an online link between January 18th and March 8th 2016. In total, the European Cockpit Association represents 38,000 pilots in 37 states (and is an umbrella organisation for national associations), and the aim of the study was to reach as many of these pilots as possible. Active pilots working in a range of industries (e.g. passenger, cargo, helicopter) were targeted. The European Cockpit Association promoted the survey to their member associations through newsletters and on social media. Twitter and targeted face-book adverts presented the survey to wider audiences.

2.3. Study participants

There were a total of 7,239 valid responses included in the study and subsequent analyses. This is after removal of surveys that did not meet a number of criteria for detecting non-meaningful or fraudulent entries (e.g. partial completion, completion time, lack of sensitivity to negatively worded items, and a number of other criteria). Within these 7,239 responses there were still missing responses (e.g. to a single item). These are responses missing completely at random. We handled these missing variables using pairwise deletion. This means that we identify that these responses are missing and we remove them from the case, but include all other responses from the respondent with the missing data. Similarly for tests of difference (ANOVAs) we excluded cases 'analysis by analysis'.

2.4. Demographic analysis

To profile our sample, the demographic data was analysed in a number of ways. First, text responses were recoded into categories. For example, company names which were entered manually were anonymised into letters (e.g. Company A, Company B). Answers written in the 'Other' response category (e.g. for training background) were either recoded into existing categories (e.g. military) or a new category (e.g. National flight school - state funded). Second, we then computed the total number of responses of each group. This involved calculating the raw number of respondents within each group, and the proportion of the sample they covered. Third, demographic groups were cross-tabulated. In particular, age and contract type, company type and contract type, company type and tenure, company type and flying experience, contract type and flying experience, age and training background, and company type and training background.

2.5. Descriptive analysis of survey items

Using the software package SPSS, we checked the normal distribution of survey items. We then ran descriptive statistics comprising frequencies, means, ranges and standard deviations (SD) for all items in the survey. Please see

Table 3 for an explanation of these terms.

Table 3 Statistical definitions

N (valid): The number of participants who provided a rating for the item.

N (missing): The number of participants who did not provide a rating for the item.

Mean score: This score indicates the general level of agreement for the whole sample, where: 1 = strongly disagree, 2 = disagree, 3 = neither, 4 = agree, 5 = strongly agree.

Reverse scored items (R): These are rescored items of statements that were worded negatively. For example, a response of 'disagree' to these items is a positive response for safety culture.

Standard deviation (SD): This indicates the spread of responses and differences from the mean scores. A large standard deviation indicates a large variation between individuals' responses on the scale. A small standard deviation indicates low variation and higher agreement amongst individuals. Smaller standard variations reveal that more people agree with one another and allow for more accurate interpretations of the data.

Range: This refers to the difference between the highest and smallest values. It indicates spread of the scores.

Min & Max: Shows the minimum and maximum scores from the scale. The agreement scale used is between 1 to 5, from strongly disagree (1) to strongly agree (5).

P value: The p value refers to the probability that any observed difference between groups is due to chance. We have set the significance level at a very strict level of 0.1%, $P < .001$ (the standard p value is usually set at $P = 0.05$, 5%). The reasons for the stricter significance level is because of the large size of this study sample, which is more likely to present more significant results.

Effect size: Effect sizes reveal the size of the difference between groups. We calculated the effect sizes for ANOVAs and T tests using Cohen's d, which considers effect sizes of 0.2 to be small, 0.5 to be medium and 0.8 to be large (Cohen 1992). Where we have many significant differences, we have presented effect sizes to show how where we have stronger (higher) or weaker (lower) differences between the means. A low score indicates that the differences are significantly different but not largely different.

T tests: A T test is a statistical test of difference between two groups.

ANOVA: An Analysis of Variance (ANOVA) is a statistical test of difference for more than two groups. Post hoc tests (e.g. Games-Howell and Sheffe reveal which groups have significant differences or not)

Pearson's/Spearman's rho Correlations: Pearson's Correlations is a statistical test that shows the relationship between two variables. A positive correlation shows that both variables increase, while a negative correlation is when one variable increases and the other decreases. A perfectly linear positive correlation would be +1 and a perfectly linear negative correlation would be -1. Therefore, anything above .7 is considered to be a good correlation. Correlations between dimensions are performed through Pearson's test and for ordinal (i.e. categories in an order, e.g. Age) demographic groups through Spearman's rho Tests.

Cronbach's alpha: Cronbach's alpha is a test of a dimension's internal reliability (i.e. how well do the items appear to be measuring the same thing). The higher the alpha (i.e. the closer to 1), the more reliable the measure. We consider alphas above .6 to show an acceptable reliability of the dimension.

Calculating safety culture dimensions

To generate overall dimension scores, the scores of each item that related to a dimension was added up and divided by the number of items in that dimension to create a mean score and standard deviation. We then checked inter-item reliability with Cronbach's alpha to see whether responses to the items under the dimension heading are consistent with one another (indicating they are measuring the same construct). Please see Table 2 for questionnaire items grouped by dimensions, and Table 17 for dimension inter-item reliability scores.

We did not include the item *'good communication exists between pilots and air traffic control to ensure safety'* under the Communication & Learning dimension because this item may be more indicative of problems outside of the airline. Similarly, we did not include the item *'I feel fully supported by my company if I report unfit to fly'* in the Perceived Organisational Support scale, as it was an additional item generated for this survey only. The individual results for these items can be found in the descriptive data. The survey dimensions are included in Table 2. For each dimension, the overall mean score was calculated. Group comparisons were then made.

2.6. Group comparisons

We used T Tests and One-Way Analysis of Variance (ANOVAs) to check statistically for significant differences on each safety culture dimension between the following groups: The type of company worked for; job role (Captain, First Officer, Second Officer); Contract type; Managerial responsibilities; Flying experience; Gender; Age; Country base; Nationality; Company.

Where there were more than two groups, we used ANOVAs. Otherwise T Tests were used. If we were testing one independent variable at a time, we used a One-Way ANOVA. If two independent variables were tested together, we used a Two-Way ANOVA. In this report, we only focus on significant differences between groups, and these are illustrated with Spider Diagrams.

Due to the large and unequal sample size of different groups, the variances of the response patterns by different groups were examined in order to assess which comparative statistic was most appropriate for comparing the respondent groups. To do this, we checked the homogeneity of variance using a Levene's test, and the following strategy was applied. If the Levene's test was not significant, thereby indicating equal variances, we proceeded with interpretation of the ANOVA table with post-hoc Scheffé tests (Scheffé is used when there are mostly samples of unequal sizes). If the Levene's test was significant, indicating unequal variances, we used Welch and Brown-Forsyth tests, which are more conservative tests of difference and used Games-Howell to examine post-hoc comparisons. This approach has been recommended by expert statisticians (Field 2013)

An additional check where equal variance assumptions were violated was also undertaken. This involved running the non-parametric test, Kruskal-Wallis, to compare results. Where there was a non-significant result in the non-parametric test, we report this finding.

Finally, we use a stringent significance level of $p > 0.001$. This reduces the chances of Type 1 errors, i.e. the likelihood of rejecting the null hypothesis when it is true. This reduces the likelihood of finding significant differences.

For country, nationality and company ID, we applied a threshold cut-off point of ≥ 30 respondents per group. This allowed for inclusion in all statistical tests (i.e. ANOVAs will not present output tables if there are groups with a value of 1) and for the results to be representative by group.

For all ANOVAs, the assumptions of normality were not satisfied for the dependent dimension variables tested, with skew results all greater than 1 and a Shapiro-Wilk test presenting a significant p value of $p < .000$. However, the sample is large enough that parametric tests are appropriate and ANOVAs are not very sensitive to moderate deviations from normality; studies with non-normal distributions found the false positive rate is not affected very much (Glass et al. 1972).

In order to test how meaningful the significant differences between two groups are, we calculated the effect sizes for ANOVAs and T-tests using Cohen's d, which considers effect sizes of 0.2 to be small, 0.5 to be medium and 0.8 to be large (Cohen 1992).

Correlations between dimensions are performed through Pearson's tests and for ordinal demographic groups through Spearman's Rho Tests. Only the significant differences are described.

2.7. Comparing responses from participants in different airlines

Finally, we examined the response patterns from survey respondents working in different commercial airlines. Where more than 30 respondents reported working for a single airline, we aggregated those responses together to generate an airline score, and compared scores. This data is anonymised (i.e. we do not report any airline name within the report), and must be caveated. Specifically, our survey did not sample any airlines directly, meaning that any data collected from pilots working in a given airline is not necessarily reflective of the organisation as a whole (i.e. many pilots will not have responded to the survey). In addition, we cannot ascertain for definite whether pilots do work for the airlines they report working for. Rather, our interest is in whether responses from pilots in some airlines differ significantly from those in others – i.e. to what extent is the 'safety cultures' perceived by respondents working in different airlines homogenous or heterogeneous? Homogeneity would indicate, broadly, pilots working in commercial European aviation to have a 'shared' safety culture, regardless of where they work. Heterogeneity would indicate pilot beliefs about safety culture are driven by practices specific to airlines, which vary from the perspective of pilots.

3 RESULTS

3.1. Responses

We received a total of 7,239 valid responses (14% population response rate).

3.2. Demographics

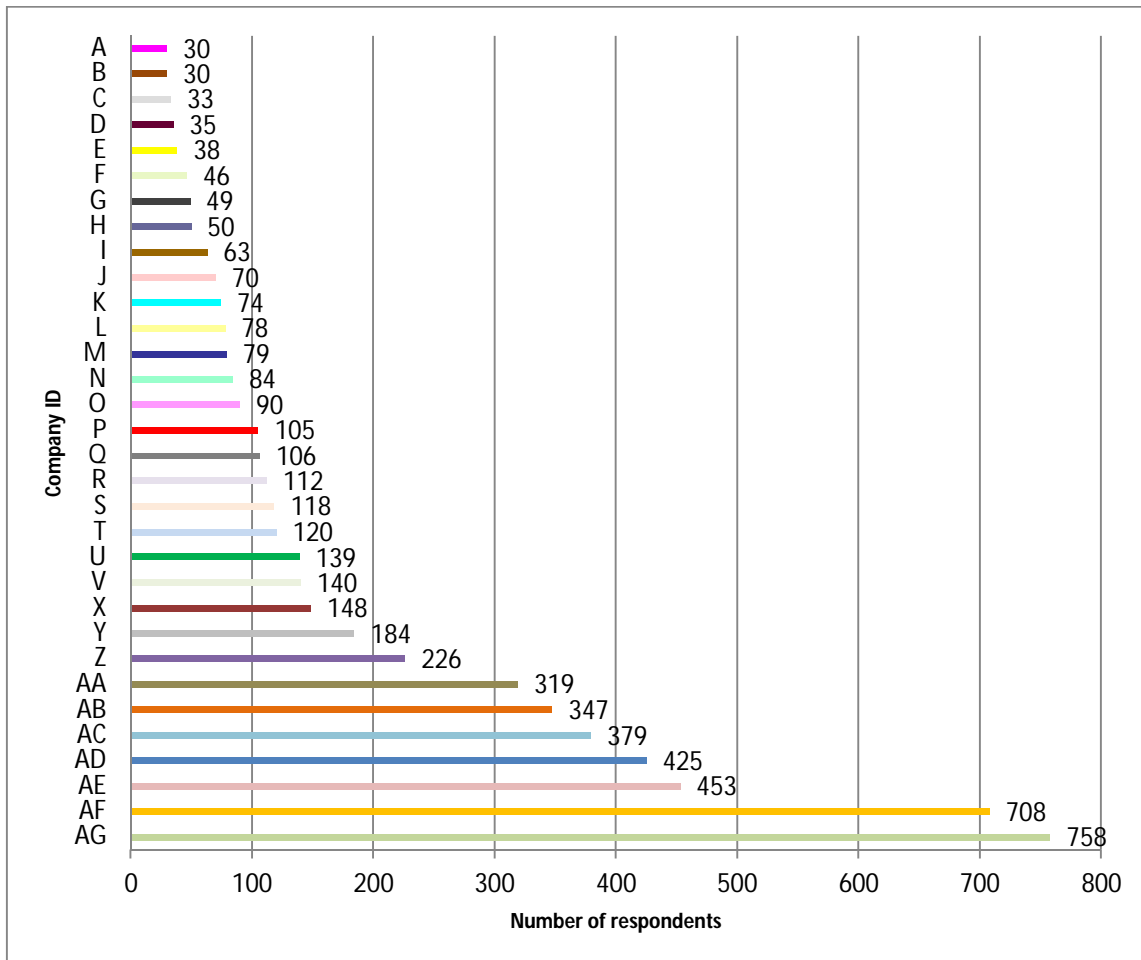
The table below presents the sample demographics (missing responses not included). It can be seen that the vast majority of respondents report working for a European company (whether airline, or other organisation). For 34 organisations, there were 30 or more respondents reported working for the same organisation. For nine organisations, over 200 respondents reported working for the same organisation. In total, 3962 respondents reported working for a 'network' airline (flag/legacy carriers who have a big network of international destinations and provide a range of pre-flight and onboard services, including different service classes, and connecting flights)(Reitchmuth 2008), and 1708 for a 'low cost' airline (no frills service focused on cost reduction and delivering lowest fares)(Reitchmuth 2008).

Table 4: Company Demographics

COMPANY DEMOGRAPHICS		n	%
Sample:	Report European company	6667	92.14
	Report worldwide company	71	0.98
	Do not report company	501	6.88
	Total	7239	100.00
Company:	1-10 respondents	189	71.86
	11-30 respondents	40	15.21
	31-50 respondent	7	2.66
	51-100 respondents	9	3.42
	101-200 respondents	9	3.42
	201-300 respondents	1	0.38
	301-400 respondents	3	1.14
	401-500 respondents	3	1.14
	501+ Respondents	2	0.76
	Total	263	100.00
Company type:	Aerial work/ambulance/surveillance	51	0.71
	Business	129	1.79
	Cargo	435	6.03
	Charter/leisure	543	7.53
	General Aviation	135	1.87
	Helicopter	108	1.50
	Low cost	1708	23.67
	Network	3962	54.91
	Other (Please state)	144	2.00
	Total	7215	100.00

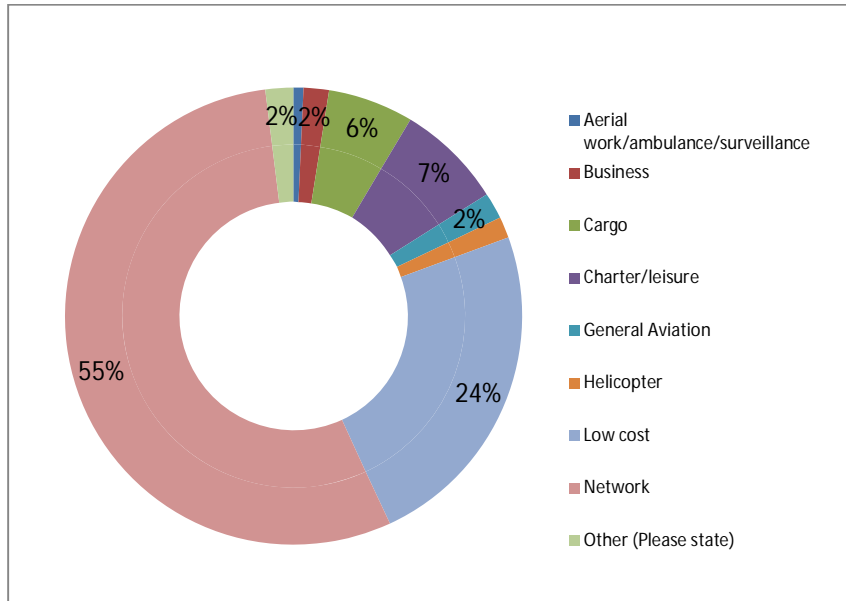
The figure below graphically shows the respondents by company, with nearly 2000 responses from pilots reporting to work for three airlines.

Figure 18 Respondents per company (for companies with =>30 respondents)



The figure 19 graphically shows the respondents by company type. It can be seen that over 85% of the sample reported working for passenger airlines (low cost, network, charter/leisure), and further 6% for cargo airlines.

Figure 19 Company type



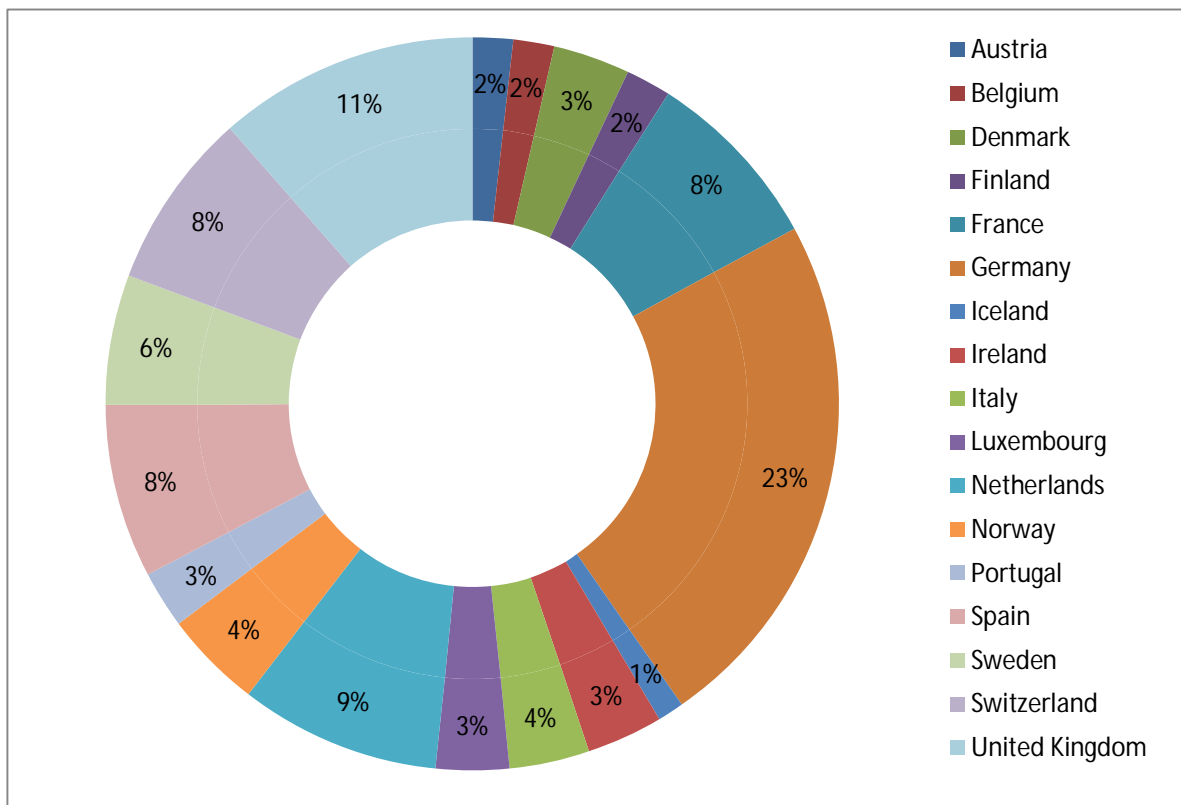
The table below reports the countries from which pilots are based. It can be seen that the majority of pilots (64%) report being based in Germany, France, Spain, UK, Netherlands, and Switzerland. Six countries (Azerbaijan, Belarus, Bosnia and Herzegovina, FYR Macedonia, Georgia and Slovenia) had only one respondent.

Table 5 Pilots' country base

Country Based	n	%	Country Based	n	%	Country Based	n	%
Albania	4	0.06	FYR Macedonia	1	0.01	Poland	27	0.37
Austria	123	1.71	Georgia	1	0.01	Portugal	172	2.39
Azerbaijan	1	0.01	Germany	1597	22.15	Romania	26	0.36
Belarus	1	0.01	Greece	18	0.25	Russia	4	0.06
Belgium	124	1.72	Hungary	12	0.17	Serbia	3	0.04
Bosnia & Herzegovina	1	0.01	Iceland	80	1.11	Slovak Republic	4	0.06
Bulgaria	4	0.06	Ireland	230	3.19	Slovenia	1	0.01
Croatia	52	0.72	Italy	243	3.37	Spain	527	7.31
Cyprus	6	0.08	Latvia	10	0.14	Sweden	394	5.46
Czech Republic	5	0.07	Lithuania	10	0.14	Switzerland	538	7.46
Denmark	233	3.23	Luxembourg	222	3.08	Turkey	24	0.33
Estonia	3	0.04	Malta	19	0.26	Ukraine	2	0.03
Finland	137	1.90	Netherlands	609	8.45	United Kingdom	789	10.94
France	556	7.71	Norway	297	4.12	Other	101	1.40
						Total:	7211	100.00

The figure below graphically demonstrates the countries from which pilots are based, excluding those countries which covered less than 1% of respondents (i.e. 70 pilots). Germany had the most pilots (23%), and Iceland the least (1.1%).

Figure 20 Country base (This figure does not include countries that make up less than 1 % of the sample)



Project: Resolving the organizational accident
Reference ID: FSS_P5_LSE_D5.4
Classification: Public



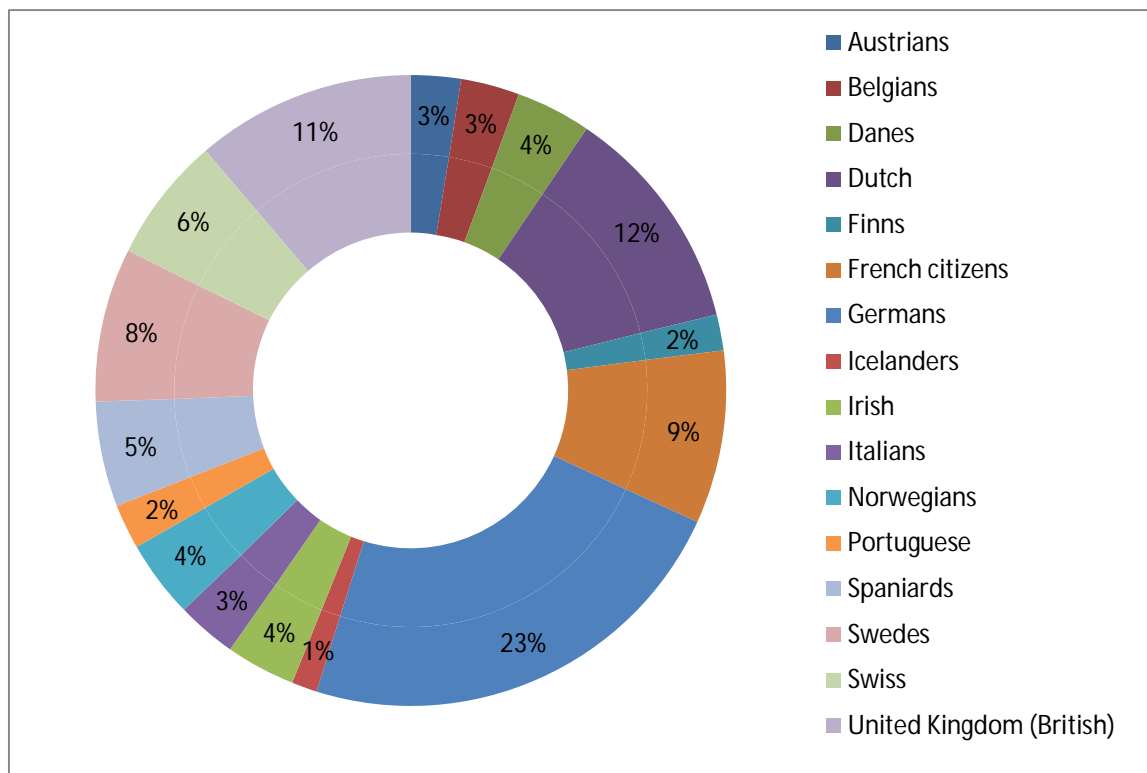
Table 6 reports on the nationality of respondents. Nearly 60% of respondents were from the Netherlands, France, Germany, Sweden, and the UK.

Table 6 Nationality of respondents (excludes nationalities that make up less than 1% of the sample)

Nationality	n	%
Austrians	176	2.45
Belgians	204	2.84
Danes	263	3.66
Dutch	800	11.14
Finns	126	1.76
French citizens	607	8.46
Germans	1570	21.87
Icelanders	91	1.27
Irish	243	3.38
Italians	209	2.91
Norwegians	272	3.79
Portuguese	158	2.20
Spaniards	368	5.13
Swedes	539	7.51
Swiss	438	6.10
British)	770	10.73
Total	6834	95.19

The figure below graphically illustrates the nationality of respondents, excluding those countries which covered only 1% of respondents (i.e. 7 pilots). The most represented nationality was German (23%), and Iceland the least (1.27%). The majority were from Northern and Western European countries.

Figure 21 Nationality of respondents (excludes countries that make up less than 1 % of the sample)



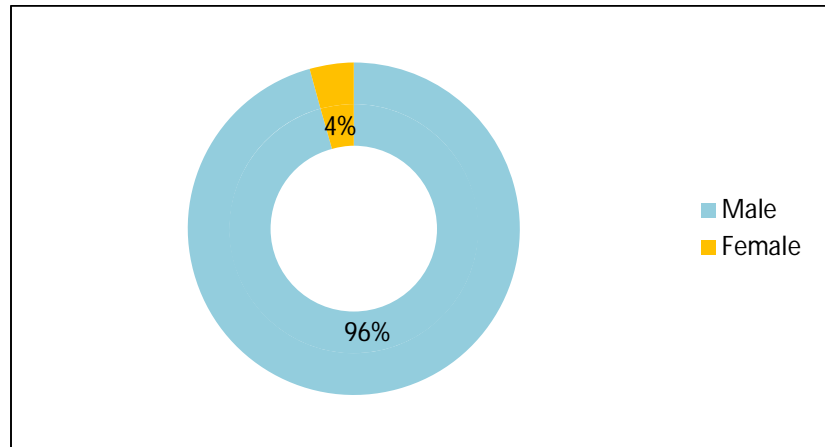
The table below reports on the following demographic characteristics: gender, age, job, contract type, managerial role, tenure in company, flying experience, and training.

Table 7 Pilot Demographics

PILOT		n	%
Gender:	Male	6889	95.73
	Female	307	4.27
	Total	7196	100.00
Age:	18-30	1082	14.99
	31-40	2158	29.89
	41-50	2331	32.29
	51-60	1419	19.66
	60+0	229	3.17
	Total	7219	100.00
Job:	Captain	4037	56.09
	First Officer	3089	42.91
	Second Officer	72	1.00
	Total	7198	100.00
Contract type:	Typical contract	6394	88.47
		<i>(Permanent contract)</i>	<i>6394 88.47</i>
	Atypical contract	805	11.14
		<i>(Self-employed contract</i>	<i>317 4.39</i>
		<i>Zero-hours contract</i>	<i>209 2.89</i>
		<i>Fixed-term contract</i>	<i>257 3.56</i>
		<i>Pay-to-fly contract)</i>	<i>22 0.30</i>
	Other	28	0.39
	<i>(Unemployed/retired</i>	<i>13 0.18</i>	
	<i>Other)</i>	<i>15 0.21</i>	
Total	7227	100.00	
Management role:	Yes (flight operations & training)	694	9.64
	Yes (safety department)	119	1.65
	Yes (other including union/company council)	47	0.65
	No	6339	88.05
	Total	7199	100.00
Tenure in company:	<1yr	319	4.42
	1-4yrs	1371	18.98
	5-10yrs	2030	28.10
	11yrs+	3504	48.50
	Total	7224	100.00
Flying experience:	<1000	202	2.79
	1000-3000	745	10.31
	3001-5000	1007	13.93
	5001-10000	2092	28.94
	10000+	3183	44.03
	Total	7229	100.00
Training:	Airline funded cadetship	1693	23.69
	Military	795	11.12
	National flight school - state funded	296	4.14
	Self-funded cadetship, with an airline (integrated)	1215	17.00
	Self-funded, modular training	3032	42.42
	Self-funded, self-improver (non-modular)	22	0.31
	University - State funded	42	0.59
	Other	52	0.73
Total	7147	100.00	

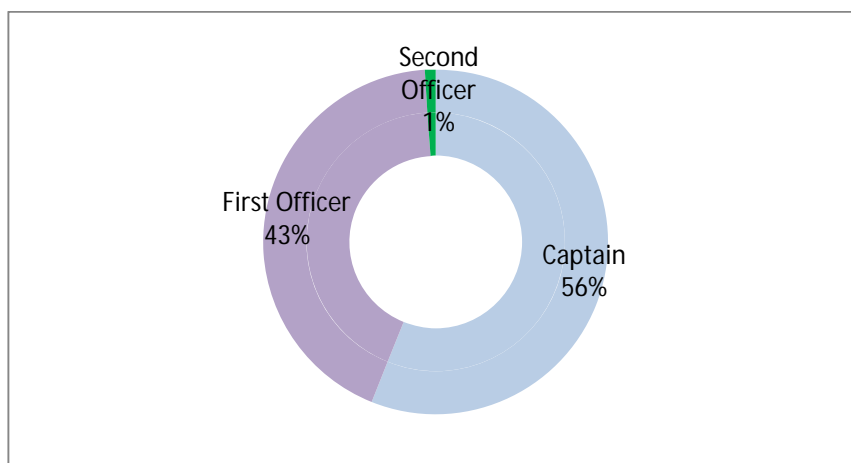
The figure below shows that approximately 96% (n=6889) of pilots were male.

Figure 22 Gender



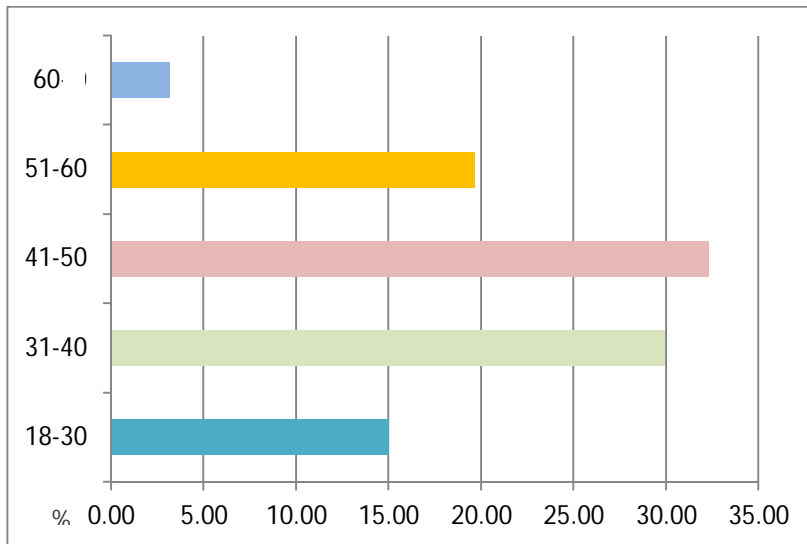
The figure below shows that the data was split almost in half between First Officers (43%) and Captains (56%), and only 1% of responses came from Second Officers. This is representative of the industry, as there are slightly more Captains, and very few Second Officers presently working in European airlines.

Figure 23 Job Title



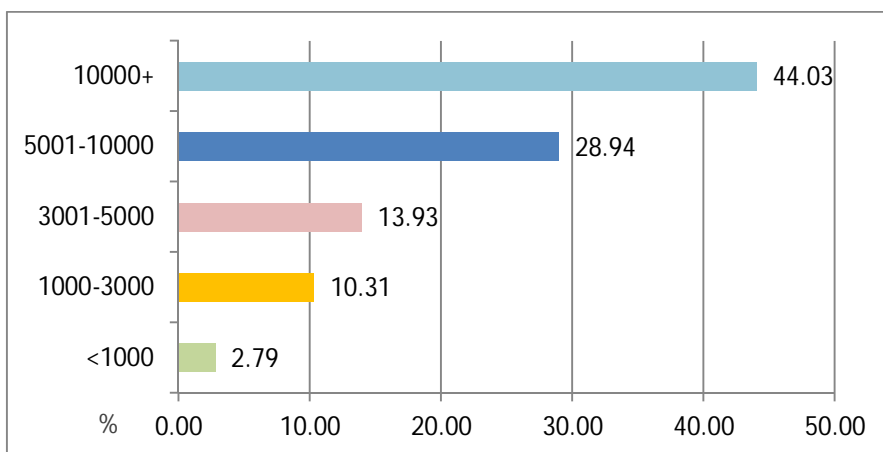
The figure below reports on the age of pilots participating in the survey. The age group 41-50 was the most represented (32%), and 60+ the least represented (3%).

Figure 24 Age



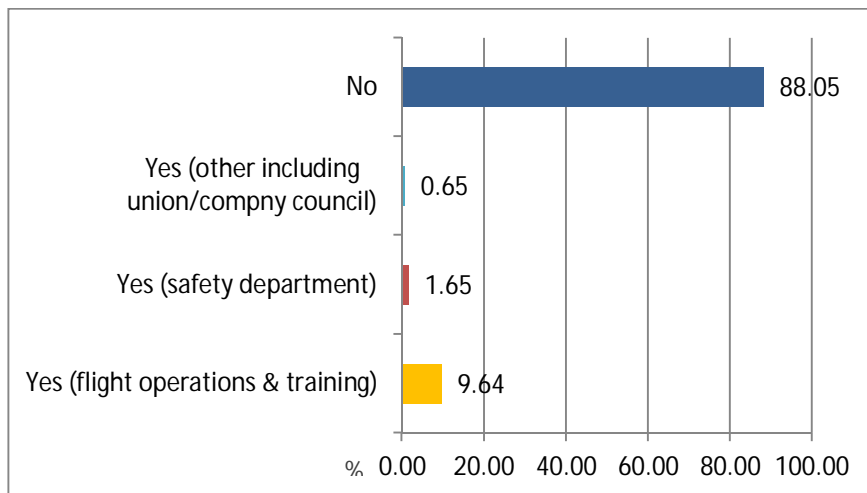
The figure below reports on the flying experience of pilots participating in the survey. Over 40% of pilots had greater than 10,000 flight hours. Thirteen percent had completed less than 3000 hours.

Figure 25 Flying experience



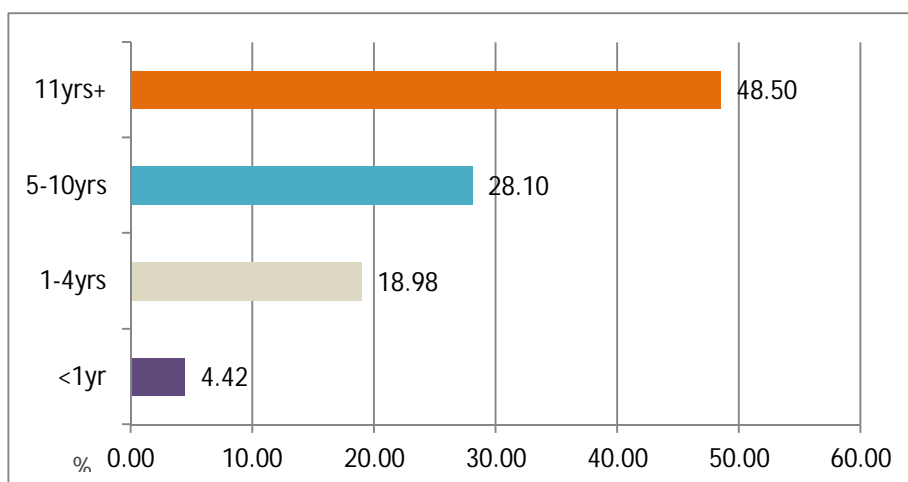
The figure below reports on the proportion of pilots in a managerial role. Most (88%) were not in a management role, whilst nearly 10% had a management role for flight operations and training.

Figure 26 Management role



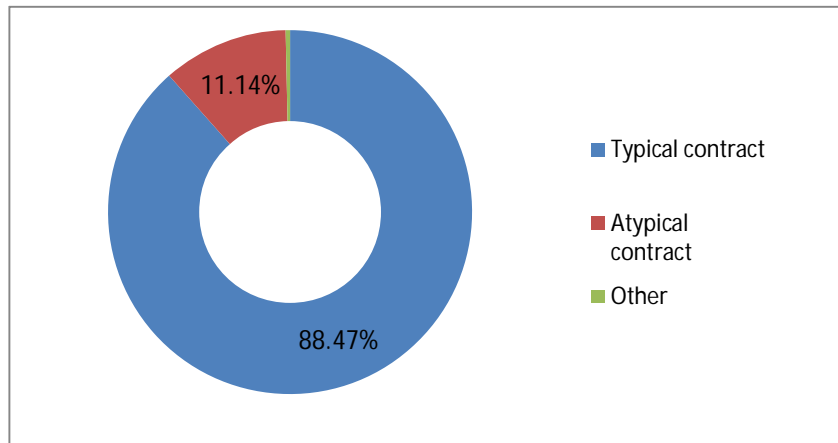
The figure below reports on the tenure of pilots in their company. Nearly half (48.5%) had been in their company for 11 years or more. Under 5% had been in their company for less than a year.

Figure 27 Tenure in company



The figure below reports on contract type. It shows that that the vast majority of pilots (88.47%) had a typical contract, whilst a minority (11.14%) of pilots were on an atypical contract.

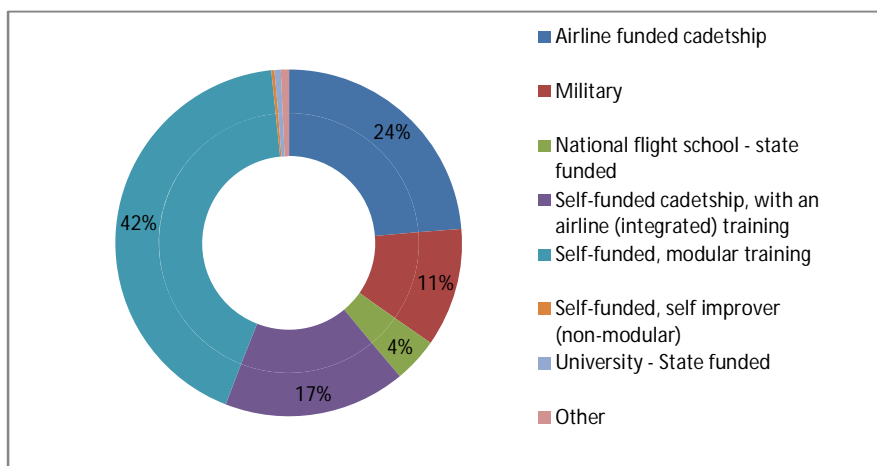
Figure 28 Contract type



Typical contract = permanent contract; Atypical contract = Self-employed, Zero hours, Fixed-term, and Pay-to-Fly contracts.

The figure below reports on training background of pilots. Most pilots (42%) had been self-funded, whilst a further 24% had been supported by an airline.

Figure 29 Training background



Please see Appendices 1 for further demographic group cross-tabulations.

3.3. Reporting item-by-item

This section reports the descriptive statistics by item for the whole sample, split by sections of the questionnaire. Overall there are high Standard Deviations (SDs) indicating substantial variations between pilots. For the total sample, this is expected because the pilots come from diverse backgrounds and contexts (e.g. different geographical locations, airlines and training backgrounds).

3.3.1. Q Section B – Descriptive statistics of all respondents by items in section B of survey

Table 8 reports on the mean scores for all items, by all respondents, in section B (General) of the safety culture survey. It can be seen that for all items the full range of response options (1-5) were used. The overall mean score for all section B items was 3.66, and the standard deviation was .994. Safety culture researchers tend to utilise the score '3.5' as an ad-hoc indicator of whether a safety culture is positive or problematic. This indicates that, across the entire sample, responses to section B of the survey were generally positive. Additionally, the Standard Deviation shows that there is a lot of variation in these opinions.

Table 8 Survey Section B descriptive data

	Range	Min	Max	Mean	SD
B01 My colleagues are committed to safety.	4	1	5	4.43	.725
B02 Voicing concerns about safety is encouraged.	4	1	5	4.00	.929
B03 We have sufficient staff to do our work safely.	4	1	5	3.27	1.127
B04 Everyone I work with in this company feels that safety is their personal responsibility.	4	1	5	3.73	0.948
B05 My direct manager is committed to safety.	4	1	5	3.79	1.016
B06 Pilots have a high degree of trust in management with regard to safety.	4	1	5	2.95	1.182
B07 I have confidence in the people that I interact with in my normal working situation.	4	1	5	4.01	.798
B08 Pilots who report safety-related occurrences are treated in a just and fair manner.	4	1	5	3.84	1.047
B09 People in this company share safety-related information.	4	1	5	3.79	.988
B10 My direct manager takes action on the safety issues we raise.	4	1	5	3.50	.992
B11 Information about safety-related changes within this company is clearly communicated to staff.	4	1	5	3.64	1.009
B12 We get timely feedback on the safety issues we raise.	4	1	5	3.23	1.060
B13 My involvement in safety activities is sufficient.	4	1	5	3.70	0.823
B14r Pilots who raise safety issues are seen as troublemakers.	4	1	5	3.70	1.120
B15 I am prepared to speak to my direct manager when unsafe situations are developing.	4	1	5	3.96	0.911
B16 There is good communication up and down the company about safety.	4	1	5	3.30	1.077
B17 Changes to the company, systems and procedures are properly assessed for safety risk.	4	1	5	3.23	1.061
B18 Safety is taken seriously in this company.	4	1	5	3.80	1.017
B19 We learn lessons from safety-related incident or occurrence investigations.	4	1	5	3.93	.938
B20 My direct manager would always support me if I had a concern about safety.	4	1	5	3.53	1.039
B21 We have sufficient practical support from our safety manager/department.	4	1	5	3.42	0.998
B22 I have good access to information regarding safety incidents or occurrences within the company.	4	1	5	3.43	1.131
B23r There are people who I do not want to work with because of their negative (e.g. loose, careless) attitude to safety.	4	1	5	3.56	1.150

B24 Other people in this company understand how my job contributes to safety.	4	1	5	3.57	0.929
B25 When I am unwell, I do not go to work.	4	1	5	3.85	1.068
B26 If I see unsafe behaviour by any of my colleagues I would talk to them about it.	4	1	5	4.06	.748

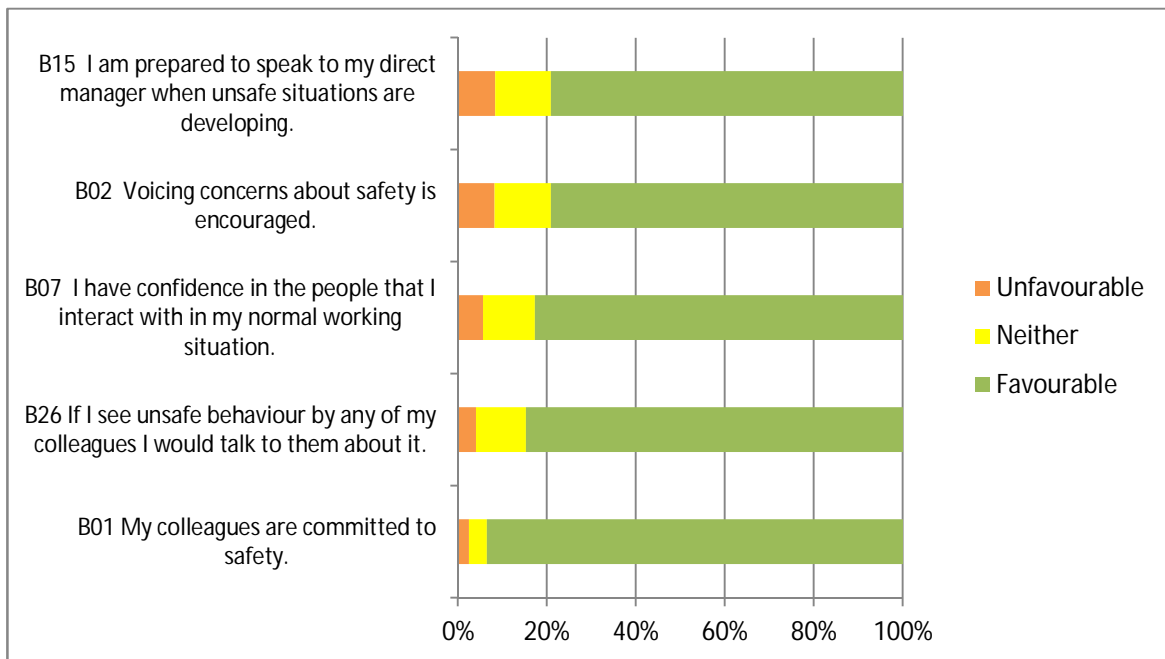
The table below reports on the extent to which pilots gave a 'favourable' or 'unfavourable' response to each survey item in Section B. Items are highlighted where over 25% of respondents responded unfavourably. The most and least favourable responses are reported on the following page.

Table 9 Survey Section B Favourable and Unfavourable responses

	% Unfavourable	% Neither	% Favourable
B01 My colleagues are committed to safety.	2.46	4.05	93.49
B02 Voicing concerns about safety is encouraged.	8.29	12.62	79.09
B03 We have sufficient staff to do our work safely.	27.77	21.77	50.46
B04 Everyone I work with in this company feels that safety is their personal responsibility.	12.43	19.48	68.09
B05 My direct manager is committed to safety.	11.88	17.99	70.13
B06 Pilots have a high degree of trust in management with regard to safety.	38.08	24.98	36.94
B07 I have confidence in the people that I interact with in my normal working situation.	5.58	11.74	82.68
B08 Pilots who report safety-related occurrences are treated in a just and fair manner.	12.13	16.78	71.09
B09 People in this company share safety-related information.	12.38	15.11	72.51
B10 My direct manager takes action on the safety issues we raise.	15.56	27.67	56.77
B11 Information about safety-related changes within this company is clearly communicated to staff.	15.13	19.76	65.11
B12 We get timely feedback on the safety issues we raise.	24.87	29.77	45.36
B13 My involvement in safety activities is sufficient.	8.44	24.24	67.33
B14r Pilots who raise safety issues are seen as troublemakers.	17.24	18.26	64.50
B15 I am prepared to speak to my direct manager when unsafe situations are developing.	8.39	12.52	79.08
B16 There is good communication up and down the company about safety.	23.80	25.39	50.81
B17 Changes to the company, systems and procedures are properly assessed for safety risk.	25.36	28.58	46.07
B18 Safety is taken seriously in this company.	11.73	18.74	69.53
B19 We learn lessons from safety-related incident or occurrence investigations.	9.15	12.98	77.87
B20 My direct manager would always support me if I had a concern about safety.	15.32	28.57	56.11
B21 We have sufficient practical support from our safety manager/department.	18.47	27.40	54.13
B22 I have good access to information regarding safety incidents or occurrences within the company.	22.48	20.10	57.42
B23r There are people who I do not want to work with because of their negative (e.g. loose, careless) attitude to safety.	21.82	16.57	61.60
B24 Other people in this company understand how my job contributes to safety.	13.95	24.08	61.97
B25 When I am unwell, I do not go to work.	14.14	13.44	72.42
B26 If I see unsafe behaviour by any of my colleagues I would talk to them about it.	4.04	11.31	84.65

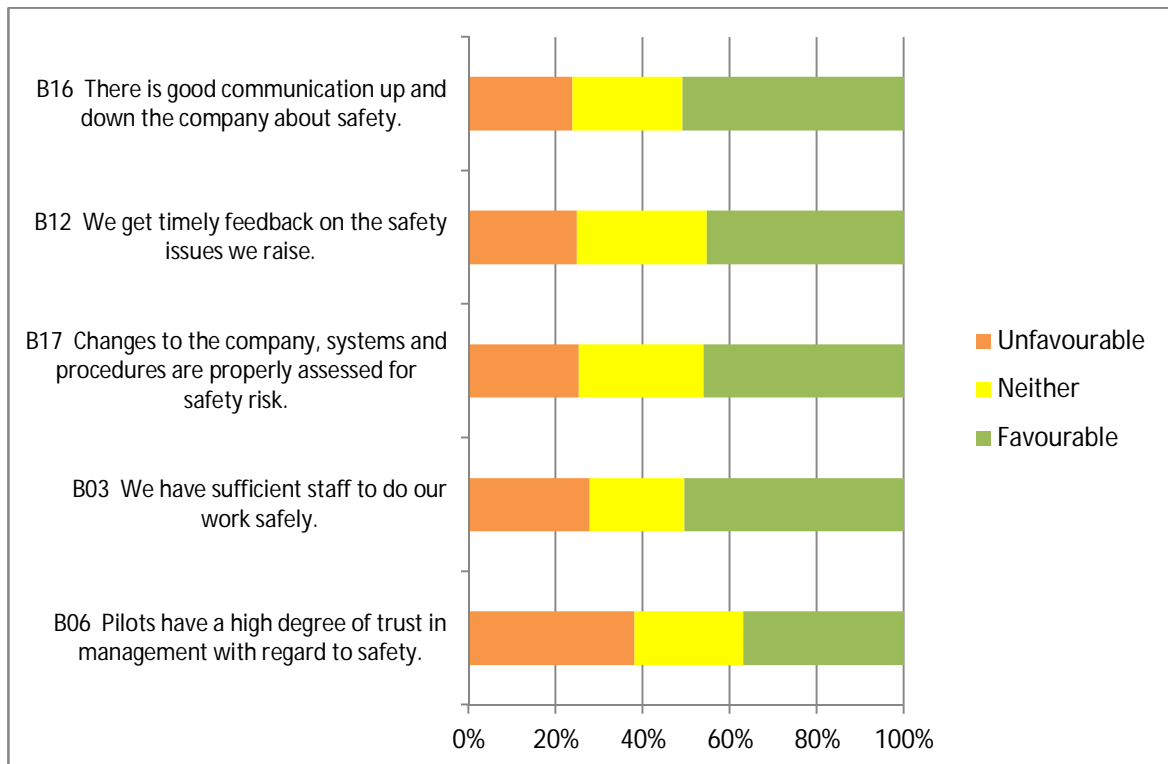
The figure below reports on the five section B items pilots responded to most favourably (i.e. agreed with a positive statement on safety culture, and disagreed with a negative statement). For the item B01 “My colleagues are committed to safety”, 93% of pilots responded favourably to this item. This was followed by the item B26 “If I see unsafe behaviour by any of my colleagues I would talk to them about it” (84%). This indicates pilots to feel positively about the safety practices of their colleagues.

Figure 30 Top 5 most favourable responses in section B



The figure below reports on the five section B items pilots responded to least favourably (i.e. disagreed with a positive statement on safety culture, and agreed with a negative statement). For the item B06 “Pilots have a high degree of trust in management with regard to safety”, only 37% of pilots gave a favourable response. For the item B03, only 50% of pilots responded favourably to “We have sufficient staff to do our work safely”. This indicates some overall concerns over management commitment to safety and resourcing.

Figure 31 Top 5 least favourable responses overall in section B



3.3.2. Q Section C – Descriptive statistics of all respondents by items in section C

The table below reports on the mean scores for all items, by all respondents, in section C of the safety culture survey (operational). It can be seen that for all items the full range of response options (1-5) were used. The overall mean score for all section C items was 3.77, and the standard deviation was .94. Safety culture researchers tend to utilise the score '3.5' as an ad-hoc indicator of whether a safety culture is positive or problematic. This indicates that, across the entire sample, responses to section C of the survey were generally positive. The Standard Deviation shows a high degree of variation in these opinions.

Table 10 Survey Section C descriptive data

	Range	Min	Max	Mean	SD
C01 We have the resources needed to do our work safely.	4	1	5	3.62	.965
C02 I read reports of incidents or occurrences that are relevant to our work.	4	1	5	4.15	.758
C03 We have procedures that are focused on appearing to follow the rules, rather than improving practice.	4	1	5	3.42	1.025
C04 Good communication exists between pilots and Engineering/Maintenance to ensure safety.	4	1	5	3.63	.964
C05 I am satisfied with the level of confidentiality of the reporting and investigation process.	4	1	5	3.54	1.117
C06r We often have to deviate from procedures for safety reasons.	4	1	5	3.99	.824
C07 I have sufficient opportunity to regularly practice my manual flying skills.	4	1	5	3.59	1.186
C08 Maintenance are able to promptly repair technical deficiencies to the aircraft.	4	1	5	3.44	1.067
C09 Adequate training is provided when new systems and procedures are introduced.	4	1	5	2.98	1.140
C10r I have to take risks that make me feel uncomfortable about safety.	4	1	5	4.10	.920
C11 Good communication exists between pilots and Air Traffic Control to ensure safety.	4	1	5	3.87	0.865
C12 A staff member who takes unacceptable risks would be disciplined or corrected in this company.	4	1	5	3.68	0.963
C13 I feel entirely confident to fly my aircraft.	4	1	5	4.34	.714
C14 The SOPs associated with my work are appropriate to ensure safe operations.	4	1	5	4.00	0.815
C15 Good communication exists between flight crew and cabin crew to ensure safety.	4	1	5	3.96	0.865
C16 I have sufficient training to understand the procedures associated with my work.	4	1	5	4.04	0.824

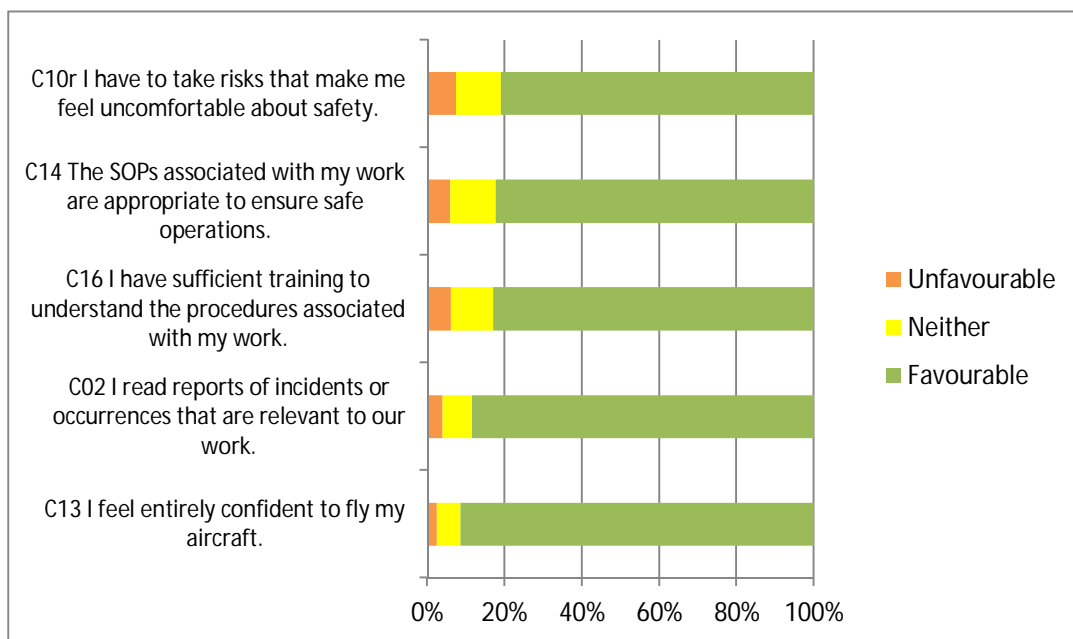
The table below reports on the extent to which pilots gave a 'favourable' or 'unfavourable' response to each survey item in Section C. The most and least favourable responses are reported on the following pages.

Table 11 Survey Section C Favourable and Unfavourable responses

	% Unfavourable	% Neither	% Favourable
C01 We have the resources needed to do our work safely.	15.38	18.03	66.59
C02 I read reports of incidents or occurrences that are relevant to our work.	3.95	7.60	88.45
C03 We have procedures that are focused on appearing to follow the rules, rather than improving practice.	20.04	28.55	51.41
C04 Good communication exists between pilots and Engineering/Maintenance to ensure safety.	13.76	21.96	64.28
C05 I am satisfied with the level of confidentiality of the reporting and investigation process.	19.58	19.48	60.95
C06r We often have to deviate from procedures for safety reasons.	5.55	15.17	79.29
C07 I have sufficient opportunity to regularly practice my manual flying skills.	21.27	14.37	64.37
C08 Maintenance are able to promptly repair technical deficiencies to the aircraft.	21.58	20.93	57.48
C09 Adequate training is provided when new systems and procedures are introduced.	36.03	25.28	38.69
C10r I have to take risks that make me feel uncomfortable about safety.	7.39	11.59	81.02
C11 Good communication exists between pilots and Air Traffic Control to ensure safety.	7.69	16.47	75.84
C12 A staff member who takes unacceptable risks would be disciplined or corrected in this company.	12.67	19.53	67.80
C13 I feel entirely confident to fly my aircraft.	2.38	6.15	91.47
C14 The SOPs associated with my work are appropriate to ensure safe operations.	5.95	11.74	82.31
C15 Good communication exists between flight crew and cabin crew to ensure safety.	6.66	15.06	78.28
C16 I have sufficient training to understand the procedures associated with my work.	6.01	11.05	82.94

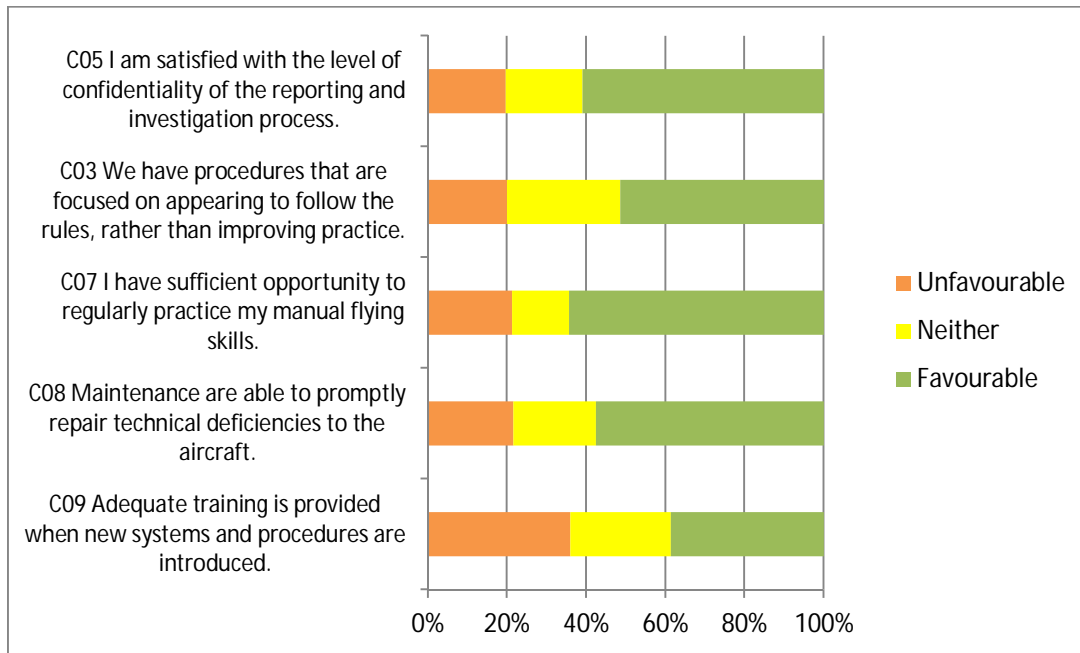
The figure below reports on the five section C items pilots responded to most favourably (i.e. agreed with a positive statement on safety culture, and disagreed with a negative statement). For the item C13 "I feel entirely confident to fly my aircraft", 91% of pilots responded favourably to this item. This was followed by the item C02 "I read reports of incidents or occurrences that are relevant to our work" (85%). Pilots also reported (83%) feeling "I have sufficient training to understand the procedures associated with my work" (C16). This indicates a general feeling of positivity amongst pilots towards their skills and knowledge for ensuring safe operations.

Figure 32 Top 5 most favourable responses in Section C



The figure below reports on the five section C items pilots responded to least favourably (i.e. disagreed with a positive statement on safety culture, and agreed with a negative statement). For the item C09 "Adequate training is provided when new systems and procedures are introduced", 38% of pilots gave a favourable response. For the item C08, 21% of pilots responded unfavourably to "Maintenance are able to promptly repair technical deficiencies to the aircraft". This indicates some concern over the systems for ensuring safe operations.

Figure 33 Top 5 least favourable responses in Section C



3.3.3. Q Section D – Descriptive statistics of all respondents by items in section D

The following tables report on the mean scores for all items, by all respondents, in section D of the safety culture survey (working life). It can be seen that for all items the full range of response options (1-5) were used. The overall mean score for all section D items was 2.927, and the standard deviation was 1.06. Safety culture researchers tend to utilise the score '3.5' as an ad-hoc indicator of whether a safety culture is positive or problematic. This indicates that, across the entire sample, responses to section D of the survey were generally not positive.

The table below reports on the items focussing on perceived organisational support. It shows that, in general, pilots feel their organisations do not care adequately for their well-being or value them. The Standard Deviation shows a high degree of variation in these opinions.

Table 12 Survey Section Descriptives: Perceived Organisational Support (n=6893)

	Range	Min	Max	Mean	SD
D03r The company shows very little concern for my well-being.	4	1	5	2.70	1.183
D05 The company takes pride in my accomplishments at work.	4	1	5	2.64	1.056
D09 The company values my contribution to its well-being.	4	1	5	2.71	1.094
D11 The company really cares about my wellbeing.	4	1	5	2.36	1.097
D13r The company fails to appreciate any extra effort from me.	4	1	5	2.56	1.135
D14 The company cares about my general satisfaction at work.	4	1	5	2.40	1.065
D15r Even if I did the best job possible, the company would fail to notice.	4	1	5	2.53	1.135
D16r The company would ignore any complaint from me.	4	1	5	3.36	1.018

The table below reports on the items focussing on fatigue. It shows that, in general, pilots feel fatigued and that often their organisation does not support them on this issue. The Standard Deviation shows a high degree of variation in these opinions.

Table 13 Survey Section D Descriptives: Fatigue (n=6896)

	Range	Min	Max	Mean	SD
D01r Pilots in this company are often tired at work.	4	1	5	2.42	1.089
D06 I would feel comfortable to complete a fatigue report.	4	1	5	3.48	1.190
D12 The issue of fatigue is taken seriously by this company.	4	1	5	2.57	1.118
D17 I feel fully supported by my company if I report unfit to fly.	4	1	5	3.08	1.177

The table below reports on the items focussing on speaking -up. It shows that, in general, pilots feel positively on this issue.

Table 14 Survey Section D Descriptives: Speaking-up (n=6872)

	Range	Min	Max	Mean	SD
D02 First officers are willing to challenge Captains on their decision making.	4	1	5	3.74	.846
D08 Captains encourage their crew to speak-up if they are concerned with decisions made by the Captain.	4	1	5	3.96	0.789

The table below reports on the items focussing on their national aviation authority's approach to safety. Overall, perceptions of pilots were not especially positive.

Table 15 Survey Section D Descriptives: National Authority (n=6841)

	Range	Min	Max	Mean	SD
D04 My national aviation authority manages safety reports well.	4	1	5	2.88	.933
D07 My national aviation authority takes safety seriously.	4	1	5	3.25	1.053

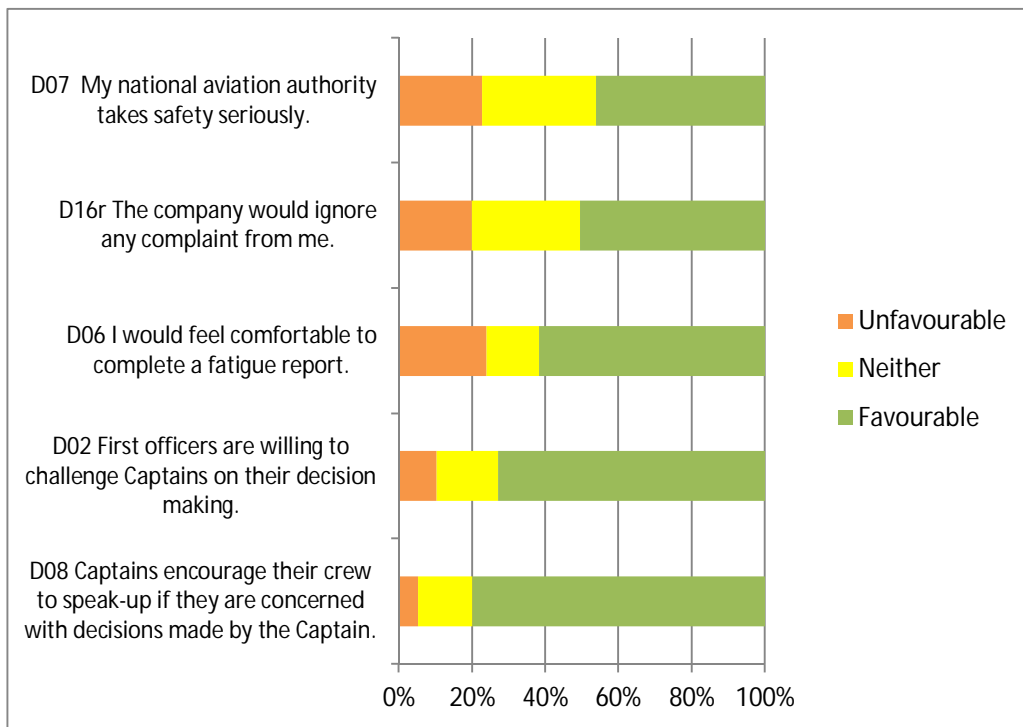
The table below reports on the extent to which pilots gave a 'favourable' or 'unfavourable' response to each survey item in Section D. Please note, item D10 was not included in the survey due to a numbering error. The most and least favourable responses are reported on the following page.

Table 16 Survey Section D Favourable and Unfavourable responses

	% Unfavourable	% Neither	% Favourable
D01r Pilots in this company are often tired at work.	57.78	22.73	19.90
D02 First officers are willing to challenge Captains on their decision making.	10.33	16.72	72.94
D03r The company shows very little concern for my well-being.	44.49	26.83	28.64
D04 My national aviation authority manages safety reports well.	28.33	46.36	23.62
D05 The company takes pride in my accomplishments at work.	43.58	34.48	21.46
D06 I would feel comfortable to complete a fatigue report.	23.93	14.43	61.72
D07 My national aviation authority takes safety seriously.	22.48	31.07	45.81
D08 Captains encourage their crew to speak-up if they are concerned with decisions made by the Captain.	5.19	14.82	79.82
D09 The company values my contribution to its well-being.	41.69	31.90	26.04
D11 The company really cares about my wellbeing.	57.52	27.16	17.27
D12 The issue of fatigue is taken seriously by this company.	50.05	26.83	23.06
D13r The company fails to appreciate any extra effort from me.	53.30	24.75	22.44
D14 The company cares about my general satisfaction at work.	55.26	27.56	17.24
D15r Even if I did the best job possible, the company would fail to notice.	53.57	25.16	21.77
D16r The company would ignore any complaint from me.	20.02	29.47	50.70
D17 I feel fully supported by my company if I report unfit to fly.	31.73	25.70	42.41

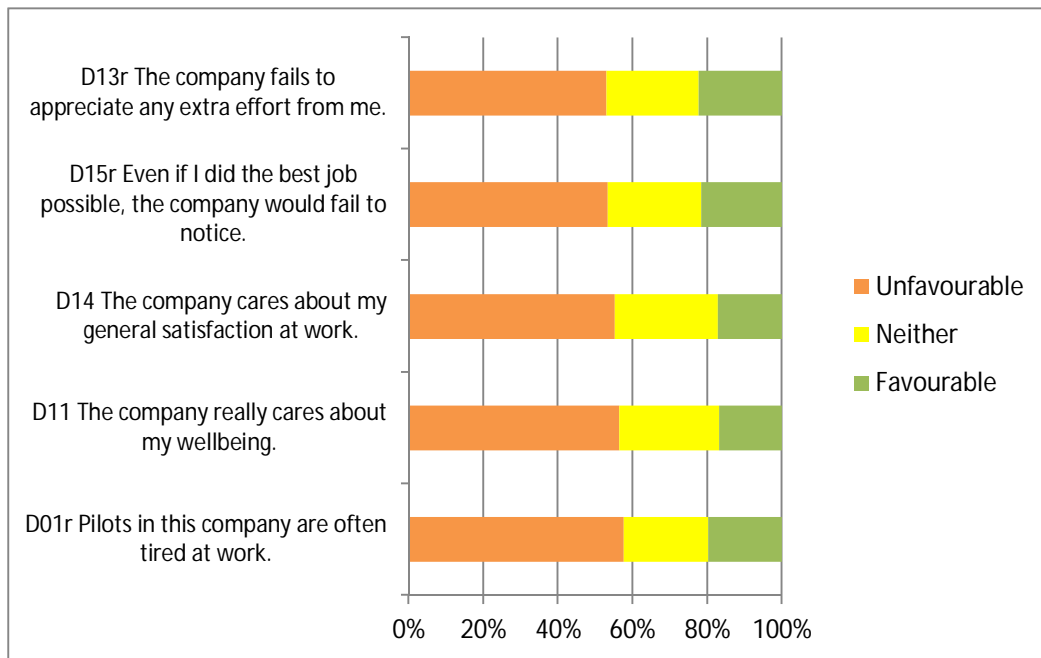
The figure below reports on the five section D items pilots responded to most favourably (i.e. agreed with a positive statement on safety culture, and disagreed with a negative statement). For the item D08 “Captains encourage their crew to speak-up if they are concerned with decisions made by the Captain”, 80% of pilots responded favourably to this item.

Figure 34 Top 5 most favourable responses in section D



The figure below reports on the five section C items pilots responded to least favourably (i.e. disagreed with a positive statement on safety culture, and agreed with a negative statement). For the item D09 “Pilots in this company are often tired at work”, 58% of pilots gave an unfavourable response.

Figure 35 Top 5 least favourable responses in section D



3.4. Safety culture dimensions

In this section, we focus on the latent dimensions measured by the safety culture questionnaire items. To recap, groups of individual survey items refer to broader conceptual themes (e.g. Management Commitment to Safety), and we utilise these 'dimensions' to interpret the results of the survey, and to make group comparisons. Please see the methods (section 2.6) for details on the dimensions are calculated, the items underlying the themes, and the dimensions themselves.

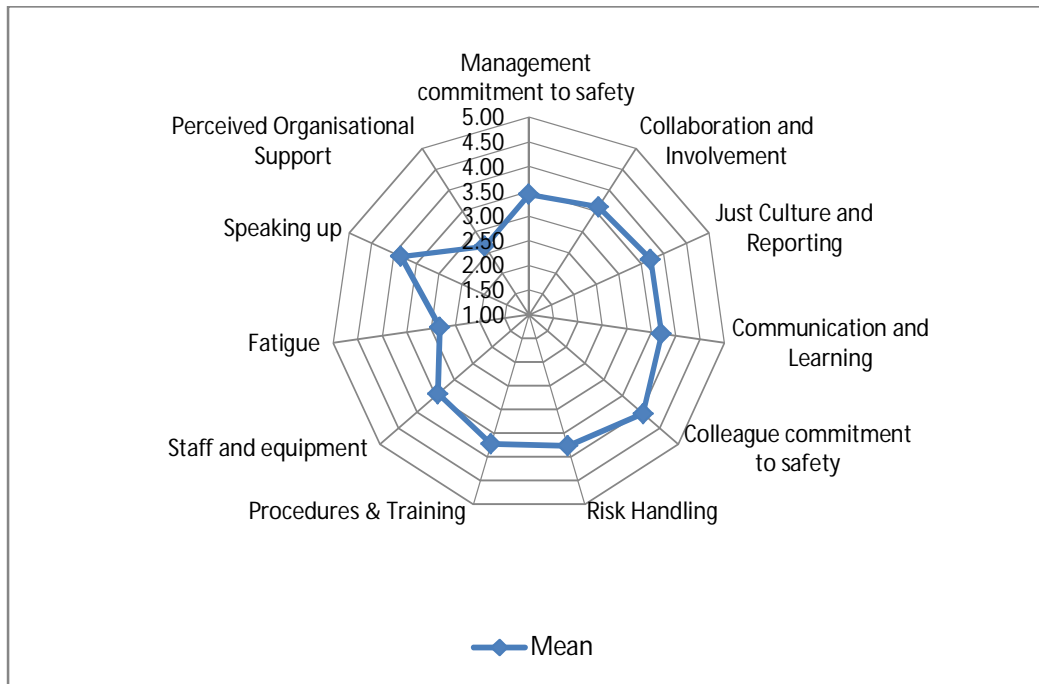
3.4.1. Dimension Descriptive Statistics & Reliability

Groups of survey items were aggregated together (with a mean score being generated) according to the safety culture 'dimension' they relate to (e.g. management commitment to safety). This allows for analysis of the safety culture (rather than responses to a single survey item), and for meaningful between group comparisons to be made. Safety culture assessments often attempt to ascertain whether responses to a dimension are positive or not. Although there is no definitive rule for doing this the following interpretation is often used.

If the mean score of a dimension is under 2.5, this is considered concerning as it indicates most participants responded negatively to an item (thus indicating opportunities for improvement). If a dimension mean score is between 2.5 to 3.5, this is somewhat open to interpretation as it indicates either conflicting viewpoints, or uncertainty (e.g. participants indicating they 'Neither Agree Nor Disagree' to safety survey items). The implications of this depend on the topic under investigation. A dimension mean score above 3.5 generally considered positive, as it indicates most participants responded positively to a survey item.

The figure below reports the mean scores for the 11 dimensions included in the survey. It can be seen that the majority of dimension mean scores are above 3.5, indicating a positive response from across the sample. This includes: Colleague commitment to safety (4.06); Speaking up (m=3.85); Risk Handling (3.77); Procedures & Training (m=3.73); Just culture and Reporting (3.71); Communication and Learning (m=3.71); Collaboration and Involvement (m=3.60). However, pilots indicated uncertainty on the following: Management commitment to safety (m=3.44); Staff and equipment (m=3.44); Fatigue (m=2.82); Perceived Organisational Support (m=2.65).

Figure 36 Spider graph of dimension scale mean scores



The table below reports descriptive data on the survey scales. It can be seen that for two scales, staff and equipment and procedures and training, the scores were less than optimal ($\alpha > 0.6$). This means that all items underlying these dimensions may not be measuring the exact same concept.

Table 17 Dimension scale descriptive statistics and reliability

Dimension (items)	N (valid)	N (missing)	Range	Min	Max	Mean	SD	alpha
Management commitment to safety (B05;B06;B10;B20)	7163	76	4.00	1.00	5.00	3.44	.90	.876
Collaboration and Involvement (B13;B14R;B23R;B24;C04;C08)	6868	371	4.00	1.00	5.00	3.60	.65	.719
Just Culture and Reporting (B02;B08;B12;B15;C05;C12)	6855	384	4.00	1.00	5.00	3.71	.72	.806
Communication and Learning (B09;B11;B16;B19;B22;C02)	6859	380	4.00	1.00	5.00	3.71	.77	.866
Colleague commitment to safety (B01;B04;B07)	7213	26	4.00	1.00	5.00	4.06	.65	.686
Risk Handling (B17;C06;C10)	6900	339	4.00	1.00	5.00	3.77	.70	.607
Procedures & Training (C03;C07;C09;C13;C14;C16)	6848	391	4.00	1.00	5.00	3.73	.53	.523
Staff and equipment (B03;B21;C01)	6892	347	4.00	1.00	5.00	3.44	.87	.795
Fatigue (D01R;D06;D12)	6864	375	4.00	1.00	5.00	2.82	.89	.686
Speaking up (D02;D08)	6847	392	4.00	1.00	5.00	3.85	.67	.500
Perceived Organisational Support (D03R;D05;D09;D11;D13R;D14;D15R;D16R)	6758	481	4.00	1.00	5.00	2.65	.88	.921

3.4.2. Dimension correlations

Pearson's correlations show significant correlations between all the dimensions at the $\Rightarrow .001$ significance level. This is expected as these are all dimensions of safety culture, and significant associations are more likely in a large sample.

Table 18 Dimension correlations

		Management Commitment to Safety	Collaboration & Involvement	Just Culture & Reporting	Communication & Learning	Risk Handling	Colleague Commitment	Staff & Equipment	Procedures & Training	Fatigue	Speaking up	Perceived Organisational Support
Management Commitment to Safety	Pearson Correlation	1	.700**	.800**	.733**	.640**	.609**	.749**	.495**	.621**	.311**	.678**
	Sig.		.000	.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	7163	6809	6801	6797	6835	7139	6830	6781	6798	6779	6698
Collaboration & Involvement	Pearson Correlation	.700**	1	.748**	.725**	.672**	.648**	.705**	.553**	.606**	.409**	.620**
	Sig.	.000		.000	.000	.000	.000	.000	.000	.000	.000	.000
	N	6809	6868	6792	6794	6828	6848	6822	6773	6789	6771	6693
Just Culture & Reporting	Pearson Correlation	.800**	.748**	1	.798**	.649**	.646**	.729**	.498**	.622**	.404**	.626**
	Sig.	.000	.000		.000	.000	.000	.000	.000	.000	.000	.000
	N	6801	6792	6855	6778	6817	6833	6810	6768	6774	6758	6683
Communication & Learning	Pearson Correlation	.733**	.725**	.798**	1	.627**	.624**	.752**	.513**	.604**	.375**	.618**
	Sig.	.000	.000	.000		.000	.000	.000	.000	.000	.000	.000
	N	6797	6794	6778	6859	6818	6838	6814	6765	6779	6760	6678
Risk Handling	Pearson Correlation	.640**	.672**	.649**	.627**	1	.530**	.643**	.513**	.525**	.298**	.525**
	Sig.	.000	.000	.000	.000		.000	.000	.000	.000	.000	.000
	N	6835	6828	6817	6818	6900	6879	6850	6805	6821	6800	6717
Colleague Commitment	Pearson Correlation	.609**	.648**	.646**	.624**	.530**	1	.595**	.432**	.464**	.410**	.456**
	Sig.	.000	.000	.000	.000	.000		.000	.000	.000	.000	.000
	N	7139	6848	6833	6838	6879	7213	6871	6825	6841	6825	6736
Staff & Equipment	Pearson Correlation	.749**	.705**	.729**	.752**	.643**	.595**	1	.538**	.655**	.296**	.661**
	Sig.	.000	.000	.000	.000	.000	.000		.000	.000	.000	.000
	N	6830	6822	6810	6814	6850	6871	6892	6798	6813	6793	6707
Procedures & Training	Pearson Correlation	.495**	.553**	.498**	.513**	.513**	.432**	.538**	1	.435**	.287**	.440**
	Sig.	.000	.000	.000	.000	.000	.000	.000		.000	.000	.000
	N	6781	6773	6768	6765	6805	6825	6798	6848	6771	6758	6677
Fatigue	Pearson Correlation	.621**	.606**	.622**	.604**	.525**	.464**	.655**	.435**	1	.275**	.740**
	Sig.	.000	.000	.000	.000	.000	.000	.000	.000		.000	.000
	N	6798	6789	6774	6779	6821	6841	6813	6771	6864	6813	6736
Speaking up	Pearson Correlation	.311**	.409**	.404**	.375**	.298**	.410**	.296**	.287**	.275**	1	.261**
	Sig.	.000	.000	.000	.000	.000	.000	.000	.000	.000		.000
	N	6779	6771	6758	6760	6800	6825	6793	6758	6813	6847	6711
Perceived Organisational Support	Pearson Correlation	.678**	.620**	.626**	.618**	.525**	.456**	.661**	.440**	.740**	.261**	1
	Sig.	.000	.000	.000	.000	.000	.000	.000	.000	.000	.000	
	N	6698	6693	6683	6678	6717	6736	6707	6677	6736	6711	6758

** . Correlation is significant at the 0.001 level (2-tailed).

3.4.3. Between group differences

Between group differences for company type, contract type, Job title, part-time/year & full-time and gender are reported through ANOVAs and T Tests. Only the significant differences are described and illustrated with Spider Diagrams.

The assumptions of normality were not satisfied for the dependent variables tested, with skew results all greater than 1 and a Shapiro-Wilk test presenting a significant p value of $p < .000$. However, the sample is large enough that parametric tests are appropriate.

We have presented effect sizes to show how where we have stronger (higher) or weaker (lower) differences between the means. A low score indicates that the differences are significantly different, but not necessarily meaningfully different.

The ANOVA summary tables show any significant differences between groups by dimension, and post hoc tests reveal where (i.e. between which groups) the significant differences exist.

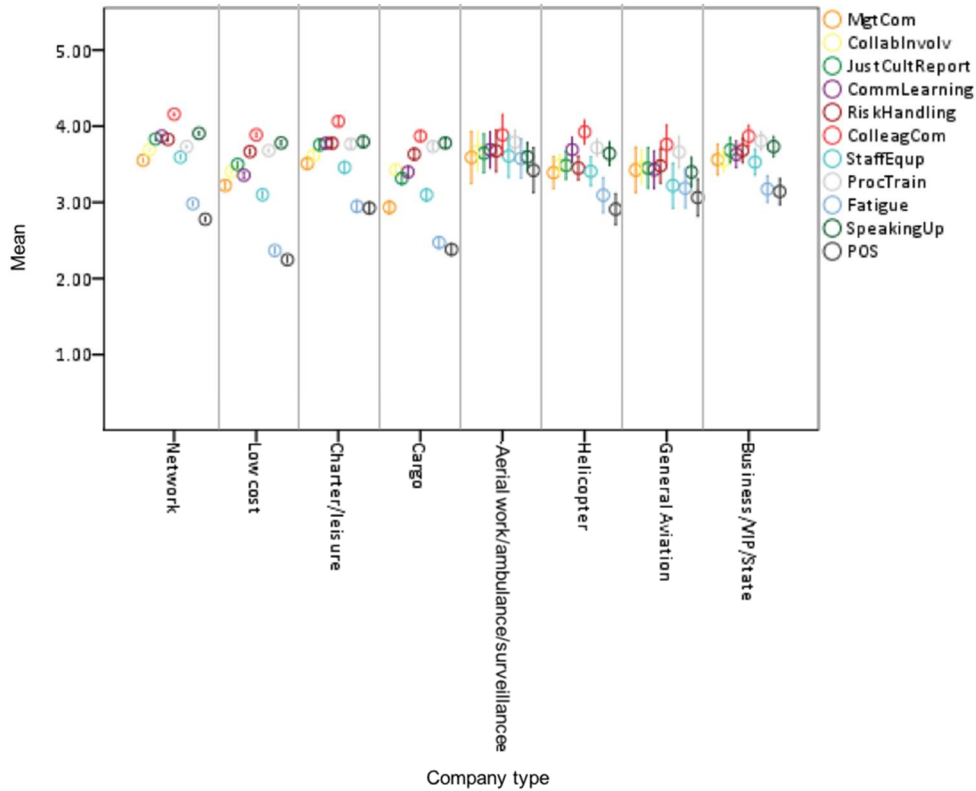
Please see the Appendices for the safety culture dimension mean scores by demographic group.

3.4.3.1. Company type

Summary overview

The figure below plots all of the mean scores (and error bars) for each safety culture dimension according to the type of company pilots report working for.

Figure 37 Means and Error bars for all dimensions by Company type



Overall, the data indicates that pilots at Cargo and Low cost companies had more negative views of safety culture, with those at Network airlines holding the most positive views.

The table below reports the mean scores for each safety culture dimension according to the type of company pilots report working for.

Table 19 Mean scores by company type

	Company type								
	Network	Low cost	Charter/leisure	Cargo	Aerial work/ambulance/surveillance	Helicopter	General Aviation	Business/VIP/State	Other
Management Commitment to Safety	3.56	3.23	3.54	2.96	3.64	3.38	3.57	3.59	4.00
Collaboration & Involvement	3.70	3.41	3.62	3.42	3.66	3.48	3.50	3.57	3.17
Just Culture & Reporting	3.84	3.50	3.76	3.32	3.61	3.46	3.48	3.71	4.00
Communication & Learning	3.88	3.37	3.78	3.41	3.66	3.68	3.48	3.64	4.00
Risk Handling	3.83	3.68	3.78	3.65	3.65	3.47	3.47	3.70	2.67
Colleague Commitment	4.16	3.89	4.06	3.89	3.89	3.88	3.88	3.90	4.00
Staff Equipment	3.60	3.11	3.47	3.10	3.57	3.38	3.28	3.54	4.00
Procedures & Training	3.74	3.68	3.77	3.74	3.75	3.72	3.69	3.83	3.50
Fatigue	2.99	2.38	2.95	2.48	3.55	3.09	3.24		3.21
Speaking up	3.91	3.79	3.79	3.80	3.57	3.64	3.40	3.77	3.00
Perceived Organisational Support	2.78	2.25	2.93	2.38	3.39	2.89	3.05	3.18	3.18

Analysis on the variations of mean scores showed that Levene’s Tests of Homogeneity of Variance were violated for all dimensions (i.e. the dimensions had unequal variances), apart from Speaking up and POS. ANOVA and Welch and Brown-Forsyth tests all showed that there were significant differences among all dimensions apart from Procedures & Training. The table below shows the ANOVA results.

Table 20 ANOVA overview of significant differences between groups for company type

		Sum of Squares	df	Mean Square	F	Sig.
Management Commitment to Safety	Between Groups	248.304	7	35.472	45.247	.000
	Within Groups	5585.737	7125	.784		
	Total	5834.040	7132			
Collaboration & Involvement	Between Groups	114.320	7	16.331	39.680	.000
	Within Groups	2813.149	6835	.412		
	Total	2927.469	6842			
Just Culture & Reporting	Between Groups	213.098	7	30.443	63.111	.000
	Within Groups	3290.675	6822	.482		
	Total	3503.773	6829			
Communication & Learning	Between Groups	351.374	7	50.196	93.865	.000
	Within Groups	3650.352	6826	.535		
	Total	4001.726	6833			
Risk Handling	Between Groups	54.104	7	7.729	15.920	.000
	Within Groups	3333.999	6867	.486		
	Total	3388.104	6874			
Colleague Commitment	Between Groups	118.591	7	16.942	41.794	.000
	Within Groups	2908.441	7175	.405		
	Total	3027.032	7182			
Staff & Equipment	Between Groups	340.122	7	48.589	68.706	.000
	Within Groups	4850.649	6859	.707		
	Total	5190.771	6866			
Procedures & Training	Between Groups	6.082	7	.869	3.149	.003
	Within Groups	1880.553	6815	.276		
	Total	1886.635	6822			
Fatigue	Between Groups	552.751	7	78.964	111.560	.000
	Within Groups	4835.849	6832	.708		
	Total	5388.600	6839			
Speaking up	Between Groups	42.511	7	6.073	13.801	.000
	Within Groups	2998.484	6814	.440		
	Total	3040.995	6821			
Perceived Organisational Support	Between Groups	461.067	7	65.867	92.520	.000
	Within Groups	4789.801	6728	.712		
	Total	5250.869	6735			

Management Commitment

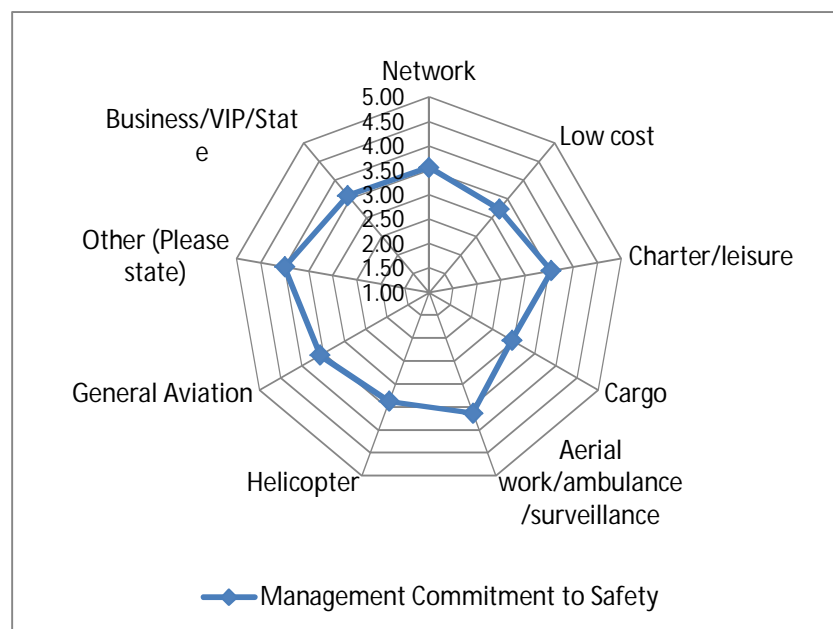
Post-hoc Games-Howell pairwise comparisons showed that Cargo airlines reported significantly lower Management Commitment scores than almost all other company types (General Aviation, Business/VIP/State, Charter/Leisure, Low cost, Network) at the .001 level of significance. Low cost reported significantly lower Management Commitment scores than Network and Charter. All other comparisons were not significant.

The effect sizes for Cargo and Network (Cohen’s $d = 0.684393$); Cargo and Charter/Leisure (Cohen’s $d = 0.658227$); Cargo and Business/VIP/State (Cohen’s $d = 0.667644$); Cargo and General Aviation (Cohen’s $d = 0.637114$) were all medium to large. The effect size for Cargo and Low cost (Cohen’s $d = 0.297438$) was low. Low cost and Network (Cohen’s $d = 0.372989$); Low cost and Charter/Leisure (Cohen’s $d = 0.350097$), are all considered to be between low to medium.

The mean differences for Cargo and Network (0.59744); Cargo and Charter/Leisure (0.57990); Cargo and Business/VIP/State (-0.62870); Cargo and General Aviation (-0.60755) were all medium to large. The effect size for Cargo and Low cost (0.26671) was low. Low cost and Network (-0.33074); Low cost and Charter/Leisure (0.31319), are all considered to be between low.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 38 Means for Management Commitment to Safety by Company type



Collaboration & Involvement

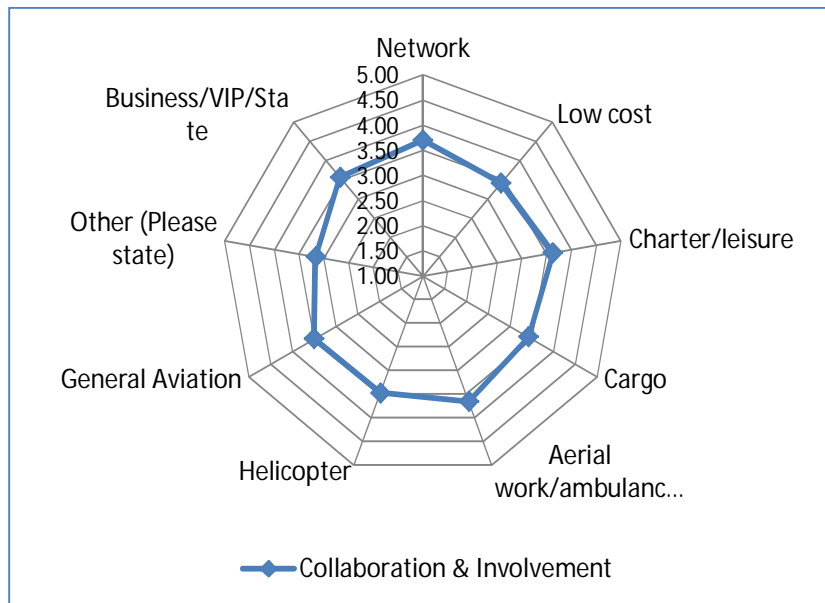
Post-hoc Games-Howell pairwise comparisons showed that both Cargo and Low cost companies reported significantly lower Collaboration & Involvement scores than Charter/Leisure and Network at the .001 level of significance.

The effect sizes for Cargo and network (Cohen's $d = 0.448657$); Cargo and Charter/Leisure (Cohen's $d = 0.320416$); Low cost and network (Cohen's $d = 0.448286$); Low cost and Charter/Leisure (Cohen's $d = 0.324883$), are all considered to be between low to be medium, based on statistical guidance (Cohen 1992).

The mean differences Cargo and network (0.27801); Cargo and Charter/Leisure (0.20034); Low cost and network (0.28854); Low cost and Charter/Leisure (0.21088), are all considered to be low.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 39 Means for Collaboration & Involvement by Company type



Just culture

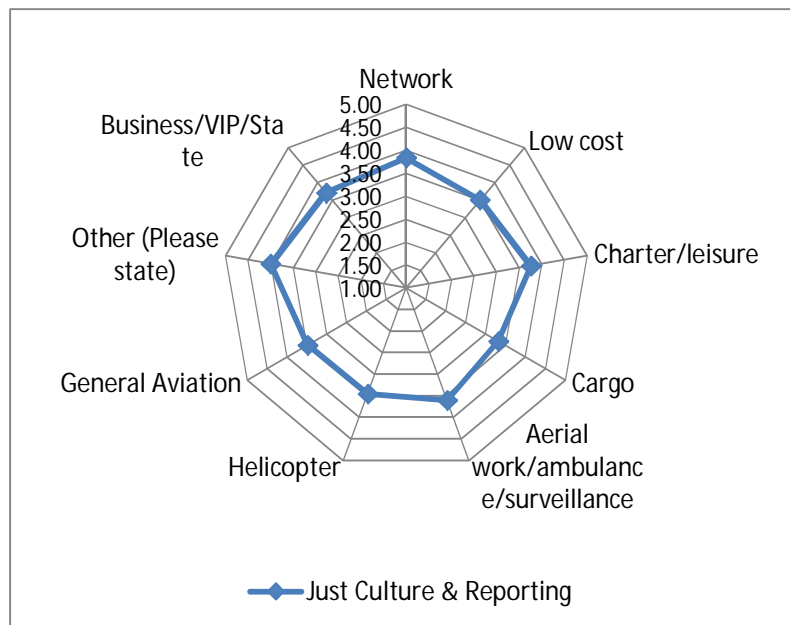
Post-hoc Games-Howell pairwise comparisons showed that Cargo reported significantly lower Just Culture scores than Business/VIP/State, Charter/Leisure, Low cost, Network. Low cost reported significantly lower Just Culture scores than Charter/Leisure and Network; and Helicopter reported significantly lower Just Culture scores than Network.

The effect sizes for Cargo and Charter/Leisure (Cohen's $d = 0.605879$), Cargo and Network (Cohen's $d = 0.721315$) are considered to be between low to medium, while Cargo and Business/VIP/State (Cohen's $d = 0.484291$), Low cost and Charter/Leisure (Cohen's $d = 0.367102$), Low cost and Network (Cohen's $d = 0.483891$), Helicopter and Network (Cohen's $d = 0.489924$) are considered to be close to medium and Cargo and Low cost (Cohen's $d = 0.244813$) is low.

The mean difference for Cargo and Charter/Leisure (-0.44415), Cargo and Network (-0.52099) are considered to be between low to medium and medium respectively, while Cargo and Business/VIP/State (-0.39219), Low cost and Charter/Leisure (-0.25853), Low cost and Network (-0.33537), Helicopter and Network (0.38199) and Cargo and Low cost (-0.18562) are considered to be low.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 40 Means for Just Culture by Company type



Communication & Learning

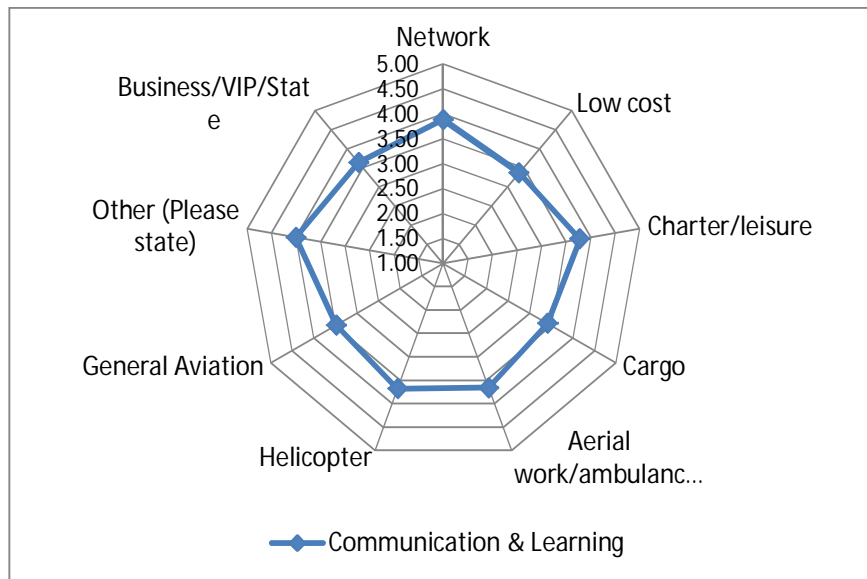
Post-hoc Games-Howell pairwise comparisons showed that both Cargo and Low cost companies reported significantly lower Communication & Learning scores than Charter/Leisure and Network at the .001 level of significance.

The effect sizes for Cargo and Charter/Leisure (Cohen's $d = 0.523037$), and Low cost and Charter/Leisure (Cohen's $d = 0.543103$) are considered to be medium, and Cargo and Network (Cohen's $d = 0.66243$), and Low cost and Network (Cohen's $d = 0.67202$.) are medium to high.

The mean difference for Cargo and Charter/Leisure (0.37175), and Low cost and Charter/Leisure (0.41658) and Cargo and Network (-0.46761) are considered to be low to medium, and Low cost and Network (-0.51243) is medium.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 41 Means for Communication & Learning by Company type



Risk Handling

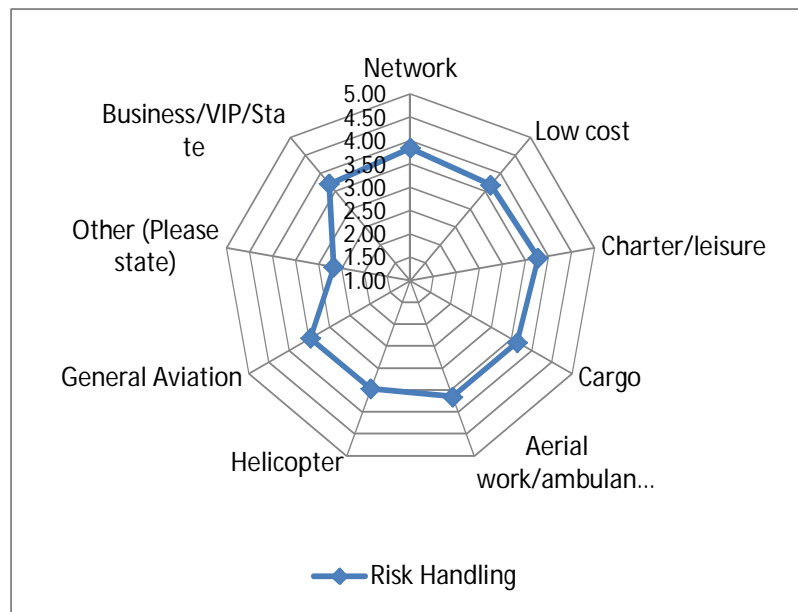
Post-hoc Games-Howell pairwise comparisons showed that Network reported significantly higher Risk Handling (risk prioritisation and management) scores than Cargo, Low cost and Helicopter at the .001 level of significance.

The effect sizes for Network and Cargo (Cohen's $d=0.273336$), and Network and Low cost (Cohen's $d= 0.22746$) are low and for Network and Helicopter (Cohen's $d=0.501206$) are considered to be medium.

The mean differences for Network and Cargo (0.18774) and Network and Low cost (0.15917) are low and for Network and Helicopter (0.36694) are considered to be medium.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 42 Means for Risk Handling by Company type



Colleague Commitment

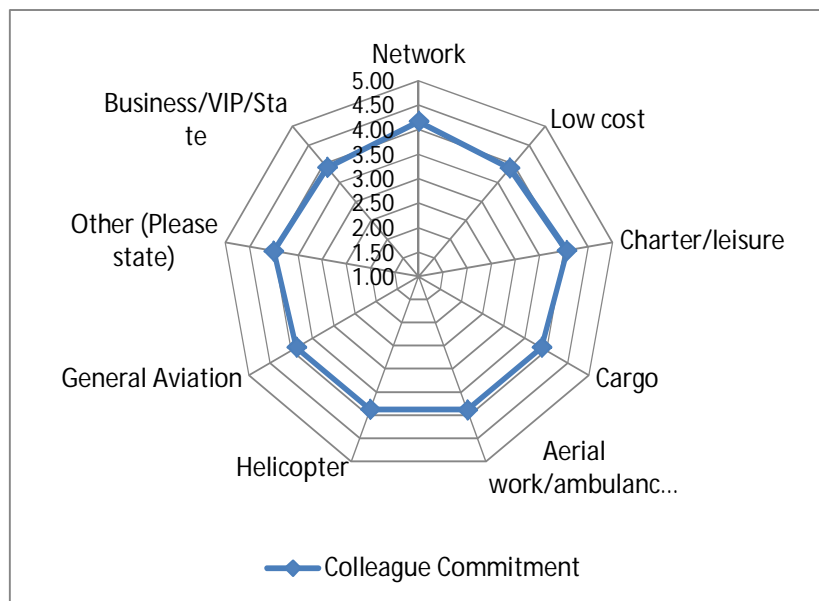
Post-hoc Games-Howell pairwise comparisons showed that Network reported significantly higher Colleague Commitment scores than Low cost, Cargo, Business/VIP/State and Helicopter. Charter/Leisure reported significantly higher Colleague Commitment scores than Low cost and Cargo at the .001 level of significance.

The effect sizes for Network and Low cost (Cohen's $d = 0.431989$), Network and Cargo (Cohen's $d = 0.435697$), Network and Business/VIP/State (Cohen's $d = 0.379847$), Network and Helicopter (Cohen's $d = 0.415645$) are considered to be between low and medium. Charter/Leisure and Low cost (Cohen's $d = 0.268583$), and Charter/Leisure Cargo (Cohen's $d = 0.271742$) are low.

The mean difference for Network and Low cost (0.27471), Network and Cargo (0.27635), Network and Business/VIP/State (0.25970), Network and Helicopter (0.28700), Charter/Leisure and Low cost (0.17521), and Charter/Leisure Cargo (0.17685) are all considered to be low.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 43 Means for Colleague Commitment by Company type



Staff & Equipment

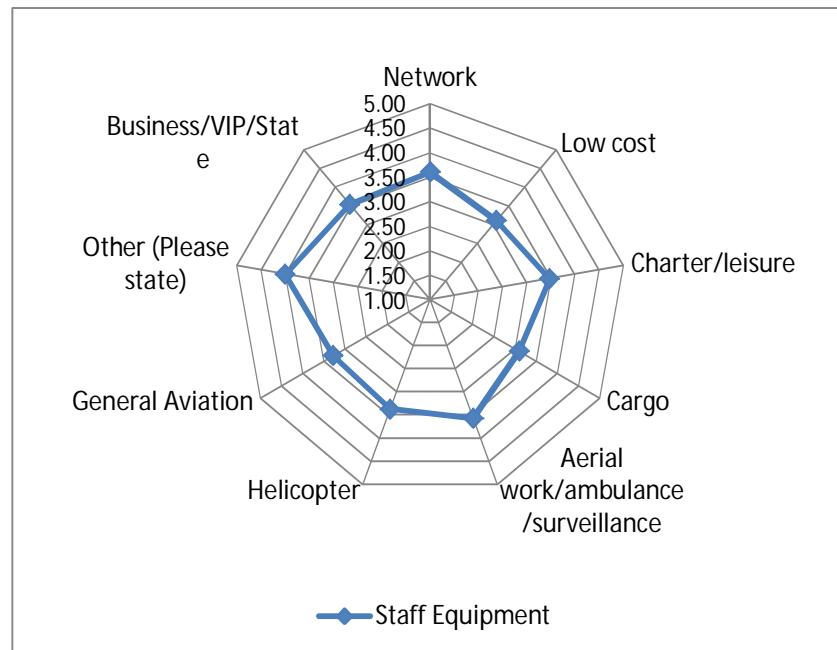
Post-hoc Games-Howell pairwise comparisons showed that both Cargo and Low cost companies reported significantly lower Staff & Equipment scores than Charter/Leisure and Business/VIP/State and Network airlines.

The effect sizes for Cargo and Charter/Leisure (Cohen’s $d = 0.431261$), Cargo and Business/VIP/State (Cohen’s $d = 0.511988$), and Cargo and Network airlines (Cohen’s $d = 0.603942$), and Low cost and Charter/Leisure (Cohen’s $d = 0.411263$), Low cost and Business/VIP/State (Cohen’s $d = 0.490101$), and Low cost and Network airlines (Cohen’s $d = 0.579428$) are all considered to be of medium effect size.

The mean difference for Cargo and Charter/Leisure (0.37349), Cargo and Business/VIP/State (-0.43799), and Low cost and Charter/Leisure (0.362914), Low cost and Business/VIP/State (-0.42742) and Low cost and Network airlines (0.49354) are all considered to be of low to medium effect size, and Cargo and Network airlines (-0.50412) is medium.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 44 Means for Staff & Equipment by Company type



Fatigue

Post-hoc Games-Howell pairwise comparisons showed that both Low cost and Cargo reported significantly lower scores on Fatigue (i.e. poorer scores) than every other company type (General Aviation, Aerial work/ambulance/surveillance, Helicopter Business/VIP/State, Charter/Leisure, Network). Aerial work/ambulance/surveillance reported significantly higher (more positive) scores on Fatigue than Charter and Network.

The effect sizes for Low cost and General Aviation (Cohen's $d = 0.961441$), Low cost and Aerial work/ambulance/surveillance (Cohen's $d = 1.3937$), Low cost and Helicopter (Cohen's $d = 0.716873$), Low cost and Business/VIP/State (Cohen's $d = 0.951748$), Low cost and Charter/Leisure (Cohen's $d = 0.668021$), and Low cost and Network (Cohen's $d = 0.718741$) are all high. Similarly, Cargo and General Aviation (Cohen's $d = 0.900396$), Cargo and Aerial work/ambulance/surveillance (Cohen's $d = 1.359779$), Cargo and Business/VIP/State (Cohen's $d = 0.889921$) are all high. Cargo and Helicopter (Cohen's $d = 0.646811$), Cargo and Charter/Leisure (Cohen's $d = 0.588398$), and Cargo and Network (Cohen's $d = 0.642194$) are all medium.

Aerial work/ambulance/surveillance and Charter (Cohen's $d = 0.735287$), and Aerial work/ambulance/surveillance and Network (Cohen's $d = 0.684848$) are medium to high.

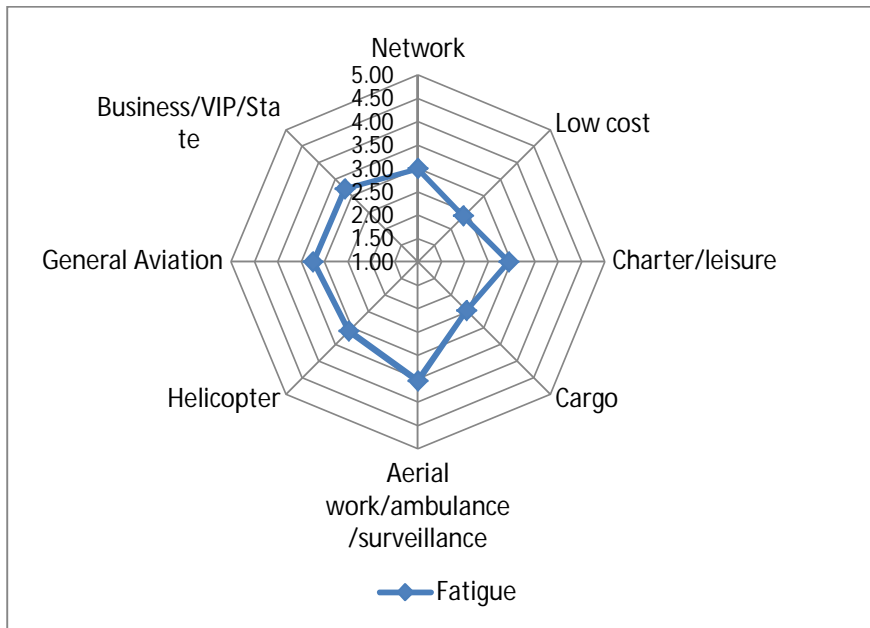
The mean difference for Low cost and General Aviation (-0.85816), Low cost and Aerial work/ambulance/surveillance (-1.16975), Low cost and Helicopter (-0.71401), Low cost and Business/VIP/State (-0.83196), Low cost and Charter/Leisure (-0.56877), and Low cost and Network (-0.61101) are all medium or high.

Similarly, Cargo and General Aviation (-0.76115), Cargo and Aerial work/ambulance/surveillance (-1.07274), Cargo and Business/VIP/State (-0.73495), Cargo and Helicopter (-0.61700), Cargo and Charter/Leisure (-0.47175), and Cargo and Network (-0.51400) are all medium or high. Aerial work/ambulance/surveillance and Charter (0.60099), and Aerial work/ambulance/surveillance and Network (0.55874) are medium to high.

To sum up, this shows that fatigue and fatigue management is considered poorest by pilots who work for Cargo and Low cost airlines and significantly more negative than pilots who work for other company types.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 45 Means for Fatigue by Company type



Speaking up

Post-hoc Games-Howell pairwise comparisons showed that Network pilots rated Speaking Up higher than Low cost and General aviation pilots.

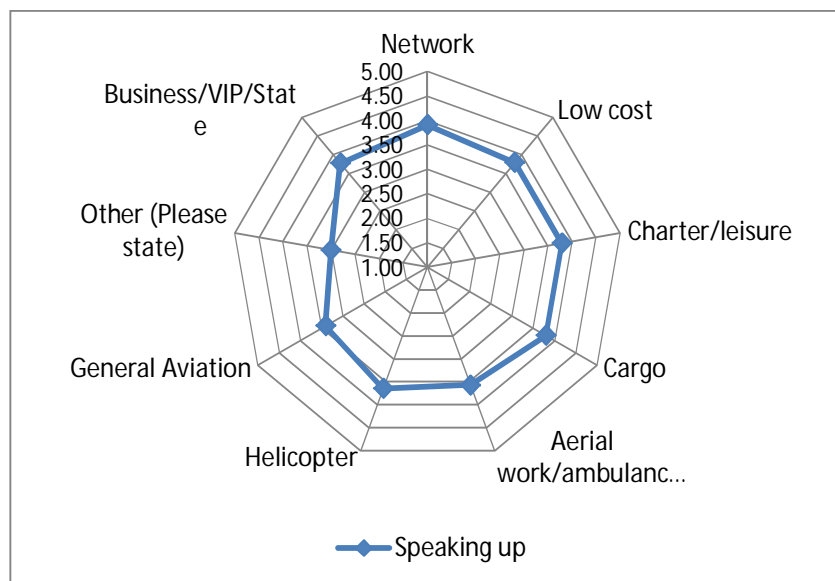
The effect sizes for Network and Low cost (Cohen's $d = 0.186182$) is low, and Network and General aviation (Cohen's $d = 0.744912$.) is considered to be medium to high.

The mean difference for Network and Low cost (0.12267) is low, and Network and General aviation (0.50595) is considered to be medium to high.

However, general Aviation pilots are often single pilot operations where 'speaking up' would not applicable.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 46 Means for Speaking Up by Company type



Perceived Organisational Support

Similar to the results found with Fatigue. Post-hoc Games-Howell pairwise comparisons showed that both Low cost and Cargo reported significantly lower scores on Perceived Organisational Support (POS) than every other company type (General Aviation, Aerial work/ambulance/surveillance, Helicopter Business/VIP/State, Charter/Leisure, Network). Business/VIP/State reported significantly higher scores on POS than Network.

The effect sizes for Low cost and General Aviation (Cohen's $d = 0.927929$), Low cost and Aerial work/ambulance/surveillance (Cohen's $d = 1.276184$), Low cost and Helicopter (Cohen's $d = 0.695834$), Low cost and Business/VIP/State (Cohen's $d = 1.093989$), Low cost and Charter/Leisure (Cohen's $d = 0.800569$) are all high, and Low cost and Network (Cohen's $d = 0.629447$) is medium to high.

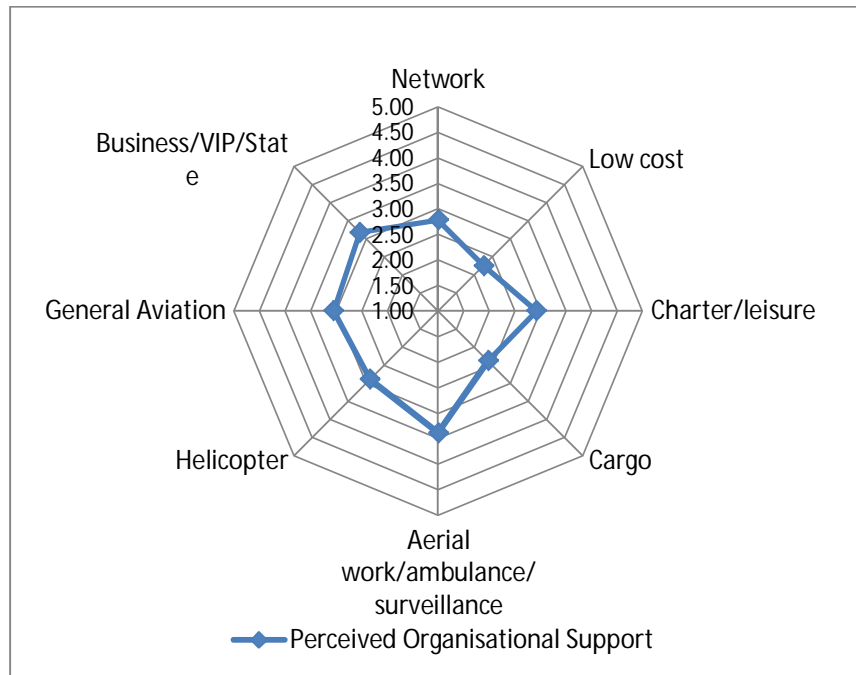
Cargo and General Aviation (Cohen's $d = 0.798518$), Cargo and Aerial work/ambulance/surveillance (Cohen's $d = 1.156615$), Cargo and Business/VIP/State (Cohen's $d = 0.965775$) are all considered to be high. Cargo and Charter/Leisure (Cohen's $d = 0.666153$) is high to medium, and Cargo and Helicopter (Cohen's $d = 0.570162$), and Cargo and Network (Cohen's $d = 0.491574$) are medium.

Business/VIP/State and Network (Cohen's $d = 0.462671$) is medium. The mean difference for Low cost and General Aviation (-0.79545), Low cost and Aerial work/ambulance/surveillance (-1.13238), Low cost and Business/VIP/State (-0.92274) are all high, Low cost and Helicopter (-0.63657), and Low cost and Charter/Leisure (-0.67141) and Low cost and Network (-0.52695) is medium to high.

Cargo and General Aviation (-0.67241), Cargo and Aerial work/ambulance/surveillance (-1.00934), Cargo and Business/VIP/State (-0.79970) are all considered to be medium to high. Cargo and Charter/Leisure (-0.54838) is medium, and Cargo and Helicopter (-0.51353) are medium, and Cargo and Network (-0.40391) is low to medium. Business/VIP/State and Network (0.52695) is medium.

Please see Appendix 3 Table 43 for percentage differences by company type per item.

Figure 47 Means for Perceived Organisational Support by Company type

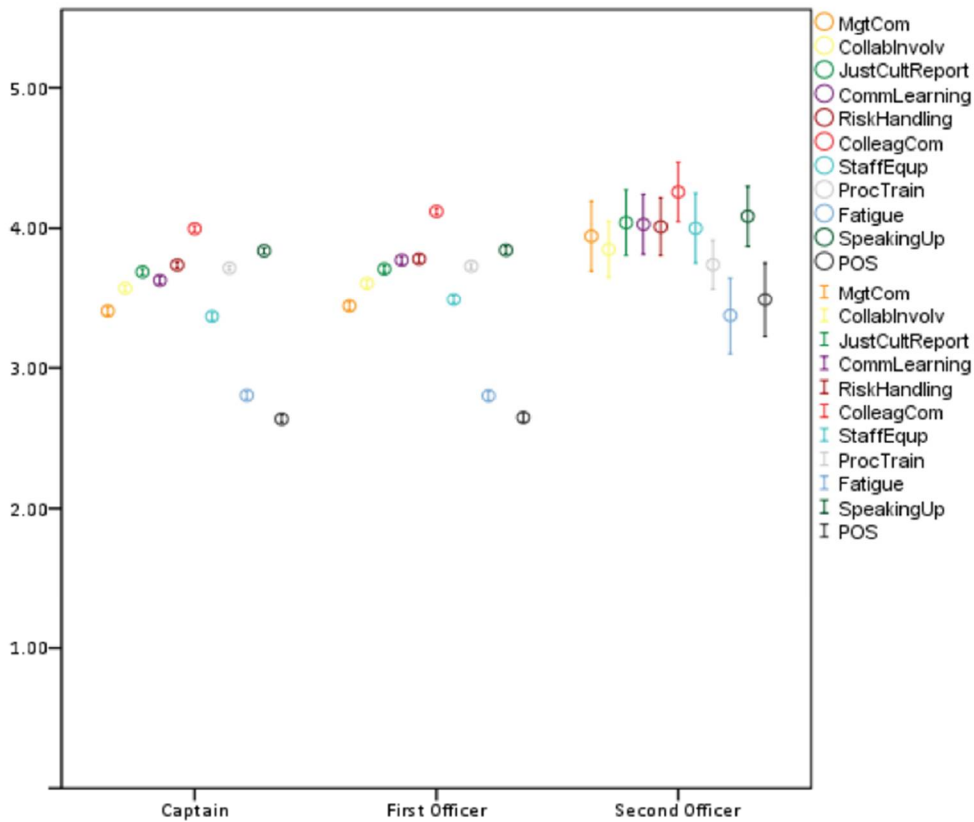


3.4.3.2. Job title

Summary overview

The figure below plots all of the mean scores (and error bars) for each safety culture dimension according to the job type of pilots.

Figure 48 Means and error bars for all dimensions by Job title



Overall, Captains had the most negative views and second officers held the most positive views, however there was a small sample of second officers. Captains and First Officers opinions were more similar.

The table below reports the mean scores for each safety culture dimension according to the job title of pilots.

Table 21 Mean scores by job type

	Job type		
	Captain	First Officer	Second Officer
Management Commitment to Safety	3.42	3.45	3.97
Collaboration & Involvement	3.59	3.61	3.86
Just Culture & Reporting	3.70	3.71	4.05
Communication & Learning	3.64	3.78	4.09
Risk Handling	3.75	3.79	4.01
Colleague Commitment	4.00	4.12	4.27
Staff Equipment	3.38	3.50	4.05
Procedures & Training	3.72	3.73	3.77
Fatigue	2.82	2.81	3.38
Speaking up	3.84	3.85	4.10
Perceived Organisational Support	2.65	2.65	3.49

Levene’s test of Homogeneity of Variance showed equal variance for all dimensions apart from Communication & Learning, Risk Handling, Staff & Equipment and Speaking up.

ANOVA showed that there were significant differences for all dimensions apart from Procedures & Training and Speaking up. Welch and Brown-Forsyth pairwise comparisons presented the same significant results, but additionally found no significant difference between Collaboration & Involvement, Just Culture and Risk Handling.

Table 22 shows significant ANOVA results for all dimensions apart from the Procedures & Training dimension.

Table 22 ANOVA overview of significant differences between groups for Job title

		Sum of Squares	df	Mean Square	F	Sig.
Management Commitment to Safety	Between Groups	22.261	2	11.130	13.641	.000
	Within Groups	5808.643	7119	.816		
	Total	5830.904	7121			
Collaboration & Involvement	Between Groups	5.693	2	2.847	6.651	.001
	Within Groups	2921.557	6826	.428		
	Total	2927.250	6828			
Just Culture & Reporting	Between Groups	7.956	2	3.978	7.765	.000
	Within Groups	3490.726	6814	.512		
	Total	3498.682	6816			
Communication & Learning	Between Groups	41.889	2	20.944	36.050	.000
	Within Groups	3961.102	6818	.581		
	Total	4002.991	6820			
Risk Handling	Between Groups	6.625	2	3.312	6.714	.001
	Within Groups	3383.648	6858	.493		
	Total	3390.273	6860			
Colleague Commitment	Between Groups	28.766	2	14.383	34.400	.000
	Within Groups	2997.512	7169	.418		
	Total	3026.279	7171			
Staff & Equipment	Between Groups	47.753	2	23.876	31.807	.000
	Within Groups	5141.967	6850	.751		
	Total	5189.720	6852			
Procedures & Training	Between Groups	.515	2	.257	.930	.395
	Within Groups	1885.132	6810	.277		
	Total	1885.647	6812			
Fatigue	Between Groups	20.233	2	10.117	12.862	.000
	Within Groups	5366.676	6823	.787		
	Total	5386.909	6825			
Speaking up	Between Groups	4.037	2	2.018	4.521	.011
	Within Groups	3040.338	6810	.446		
	Total	3044.375	6812			
Perceived Organisational Support	Between Groups	45.258	2	22.629	29.196	.000
	Within Groups	5206.959	6718	.775		
	Total	5252.217	6720			

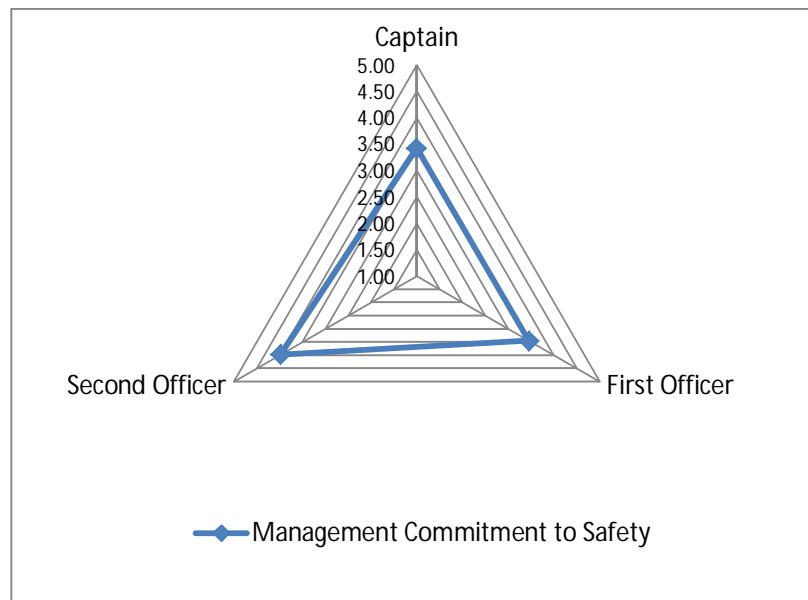
Management commitment

Post-hoc Games-Howell pairwise comparisons showed that Second Officers reported significantly higher management commitment scores than Captains and First Officers at the .001 level of significance.

The effect sizes for Second and Captains (Cohen's $d = 0.5954$) and Second Officers and First Officers (Cohen's $d = 0.569214$) are considered to be medium, based on statistical guidance (Cohen 1992).

The mean difference for Second Officers and Captains (0.55113) and Second Officers and First Officers (-0.52026) are considered to be medium.

Figure 49 Means for Management Commitment to Safety by Job title



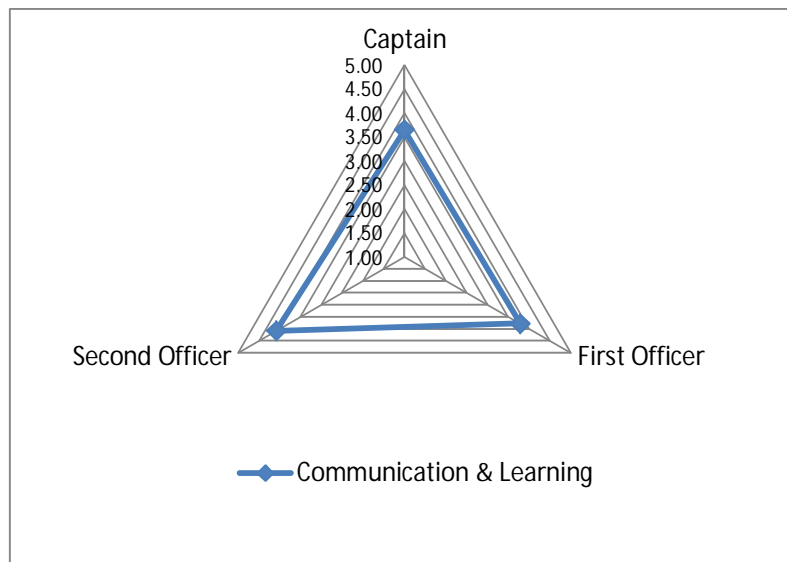
Communication & Learning

Post-hoc Games-Howell pairwise comparisons showed that Captains reported significantly lower Communication & Learning scores than First and Second Officers at the .001 level of significance.

The effect sizes for Captains and First Officers (Cohen's $d = 0.185369$) is low and for Captains and Second Officers (Cohen's $d = 0.554102$.) is considered to be medium.

The mean difference for Captains and First Officers (-0.14033) is low and for Captains and Second Officers (-0.44249) is considered to be medium.

Figure 50 Means for Communication & Learning by Job title

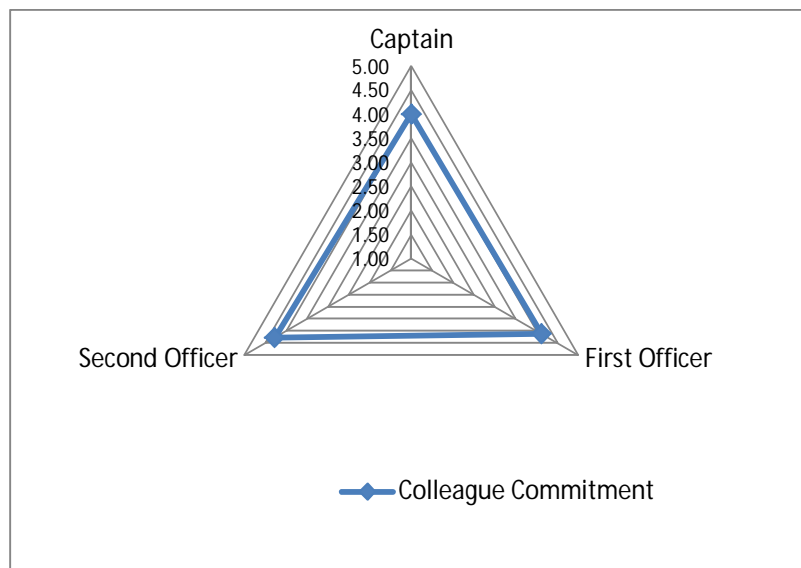


Colleague Commitment

Post-hoc Games-Howell pairwise comparisons showed that Captains reported significantly lower Colleague Commitment scores than First Officers at the .001 level of significance.

The effect sizes for Captains and First Officers (Cohen's $d = 0.187682$) is low.

Figure 51 Means for Colleague Commitment by Job title



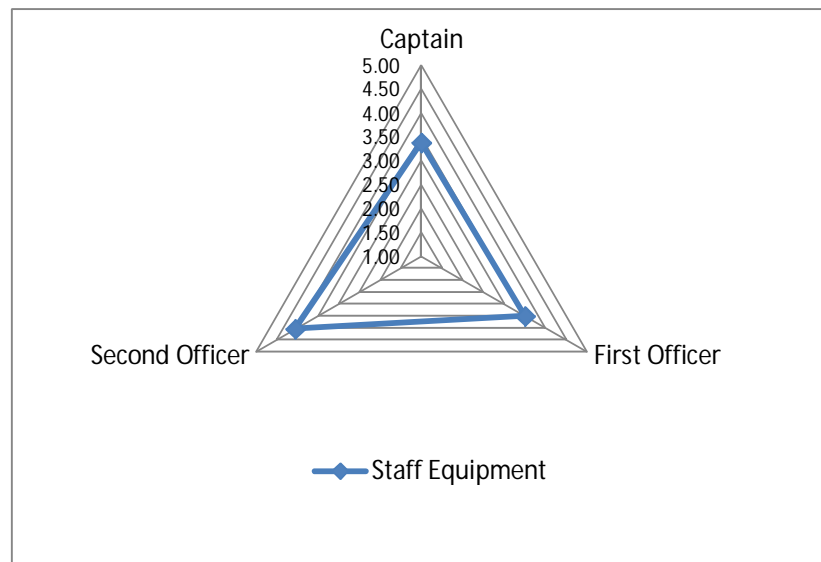
Staff and Equipment

Post-hoc Games-Howell pairwise comparisons showed that Second Officers reported significantly higher Staff and Equipment scores than Captains and First Officers, and First Officers reported significantly higher Staff and Equipment scores than Captains.

The effect sizes for Second Officer and Captains (Cohen's $d = 0.73056$), Second Officer and First Officers (Cohen's $d = 0.620305$) are considered to be quite high and First Officer and Captain (Cohen's $d = 0.138603$) to be low.

The mean difference for Second Officer and Captains (0.66700), Second Officer and First Officers (0.54761) are all considered to be medium to high and First Officer and Captain (0.11938) to be low.

Figure 52 Means for Staff & Equipment by Job title



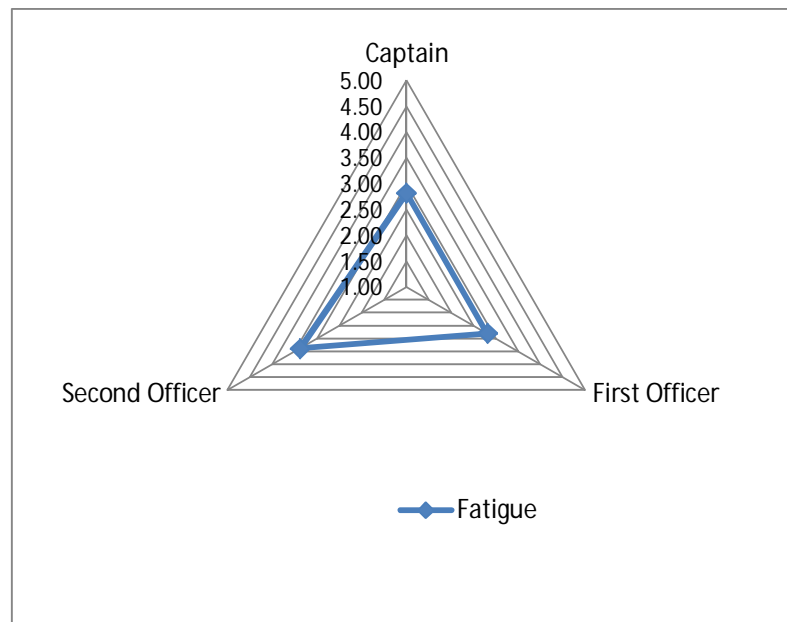
Fatigue

Post-hoc Games-Howell pairwise comparisons showed that Second Officers reported significantly Fatigue scores than Captains and First Officers at the .001 level of significance.

The effect sizes for Second Officer and Captains (Cohen's $d = 0.578475$) and Second Officers and First Officers (Cohen's $d = 0.592116$) are all considered to be medium.

The mean difference for Second Officer and Captains (0.56271) and Second Officers and First Officers (0.57268) are considered to be medium.

Figure 53 Means for Fatigue by Job title



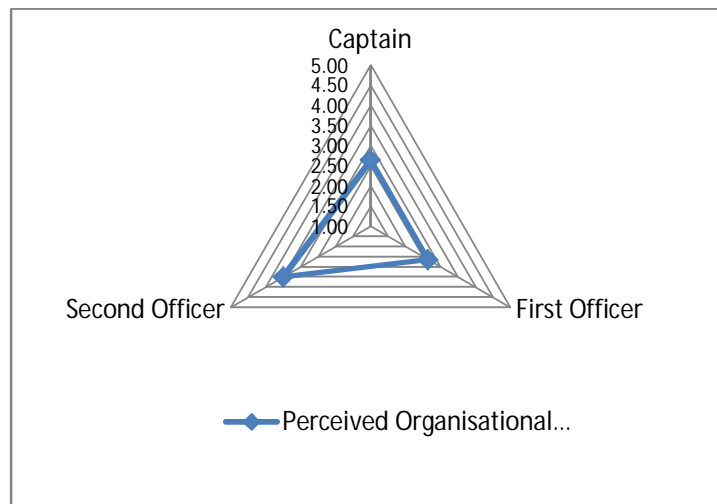
Perceived Organisational Support

Post-hoc Games-Howell pairwise comparisons showed that Second Officers reported significantly Fatigue scores than Captains and First Officers at the .001 level of significance.

The effect sizes for Second Officer and Captains (Cohen's $d = 0.88641$) and Second Officer and First Officers (Cohen's $d = 0.887179$) are considered to be high.

The mean difference for Second Officer and Captains (0.84511) and Second Officer and Captains (0.84475) are all considered to be high.

Figure 54 Means for Perceived Organisational Support by Job title

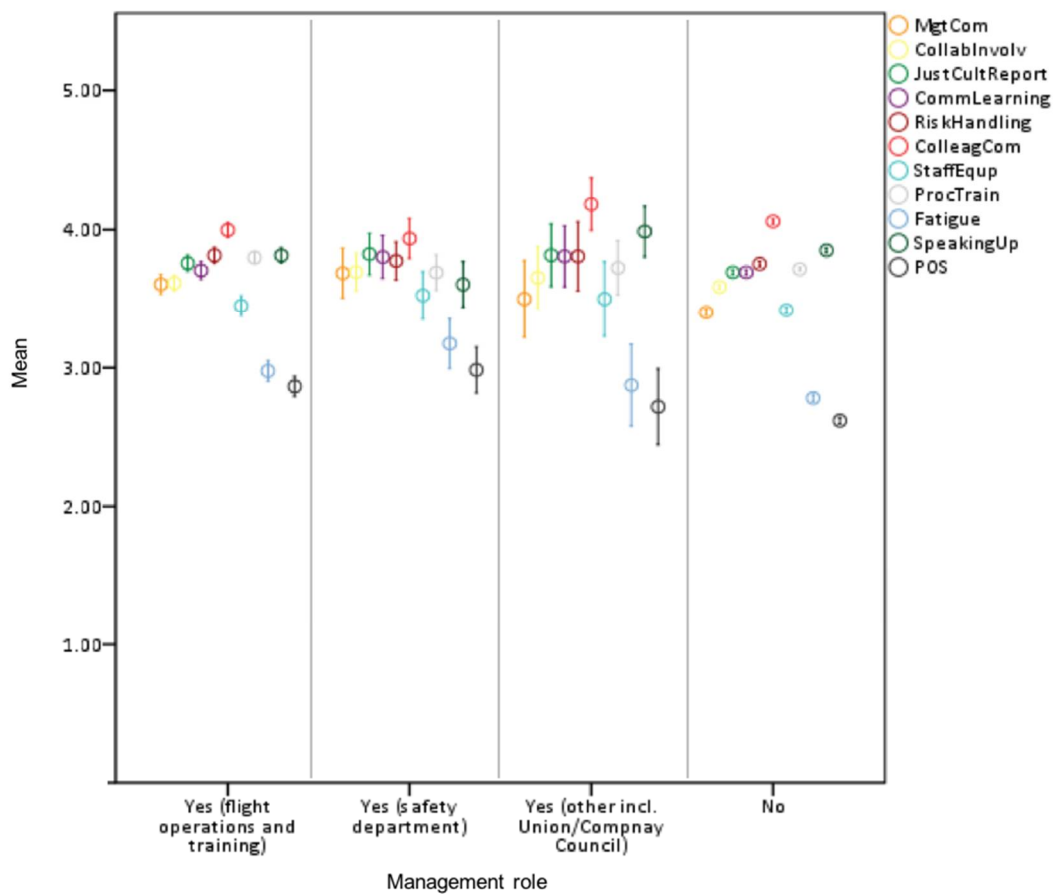


3.4.3.3. Management role

Summary overview

The figure below plots all of the mean scores (and error bars) for each safety culture dimension according to whether they had a management role.

Figure 55 Means and error bars for all dimensions by Management Role



Pilots with a management role, either in operations, training or safety have a significantly more positive perception than those who do not hold any management role, across a number of safety culture dimensions. This may be because these pilots are potentially in a position of power to make changes to improve safety, therefore there may be self-desirability bias here. Alternatively, perhaps those in management positions do not hear or witness as many operational problems, because they are hidden from them, or it may reflect communication issues, i.e. pilots in management positions are more aware of the reasons behind changes to SOPs, and therefore understand them better.

The table below reports the mean scores for each safety culture dimension according to whether pilots had management role.

Table 23 Mean scores by management role

	Management role			
	Yes (flight operations and training)	Yes (safety department)	Yes (other incl. Union/Company Council)	No
Management Commitment to Safety	3.64	3.71	3.48	3.41
Collaboration & Involvement	3.63	3.70	3.63	3.60
Just Culture & Reporting	3.78	3.84	3.81	3.70
Communication & Learning	3.72	3.84	3.82	3.70
Risk Handling	3.82	3.77	3.80	3.76
Colleague Commitment	4.01	3.94	4.17	4.06
Staff Equipment	3.48	3.57	3.50	3.43
Procedures & Training	3.81	3.72	3.73	3.72
Fatigue	3.01	3.21	2.89	2.79
Speaking up	3.81	3.65	3.98	3.86
Perceived Organisational Support	2.89	2.98	2.75	2.62

Levene’s Tests of Homogeneity of Variance were satisfied for all dimensions, apart from Speaking up.

ANOVA and Welch and Brown-Forsyth both found significant differences for Management Commitment, Procedures & Training, Fatigue and Perceived Organisational Support. Table 24 shows the ANOVA results.

Table 24 ANOVA overview of significant differences between groups for management role

		Sum of Squares	df	Mean Square	F	Sig.
Management Commitment to Safety	Between Groups	41.660	3	13.887	17.107	.000
	Within Groups	5778.957	7119	.812		
	Total	5820.617	7122			
Collaboration & Involvement	Between Groups	1.855	3	.618	1.447	.227
	Within Groups	2918.153	6829	.427		
	Total	2920.008	6832			
Just Culture & Reporting	Between Groups	6.891	3	2.297	4.483	.004
	Within Groups	3491.597	6814	.512		
	Total	3498.488	6817			
Communication & Learning	Between Groups	2.764	3	.921	1.571	.194
	Within Groups	4000.678	6819	.587		
	Total	4003.443	6822			
Risk Handling	Between Groups	2.290	3	.763	1.547	.200
	Within Groups	3384.730	6860	.493		
	Total	3387.020	6863			
Colleague Commitment	Between Groups	3.912	3	1.304	3.092	.026
	Within Groups	3022.810	7169	.422		
	Total	3026.722	7172			
Staff & Equipment	Between Groups	3.762	3	1.254	1.661	.173
	Within Groups	5173.399	6851	.755		
	Total	5177.161	6854			
Procedures & Training	Between Groups	5.304	3	1.768	6.423	.000
	Within Groups	1873.812	6807	.275		
	Total	1879.116	6810			
Fatigue	Between Groups	45.807	3	15.269	19.523	.000
	Within Groups	5336.372	6823	.782		
	Total	5382.179	6826			
Speaking up	Between Groups	6.295	3	2.098	4.703	.003
	Within Groups	3037.140	6807	.446		
	Total	3043.435	6810			
Perceived Organisational Support	Between Groups	53.923	3	17.974	23.364	.000
	Within Groups	5168.230	6718	.769		
	Total	5222.153	6721			

Management Commitment

Post-hoc Games-Howell pairwise comparisons showed that pilots who hold a managerial position in flight operations or training reported significantly higher Management Commitment to Safety scores than pilots with no managerial role at the .001 level of significance.

The effect sizes between Managerial role in flight operations or training and no managerial role groups (Cohen's $d = 0.258926$) is considered to be low.

Figure 56 Means for Management Commitment by Management Role

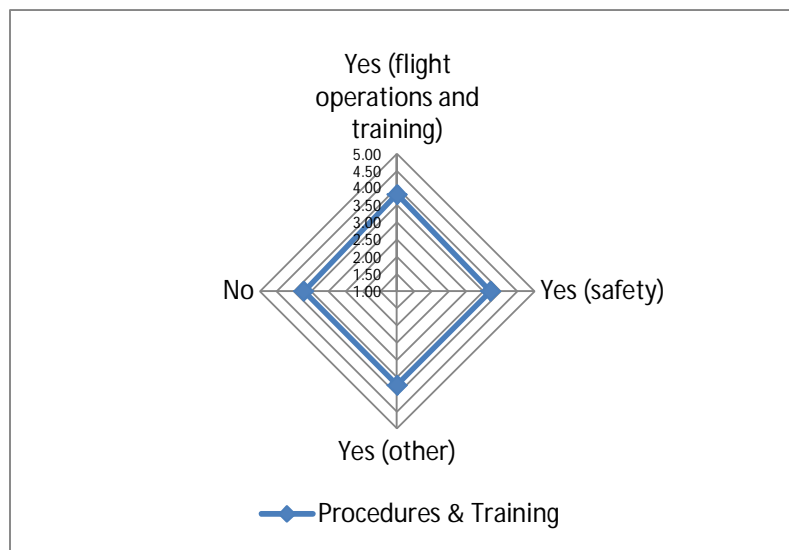


Procedures & Training

Post-hoc Games-Howell pairwise comparisons showed that pilots who hold a managerial position in flight operations or training reported significantly higher Procedures & Training to Safety scores than pilots with no managerial role at the .001 level of significance.

The effect sizes between Managerial role in flight operations or training and no managerial role groups (Cohen's $d = 0.183197$) is considered to be low.

Figure 57 Means for Procedures & Training by Management Role

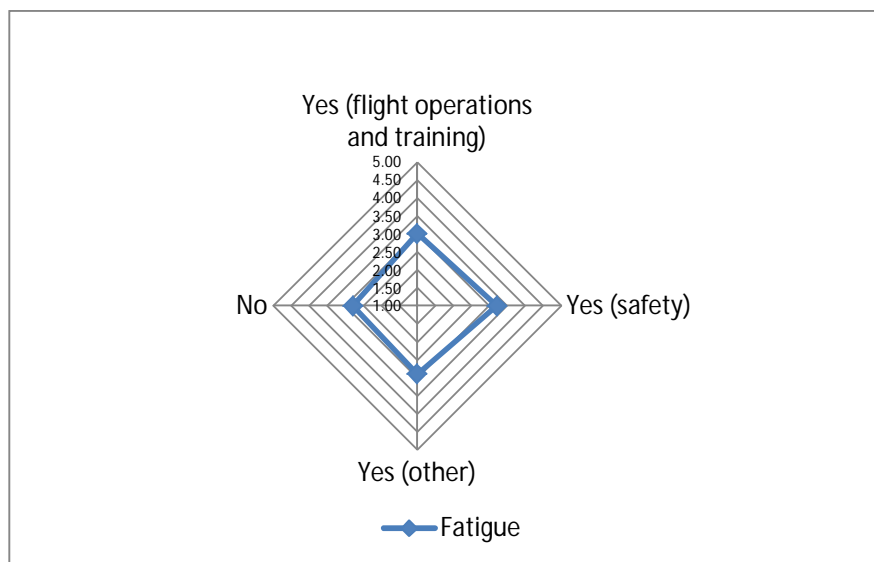


Fatigue

Post-hoc Games-Howell pairwise comparisons showed that pilots who hold a managerial position in flight operations or training, or in the safety department, reported significantly higher (more positive) Fatigue scores than pilots with no managerial role at the .001 level of significance.

The effect sizes between Managerial role in flight operations or training and no managerial role groups (Cohen's $d = 0.245071$) is considered to be low, and between Managerial role in safety and no managerial role groups (Cohen's $d = 0.481588$) is medium.

Figure 58 Means for Fatigue by Management Role

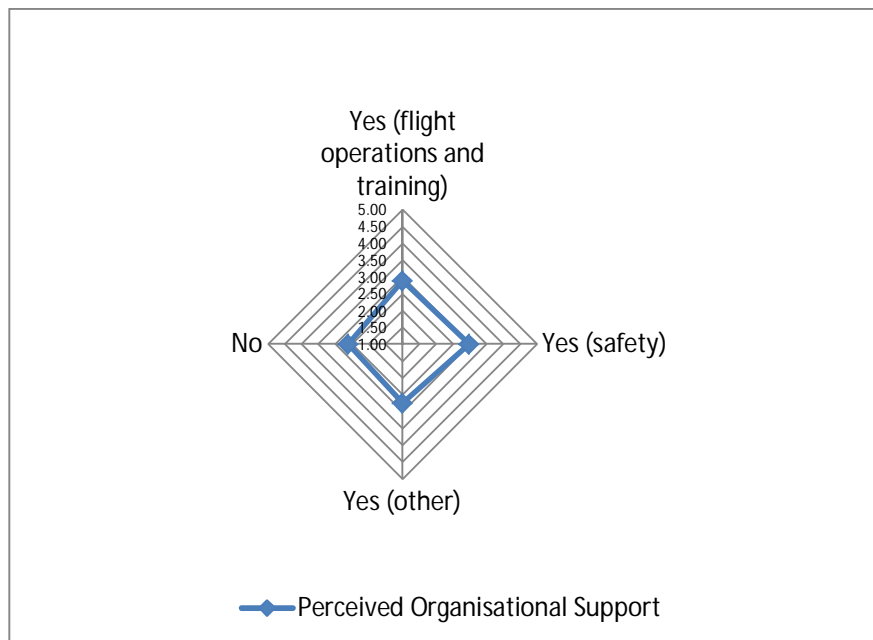


Perceived Organisational Support

Post-hoc Games-Howell pairwise comparisons showed that pilots who hold a managerial position in flight operations or training, or in the safety department, reported significantly higher Perceived Organisational Support scores than pilots with no managerial role at the .001 level of significance.

The effect sizes between Managerial role in flight operations or training and no managerial role groups (Cohen's $d = 0.302861$) is considered to be low, and between Managerial role in safety and no managerial role groups (Cohen's $d = 0.42402$) is between low and medium.

Figure 59 Means for Procedures & Training by Management Role

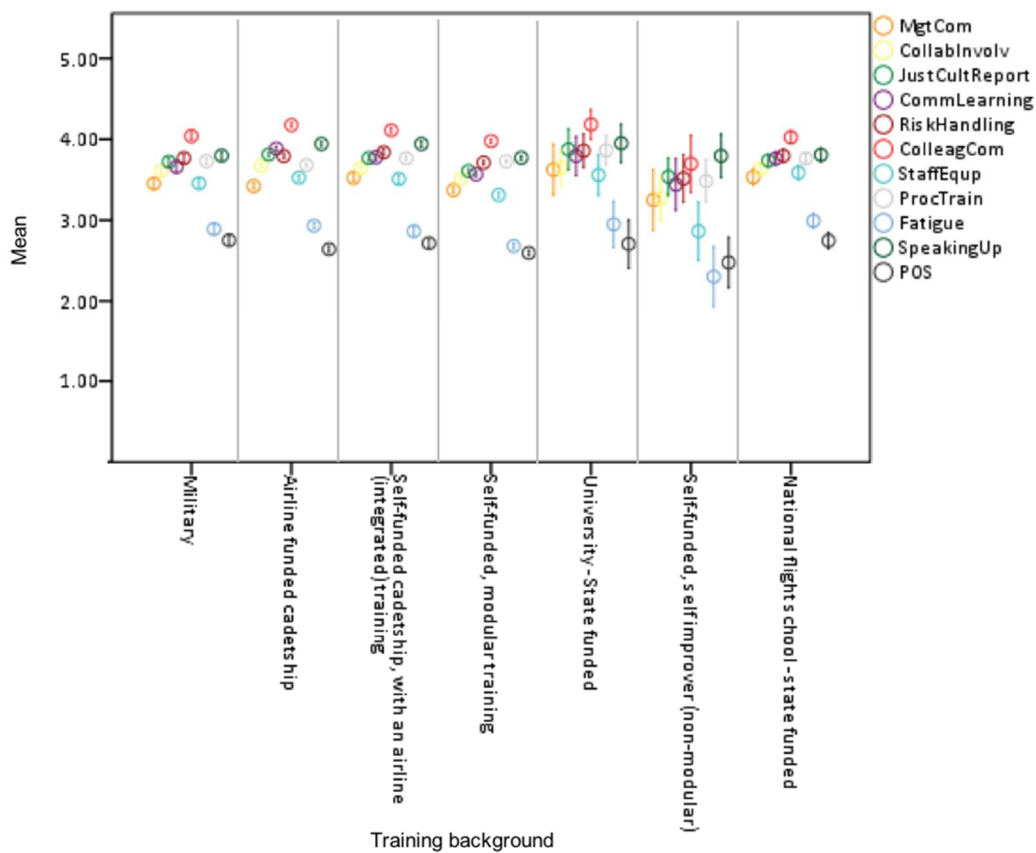


3.4.3.4. Training background

Summary overview

The figure below plots all of the mean scores (and error bars) for each safety culture dimension according to their training background.

Figure 60 Means and error bars for all dimensions by Training background (other not included)



Pilots that have had self-funded modular training generally have a significantly more negative perception across dimensions compared with those with self-funded cadetship with an airline (integrated) training or Airline funded cadetship.

The table below reports the mean scores for each safety culture dimension according to the training background of pilots.

Table 25 Mean scores by training background

	Training background							
	Military	Airline funded cadetship	Self-funded cadetship, with an airline (integrated) training	Self-funded, modular training	Other	University - State funded	Self-funded, self improver (non-modular)	National flight school - state funded
Management Commitment to Safety	3.47	3.43	3.54	3.39	3.49	3.61	3.25	3.53
Collaboration & Involvement	3.62	3.68	3.66	3.52	3.53	3.65	3.27	3.63
Just Culture & Reporting	3.73	3.82	3.77	3.61	3.71	3.88	3.54	3.74
Communication & Learning	3.68	3.89	3.79	3.58	3.61	3.80	3.44	3.76
Risk Handling	3.77	3.80	3.85	3.72	3.75	3.85	3.52	3.80
Colleague Commitment	4.03	4.18	4.12	3.98	3.87	4.18	3.70	4.03
Staff Equipment	3.46	3.54	3.52	3.32	3.52	3.56	2.86	3.58
Procedures & Training	3.73	3.69	3.77	3.73	3.70	3.87	3.48	3.76
Fatigue	2.91	2.94	2.87	2.69	2.81	2.96	2.30	2.99
Speaking up	3.80	3.94	3.95	3.78	3.64	3.96	3.80	3.80
Perceived Organisational Support	2.77	2.64	2.71	2.60	2.74	2.71	2.48	2.75

Levene’s Tests of Homogeneity of Variance were violated for all dimensions, apart from Procedures & Training.

ANOVA and Welch and Brown-Forsyth both identified significant differences represented in all dimensions. The table below shows the ANOVA results.

Table 26 ANOVA overview of significant differences between groups for training background

		Sum of Squares	df	Mean Square	F	Sig.
Management Commitment to Safety	Between Groups	25.244	7	3.606	4.437	.000
	Within Groups	5744.132	7067	.813		
	Total	5769.376	7074			
Collaboration & Involvement	Between Groups	35.272	7	5.039	11.899	.000
	Within Groups	2869.157	6775	.423		
	Total	2904.430	6782			
Just Culture & Reporting	Between Groups	51.941	7	7.420	14.681	.000
	Within Groups	3418.802	6764	.505		
	Total	3470.743	6771			
Communication & Learning	Between Groups	114.969	7	16.424	28.794	.000
	Within Groups	3859.862	6767	.570		
	Total	3974.830	6774			
Risk Handling	Between Groups	17.368	7	2.481	5.041	.000
	Within Groups	3350.828	6808	.492		
	Total	3368.196	6815			
Colleague Commitment	Between Groups	53.134	7	7.591	18.422	.000
	Within Groups	2930.884	7113	.412		
	Total	2984.018	7120			
Staff & Equipment	Between Groups	76.222	7	10.889	14.586	.000
	Within Groups	5076.415	6800	.747		
	Total	5152.637	6807			
Procedures & Training	Between Groups	7.308	7	1.044	3.792	.000
	Within Groups	1860.072	6757	.275		
	Total	1867.380	6764			
Fatigue	Between Groups	97.016	7	13.859	17.884	.000
	Within Groups	5249.474	6774	.775		
	Total	5346.490	6781			
Speaking up	Between Groups	44.416	7	6.345	14.414	.000
	Within Groups	2973.636	6755	.440		
	Total	3018.053	6762			
Perceived Organisational Support	Between Groups	26.373	7	3.768	4.845	.000
	Within Groups	5187.926	6672	.778		
	Total	5214.299	6679			

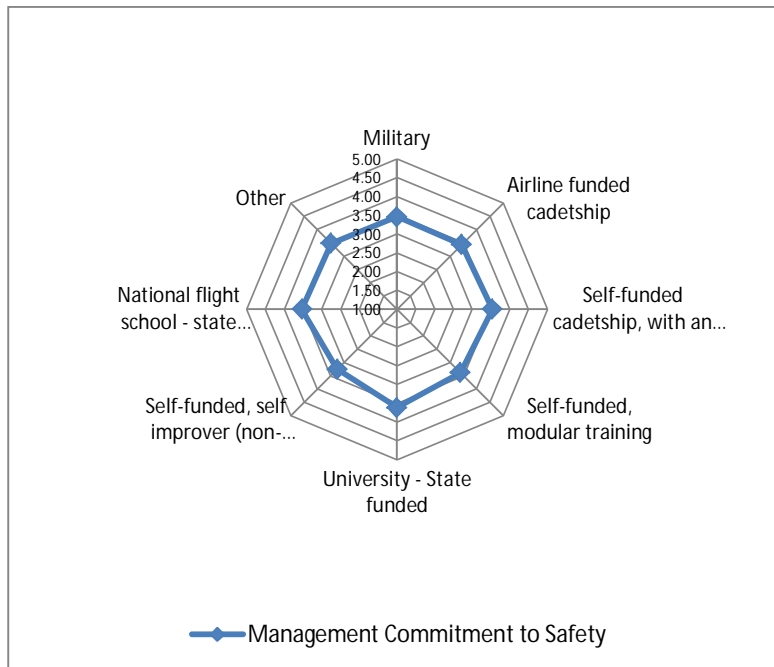
Management Commitment

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through self-funded modular training reported significantly lower Management Commitment to Safety scores than pilots who trained through a self-funded cadetship with an airline (integrated) training, at the .001 level of significance.

The effect sizes between these two groups (Cohen's $d = 0.163361$) is considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 61 Means for Management Commitment by Training background



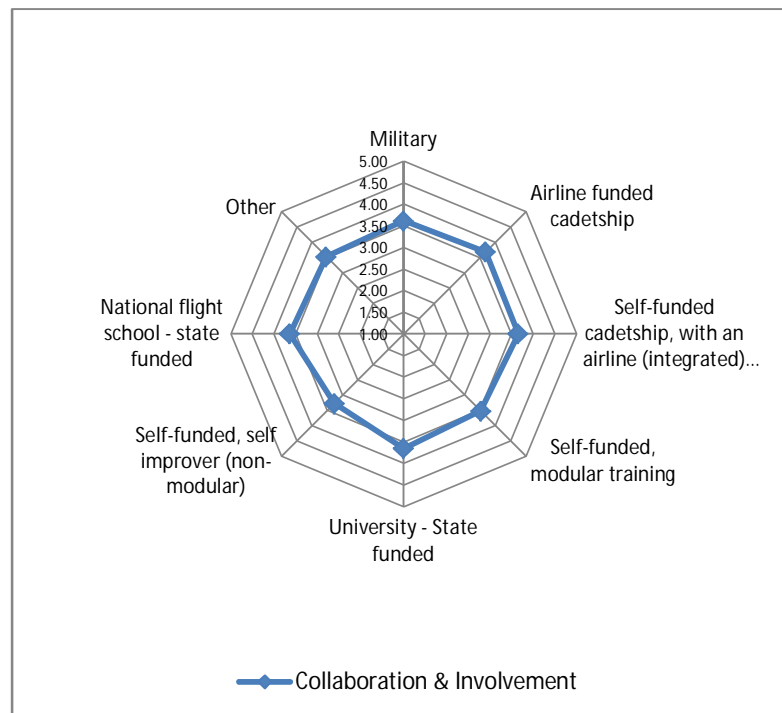
Collaboration & Involvement

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded modular training, reported significantly lower Collaboration & Involvement scores than pilots who trained through an Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training, at the .001 level of significance.

The effect sizes between Airline funded cadetship and self-funded modular training (Cohen's $d = 0.250584$), and between self-funded modular training and self-funded cadetship with an airline (integrated) training (Cohen's $d = 0.200548$) are considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 62 Means for Collaboration & Involvement by Training background



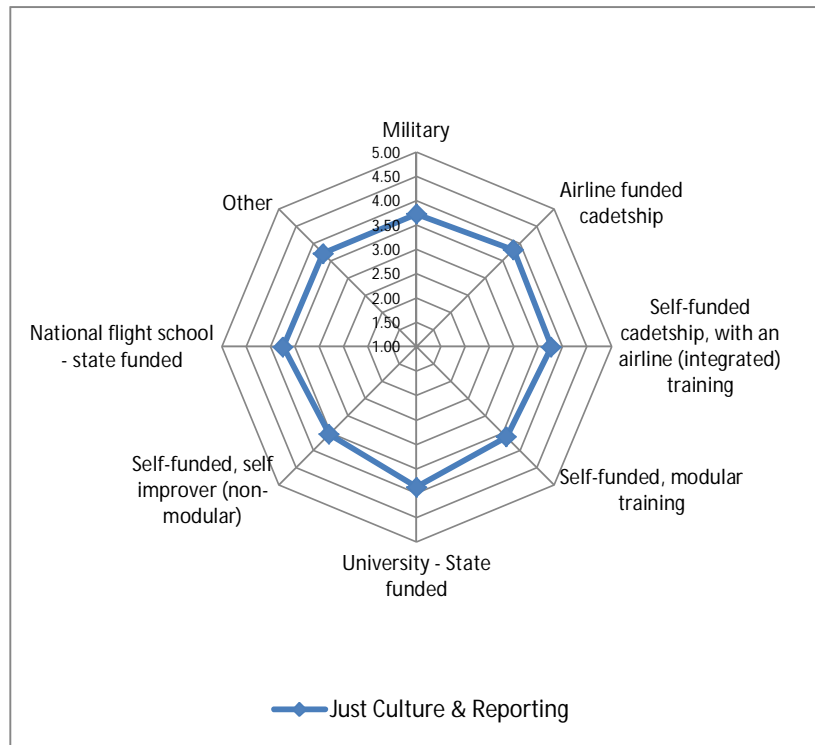
Just Culture

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded modular training, reported significantly lower Collaboration & Involvement scores than pilots who trained through an Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training, at the .001 level of significance.

The effect sizes between Airline funded cadetship and self-funded modular training (Cohen’s $d = 0.294639$), and between self-funded modular training and self-funded cadetship with an airline (integrated) training (Cohen’s $d = 0.214277$) are considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 63 Means for Just Culture by Training background



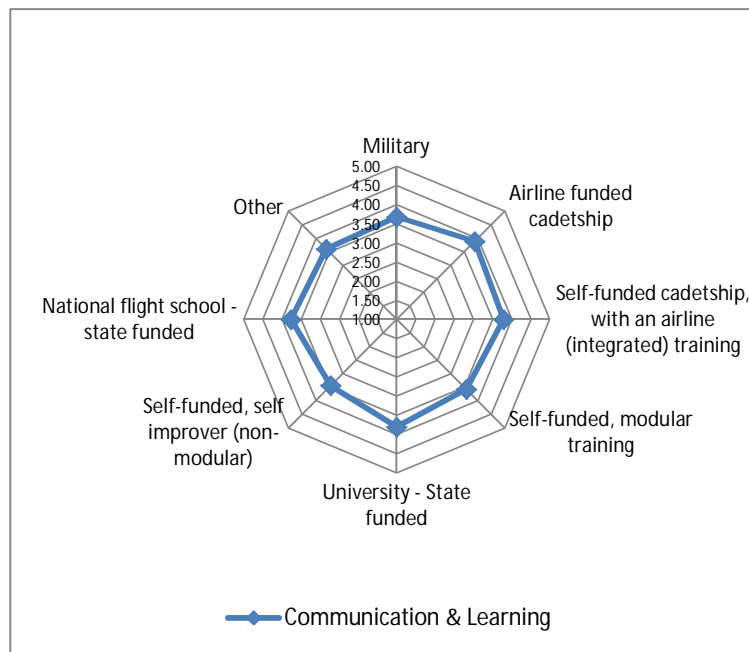
Communication & Learning

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded modular training, reported significantly lower Communication & Learning scores than pilots who trained through an Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training, and those who trained at a National flight school that was state funded, all at the .001 level of significance. Pilots who trained via Airline funded cadetship had significantly higher scores than those who learned to fly in the military.

The effect sizes between Airline funded cadetship and self-funded cadetship with an airline (integrated) training (Cohen's $d = 0.145553$), and between Airline funded cadetship and National flight school (Cohen's $d = 0.197043$), and between Airline funded cadetship and Military training (Cohen's $d = 0.298874$) are all considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 64 Means for Communication & Learning by Training background



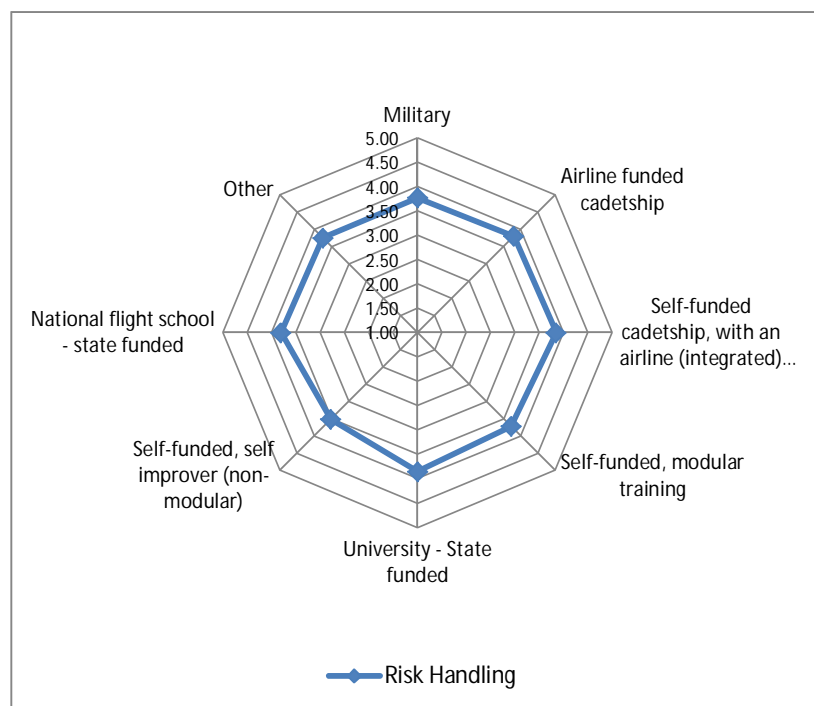
Risk Handling

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through self-funded modular training reported significantly lower Risk Handling to Safety scores than pilots who trained through a self-funded cadetship with an airline (integrated) training, at the .001 level of significance.

The effect sizes between these two groups (Cohen's $d = 0.176751$) is considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 65 Risk Handling by Training background



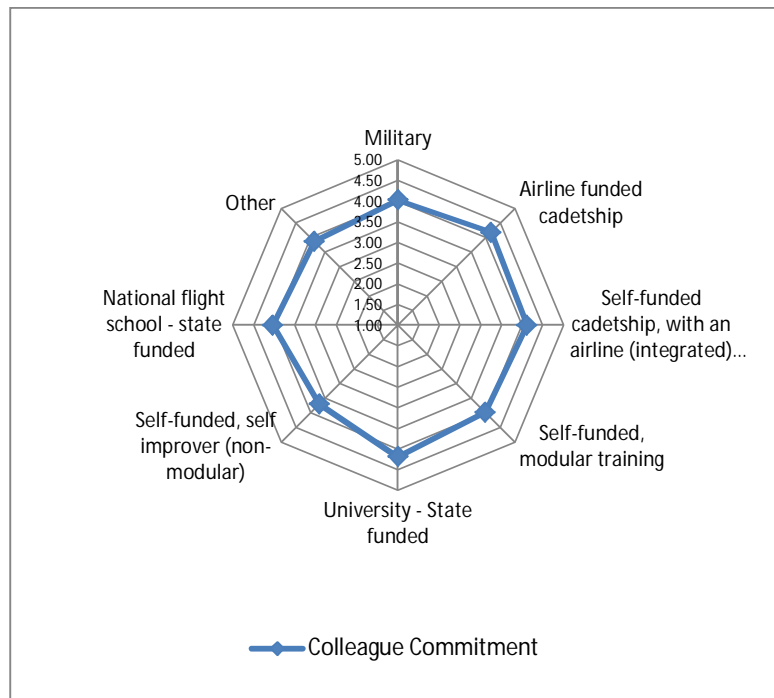
Colleague Commitment

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded modular training, reported significantly lower Colleague Commitment scores than pilots who trained through an Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training, at the .001 level of significance. Pilots who trained via Airline funded cadetship had significantly higher scores than those who learned to fly in the military.

The effect sizes between self-funded modular training and self-funded cadetship with an airline (integrated) training (Cohen’s $d = 0.210317$), and between a self-funded modular training and Airline funded cadetship (Cohen’s $d = 0.313743$), and between Airline funded cadetship and Military training (Cohen’s $d = 0.237097$) are all considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 66 Means for Colleague Commitment by Training background



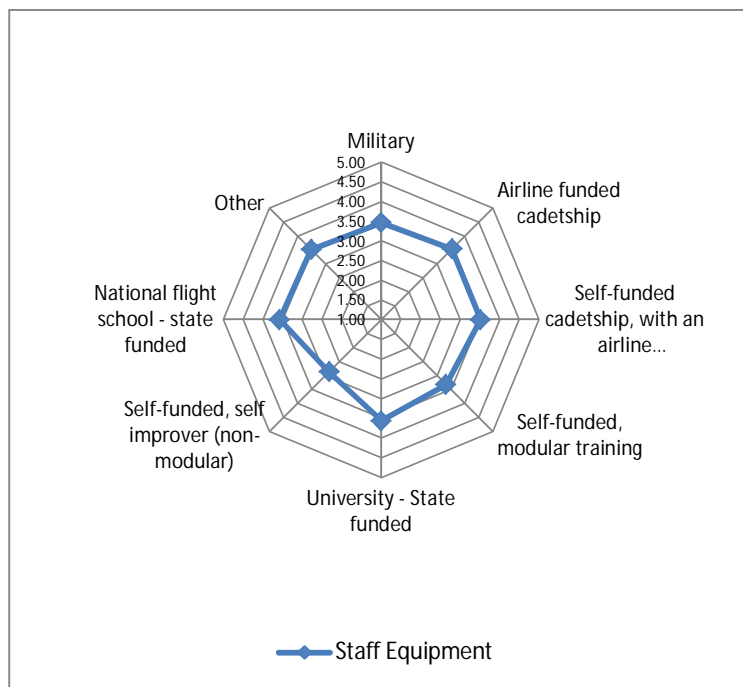
Staff & Equipment

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded modular training reported significantly lower Staff & Equipment scores than pilots who trained through an Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training, and those who trained at a National flight school, all at the .001 level of significance.

The effect sizes between self-funded modular training and self-funded cadetship with an airline (integrated) training (Cohen's $d = 0.216115$), and between a self-funded modular training and Airline funded cadetship (Cohen's $d = 0.256828$), and between a self-funded modular training and National flight school (Cohen's $d = 0.302349$) are all considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 67 Means for Staff & Equipment by Training background



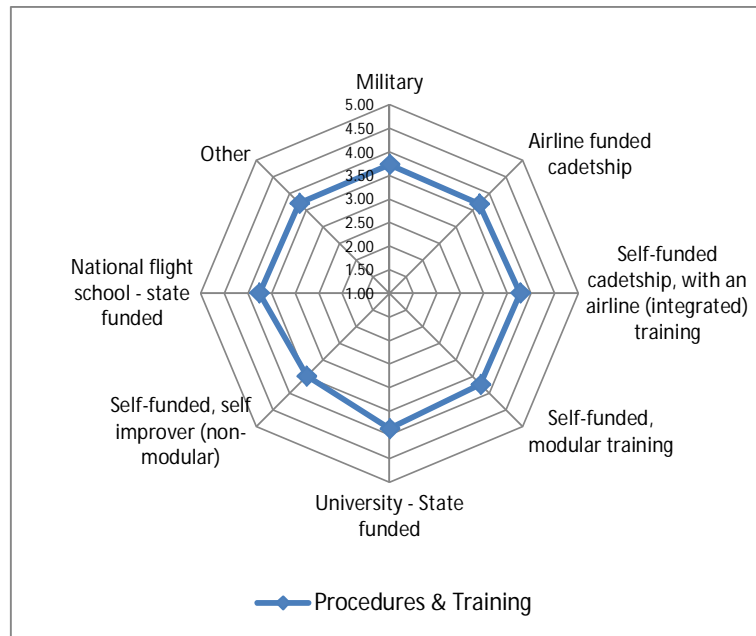
Procedures & Training

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded cadetship with an airline (integrated) training reported significantly lower Procedures & Training scores than pilots who trained through an Airline funded cadetship.

The effect sizes between self-funded cadetship with an airline (integrated) training and Airline funded cadetship (Cohen's $d = 0.163135$) is considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 68 Means for Procedures & Training by Training background



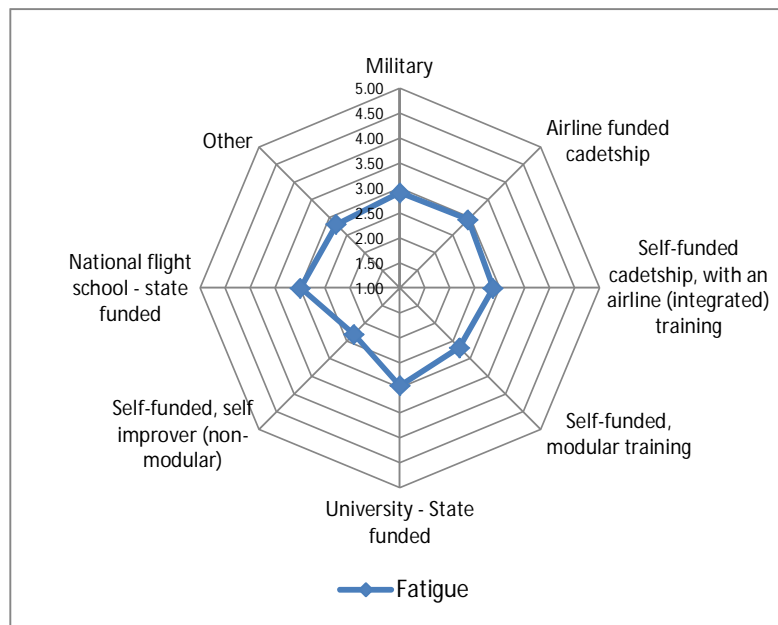
Fatigue

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded modular training reported significantly lower (more negative) Fatigue management scores than pilots who trained through an Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training, and those who trained at a National flight school, and who had Military training, all at the .001 level of significance.

The effect sizes between self-funded modular training and self-funded cadetship with an airline (integrated) training (Cohen's $d = 0.196105$), and between a self-funded modular training and Airline funded cadetship (Cohen's $d = 0.296761$), and between a self-funded modular training and National flight school (Cohen's $d = 0.352747$), and between a self-funded modular training and Military training (Cohen's $d = 0.246649$) are all considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 69 Means for Fatigue by Training background



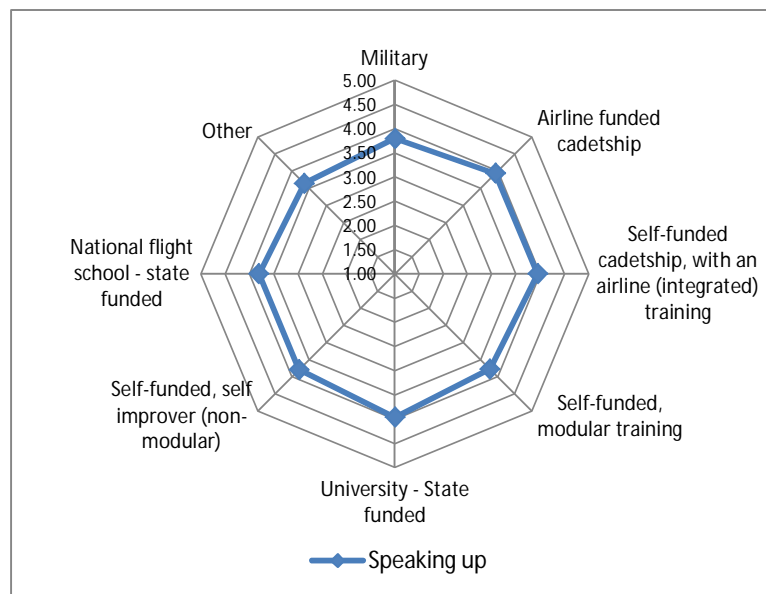
Speaking Up

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through a self-funded modular training reported significantly lower speaking up scores than pilots who trained through an Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training. Whilst those that trained in the military reported significantly lower speaking up scores than pilots who trained through Airline funded cadetship and those who trained via a self-funded cadetship with an airline (integrated) training, all at the .001 level of significance.

The effect sizes between self-funded modular training and self-funded cadetship with an airline (integrated) training (Cohen's $d = 0.260041$), and between a self-funded modular training and Airline funded cadetship (Cohen's $d = 0.248005$), and between a Military training and self-funded cadetship with an airline (integrated) training (Cohen's $d = 0.226$), and between Military training and Airline funded cadetship (Cohen's $d = 0.213888$) are all considered to be low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 70 Means for Speaking Up by Training background



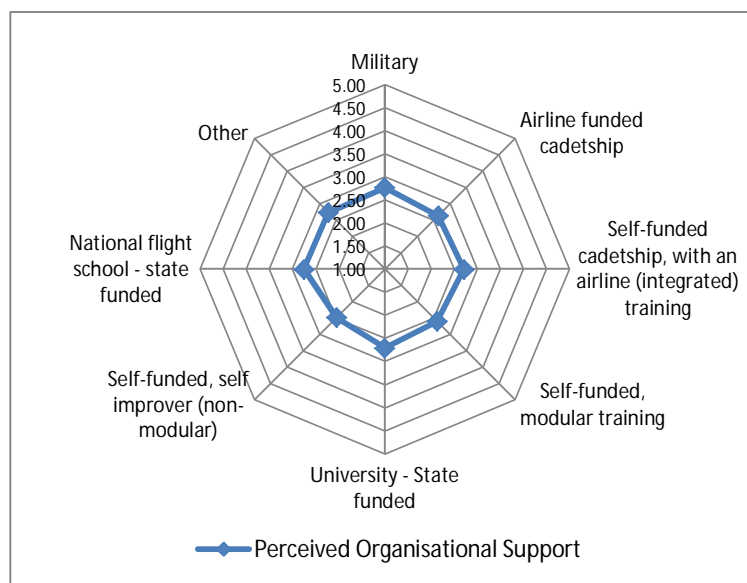
Perceived Organisational Support

Post-hoc Games-Howell pairwise comparisons showed that pilots who trained to fly through self-funded modular training reported significantly lower Perceived Organisational Support scores than pilots who trained in the military, at the .001 level of significance.

The effect sizes between these two groups (Cohen’s $d = 0.190997$) is considered to be very low.

Please see Appendix 3 Table 45 for percentage differences by training background per item.

Figure 71 Means for Perceived Organisational Support by Training background

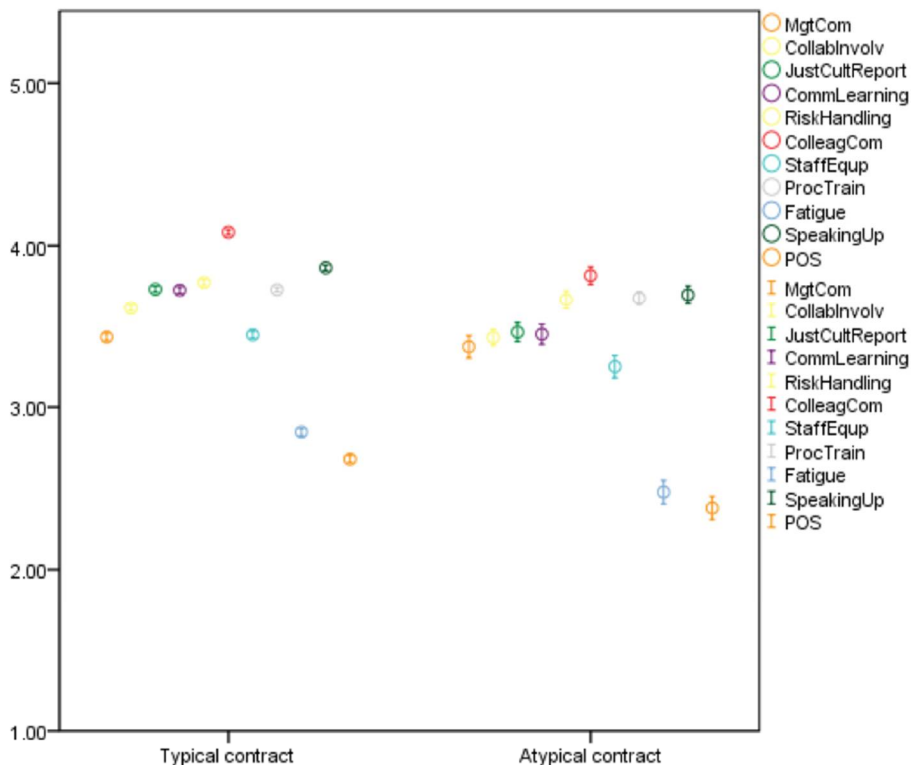


3.4.3.5. Contract type

Summary overview

The figure below plots all of the mean scores (and error bars) for each safety culture dimension according to contract type of pilots. Appendix Table 39 presents the means for contract type by dimension.

Figure 72 Means and error bars for all dimensions by Contract type (other not included)



Pilots on a typical contract reported significantly higher scores than pilots on an atypical contract across all but two (Management Commitment to Safety and Procedures and Training) safety culture dimensions. This may be because those on an insecure contract are treated differently to those on a more secure contract, as found elsewhere or that they perceive the organisation more negatively because of their lack of job security. It is notable that of those on an atypical contract, over a third (n=315) were pilots aged 30 or under. This group, in turn constituted only 15% of the sample (n=1082), which indicates new pilots entering the industry are increasingly being employed on atypical contracts

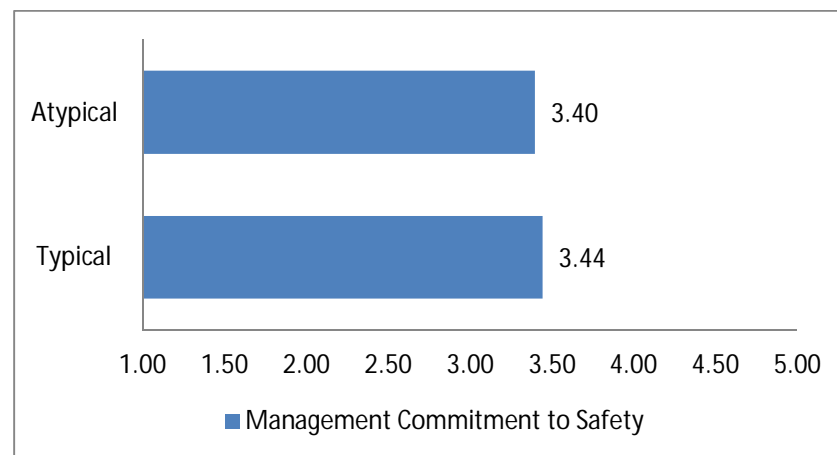
Levene's Tests of Homogeneity of Variance were satisfied for Management Commitment, Risk Handling, and Procedures & Training.

Management Commitment

An independent samples t-test showed no significant differences between those on a typical contract (mean=3.44) compared with those on an atypical contract (mean=3.40) on their perceptions on Management Commitment to Safety at the .001 level of significance.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 73 Means for Management Commitment by Typical/Atypical Contract



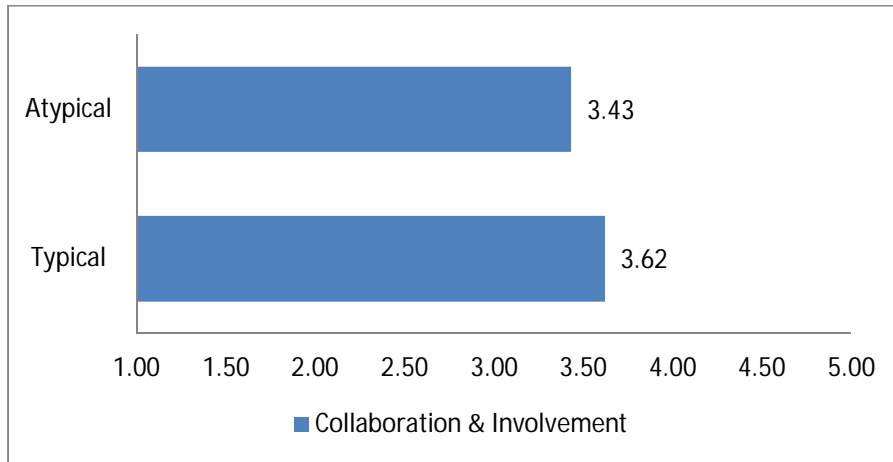
Collaboration & Involvement

An independent samples t-test showed that pilots on a typical contract (mean=3.62) reported significantly higher Collaboration & Involvement scores than pilots on an atypical contract (mean=3.43), at the .001 level of significance.

The effect size (Cohen's $d = 0.355441$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 74 Means for Collaboration & Involvement by Typical/Atypical Contract



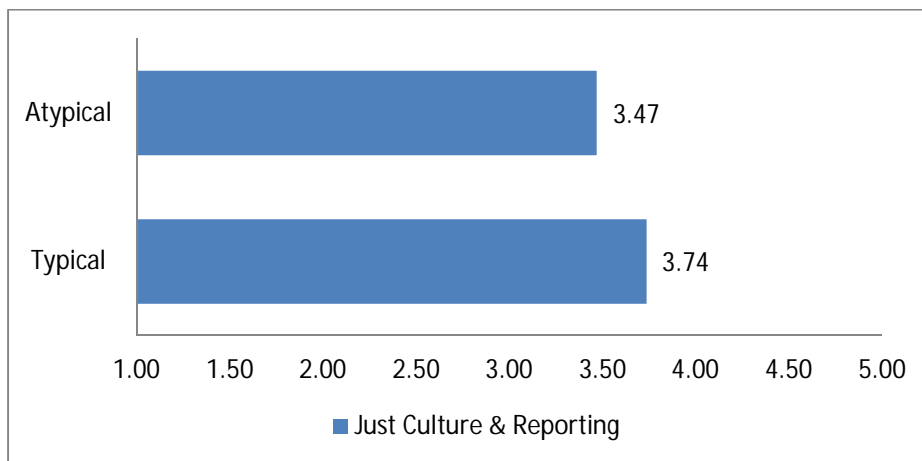
Just culture

An independent samples t-test showed that pilots on a typical contract (mean=3.74) reported significantly higher Just Culture scores than pilots on an atypical contract (mean=3.47), at the .001 level of significance.

The effect size (Cohen's $d = 0.355441$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 75 Means for Just Culture by Typical/Atypical Contract



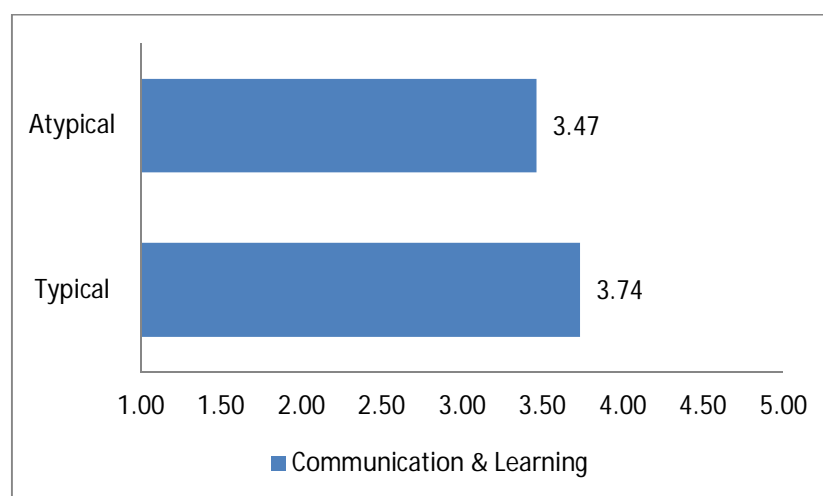
Communication & Learning

An independent samples t-test showed that pilots on a typical contract (mean=3.74) reported significantly higher Communication & Learning scores than pilots on an atypical contract (mean=3.47), at the .001 level of significance.

The effect size (Cohen's $d = 0.341642$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 76 Means for Communication & Learning by Typical/Atypical Contract

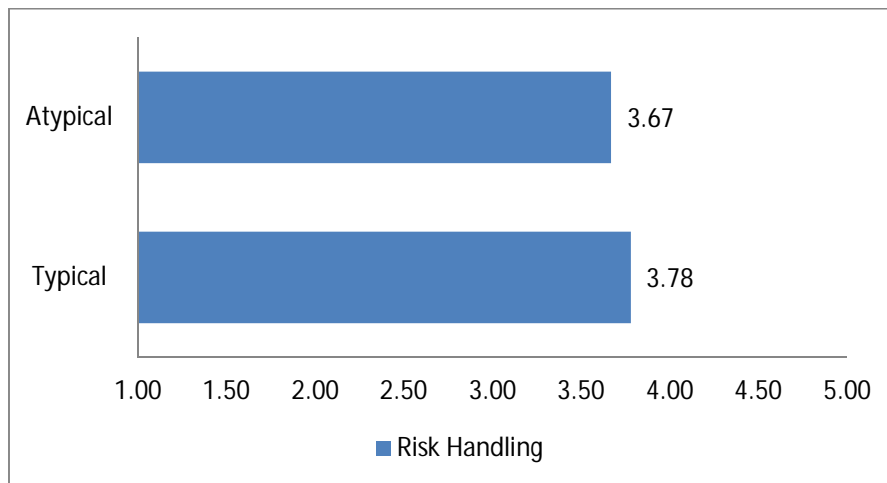


Risk Handling

An independent samples t-test showed that pilots on a typical contract (mean=3.78) reported significantly higher Risk Handling scores than pilots on an atypical contract (mean=3.67), at the .001 level of significance.

The effect size (Cohen's $d = 0.150524$) is low.

Figure 77 Means for Risk Handling by Typical/Atypical Contract

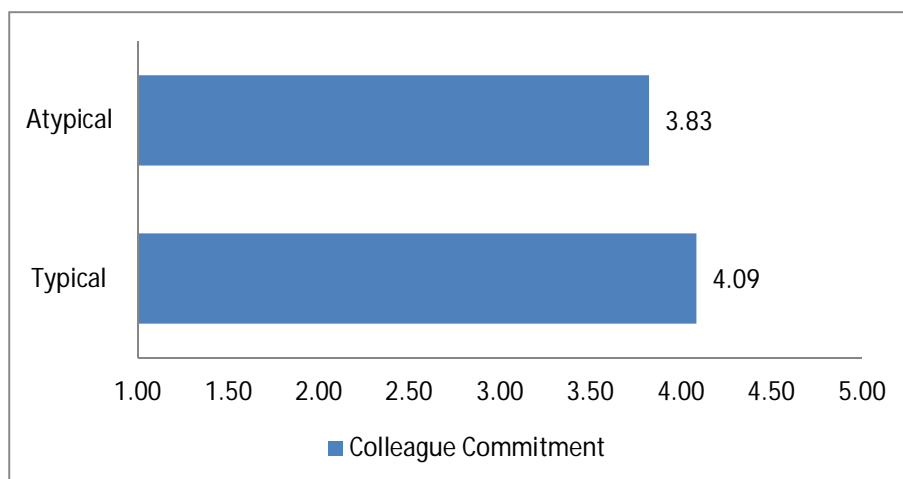


Colleague Commitment

An independent samples t-test showed that pilots on a typical contract (mean=4.09) reported significantly higher Colleague Commitment scores than pilots on an atypical contract (mean=3.83), at the .001 level of significance. The effect size (Cohen's $d=0.150524$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 78 Means for Colleague Commitment by Typical/Atypical Contract



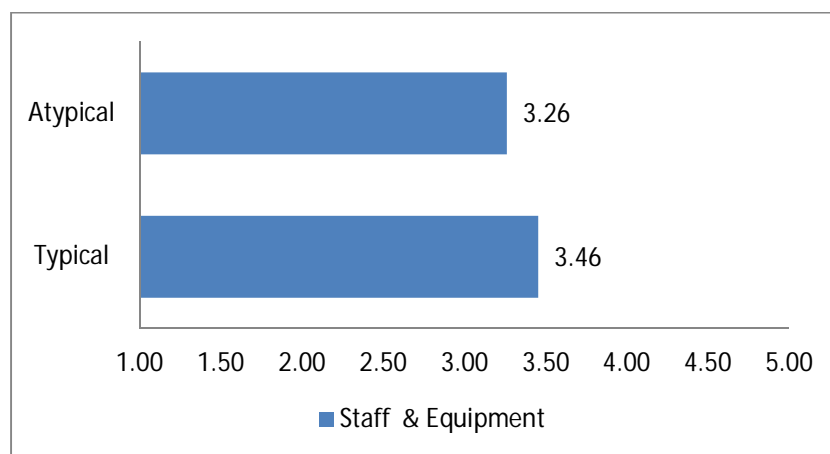
Staff & Equipment

An independent samples t-test showed that pilots on a typical contract (mean=3.46) reported significantly higher Staff & Equipment scores than pilots on an atypical contract (mean=3.26), at the .001 level of significance.

The effect size (Cohen's $d = 0.220511$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 79 Means for Staff & Equipment by Typical/Atypical Contract

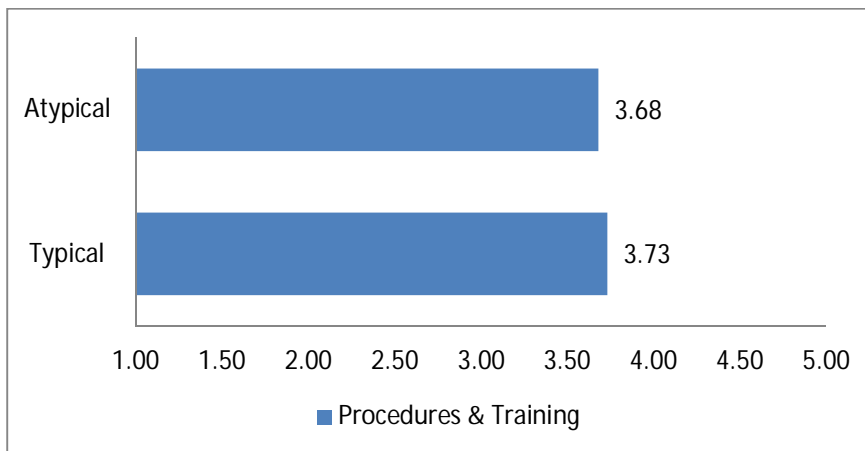


Procedures & Training

An independent samples t-test showed no significant differences between those on a typical contract (mean=3.73) compared with those on an atypical contract (mean=3.68) on their perceptions on Procedures & Training at the .001 level of significance.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 80 Means for Procedures & Training by Typical/Atypical Contract



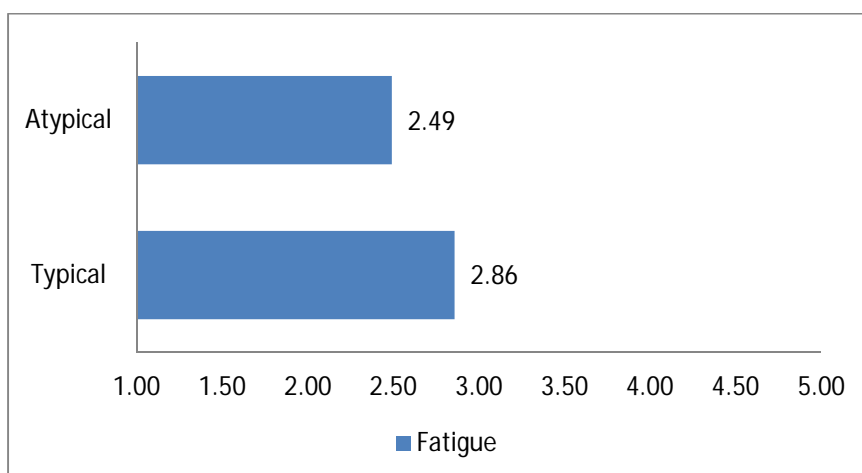
Fatigue

An independent samples t-test showed that pilots on a typical contract (mean=2.86) reported significantly higher Fatigue scores than pilots on an atypical contract (mean=2.49), at the .001 level of significance.

The effect size (Cohen's $d = 0.394705$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 81 Means for Fatigue by Typical/Atypical Contract



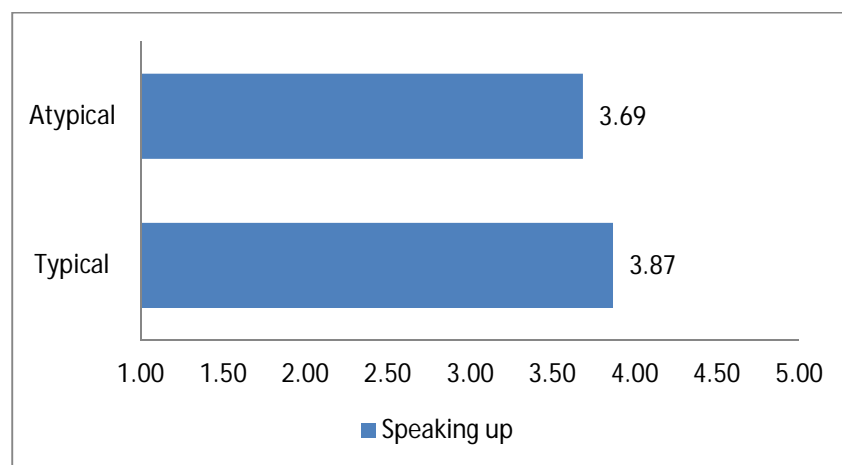
Speaking up

An independent samples t-test showed that pilots on a typical contract (mean=3.87) reported significantly higher Speaking up scores than pilots on an atypical contract (mean=3.69), at the .001 level of significance.

The effect size (Cohen's $d = 0.259577$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 82 Means for Speaking Up by Typical/Atypical Contract



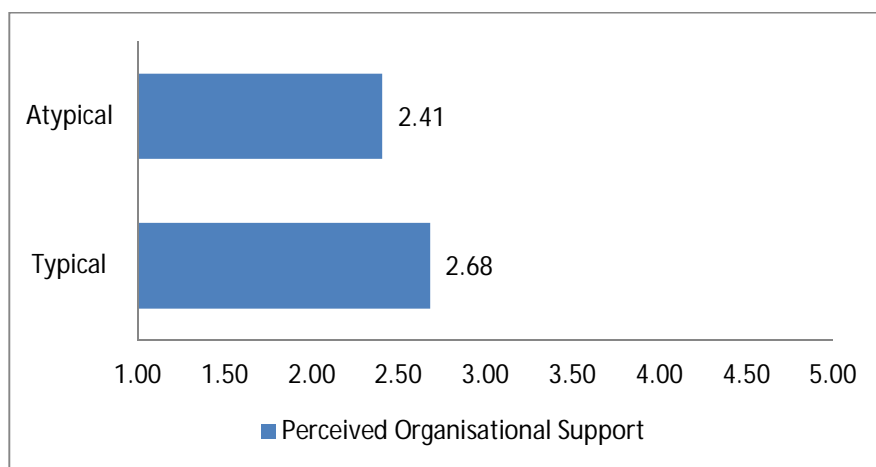
Perceived Organisational Support

An independent samples t-test showed that pilots on a typical contract (mean=2.68) reported significantly higher Perceived Organisational Support scores than pilots on an atypical contract (mean=2.41), at the .001 level of significance.

The effect size (Cohen's $d = 0.301591$) is low.

Please see Appendix 3 Table 44 for percentage differences by contract type per item.

Figure 83 Means for Perceived Organisational Support by Typical/Atypical Contract



3.4.3.6. Gender

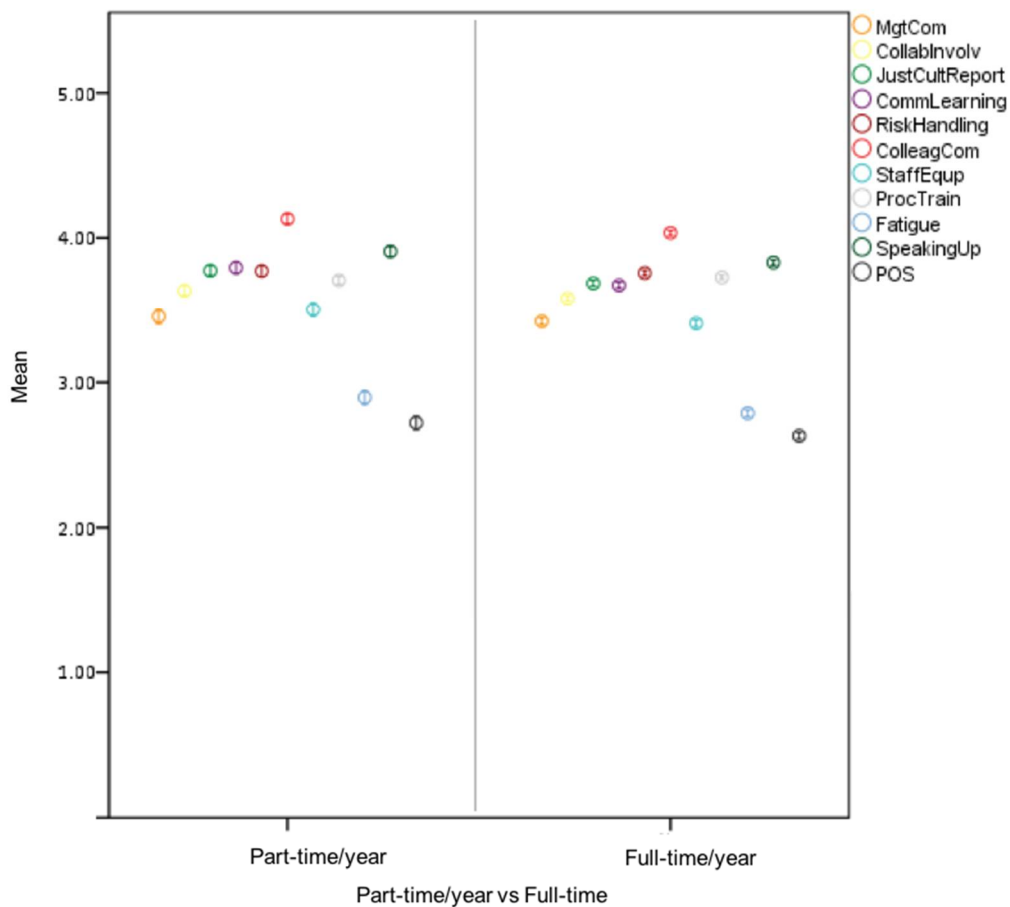
T test pairwise comparisons showed no significant differences between males and females on their perceptions on any of the dimensions at the .001 level of significance.

3.4.3.7. Part-time/year & Full-time/year

Summary overview

The figure below plots all of the mean scores (and error bars) for each safety culture dimension according to whether they were full or part-time.

Figure 84 Means and Error bars for all dimensions by Part-time/year & Full-time/year



Overall, those on a part-time or part-year contract had more positive views than those on a full-time contract. This contrasts the results for typical and atypical contract types, where atypical contracts had more negative views. Pilots may be on a permanent contract but work fewer hours and consequently may be less involved with cultural issues than those on a full-time/full-year basis.

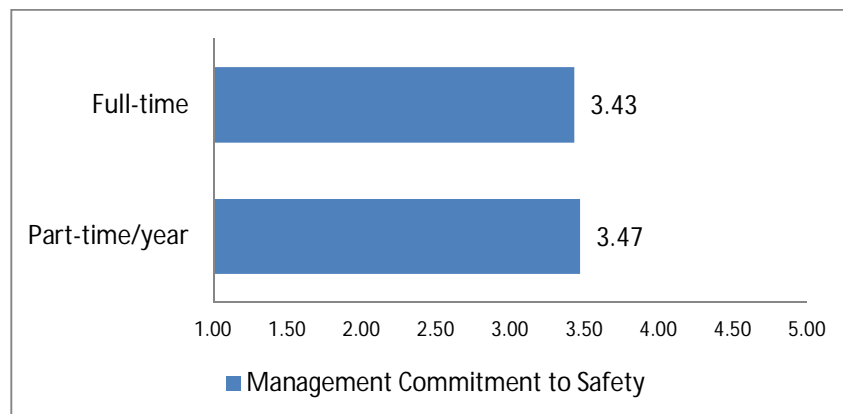
Levene's Tests of Homogeneity of Variance were satisfied for all dimensions other than Just Culture, Communication & Learning, Fatigue and Speaking up.

Management Commitment

An independent samples t-test showed that pilots on a part-time or part-year contract (mean=3.47) reported significantly higher Management Commitment scores than pilots on a full-time contract (mean=3.43) at the .001 level of significance.

The effect size (Cohen's $d = 0.043037$.) is very low.

Figure 85 Means for Management Commitment by Part-time/year and Full time

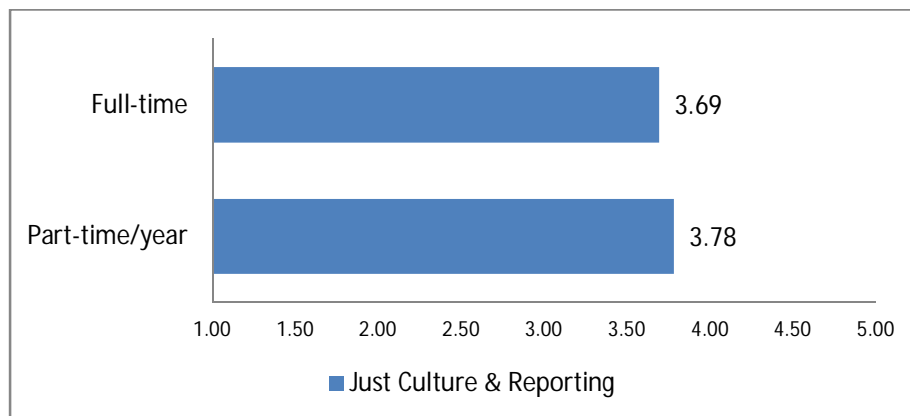


Just culture

An independent samples t-test showed that pilots on a part-time or part-year contract (mean=3.78) reported significantly higher Just Culture scores than pilots on a full-time contract (mean=3.69) at the .001 level of significance.

The effect size (Cohen's $d = 0.130162$) is low.

Figure 86 Means for Just Culture by Part-time/year and Full time

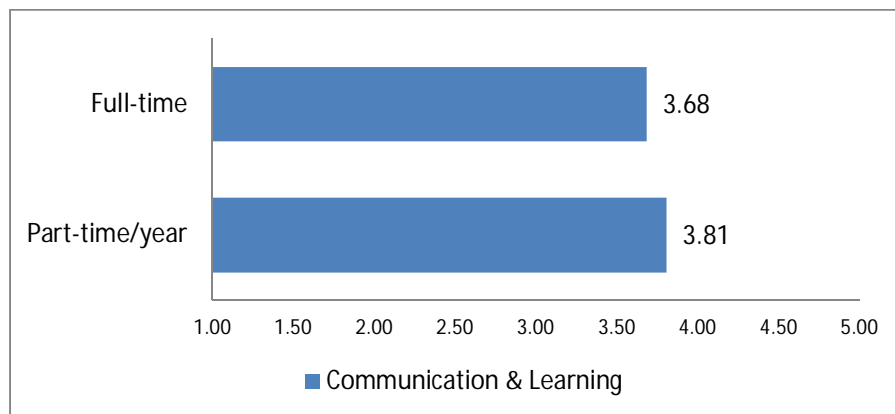


Communication & Learning

An independent samples t-test showed that pilots on a part-time or part-year contract (mean=3.81) reported significantly higher Communication & Learning scores than pilots on a full-time contract (mean=3.68) at the .001 level of significance.

The effect size (Cohen's $d = 0.161652$) is low.

Figure 87 Means for Communication & Learning by Part-time/year and Full time

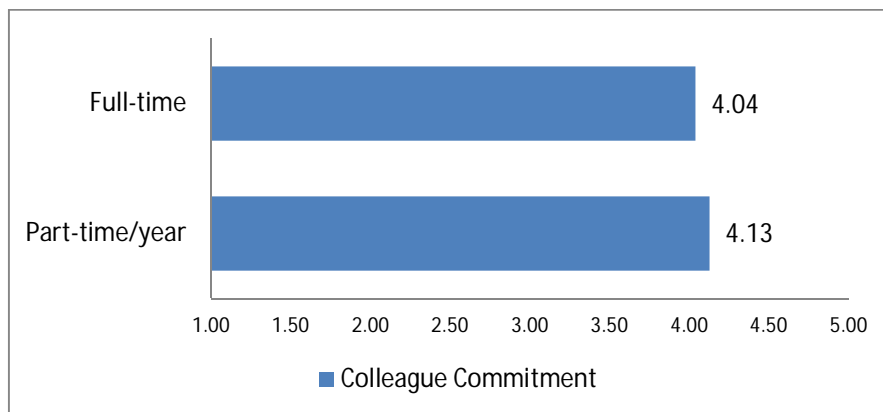


Colleague Commitment

An independent samples t-test showed that pilots on a part-time or part-year contract (mean=4.13) reported significantly higher Colleague Commitment scores than pilots on a full-time contract (mean=4.04) at the .001 level of significance.

The effect size (Cohen's $d = 0.139227$) is very low.

Figure 88 Means for Colleague Commitment by Part-time/year and Full time

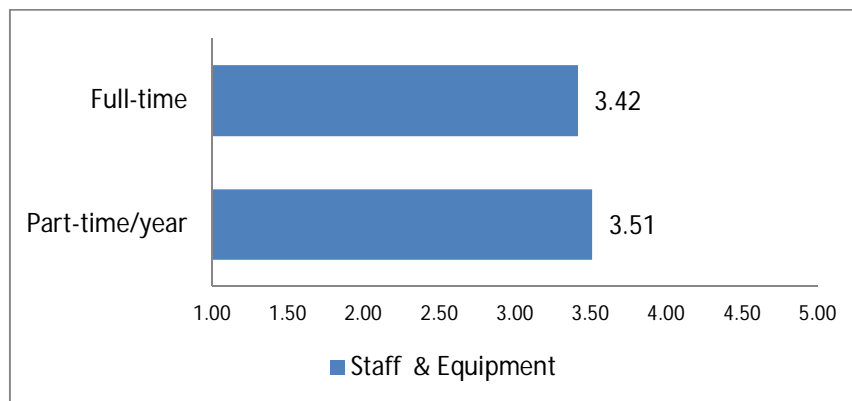


Staff & Equipment

An independent samples t-test showed that pilots on a part-time or part-year contract (mean=3.51) reported significantly higher Staff & Equipment scores than pilots on a full-time contract (mean=3.42) at the .001 level of significance.

The effect size (Cohen's $d = 0.110484$) is low.

Figure 89 Means for Staff & Equipment by Part-time/year and Full time

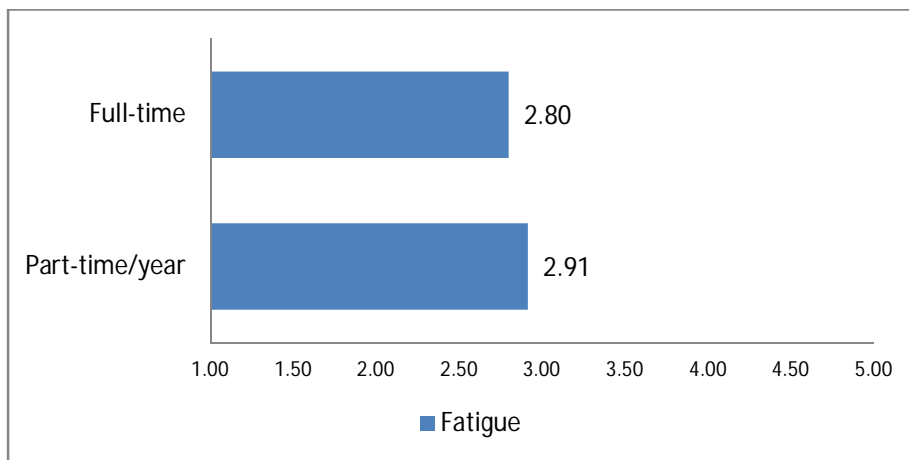


Fatigue

An independent samples t-test showed that pilots on a part-time or part-year contract reported (mean=2.91) significantly higher Fatigue scores than pilots on a full-time contract (mean=2.80) at the .001 level of significance.

The effect size (Cohen's $d = 0.133527$) is low.

Figure 90 Means for Fatigue by Part-time/year and Full time

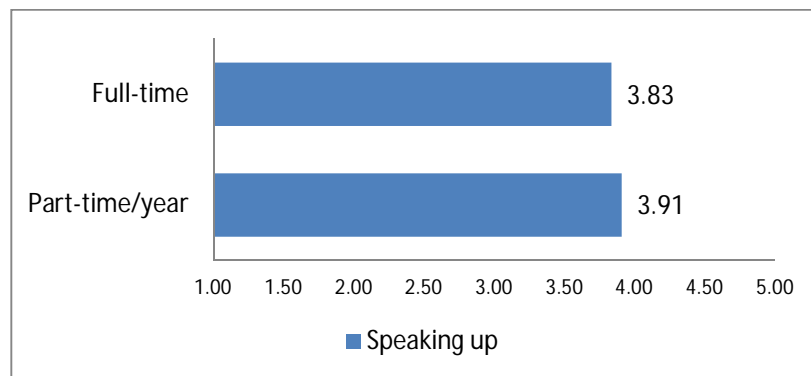


Speaking up

An independent samples t-test showed that pilots on a part-time or part-year contract (mean=3.91) reported significantly higher Speaking up scores than pilots on a full-time contract (mean=3.83) at the .001 level of significance.

The effect size (Cohen's $d = 0.114456$) is low.

Figure 91 Means for Speaking Up by Part-time/year and Full time

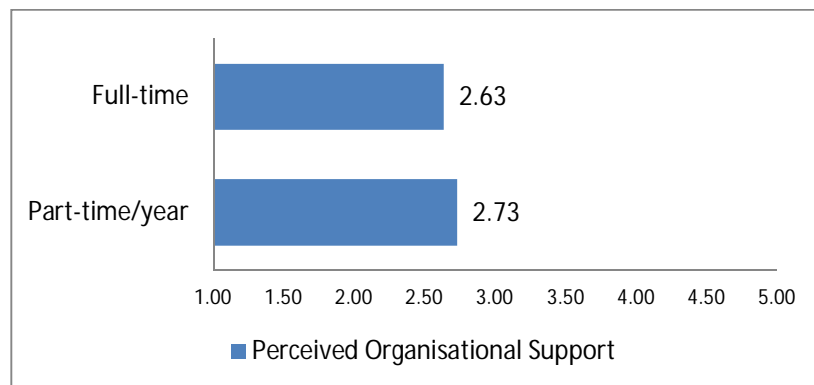


Perceived Organisational Support

An independent samples t-test showed that pilots on a part-time or part-year contract (mean=2.73) reported significantly higher Perceived Organisational Support scores than pilots on a full-time contract (mean=2.63) at the .001 level of significance.

The effect size (Cohen's $d = 0.10942$) is low.

Figure 92 Means for Perceived Organisational Support by Part-time/year and Full time



3.4.4. Correlations

A number of correlations were performed in order to examine whether responses to the safety culture survey were associated with perceptions of safety culture. Correlations were performed for Age, Tenure, Flying Experience are reported through Spearman's Rho Tests. Only the significant differences are described.

3.4.4.1. Age

Spearman's correlations show a negative correlation between age and Procedures & Training ($r_s = -0.48$, $p < 0.001$), and Speaking Up ($r_s = -.043$, $p < 0.001$). This means that the older the pilot the more negative his/her views on these procedures and training and on speaking up. However, these have a low effect size.

There was a positive correlation between age and Fatigue ($r_s = .054$, $p < 0.001$), and Perceived Organisational Support ($r_s = .061$, $p < 0.001$). This means that the older the pilot the more positive their views on fatigue levels/management and organisational support. These have moderate effect sizes. All other correlations were not significant. This reveals age not to be a factor across the dimensions.

3.4.4.2. Tenure

Spearman's correlations show a negative correlation between tenure and Procedures & Training ($r_s = -.049$, $p < 0.001$). This means that the longer the pilot has worked within their organisation, the more negative their opinions on procedures. There was a positive correlation between tenure and Just Culture ($r_s = .048$, $p < 0.001$) and Fatigue ($r_s = .044$, $p < 0.001$). This means those who have been in the organisation longer hold more positive views on just culture and fatigue management. These all have moderate effect sizes. All other correlations were not significant.

3.4.4.3. Flying experience

Management Commitment

Pearson correlations show a negative correlation between flying experience and Management Commitment ($r_s = -.044$, $p < 0.001$). This means that the more hours the pilot has flown, the more negative their opinions on management commitment to safety. This has a medium effect size.

Procedures & Training

Pearson correlations show a negative correlation between flying experience and Procedures & Training ($r_s = -.068$, $p < 0.001$). This means that the more hours the pilot has flown, the more negative their opinions on procedures and training. This has a good effect size.

3.4.4.4. Safety Culture Dimension Means by Company

To examine further the variations in safety culture amongst pilots, we explored whether pilots who reported working at different companies had diverging perceptions of safety culture. It was found that for some safety culture dimensions, scores across companies were relatively similar, and positive. However for others, scores were divergent and heterogeneous. Please note, companies are anonymised, and company numbers do not map onto a single company. To support interpretation, the two lines on the graph indicate where means are either ≤ 2.5 or ≥ 3.5 .

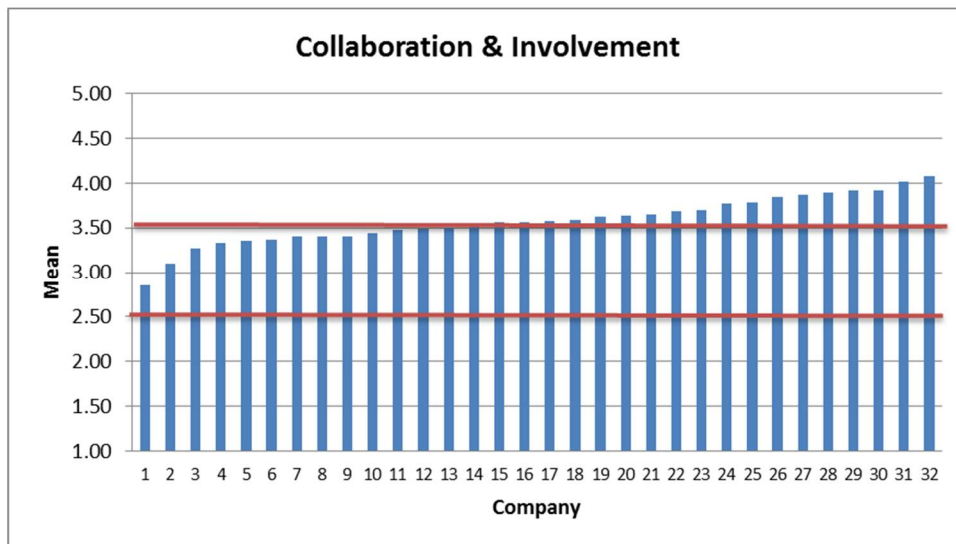
The figure below reports on Management Commitment to Safety. It can be seen that the most positive company mean is 4.31 and the lowest company mean at 2.40.

Figure 93 Means for Management Commitment to Safety by company (for companies with ≥ 30 respondents)



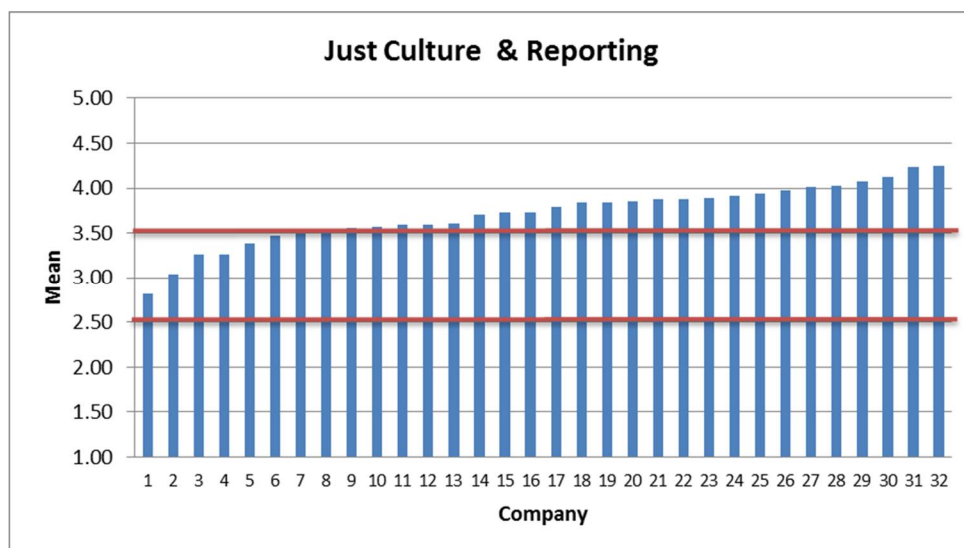
The figure below reports on Collaboration and Involvement. It can be seen that the most positive company mean is 4.08 and the lowest company mean at 2.86.

Figure 94 Means for Collaboration and Involvement by company (for companies with =>30 respondents)



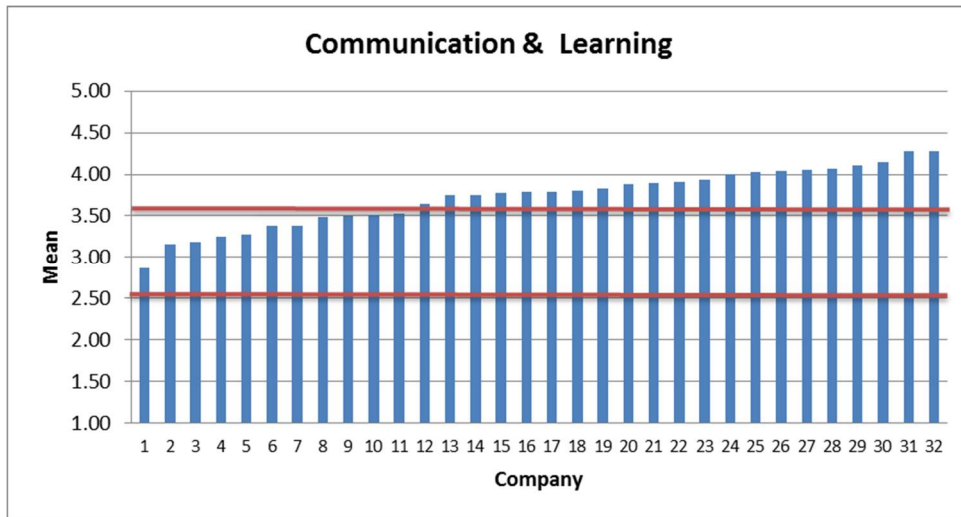
The figure below reports on Just Culture and Reporting. It can be seen that 46 percent of company mean scores were above 3.5, and the range was 2.81 to 4.24.

Figure 95 Means for Just Culture and Reporting by company (for companies with =>30 respondents)



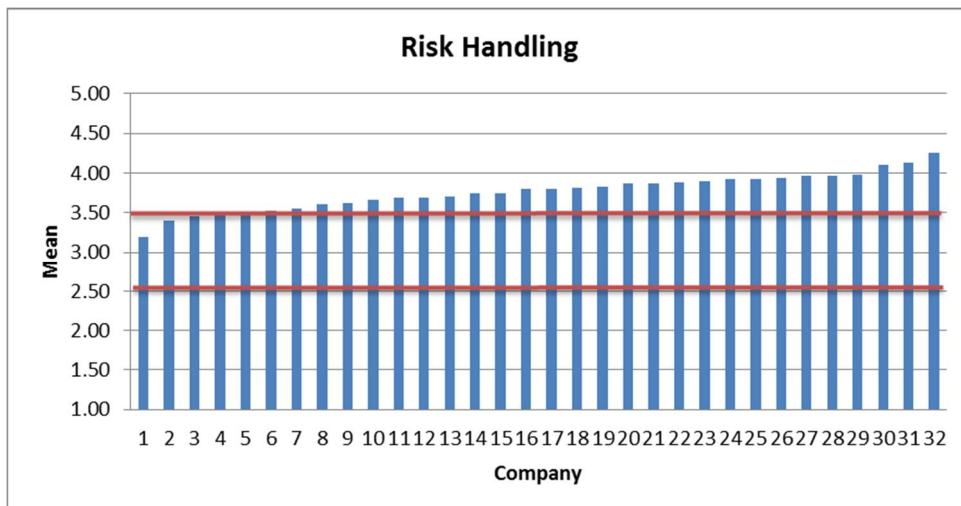
The figure below reports on Communication and Learning. It can be seen that the most positive company mean is 4.28 and the lowest company mean at 2.86.

Figure 96 Means for Communication and Learning by company (for companies with =>30 respondents)



The figure below reports on Risk Handling. It can be seen that the most positive company mean is 4.25 and the lowest company mean at 3.19.

Figure 97 Means for Risk Handling by company (for companies with =>30 respondents)



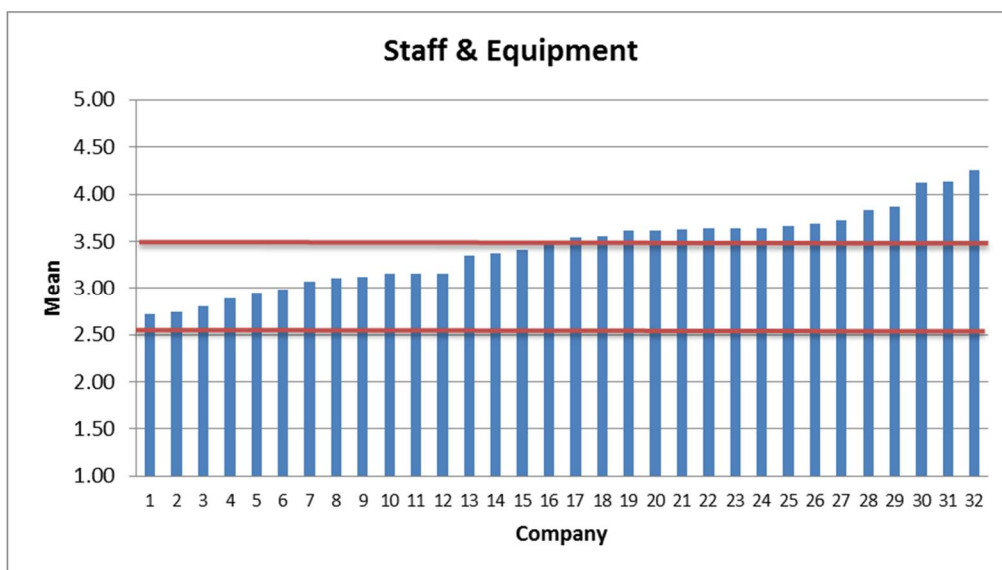
The figure below reports on Colleague Commitment to Safety. It can be seen that the most positive company mean is 4.48 and the lowest company mean at 3.39. Overall, 94% of companies had a mean score above 3.5.

Figure 98 Means for Colleague Commitment to Safety by company (for companies with =>30 respondents)



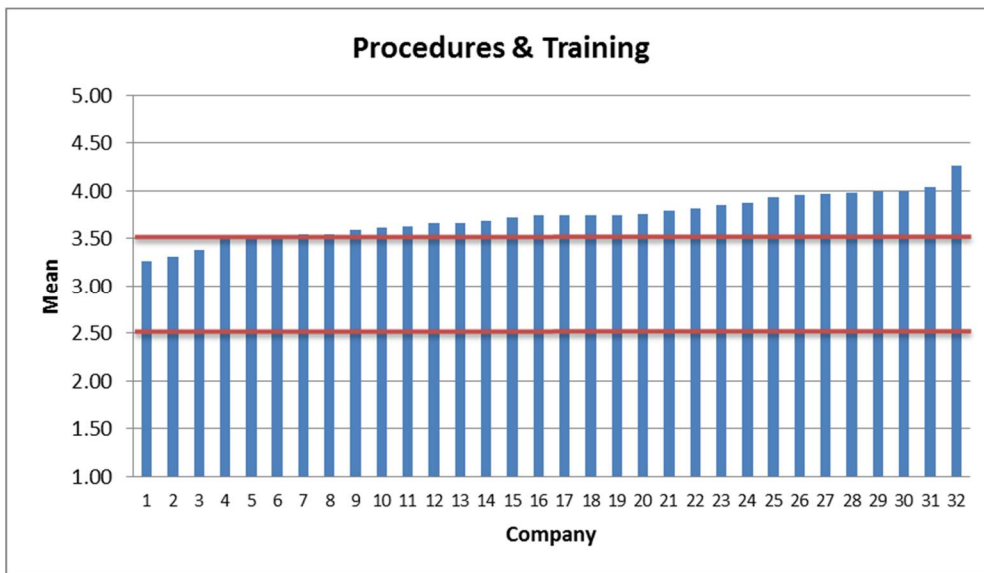
The figure below reports on Staff and Equipment. It can be seen that the most positive company mean is 4.26 and the lowest company mean at 2.72. Overall, 50% of companies had a mean score below 3.5.

Figure 99 Means for Staff & Equipment by company ID (for companies with =>30 respondents)



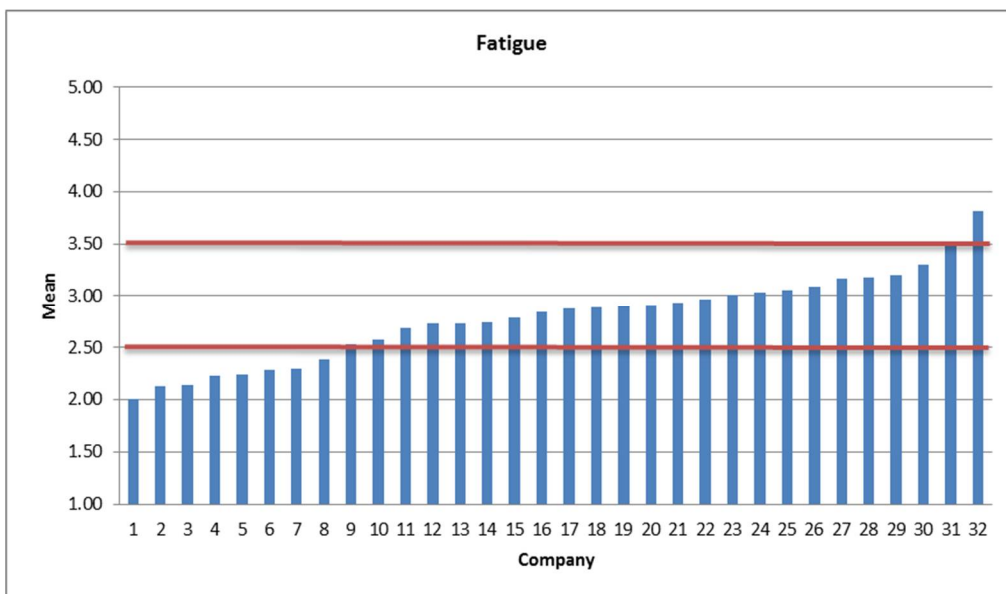
The figure below reports on Procedures and Training. It can be seen that the most positive company mean is 4.27 and the lowest company mean at 3.46.

Figure 100 Means for Procedures and Training (for companies with =>30 respondents)



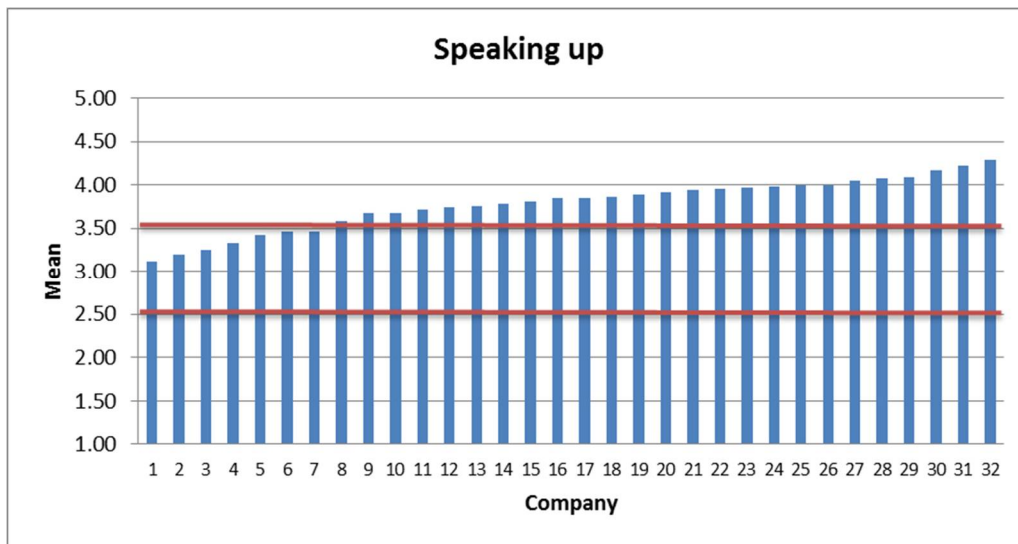
The figure below reports on Fatigue. It can be seen that the most positive company mean is 3.81 and the lowest company mean at 2.01.

Figure 101 Means for Fatigue (for companies with =>30 respondents)



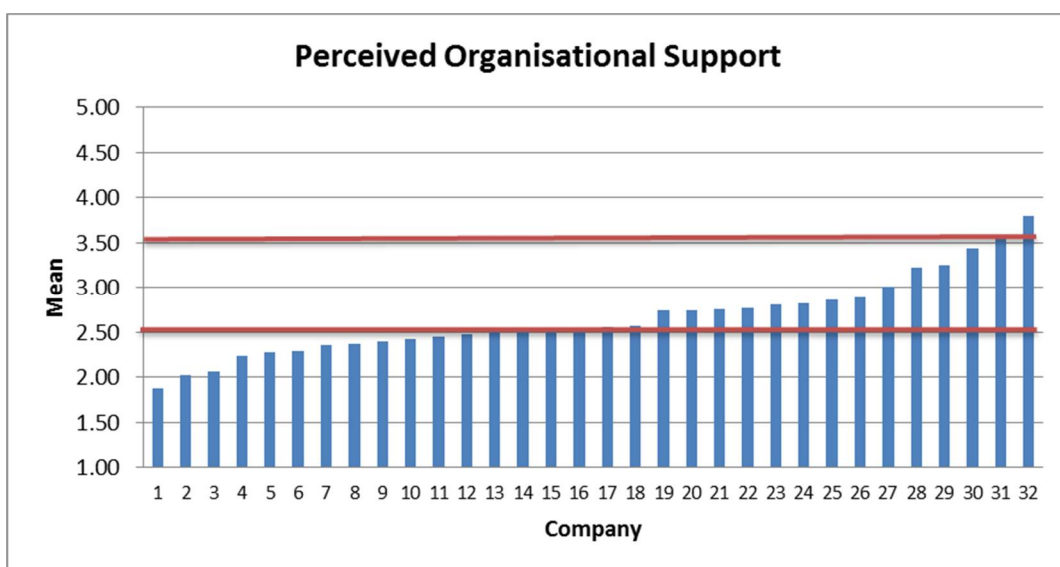
The figure below reports on Speaking-up. It can be seen that the most positive company mean is 4.29 and the lowest company mean at 3.11.

Figure 102 Means for Speaking Up (for companies with =>30 respondents)



The figure below reports Perceived Organisational Support. Forty percent of company mean scores were below 2.5, and the range was 1.88 to 3.80.

Figure 103 Means for Perceived Organisational Support by company (for companies with =>30 respondents)



The table below reports on the proportion of companies, by safety culture dimension, with mean scores of 2.5 or lower, between 2.5 and 3.5, and 3.5 or above. Overall, it was found that companies which were low on one safety culture dimension (e.g. fatigue) tended to be low on others.

Table 27 Means for Perceived Organisational Support by Company ID (for companies with =>30 respondents)

Safety Culture Dimension	% of companies with a mean score of <=2.5	% of companies with a mean score of >2.5 to <3.5	% of companies with a mean score of >=3.5
Management commitment to safety	3	50	47
Collaboration and Involvement	0	38	62
Just Culture and Reporting	0	19	81
Communication and Learning	0	25	75
Risk Handling	0	16	84
Colleague commitment to safety	0	6	94
Staff and equipment	0	50	50
Procedures & Training	0	9	91
Fatigue	25	69	6
Speaking up	0	22	78
Perceived Organisational Support	41	53	6

The above analysis indicates considerable variations in perceptions of safety culture dimensions between pilots working at different companies. This indicates that safety practices at aviation companies differ, leading to differential beliefs on issues such as the extent to which management is committed to safety, or resourcing. However, because this survey did not set out to survey safety culture in individual companies, which would achieve more complete samples per company, the evidence for this finding could be strengthened through engagement with individual airlines.

3.4.4.5. Safety Culture Dimension Means by Nationality and Country Base

To examine further the variations in safety culture amongst pilots, we also focussed on the nationality of pilots and the country where they were based. To present the data, it was necessary to focus only on nationalities with over 100 pilots.

The table below reports on safety culture dimensions by pilot nationality. It can be seen that there is relatively little variance between pilots of different nationality.

Table 28 Perceptions of safety culture by nationality

	Management Commitment to Safety	Collaboration & Involvement	Just Culture & Reporting	Communication & Learning	Risk Handling	Colleague commitment to safety	Staff & Equipment	Procedures & Training	Fatigue	Speaking up	Perceived Organisational Support
Austrians	3.55	3.60	3.74	3.74	3.80	4.11	3.41	3.83	2.87	3.86	2.56
Belgians	3.14	3.43	3.35	3.32	3.68	3.84	3.14	3.68	2.47	3.81	2.36
Danes	3.60	3.64	3.75	3.65	3.86	4.09	3.36	3.72	2.74	4.07	2.69
Dutch	3.80	3.86	3.96	3.95	4.05	4.20	3.83	3.96	3.27	4.09	3.26
Finns	3.69	3.82	3.98	3.77	3.93	4.22	3.34	3.63	2.77	3.76	2.56
French	3.32	3.51	3.57	3.67	3.74	3.91	3.50	3.64	2.84	3.56	2.51
German	3.34	3.61	3.75	3.85	3.77	4.16	3.50	3.73	2.92	3.90	2.57
Irish	3.43	3.62	3.65	3.64	3.76	3.99	3.29	3.75	2.44	3.85	2.51
Italian	3.21	3.37	3.37	3.33	3.59	3.69	3.16	3.58	2.66	3.47	2.54
Luxembourgers	3.08	3.47	3.44	3.54	3.73	3.96	3.00	3.74	2.49	4.00	2.40
Norwegian	3.68	3.80	3.83	3.77	3.81	4.32	3.64	3.93	3.01	4.03	2.88
Portuguese	3.72	3.59	3.68	3.65	3.79	4.09	3.66	3.97	3.14	3.49	2.95
Spaniards	3.09	3.24	3.28	3.35	3.45	3.63	3.07	3.59	2.48	3.31	2.40
Swedes	3.57	3.65	3.83	3.69	3.79	4.15	3.44	3.74	2.79	4.01	2.60
Swiss	3.47	3.83	3.86	3.98	3.81	4.22	3.59	3.60	2.96	4.02	2.84
United Kingdom	3.23	3.39	3.58	3.41	3.61	3.94	3.05	3.52	2.35	3.88	2.32

Similarly, the table below reports on safety culture dimensions by the country at which pilots are based.

Table 29 Perceptions of safety culture by the country at which pilots are based.

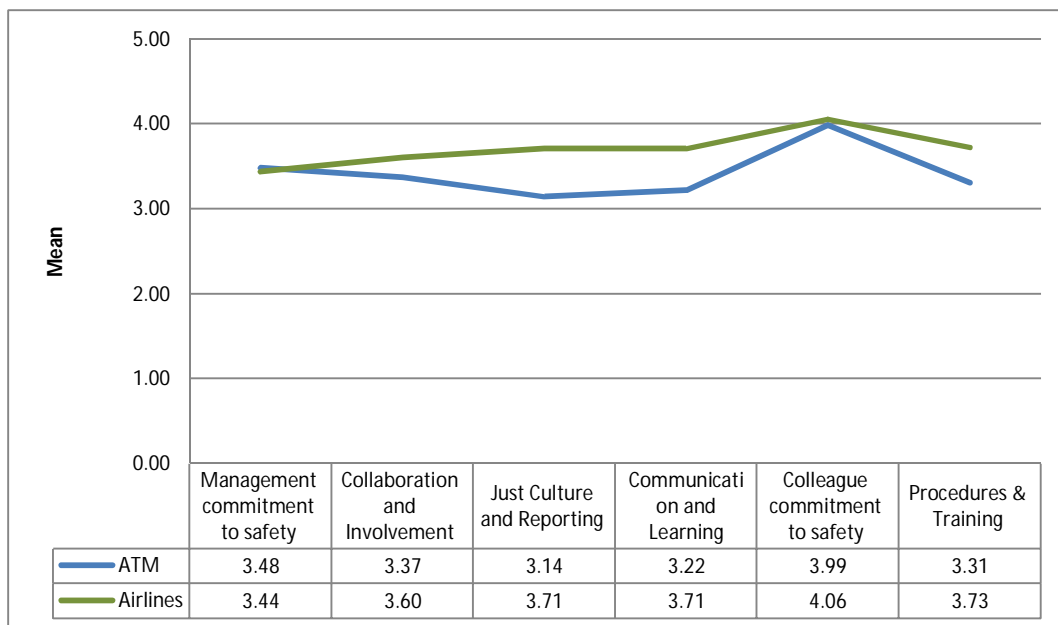
	Management commitment to safety	Collaboration & Involvement	Just Culture & Reporting	Communication & Learning	Risk Handling	Colleague commitment to safety	Staff & equipment	Procedures & Training	Fatigue	Speaking up	Perceived Organisational Support
Austria	3.56	3.49	3.73	3.56	3.84	3.91	3.35	3.76	2.80	3.58	2.55
Belgium	3.20	3.41	3.34	3.23	3.66	3.78	3.14	3.75	2.43	3.78	2.32
Croatia	3.11	3.34	3.54	3.63	3.53	3.85	3.16	3.99	2.35	3.45	2.31
Denmark	3.80	3.76	3.95	3.80	3.94	4.24	3.47	3.73	2.96	4.21	2.89
Estonia	3.25	3.56	3.61	4.06	3.67	3.78	3.56	4.00	2.78	3.67	2.75
Finland	3.63	3.83	3.98	3.80	3.92	4.23	3.31	3.63	2.79	3.78	2.61
France	3.29	3.52	3.57	3.70	3.72	3.89	3.53	3.63	2.90	3.52	2.56
Germany	3.35	3.61	3.76	3.86	3.77	4.16	3.51	3.72	2.92	3.92	2.57
Iceland	4.09	3.81	4.10	4.03	4.01	4.24	3.89	4.00	3.31	3.97	3.22
Ireland	3.40	3.65	3.65	3.67	3.77	3.98	3.31	3.76	2.41	3.87	2.51
Italy	3.18	3.35	3.35	3.27	3.65	3.68	3.16	3.61	2.50	3.53	2.40
Luxembourg	2.74	3.43	3.09	3.32	3.63	3.85	2.82	3.82	2.30	3.86	2.16
Netherlands	4.00	3.97	4.11	4.10	4.13	4.30	4.04	4.01	3.55	4.17	3.57
Norway	3.66	3.77	3.80	3.75	3.79	4.31	3.63	3.93	2.98	4.04	2.84
Portugal	3.66	3.59	3.66	3.58	3.80	4.06	3.58	3.96	2.97	3.55	2.79
Spain	3.21	3.30	3.36	3.37	3.56	3.71	3.11	3.65	2.44	3.49	2.29
Sweden	3.62	3.71	3.89	3.72	3.79	4.19	3.47	3.75	2.82	4.03	2.62
Switzerland	3.49	3.80	3.88	3.99	3.78	4.25	3.61	3.61	2.98	4.02	2.89
United Kingdom	3.27	3.41	3.60	3.43	3.63	3.97	3.06	3.52	2.40	3.90	2.36
Other	3.33	3.41	3.51	3.51	3.54	3.81	3.29	3.65	2.73	3.45	2.65

There were minimal differences in responses from pilots across the different European countries and across different nationalities.

3.4.5. Comparison with ATM (a comparison with published data)

A comparison between previously tested in Air Traffic Management (operational staff only) across Europe (n=5,176) (Reader, Noort et al. 2015) compared with pilot mean scores on the same dimensions from this study (n=7,329) shows similar safety culture means (see Figure 104). Not all dimensions had the same items and two of the dimensions we have matched are have different names Procedures & Training and Safety Support, so a statistical test of differences is not presented. As can be seen below, the data from pilots is broadly equivalent to ATM.

Figure 104 Comparison t-test between pilots and ATM



4 DISCUSSION AND LIMITATIONS

4.1. Discussion

According to the Civil Aviation Authority, a positive safety culture is the foundation to an effective safety management system (CAA, 2015). In this study, we measured perceptions of safety culture amongst 7,239 pilots working in Europe. This is equivalent to approximately 14% of the population, and one of the largest ever safety culture studies of pilots working in commercial aviation.

Overall, perceptions of safety culture amongst pilots working in Europe were favourable, although differences were found according to the contracts and companies pilots worked for. For the majority of items (59%) responses to the survey were above 3.5 (indicating mostly positive perceptions). For example, pilots were very positive on issues such as the SOPs associated with their work, the ability of their colleagues, being able to speak to their manager if an unsafe situation develops, and not feeling under pressure to take risks that make them feel uncomfortable. For 41% of items, scores were below 3.5, indicating mixed or negative perceptions. For example, in terms of feeling tired, getting feedback on safety issues, communication on safety, and training. In terms of safety culture dimensions, which are used to characterise the culture, the mean scores of 7 dimensions were above 3.5. Four dimensions were between 2.5 and 3.5. This indicates that whilst safety culture is generally perceived positively by pilots, some attention is required.

In terms of safety culture dimensions, pilots tended to have concerns over the issues of fatigue and fatigue management, management commitment to safety, staff and equipment, and perceived organisational support. At an individual survey item level, concerns focussed on trust in management with regard to safety, receiving feedback on safety issues, training, national aviation authorities, and pilots being tired at work. More positively, the vast majority of pilots felt their colleagues were committed to safety, that voicing concerns on safety was encouraged, and that they do not need to take risks that make them feel uncomfortable about safety.

Between group analyses revealed that the extent to which pilots had positive or negative perceptions of safety culture was, in-part, influenced by the type of company they worked for (e.g. Cargo, Low Cost, Network Carrier), and their contract with that company (e.g. typical or atypical). In general, those at Low Cost and Cargo companies, and on atypical contracts, tended to view safety culture least positively. It is notable that most pilots (88.47%) were on typical contracts. However, of those on an atypical contract, over a third (n=315) were pilots aged 30 or under. This group, in turn constituted only 15% of the sample (n=1082), which indicates new pilots entering the industry are increasingly being employed on atypical contracts, with potential implications for safety culture. This is consistent with research on the changing nature of Pilot employment contracts⁵.

⁵ Jorens, Y., Gillis, D., Valcke, L., & De Coninck, J. 'Atypical Forms of Employment in the Aviation Sector', European Social Dialogue, European Commission, 2015.

Analysis showed considerable variation, for some safety culture dimensions, between pilots working at different companies. This indicates that safety practices at aviation companies differ, leading to differential beliefs on issues such as the extent to which management is committed to safety, or resourcing.

4.2. Limitations

Despite a number of security checks to capture bogus entries, pilots completed the survey anonymously, meaning it is not possible to identify their credentials or the companies they reported working for. Because this survey did not set out to survey safety culture in any particular company, data relating to individual companies must be interpreted with caution. However, data analysis indicates that pilots were not uniform in the nature of their response patterns. They were positive on some issues, and negative on others. Furthermore, responses to survey items within a psychometric dimension tended to be consistent with one another. This indicates that pilots were completing the survey in the expected fashion, and that the survey was not being used to air grievances.

Data analysis using higher-level statistics has yet to be performed (e.g. confirmatory factor analysis, multi-level modelling), and this report is primarily descriptive. A number of issues in the data arose around variance and group sizes. Simply put, group sizes (e.g. within contract types) were unequal, albeit taken into account within the statistical tests. Furthermore, some of the between group comparisons showed weak effect sizes (indicated differences between groups were low in some cases).

The survey was heavily distributed through the European Cockpit Association and their trade members. Another approach could directly survey pilots through their airlines. However, efforts were made to advertise through other methods including social media and resulted in a very large sample (14% of the population). The sample largely comprised of Northern and Western European countries.

5 CONCLUSIONS AND RECOMMENDATIONS

5.1. Conclusions

This is the first major independent survey of the safety culture of European pilots, achieving a return rate of more than 7000 pilots. The results show that the overall pilots' perception of safety culture is generally positive. However, the survey also reveals significant differences in the pilots' assessment of safety culture depending on different factors such as the type of airlines they work for or the type of contracts on which they operate. Pilots working on atypical contracts and those working for low cost and cargo airlines have more negative perceptions of safety culture than their colleagues working under more secure forms of employment and for network carrier airlines. Perceptions of management commitment to safety, staffing and equipment, fatigue and perceived organisational support were not especially positive across the whole sample.

Aviation has the reputation of being the safest mode of transport, and indeed other modes of transport (rail, road and sea) look to aviation to learn how to do safety better. This survey represents a significant learning opportunity for the aviation industry, to reflect on why it is so safe, and also where it needs to address certain issues to ensure that it continues to remain so safe in the future.

5.2. Recommendations

Going forward, researchers and safety practitioners may wish to focus on the following. First, to identify the causes and potential solutions on the areas of safety culture within European aviation that were less positively perceived by pilots in this survey (e.g. fatigue, management commitment to safety). Second, and as done in other safety critical industries (ATM, Oil and Gas), to begin systematically measuring and exploring safety culture in commercial aviation companies. Third, to consider opportunities for inter-organisational learning on safety culture (e.g. sharing best practice amongst organisations).

Overall, our results were consistent with some of the previous research in the commercial aviation sector. For example, on the notion that company variations have an influence upon the safety culture of pilots (Evans, Glendon et al. 2007). Nevertheless, for the first time across the European industry, safety culture amongst pilots has been systematically measured. This creates data for 'normalising' what safety culture looks like from the perspective of pilots (e.g. for comparable future studies), and provides a survey scale for future studies to use.

The industry and its constituents, from the airlines to the regulators, and even the European Commission, need to consider the results in this report. Overall there is much to be positive about, however there are concerns that require consideration. Four ways forward are suggested:

1. One is to convene a series of workshops with pilots, managers and decision makers, to discuss the results and what is beneath them, i.e. what is driving these results, and what could be changed that would bolster safety culture yet still enable European aviation to remain competitive. Such

workshops would need representation from Low Cost and Cargo airlines, as well as companies and staff utilising atypical contracts.

2. The results of the survey indicate that pilots across the industry are concerned with fatigue management. Over half did not believe their company takes fatigue seriously. This needs to be addressed by actions undertaken jointly with regulators, airlines and representative bodies, to educate managers and pilots about the potential safety implications and also the necessity to improve this cultural dimension.
3. Given the different perception of safety culture according to the type of contracts under which pilots work, the regulatory authorities should consider how to take this factor into account to ensure the continued safety of operations. The results from this survey raise questions about the potential impact on safety culture of atypical contracts.
4. On a more strategic level, commercial aviation, as is done in other safety critical industries (e.g. ATM, Oil and Gas), needs to begin systematically measuring and exploring safety culture in commercial aviation companies. This is also beginning within the Future Sky Safety programme of work, with several airlines are already embarking on specific safety culture studies. This approach allows the management of such companies, as well as other staff besides pilots, to have their say. If this is achieved, learning on safety culture (e.g. sharing best practices amongst organisations) can begin to occur across European airlines as it already occurs for Air Traffic Management organisations.

6 REFERENCES

- Aarons, R. N. (2011). "A failed culture of safety." *Business & Commercial Aviation* **107**(2): 53.
- Atak, A. and S. Kingma (2011). "Safety culture in an aircraft maintenance organisation: A view from the inside." *Safety Science* **49**(2): 268-278.
- CAA. (2015). "Safety Management Systems - Guidance to Organisations: CAP 795." from <http://publicapps.caa.co.uk/modalapplication.aspx?appid=11&mode=detail&id=6616>.
- Chinda, T. and S. Mohamed (2008). "Structural equation model of construction safety culture." *Engineering, Construction and Architectural Management* **15**(2): 114-131.
- Clarke, S. (1998). "Safety Culture on the UK Railway Network." *Work and Stress* **12**(3): 285-292.
- Clarke, S. (1999). "Perceptions of Organizational Safety: Implications for the Development of Safety Culture." *Journal of Organizational Behavior* **20**(2): 185-198.
- Clarke, S. (2006). "The relationship between safety climate and safety performance: a meta-analytic review." *J Occup Health Psychol* **11**(4): 315-327.
- Cohen, J. (1992). "A power primer." *Psychological Bulletin* **112**(1): 155-159.
- Conchie, S. M., I. J. Donald and P. J. Taylor (2006). "Trust: Missing piece (s) in the safety puzzle." *Risk Analysis* **26**(5): 1097-1104.
- Cooper, M. (2000). "Towards a model of safety culture." *Safety Science* **36**(2): 111-136.
- Cox, S. J. and A. J. T. Cheyne (2000). "Assessing safety culture in offshore environments." *Safety Science* **34**(1-3): 111-129.
- EASA. (2016). "Annual Safety Review 2016." from https://www.easa.europa.eu/system/files/dfu/209735_EASA_ASR_MAIN_REPORT.pdf.
- Eisenberger, R., R. Huntington, S. Hutchison and D. Sowa (1986). "Perceived Organizational Support." *Journal of Applied Psychology* **71**: 500-507.
- Ek, A. and R. Akseleson (2007). "Aviation on the ground: Safety culture in a ground handling company." *International Journal of Aviation Psychology* **17**(1): 59-76.
- Evans, B., A. I. Glendon and P. A. Creed (2007). "Development and initial validation of an Aviation Safety Climate Scale." *Journal of Safety Research* **38**(6): 675-682.
- Field, A. (2013). *Discovering statistics using IBM SPSS statistics (4th ed.)* London, Sage.
- Gao, Y., P. J. Bruce, D. G. Newman and C. B. Zhang (2013). "Safety climate of commercial pilots: The effect of pilot ranks and employment experiences." *Journal of Air Transport Management* **30**: 17-24.
- Gill, G. K. and G. S. Shergill (2004). "Perceptions of safety management and safety culture in the aviation industry in New Zealand." *Journal of Air Transport Management* **10**(4): 231-237.
- Guldenmund, F. W. (2000). "The nature of safety culture: a review of theory and research." *Safety Science* **34**(1-3): 215-257.
- Halligan, M. and A. Zecevic (2011). "Safety culture in healthcare: a review of concepts, dimensions, measures and progress." *BMJ Quality & Safety* **20**(4): 338-343.
- Havold, J. I. (2005). "Safety-culture in a Norwegian shipping company." *J Safety Res* **36**(5): 441-458.
- Huber, G. P. (1991). "Organizational learning: The contributing processes and the literatures." *Organization Science* **2**(1): 88-115.
- International Atomic Energy Agency (1986). Summary Report on the Post-Accident Review Meeting on the Chernobyl Accident. *Safety Series 75-INSAG-1*. International Safety Advisory Group. Vienna.
- Jorens, Y., D. Gillis, L. Valcke and J. De Coninck (2015). Atypical Employment in Aviation. European Social Dialogue European Commission.

- Kao, L.-H., M. Stewart and K.-H. Lee (2009). "Using structural equation modeling to predict cabin safety outcomes among Taiwanese airlines." Transportation Research Part E: Logistics and Transportation Review **45**(2): 357-365.
- Kapur, N., A. Parand, T. Soukup, T. Reader and N. Sevdalis (2016). "Aviation and healthcare: a comparative review with implications for patient safety." JRSM Open **7**(1): 2054270415616548.
- Kim, C.-Y. and B.-H. Song (2016). "An Empirical Study on Safety Culture in Aviation Maintenance Organization." International Journal of u- and e- Service, Science and Technology **9**(6): 333-344.
- Lee, T. and K. Harrison (2000). "Assessing safety culture in nuclear power stations." Safety Science **34**: 61-97.
- Madsen, P. M. (2011). "Perils and Profits: A Reexamination of the Link Between Profitability and Safety in U.S. Aviation." Journal of Management.
- McDonald, N., S. Corrigan, C. Daly and S. Cromie (2000). "Safety management systems and safety culture in aircraft maintenance organisations." Safety Science **34**(1-3): 151-176.
- Mearns, K., B. Kirwan, T. W. Reader, J. Jackson, R. Kennedy and R. Gordon (2013). "Development of a methodology for understanding and enhancing safety culture in Air Traffic Management." Safety Science **53**: 123-133.
- O'Connor, P., A. O'Dea, Q. Kennedy and S. E. Buttrey (2011). "Measuring safety climate in aviation: A review and recommendations for the future." Safety Science **49**(2): 128-138.
- Reader, T. W., K. Mearns, C. Lopes and J. Kuha (2016). "Organizational support for the workforce and employee safety citizenship behaviors: A social exchange relationship." Human Relations.
- Reader, T. W., M. C. Noort, S. Shorrock and B. Kirwan (2015). "Safety sans Frontieres: An International Safety Culture Model." Risk Analysis **35**(5): 770-789.
- Reason, J. (1997). Managing the Risks of Organizational Accidents. Professional Safety. Surrey (UK), Ashgate Publishing Ltd.
- Reason, J. T. (1997). Managing the risks of organizational accidents. Aldershot, Ashgate.
- Reitchmuth, J. (2008). Topical Report: Airline Business Models. Air Transport and Airport Research.
- Sexton, J. B., J. R. Klinect and H. R. L. (2001). The link between safety attitudes and observed performance in flight operations Proceedings of the Eleventh International Symposium on Aviation Psychology., Columbus, OH: Ohio State University.
- Zohar, D. (2010). "Thirty years of safety climate research: reflections and future directions." Accid Anal Prev **42**(5): 1517-1522.

7 APPENDICES

7.1. Appendix 1 Demographic group cross-tabulations

A number of cross-tabulations were conducted. This was in order to examine in greater depth the demographic categories of respondents.

The table below shows that 39.18% of 18-30 year old pilots were on atypical contracts, in comparison to 11.91% of 18-30 year olds on a typical (permanent) contract.

Table 30 Contract Type and Age

		Age					Total
		18-30	31-40	41-50	51-60	60+	
Contract type	Typical contract	759	1927	2180	1331	178	6375
	Atypical contract	315	226	141	84	38	804
Total		1074	2153	2321	1415	216	7179

The table below shows that the majority of pilots with typical contracts were based in Network airlines (62.30%), whilst only 17.42% of employees at network airlines were on atypical contracts. The majority of pilots with atypical contracts worked for Low cost airlines (60.40%).

Table 31 Contract Type and Company Type

Contract Type		Company type							Business/VIP/State	Total
		Network	Low cost	Charter / leisure	Cargo	Aerial work/ambulance /surveillance	Helicopter	General Aviation		
Contract Type	Typical contract	3972	1246	489	419	34	92	39	85	6376
	Atypical contract	139	482	49	28	17	21	31	31	798
Total		4111	1728	538	447	51	113	70	116	7174

The table below shows that over half (64%) of network pilots had been in their organisation for 11 or more years. This is unlike low cost airlines, where 43% of pilots have worked for 4 or fewer years. 30% of charter/leisure pilots had worked for their airline for 4 or fewer years, and the majority (81%) of cargo pilots had worked for their company for 5 or more years.

The table below shows that almost 80% (77.18%) of pilots on typical contracts have over 5000+ hours, whilst 43.73% of those on atypical contracts have flown less than 3000 hours.

Table 32 Contract type and Flying Experience

		Flying experience (flight hrs)					Total
		<1000	1000-3000	3001-5000	5001-10000	10000+	
Contract Type	Typical contract	79	504	874	1925	3002	6384
	Atypical contract	115	237	131	162	160	805
Total		194	741	1005	2087	3162	7189

The table below shows that a little over half (52.20%) of pilots on an atypical contract, and 41.25% of those on typical contracts had self-funded modular training.

Table 33 Contract type and Training background

		Training background							Total	
		Military	Airline funded cadetship	Self-funded cadetship, with an airline (integrated) training	Self-funded, modular training	Other	University - State funded	Self-funded, self improver (non-modular)		National flight school - state funded
Contract Type	Typical contract	711	1602	1042	2603	44	35	17	257	6311
	Atypical contract	78	82	166	416	7	6	5	37	797
Total		789	1684	1208	3019	51	41	22	294	7108

The table below shows that the majority of pilots working for Network airlines, Charter, Helicopter, Aerial work/ambulance/surveillance and Cargo have had a tenure of 11 years or over, whilst those working for Low cost, Business/VIP/State airlines and general aviation have more of an equal split majority between tenures of 1-4yrs and 5-10yrs.

Table 34 Company Type and Tenure

		Company type								Total
		Network	Low cost	Charter/leisure	Cargo	Aerial work/ambulance/surveillance	Helicopter	General Aviation	Business/VIP/State	
Tenure	<1yr	126	107	29	15	8	5	13	14	317
	1-4yrs	402	640	138	67	16	27	27	46	1363
	5-10yrs	946	648	172	157	9	32	20	40	2024
	11yrs+	2637	342	205	208	18	49	15	16	3490
Total		4111	1737	544	447	51	113	75	116	7194

The table below shows that for most company types (excluding general aviation and Aerial work/ambulance/surveillance), over half of pilots had over 5000 hours of flying experience.

Table 35 Company type and Flying Experience

		Flying experience (flight hrs)					Total
		<1000	1000-3000	3001-5000	5001-10000	10000+	
Company type	Network	69	272	470	1110	2199	4120
	Low cost	71	312	313	531	509	1736
	Charter/leisure	18	58	81	164	222	543
	Cargo	3	26	64	171	182	446
	Aerial work/ambulance/surveillance	7	8	14	18	3	50
	Helicopter	7	20	29	42	15	113
	General Aviation	17	16	12	17	13	75
	Business/VIP/State	9	26	23	33	25	116
Total		201	738	1006	2086	3168	7199

The table below shows that a little over half (56.99%) of pilots from Network airlines, and 31.59% of those from Low cost airlines had self-funded modular training.

Table 36 Company type and Training background

		Training background								Total
		Military	Airline funded cadetship	Self-funded cadetship, with an airline (integrated) training	Self-funded, modular training	University - State funded	Self-funded, self improver (non-modular)	National flight school - state funded	Other	
Company type	Network	496	1390	635	1284	25	8	194	32	4064
	Low cost	114	156	373	982	12	13	63	10	1723
	Charter/leisure	45	69	98	310	3	0	10	5	540
	Cargo	50	53	80	251	1	1	6	3	445
	Aerial work/ambulance/surveillance	15	0	0	29	0	0	6	0	50
	Helicopter	43	10	10	43	0	0	2	0	108
	General Aviation	12	4	6	44	0	0	4	1	71
	Business/VIP/State	17	4	10	77	0	0	8	0	116
Total		792	1686	1212	3020	41	22	293	51	7117

The table below shows that for pilots over 51, at least 25% were trained in the military, at least 25% were trained through airline cadetship, and 5% or less were self-funded (with airline training). Of those under 40, over 22% were self-funded (with airline training), and only 4% trained in the military. For those between 41-50, nearly half (46%) were self-funded (with modular training).

Table 37 Age and Training background

		Age					Total
		18-30	31-40	41-50	51-60	60+	
Training background	Military	10	67	269	374	71	791
	Airline funded cadetship	243	481	560	346	55	1685
	Self-funded cadetship, with an airline (integrated) training	354	497	288	71	4	1214
	Self-funded, modular training	373	1003	1060	516	74	3026
	Other	5	8	14	19	6	52
	University - State funded	11	10	12	8	1	42
	Self-funded, self improver (non-modular)	1	3	3	12	3	22
	National flight school - state funded	74	63	95	52	11	295
Total		1071	2132	2301	1398	225	7127



7.2. Appendix 2 Means for dimensions by demographic groups

The tables below show the means for dimensions by demographic groups.

Table 38 Means for dimensions by demographic groups (Job title; Gender; Flying experience; Age; Tenure)

Dimension	Job title			Gender		Flying experience					Age					Tenure			
	Captain	First Officer	Second Officer	Male	Female	<1000	1000-3000	3001-5000	5001-10000	10000+	18-30	31-40	41-50	51-60	60+	<1yr	1-4yrs	5-10yrs	11yrs+
Management Commitment to Safety	3.42	3.45	3.97	3.44	3.48	3.82	3.63	3.42	3.35	3.44	3.57	3.36	3.41	3.51	3.49	3.83	3.50	3.29	3.47
Collaboration & Involvement	3.59	3.61	3.86	3.60	3.63	3.76	3.64	3.57	3.57	3.61	3.65	3.56	3.58	3.65	3.62	3.77	3.57	3.53	3.64
Just Culture & Reporting	3.70	3.71	4.05	3.71	3.67	3.88	3.76	3.66	3.65	3.74	3.76	3.65	3.69	3.79	3.73	3.91	3.67	3.60	3.77
Communication & Learning	3.64	3.78	4.09	3.70	3.78	4.05	3.82	3.67	3.66	3.71	3.78	3.68	3.68	3.73	3.73	3.93	3.71	3.58	3.76
Risk Handling	3.75	3.79	4.01	3.77	3.81	4.00	3.85	3.72	3.74	3.77	3.85	3.72	3.76	3.79	3.75	3.96	3.78	3.69	3.79
Colleague Commitment	4.00	4.12	4.27	4.05	4.14	4.13	4.10	4.07	4.03	4.06	4.10	4.05	4.03	4.08	4.03	4.12	4.03	4.00	4.09
Staff Equipment	3.38	3.50	4.05	3.44	3.42	3.78	3.59	3.40	3.36	3.44	3.57	3.36	3.41	3.50	3.46	3.72	3.42	3.32	3.48
Procedures & Training	3.72	3.73	3.77	3.73	3.74	3.86	3.81	3.78	3.70	3.70	3.81	3.72	3.71	3.70	3.74	3.79	3.78	3.72	3.71
Fatigue	2.82	2.81	3.38	2.82	2.77	3.09	2.84	2.76	2.77	2.84	2.83	2.74	2.81	2.91	2.99	3.09	2.78	2.68	2.89
Speaking up	3.84	3.85	4.10	3.85	3.87	3.86	3.88	3.87	3.81	3.86	3.92	3.85	3.81	3.86	3.82	3.81	3.83	3.80	3.89
Perceived Organisational Support	2.65	2.65	3.49	2.65	2.67	3.10	2.74	2.61	2.58	2.67	2.69	2.55	2.65	2.75	2.92	3.13	2.67	2.51	2.69

Table 39 Means for dimensions by demographic groups (Company type; Contract type; Part-time or Part Year working; Part-timers average percentage work time)

Dimension	Company type									Contract type			Part-time or Part Year working		Part-timers average percentage work time				
	Network	Low cost	Charter/leisure	Cargo	Aerial work/ambulance/surveillance	Helicopter	General Aviation	Business/VI P/State	Other	Typical contract	Atypical contract	Other	Yes	No	<25%	25-50%	51-75%	76-90%	91-100%
Management Commitment to Safety	3.56	3.23	3.54	2.96	3.64	3.38	3.57	3.59	4.00	3.44	3.40	3.79	3.47	3.43	3.62	3.40	3.30	3.55	3.44
Collaboration & Involvement	3.70	3.41	3.62	3.42	3.66	3.48	3.50	3.57	3.17	3.62	3.43	3.42	3.65	3.59	3.52	3.42	3.49	3.73	3.69
Just Culture & Reporting	3.84	3.50	3.76	3.32	3.61	3.46	3.48	3.71	4.00	3.74	3.47	3.66	3.78	3.69	3.80	3.46	3.63	3.87	3.81
Communication & Learning	3.88	3.37	3.78	3.41	3.66	3.68	3.48	3.64	4.00	3.74	3.47	3.59	3.81	3.68	3.80	3.46	3.62	3.89	3.90
Risk Handling	3.83	3.68	3.78	3.65	3.65	3.47	3.47	3.70	2.67	3.78	3.67	3.58	3.78	3.77	3.71	3.52	3.64	3.85	3.83
Colleague Commitment	4.16	3.89	4.06	3.89	3.89	3.88	3.88	3.90	4.00	4.09	3.83	3.89	4.13	4.04	4.02	3.88	4.00	4.20	4.19
Staff & Equipment	3.60	3.11	3.47	3.10	3.57	3.38	3.28	3.54	4.00	3.46	3.26	3.46	3.51	3.42	3.62	3.17	3.29	3.60	3.67
Procedures & Training	3.74	3.68	3.77	3.74	3.75	3.72	3.69	3.83	3.50	3.73	3.68	3.93	3.71	3.73	3.80	3.63	3.60	3.74	3.84
Fatigue	2.99	2.38	2.95	2.48	3.55	3.09	3.24		3.21	2.86	2.49	2.90	2.91	2.80	3.16	2.53	2.66	3.04	2.95
Speaking up	3.91	3.79	3.79	3.80	3.57	3.64	3.40	3.77	3.00	3.87	3.69	3.63	3.91	3.83	3.73	3.63	3.82	3.99	3.90
Perceived Organisational Support	2.78	2.25	2.93	2.38	3.39	2.89	3.05	3.18	3.18	2.68	2.41	2.78	2.73	2.63	2.92	2.38	2.62	2.83	2.64



Table 40 Means for dimensions by demographic groups (Management role; Training background)

Dimension	Management role				Training background							
	Yes (flight operations and training)	Yes (safety department)	Yes (other incl. Union/Company Council)	No	Military	Airline funded cadetship	Self-funded cadetship, with an airline (integrated) training	Self-funded, modular training	Other	University - State funded	Self-funded, self improver (non-modular)	National flight school - state funded
Management Commitment to Safety	3.64	3.71	3.48	3.41	3.47	3.43	3.54	3.39	3.49	3.61	3.25	3.53
Collaboration & Involvement	3.63	3.70	3.63	3.60	3.62	3.68	3.66	3.52	3.53	3.65	3.27	3.63
Just Culture & Reporting	3.78	3.84	3.81	3.70	3.73	3.82	3.77	3.61	3.71	3.88	3.54	3.74
Communication & Learning	3.72	3.84	3.82	3.70	3.68	3.89	3.79	3.58	3.61	3.80	3.44	3.76
Risk Handling	3.82	3.77	3.80	3.76	3.77	3.80	3.85	3.72	3.75	3.85	3.52	3.80
Colleague Commitment	4.01	3.94	4.17	4.06	4.03	4.18	4.12	3.98	3.87	4.18	3.70	4.03
Staff Equipment	3.48	3.57	3.50	3.43	3.46	3.54	3.52	3.32	3.52	3.56	2.86	3.58
Procedures & Training	3.81	3.72	3.73	3.72	3.73	3.69	3.77	3.73	3.70	3.87	3.48	3.76
Fatigue	3.01	3.21	2.89	2.79	2.91	2.94	2.87	2.69	2.81	2.96	2.30	2.99
Speaking up	3.81	3.65	3.98	3.86	3.80	3.94	3.95	3.78	3.64	3.96	3.80	3.80
Perceived Organisational Support	2.89	2.98	2.75	2.62	2.77	2.64	2.71	2.60	2.74	2.71	2.48	2.75



Table 41 Means for dimensions by Nationality (for nationalities with =>30 respondents)

Dimension	Austrians	Belgians	Croatians	Danes	Dutch	Finns	French citizens	Germans	Icelanders	Irish	Italians	Luxembourgers	Norwegians	Portuguese	Spaniards	St Lucians	Swedes	Swiss	British
Management Commitment to Safety	3.55	3.14	3.08	3.60	3.80	3.69	3.32	3.34	3.92	3.43	3.21	3.08	3.68	3.72	3.09	3.75	3.57	3.47	3.23
Collaboration & Involvement	3.60	3.43	3.32	3.64	3.86	3.82	3.51	3.61	3.70	3.62	3.37	3.47	3.80	3.59	3.24	3.83	3.65	3.83	3.39
Just Culture & Reporting	3.74	3.35	3.52	3.75	3.96	3.98	3.57	3.75	3.94	3.65	3.37	3.44	3.83	3.68	3.28	3.67	3.83	3.86	3.58
Communication & Learning	3.74	3.32	3.62	3.65	3.95	3.77	3.67	3.85	3.88	3.64	3.33	3.54	3.77	3.65	3.35	4.00	3.69	3.98	3.41
Risk Handling	3.80	3.68	3.54	3.86	4.05	3.93	3.74	3.77	3.89	3.76	3.59	3.73	3.81	3.79	3.45	4.00	3.79	3.81	3.61
Colleague Commitment	4.11	3.84	3.82	4.09	4.20	4.22	3.91	4.16	4.16	3.99	3.69	3.96	4.32	4.09	3.63	4.33	4.15	4.22	3.94
Staff Equipment	3.41	3.14	3.12	3.36	3.83	3.34	3.50	3.50	3.73	3.29	3.16	3.00	3.64	3.66	3.07	4.00	3.44	3.59	3.05
Procedures & Training	3.83	3.68	3.98	3.72	3.96	3.63	3.64	3.73	3.95	3.75	3.58	3.74	3.93	3.97	3.59	3.67	3.74	3.60	3.52
Fatigue	2.87	2.47	2.33	2.74	3.27	2.77	2.84	2.92	3.12	2.44	2.66	2.49	3.01	3.14	2.48	3.67	2.79	2.96	2.35
Speaking up	3.86	3.81	3.48	4.07	4.09	3.76	3.56	3.90	3.93	3.85	3.47	4.00	4.03	3.49	3.31	3.00	4.01	4.02	3.88
Perceived Organisational Support	2.56	2.36	2.28	2.69	3.26	2.56	2.51	2.57	3.03	2.51	2.54	2.40	2.88	2.95	2.40	3.38	2.60	2.84	2.32



Table 42 Means for dimensions by country base (for countries with =>30 respondents)

Dimension	Austria	Belgium	Croatia	Denmark	Estonia	Finland	France	Germany	Iceland	Ireland	Italy	Luxembourg	Netherlands	Norway	Portugal	Spain	Sweden	Switzerland	United Kingdom	Other
Management Commitment to Safety	3.56	3.20	3.11	3.80	3.25	3.63	3.29	3.35	4.09	3.40	3.18	2.74	4.00	3.66	3.66	3.21	3.62	3.49	3.27	3.33
Collaboration & Involvement	3.49	3.41	3.34	3.76	3.56	3.83	3.52	3.61	3.81	3.65	3.35	3.43	3.97	3.77	3.59	3.30	3.71	3.80	3.41	3.41
Just Culture & Reporting	3.73	3.34	3.54	3.95	3.61	3.98	3.57	3.76	4.10	3.65	3.35	3.09	4.11	3.80	3.66	3.36	3.89	3.88	3.60	3.51
Communication & Learning	3.56	3.23	3.63	3.80	4.06	3.80	3.70	3.86	4.03	3.67	3.27	3.32	4.10	3.75	3.58	3.37	3.72	3.99	3.43	3.51
Risk Handling	3.84	3.66	3.53	3.94	3.67	3.92	3.72	3.77	4.01	3.77	3.65	3.63	4.13	3.79	3.80	3.56	3.79	3.78	3.63	3.54
Colleague Commitment	3.91	3.78	3.85	4.24	3.78	4.23	3.89	4.16	4.24	3.98	3.68	3.85	4.30	4.31	4.06	3.71	4.19	4.25	3.97	3.81
Staff Equipment	3.35	3.14	3.16	3.47	3.56	3.31	3.53	3.51	3.89	3.31	3.16	2.82	4.04	3.63	3.58	3.11	3.47	3.61	3.06	3.29
Procedures & Training	3.76	3.75	3.99	3.73	4.00	3.63	3.63	3.72	4.00	3.76	3.61	3.82	4.01	3.93	3.96	3.65	3.75	3.61	3.52	3.65
Fatigue	2.80	2.43	2.35	2.96	2.78	2.79	2.90	2.92	3.31	2.41	2.50	2.30	3.55	2.98	2.97	2.44	2.82	2.98	2.40	2.73
Speaking up	3.58	3.78	3.45	4.21	3.67	3.78	3.52	3.92	3.97	3.87	3.53	3.86	4.17	4.04	3.55	3.49	4.03	4.02	3.90	3.45
Perceived Organisational Support	2.55	2.32	2.31	2.89	2.75	2.61	2.56	2.57	3.22	2.51	2.40	2.16	3.57	2.84	2.79	2.29	2.62	2.89	2.36	2.65

The means by aircraft type are not presented, as there were very few aircraft types for companies with more than 10 respondents.

7.3. Appendix 3 Favourable/Unfavourable Responses by Groups

This section shows the percentages of favourable and unfavourable responses for three of the groups that had most significant differences: company type, contract type and training background.

Table 43 Favourable/Unfavourable responses by Company type (excluding other category)

Items	Network			Low cost			Charter/leisure			Cargo			Aerial work/ambulance/surveillance			Helicopter			General Aviation			Business/VIP/State		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
B01 My colleagues are committed to safety.	1.4%	2.5%	96.0%	3.5%	5.9%	90.6%	2.6%	5.0%	92.5%	3.8%	4.3%	91.9%	9.8%	9.8%	80.4%	8.0%	10.6%	81.4%	8.0%	12.0%	80.0%	5.2%	12.1%	82.8%
B02 Voicing concerns about safety is encouraged.	5.4%	9.5%	85.1%	14.6%	16.9%	68.5%	5.2%	13.4%	81.4%	11.2%	21.6%	67.2%	15.7%	15.7%	68.6%	10.7%	15.2%	74.1%	12.0%	13.3%	74.7%	13.0%	14.8%	72.2%
B03 We have sufficient staff to do our work safely.	20.0%	20.8%	59.2%	42.2%	24.3%	33.5%	26.9%	21.6%	51.5%	45.4%	24.3%	30.3%	21.6%	19.6%	58.8%	29.2%	17.7%	53.1%	31.1%	14.9%	54.1%	23.3%	20.7%	56.0%
B04 Everyone I work with in this company feels that safety is their personal responsibility.	10.8%	17.4%	71.8%	15.1%	23.6%	61.3%	9.2%	20.2%	70.6%	17.2%	24.2%	58.6%	20.0%	12.0%	68.0%	16.1%	20.5%	63.4%	17.3%	17.3%	65.3%	16.4%	14.7%	69.0%
B05 My direct manager is committed to safety.	9.0%	16.0%	75.0%	15.8%	20.8%	63.4%	10.9%	17.3%	71.8%	20.0%	28.9%	51.1%	21.6%	9.8%	68.6%	19.5%	17.7%	62.8%	14.7%	17.3%	68.0%	14.8%	11.3%	73.9%
B06 Pilots have a high degree of trust in management with regard to safety.	33.1%	25.8%	41.1%	48.6%	23.7%	27.7%	28.5%	27.2%	44.3%	60.9%	23.5%	15.7%	23.5%	17.6%	58.8%	37.2%	18.6%	44.2%	28.4%	23.0%	48.6%	26.7%	23.3%	50.0%
B07 I have confidence in the people that I interact with in my normal working situation.	3.7%	9.8%	86.6%	9.5%	15.1%	75.4%	4.4%	12.1%	83.5%	8.1%	15.2%	76.7%	9.8%	7.8%	82.4%	7.1%	14.2%	78.8%	8.0%	16.0%	76.0%	6.9%	12.9%	80.2%



Items	Network			Low cost			Charter/leisure			Cargo			Aerial work/ambulance/surveillance			Helicopter			General Aviation			Business/VIP/State		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
B08 Pilots who report safety-related occurrences are treated in a just and fair manner.	7.6%	13.3%	79.1%	19.4%	23.8%	56.8%	10.1%	14.2%	75.7%	21.9%	24.4%	53.7%	21.6%	9.8%	68.6%	29.2%	18.6%	52.2%	13.5%	23.0%	63.5%	14.7%	15.5%	69.8%
B09 People in this company share safety-related information.	6.8%	12.6%	80.5%	25.4%	19.0%	55.6%	8.1%	14.5%	77.3%	15.3%	20.7%	64.0%	9.8%	29.4%	60.8%	18.6%	15.0%	66.4%	13.3%	17.3%	69.3%	16.4%	18.1%	65.5%
B10 My direct manager takes action on the safety issues we raise.	12.6%	26.0%	61.5%	20.0%	31.6%	48.4%	13.7%	26.0%	60.3%	26.5%	35.2%	38.3%	18.0%	22.0%	60.0%	21.4%	21.4%	57.1%	16.0%	25.3%	58.7%	14.7%	19.8%	65.5%
B11 Information about safety-related changes within this company is clearly communicated to staff.	10.8%	19.6%	69.6%	23.1%	18.8%	58.2%	14.4%	16.8%	68.8%	23.8%	27.1%	49.1%	7.8%	23.5%	68.6%	14.2%	25.7%	60.2%	20.5%	21.9%	57.5%	19.8%	15.5%	64.7%
B12 We get timely feedback on the safety issues we raise.	19.8%	29.5%	50.6%	34.8%	30.4%	34.8%	22.5%	29.0%	48.5%	34.7%	32.9%	32.4%	19.6%	31.4%	49.0%	25.7%	31.9%	42.5%	32.0%	30.7%	37.3%	24.1%	21.6%	54.3%
B13 My involvement in safety activities is sufficient.	5.9%	21.1%	72.9%	14.0%	31.4%	54.6%	7.2%	22.5%	70.3%	9.0%	29.8%	61.2%	11.8%	25.5%	62.7%	12.5%	16.1%	71.4%	10.7%	21.3%	68.0%	10.3%	25.9%	63.8%
B14r Pilots who raise safety issues are seen as troublemakers.	12.6%	15.4%	72.0%	25.5%	24.5%	50.0%	15.0%	17.9%	67.1%	22.4%	25.1%	52.6%	23.5%	9.8%	66.7%	33.6%	14.2%	52.2%	24.0%	14.7%	61.3%	25.0%	14.7%	60.3%
B15 I am prepared to speak to my direct manager when unsafe situations are developing.	7.2%	12.6%	80.3%	11.1%	12.6%	76.3%	6.5%	12.2%	81.3%	13.0%	15.3%	71.7%	5.9%	9.8%	84.3%	10.7%	8.0%	81.3%	8.1%	10.8%	81.1%	1.7%	8.6%	89.7%
B16 There is good communication up and down the company about safety.	18.6%	24.5%	56.9%	34.0%	27.1%	38.9%	19.0%	26.0%	55.0%	38.3%	27.8%	33.9%	25.5%	17.6%	56.9%	26.5%	24.8%	48.7%	28.0%	22.7%	49.3%	19.1%	22.6%	58.3%

Items	Network			Low cost			Charter/leisure			Cargo			Aerial work/ambulance/surveillance			Helicopter			General Aviation			Business/VIP/State		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
B17 Changes to the company, systems and procedures are properly assessed for safety risk.	24.9%	27.6%	47.5%	28.4%	28.6%	43.0%	22.3%	31.9%	45.9%	24.5%	34.8%	40.7%	27.5%	19.6%	52.9%	25.9%	32.1%	42.0%	24.0%	22.7%	53.3%	17.2%	26.7%	56.0%
B18 Safety is taken seriously in this company.	9.2%	17.3%	73.5%	15.9%	20.2%	63.9%	9.4%	17.3%	73.3%	18.2%	27.6%	54.3%	13.7%	19.6%	66.7%	15.9%	25.7%	58.4%	22.7%	18.7%	58.7%	14.7%	12.9%	72.4%
B19 We learn lessons from safety-related incident or occurrence investigations.	6.1%	10.8%	83.1%	14.4%	16.0%	69.6%	7.2%	14.7%	78.1%	15.2%	17.9%	66.8%	13.7%	15.7%	70.6%	14.2%	11.5%	74.3%	18.7%	16.0%	65.3%	12.9%	17.2%	69.8%
B20 My direct manager would always support me if I had a concern about safety.	12.1%	27.2%	60.8%	20.6%	31.1%	48.3%	14.5%	28.2%	57.3%	24.2%	38.6%	37.2%	17.6%	17.6%	64.7%	20.4%	19.5%	60.2%	17.3%	22.7%	60.0%	15.7%	21.7%	62.6%
B21 We have sufficient practical support from our safety manager/department.	14.0%	25.4%	60.6%	27.6%	31.4%	41.0%	16.0%	26.2%	57.8%	24.8%	31.3%	43.8%	19.6%	27.5%	52.9%	20.5%	32.1%	47.3%	29.3%	22.7%	48.0%	19.1%	23.5%	57.4%
B22 I have good access to information regarding safety incidents or occurrences within the company.	13.1%	18.9%	68.0%	43.6%	21.4%	35.0%	18.8%	21.1%	60.1%	29.4%	25.1%	45.5%	31.4%	17.6%	51.0%	16.8%	20.4%	62.8%	29.3%	17.3%	53.3%	25.2%	23.5%	51.3%
B23r There are people who I do not want to work with because of their negative (e.g. loose, careless) attitude to safety.	17.9%	15.1%	67.0%	27.1%	19.7%	53.3%	23.6%	16.1%	60.3%	26.5%	18.0%	55.5%	31.4%	15.7%	52.9%	32.7%	15.0%	52.2%	37.3%	24.0%	38.7%	28.7%	20.0%	51.3%
B24 Other people in this company understand how my job contributes to safety.	13.1%	23.5%	63.4%	14.9%	24.2%	61.0%	10.7%	24.7%	64.6%	25.8%	28.0%	46.2%	8.0%	24.0%	68.0%	7.1%	31.9%	61.1%	12.0%	18.7%	69.3%	7.9%	22.8%	69.3%

Items	Network			Low cost			Charter/leisure			Cargo			Aerial work/ambulance/surveillance			Helicopter			General Aviation			Business/VIP/State		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
B25 When I am unwell, I do not go to work.	9.1%	11.5%	79.4%	24.0%	14.9%	61.1%	11.8%	15.1%	73.2%	21.4%	17.6%	61.0%	16.0%	18.0%	66.0%	21.2%	15.9%	62.8%	21.3%	24.0%	54.7%	19.1%	25.2%	55.7%
B26 If I see unsafe behaviour by any of my colleagues I would talk to them about it.	3.1%	10.0%	86.9%	6.0%	14.3%	79.7%	3.1%	10.8%	86.0%	5.1%	11.2%	83.7%	6.0%	16.0%	78.0%	7.1%	14.2%	78.8%	9.3%	14.7%	76.0%	.9%	7.8%	91.3%
C01 We have the resources needed to do our work safely.	10.8%	17.1%	72.1%	24.6%	19.6%	55.8%	15.1%	16.7%	68.2%	20.9%	21.4%	57.7%	10.6%	21.3%	68.1%	23.8%	16.2%	60.0%	21.9%	21.9%	56.3%	11.4%	19.0%	69.5%
C02 I read reports of incidents or occurrences that are relevant to our work.	2.1%	6.5%	91.4%	8.1%	10.5%	81.4%	2.5%	7.0%	90.5%	4.9%	6.5%	88.6%	6.4%	17.0%	76.6%	5.7%	3.8%	90.5%	7.8%	15.6%	76.6%	4.7%	6.6%	88.7%
C03 We have procedures that are focused on appearing to follow the rules, rather than improving practice.	21.2%	30.3%	48.5%	17.3%	23.8%	58.9%	18.5%	33.2%	48.3%	18.6%	27.1%	54.4%	29.8%	19.1%	51.1%	19.4%	29.1%	51.5%	31.3%	20.3%	48.4%	22.6%	31.1%	46.2%
C04 Good communication exists between pilots and Engineering/Maintenance to ensure safety.	10.4%	21.8%	67.8%	21.8%	21.6%	56.6%	11.2%	21.5%	67.2%	16.2%	25.3%	58.5%	6.4%	21.3%	72.3%	14.3%	22.9%	62.9%	20.3%	21.9%	57.8%	12.3%	20.8%	67.0%
C05 I am satisfied with the level of confidentiality of the reporting and investigation process.	14.1%	17.1%	68.9%	28.5%	23.8%	47.8%	17.1%	18.3%	64.7%	35.3%	22.7%	42.0%	14.9%	31.9%	53.2%	33.3%	19.0%	47.6%	25.0%	32.8%	42.2%	21.7%	23.6%	54.7%
C06r We often have to deviate from procedures for safety reasons.	4.5%	12.9%	82.6%	6.5%	18.1%	75.4%	3.9%	15.9%	80.2%	7.0%	16.3%	76.7%	6.4%	23.4%	70.2%	13.3%	29.5%	57.1%	23.4%	26.6%	50.0%	11.3%	21.7%	67.0%
C07 I have sufficient opportunity to regularly practice my manual flying skills.	18.6%	15.1%	66.3%	32.4%	12.2%	55.4%	17.1%	13.2%	69.7%	14.7%	18.1%	67.2%	6.4%	4.3%	89.4%	17.3%	16.3%	66.3%	14.1%	14.1%	71.9%	10.4%	14.2%	75.5%



Items	Network			Low cost			Charter/leisure			Cargo			Aerial work/ambulance/surveillance			Helicopter			General Aviation			Business/VIP/State		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
C08 Maintenance are able to promptly repair technical deficiencies to the aircraft.	20.0%	23.6%	56.5%	24.7%	17.7%	57.5%	23.8%	20.2%	56.0%	21.0%	14.7%	64.3%	23.4%	14.9%	61.7%	23.8%	17.1%	59.0%	21.9%	14.1%	64.1%	23.6%	14.2%	62.3%
C09 Adequate training is provided when new systems and procedures are introduced.	37.6%	25.8%	36.6%	36.1%	24.8%	39.1%	32.8%	25.8%	41.5%	33.2%	25.1%	41.8%	29.8%	25.5%	44.7%	27.6%	21.9%	50.5%	25.0%	20.3%	54.7%	25.5%	19.8%	54.7%
C10r I have to take risks that make me feel uncomfortable about safety.	6.1%	9.5%	84.4%	8.1%	14.5%	77.4%	7.4%	14.5%	78.1%	8.6%	16.0%	75.3%	17.0%	14.9%	68.1%	21.0%	12.4%	66.7%	17.2%	20.3%	62.5%	15.1%	6.6%	78.3%
C11 Good communication exists between pilots and Air Traffic Control to ensure safety.	6.4%	15.7%	77.9%	11.9%	16.6%	71.5%	5.0%	17.6%	77.3%	8.6%	21.1%	70.3%	2.1%	10.6%	87.2%	2.9%	20.2%	76.9%	9.4%	14.1%	76.6%	5.7%	16.0%	78.3%
C12 A staff member who takes unacceptable risks would be disciplined or corrected in this company.	11.7%	20.3%	67.9%	8.9%	16.6%	74.5%	11.0%	21.7%	67.2%	29.5%	20.6%	49.9%	23.4%	23.4%	53.2%	26.7%	16.2%	57.1%	26.6%	17.2%	56.3%	15.1%	22.6%	62.3%
C13 I feel entirely confident to fly my aircraft.	2.0%	5.9%	92.2%	2.5%	5.7%	91.9%	2.7%	6.6%	90.7%	3.2%	6.7%	90.0%	6.4%	10.6%	83.0%	3.8%	9.5%	86.7%	10.9%	14.1%	75.0%	3.8%	10.4%	85.8%
C14 The SOPs associated with my work are appropriate to ensure safe operations.	5.5%	11.7%	82.8%	7.0%	12.3%	80.6%	4.1%	9.9%	86.0%	5.3%	8.6%	86.1%	12.8%	12.8%	74.5%	11.4%	17.1%	71.4%	11.1%	15.9%	73.0%	6.6%	17.9%	75.5%
C15 Good communication exists between flight crew and cabin crew to ensure safety.	4.4%	8.6%	87.0%	14.3%	16.3%	69.4%	5.2%	10.5%	84.3%	1.4%	73.5%	25.1%	0.0%	29.8%	70.2%	2.1%	36.8%	61.1%	3.3%	35.0%	61.7%	5.0%	24.0%	71.0%



Items	Network			Low cost			Charter/leisure			Cargo			Aerial work/ambulance/surveillance			Helicopter			General Aviation			Business/VIP/State		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
C16 I have sufficient training to understand the procedures associated with my work.	6.0%	11.1%	82.8%	6.3%	11.4%	82.2%	6.2%	11.2%	82.6%	4.4%	10.1%	85.5%	2.1%	12.8%	85.1%	5.7%	7.6%	86.7%	10.9%	12.5%	76.6%	3.8%	8.5%	87.7%
D01r Pilots in this company are often tired at work.	48.8%	27.1%	24.2%	75.6%	15.3%	9.0%	62.0%	18.9%	19.1%	82.5%	12.4%	5.1%	22.2%	28.9%	48.9%	34.3%	20.6%	45.1%	29.0%	32.3%	38.7%	35.6%	26.9%	37.5%
D02 First officers are willing to challenge Captains on their decision making.	10.2%	13.9%	75.9%	8.4%	19.5%	72.1%	10.8%	15.3%	73.9%	12.9%	22.7%	64.5%	18.6%	32.6%	48.8%	17.9%	31.6%	50.5%	24.1%	37.9%	37.9%	16.3%	25.0%	58.7%
D03r The company shows very little concern for my well-being.	36.4%	29.6%	34.0%	64.7%	22.5%	12.8%	36.4%	26.2%	37.4%	59.3%	21.5%	19.2%	33.3%	13.3%	53.3%	42.2%	22.5%	35.3%	32.3%	32.3%	35.5%	26.9%	25.0%	48.1%
D04 My national aviation authority manages safety reports well.	27.9%	47.0%	25.1%	30.2%	48.7%	21.1%	24.1%	48.9%	27.0%	35.5%	46.2%	18.3%	40.0%	37.8%	22.2%	38.6%	35.6%	25.7%	30.6%	32.3%	37.1%	21.6%	49.0%	29.4%
D05 The company takes pride in my accomplishments at work.	38.7%	37.5%	23.8%	59.9%	26.7%	13.4%	30.3%	41.5%	28.3%	57.2%	32.2%	10.6%	15.6%	20.0%	64.4%	35.6%	29.7%	34.7%	27.4%	33.9%	38.7%	19.4%	44.7%	35.9%
D06 I would feel comfortable to complete a fatigue report.	18.1%	15.0%	66.9%	40.7%	12.5%	46.8%	15.9%	12.1%	72.0%	25.0%	17.1%	57.9%	8.9%	17.8%	73.3%	31.4%	16.7%	52.0%	16.1%	17.7%	66.1%	17.5%	18.4%	64.1%
D07 My national aviation authority takes safety seriously.	20.4%	31.4%	48.2%	26.5%	31.7%	41.8%	18.1%	29.2%	52.6%	30.7%	36.6%	32.8%	31.1%	35.6%	33.3%	33.7%	19.8%	46.5%	25.8%	19.4%	54.8%	15.5%	27.2%	57.3%
D08 Captains encourage their crew to speak-up if they are concerned with decisions made by the Captain.	4.7%	13.2%	82.1%	5.7%	19.1%	75.2%	7.4%	14.6%	78.0%	3.3%	13.6%	83.1%	6.7%	11.1%	82.2%	6.1%	14.1%	79.8%	8.5%	22.0%	69.5%	3.8%	15.4%	80.8%

Items	Network			Low cost			Charter/leisure			Cargo			Aerial work/ambulance/surveillance			Helicopter			General Aviation			Business/VIP/State		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
D09 The company values my contribution to its well-being.	37.3%	33.5%	29.2%	56.7%	27.2%	16.1%	26.9%	40.1%	33.0%	54.2%	30.4%	15.4%	22.2%	24.4%	53.3%	36.6%	26.7%	36.6%	24.6%	32.8%	42.6%	23.3%	27.2%	49.5%
D10 I feel this company returns the effort put in by its pilots.	54.3%	26.1%	19.7%	75.5%	16.1%	8.4%	41.7%	31.5%	26.8%	73.5%	17.6%	8.9%	37.8%	11.1%	51.1%	50.0%	19.6%	30.4%	37.1%	29.0%	33.9%	34.6%	30.8%	34.6%
D11 The company really cares about my wellbeing.	50.4%	30.1%	19.5%	75.5%	17.5%	7.0%	42.7%	32.2%	25.1%	69.6%	20.6%	9.8%	31.1%	24.4%	44.4%	47.1%	25.5%	27.5%	35.5%	33.9%	30.6%	29.8%	38.5%	31.7%
D12 The issue of fatigue is taken seriously by this company.	44.6%	29.8%	25.6%	65.3%	20.2%	14.5%	44.2%	30.4%	25.3%	62.1%	22.5%	15.5%	24.4%	28.9%	46.7%	38.6%	21.8%	39.6%	33.9%	24.2%	41.9%	26.9%	28.8%	44.2%
D13r The company fails to appreciate any extra effort from me.	50.6%	26.6%	22.8%	63.9%	18.4%	17.7%	43.2%	31.7%	25.0%	57.2%	21.0%	21.7%	28.9%	22.2%	48.9%	47.5%	21.8%	30.7%	38.7%	32.3%	29.0%	31.7%	27.9%	40.4%
D14 The company cares about my general satisfaction at work.	50.8%	30.2%	19.0%	71.3%	20.4%	8.3%	38.9%	34.2%	27.0%	68.9%	21.0%	10.0%	24.4%	31.1%	44.4%	44.1%	24.5%	31.4%	37.1%	32.3%	30.6%	31.7%	31.7%	36.5%
D15r Even if I did the best job possible, the company would fail to notice.	50.1%	26.9%	23.1%	66.2%	19.7%	14.1%	39.3%	30.8%	29.9%	64.3%	20.8%	15.0%	31.1%	17.8%	51.1%	41.6%	26.7%	31.7%	37.1%	27.4%	35.5%	29.8%	27.9%	42.3%
D16r The company would ignore any complaint from me.	14.9%	28.6%	56.5%	32.1%	33.3%	34.6%	16.9%	24.3%	58.8%	25.9%	33.2%	40.9%	15.6%	22.2%	62.2%	19.6%	24.5%	55.9%	19.4%	25.8%	54.8%	14.4%	20.2%	65.4%
D17 I feel fully supported by my company if I report unfit to fly.	24.5%	25.8%	49.7%	46.1%	26.4%	27.6%	29.9%	28.3%	41.8%	49.8%	23.7%	26.5%	13.3%	17.8%	68.9%	31.4%	20.6%	48.0%	33.9%	24.2%	41.9%	24.0%	19.2%	56.7%

Table 44 Favourable/Unfavourable responses by Contract type (excluding other category)

Items	Contract type					
	Typical contract			Atypical contract		
	Unfavourable	Neutral	Favourable	Unfavourable	Neutral	Favourable
B01 My colleagues are committed to safety.	2.2%	3.4%	94.5%	4.6%	9.3%	86.1%
B02 Voicing concerns about safety is encouraged.	7.2%	12.1%	80.7%	17.3%	17.3%	65.3%
B03 We have sufficient staff to do our work safely.	27.2%	21.4%	51.3%	32.8%	24.4%	42.8%
B04 Everyone I work with in this company feels that safety is their personal responsibility.	11.9%	19.1%	69.0%	16.4%	22.7%	60.9%
B05 My direct manager is committed to safety.	11.7%	17.9%	70.4%	13.1%	19.3%	67.6%
B06 Pilots have a high degree of trust in management with regard to safety.	38.2%	25.2%	36.6%	38.1%	23.6%	38.3%
B07 I have confidence in the people that I interact with in my normal working situation.	4.9%	10.8%	84.3%	10.4%	19.3%	70.3%
B08 Pilots who report safety-related occurrences are treated in a just and fair manner.	10.9%	15.8%	73.3%	22.2%	24.6%	53.2%
B09 People in this company share safety-related information.	11.1%	14.6%	74.3%	22.5%	19.7%	57.8%
B10 My direct manager takes action on the safety issues we raise.	15.3%	28.0%	56.8%	17.8%	26.2%	56.0%
B11 Information about safety-related changes within this company is clearly communicated to staff.	14.6%	20.2%	65.2%	19.2%	17.0%	63.8%

Items	Contract type					
	Typical contract			Atypical contract		
	Unfavourable	Neutral	Favourable	Unfavourable	Neutral	Favourable
B12 We get timely feedback on the safety issues we raise.	24.1%	30.0%	45.9%	31.5%	28.6%	40.0%
B13 My involvement in safety activities is sufficient.	7.8%	23.4%	68.8%	13.5%	31.1%	55.4%
B14r Pilots who raise safety issues are seen as troublemakers.	15.8%	18.0%	66.2%	28.7%	20.4%	50.9%
B15 I am prepared to speak to my direct manager when unsafe situations are developing.	8.1%	12.5%	79.4%	10.9%	12.6%	76.5%
B16 There is good communication up and down the company about safety.	23.0%	25.4%	51.6%	30.6%	25.2%	44.2%
B17 Changes to the company, systems and procedures are properly assessed for safety risk.	26.0%	28.7%	45.2%	20.3%	27.7%	51.9%
B18 Safety is taken seriously in this company.	11.5%	19.1%	69.4%	13.5%	16.4%	70.1%
B19 We learn lessons from safety-related incident or occurrence investigations.	8.7%	12.7%	78.6%	12.9%	15.2%	71.9%
B20 My direct manager would always support me if I had a concern about safety.	15.0%	28.6%	56.4%	18.0%	28.7%	53.2%
B21 We have sufficient practical support from our safety manager/department.	17.5%	27.3%	55.2%	26.0%	29.4%	44.6%
B22 I have good access to information regarding safety incidents or occurrences within the company.	20.5%	19.9%	59.6%	38.8%	21.2%	40.0%

Items	Contract type					
	Typical contract			Atypical contract		
	Unfavourable	Neutral	Favourable	Unfavourable	Neutral	Favourable
B23r There are people who I do not want to work with because of their negative (e.g. loose, careless) attitude to safety.	19.9%	16.5%	63.5%	36.4%	16.9%	46.8%
B24 Other people in this company understand how my job contributes to safety.	14.0%	24.3%	61.7%	14.3%	22.1%	63.6%
B25 When I am unwell, I do not go to work.	12.0%	13.0%	75.0%	31.1%	16.6%	52.3%
B26 If I see unsafe behaviour by any of my colleagues I would talk to them about it.	3.6%	10.5%	85.9%	7.5%	17.5%	75.1%
C01 We have the resources needed to do our work safely.	14.6%	18.0%	67.3%	21.5%	18.3%	60.2%
C02 I read reports of incidents or occurrences that are relevant to our work.	3.7%	7.2%	89.1%	6.3%	11.2%	82.5%
C03 We have procedures that are focused on appearing to follow the rules, rather than improving practice.	20.2%	29.1%	50.7%	19.6%	23.8%	56.6%
C04 Good communication exists between pilots and Engineering/Maintenance to ensure safety.	13.2%	21.9%	64.9%	18.3%	22.3%	59.4%
C05 I am satisfied with the level of confidentiality of the reporting and investigation process.	18.3%	18.7%	63.0%	30.2%	26.1%	43.7%
C06r We often have to deviate from procedures for safety reasons.	5.1%	14.2%	80.7%	8.7%	22.6%	68.7%
C07 I have sufficient opportunity to regularly practice my manual flying skills.	19.3%	14.4%	66.3%	38.2%	13.9%	47.9%

Items	Contract type					
	Typical contract			Atypical contract		
	Unfavourable	Neutral	Favourable	Unfavourable	Neutral	Favourable
C08 Maintenance are able to promptly repair technical deficiencies to the aircraft.	22.2%	21.5%	56.4%	17.3%	16.1%	66.5%
C09 Adequate training is provided when new systems and procedures are introduced.	37.1%	25.6%	37.2%	27.6%	22.0%	50.4%
C10r I have to take risks that make me feel uncomfortable about safety.	6.8%	11.0%	82.2%	11.8%	16.3%	71.9%
C11 Good communication exists between pilots and Air Traffic Control to ensure safety.	7.3%	16.3%	76.5%	11.4%	18.0%	70.6%
C12 A staff member who takes unacceptable risks would be disciplined or corrected in this company.	12.6%	19.8%	67.6%	13.2%	17.6%	69.2%
C13 I feel entirely confident to fly my aircraft.	2.2%	5.7%	92.1%	3.6%	10.1%	86.3%
C14 The SOPs associated with my work are appropriate to ensure safe operations.	5.6%	11.6%	82.8%	8.9%	12.7%	78.5%
C15 Good communication exists between flight crew and cabin crew to ensure safety.	5.4%	14.1%	80.5%	17.2%	23.7%	59.1%
C16 I have sufficient training to understand the procedures associated with my work.	6.1%	10.9%	82.9%	5.0%	12.0%	83.1%
D01r Pilots in this company are often tired at work.	56.7%	23.0%	20.3%	64.5%	19.9%	15.6%
D02 First officers are willing to challenge Captains on their decision making.	10.2%	16.2%	73.6%	12.0%	21.1%	66.9%

Items	Contract type					
	Typical contract			Atypical contract		
	Unfavourable	Neutral	Favourable	Unfavourable	Neutral	Favourable
D03r The company shows very little concern for my well-being.	42.6%	27.7%	29.7%	61.0%	19.9%	19.1%
D04 My national aviation authority manages safety reports well.	29.6%	47.1%	23.4%	23.5%	47.6%	28.9%
D05 The company takes pride in my accomplishments at work.	42.6%	36.0%	21.4%	54.3%	23.5%	22.1%
D06 I would feel comfortable to complete a fatigue report.	21.4%	14.5%	64.1%	45.1%	13.2%	41.7%
D07 My national aviation authority takes safety seriously.	22.7%	31.4%	45.8%	22.2%	30.2%	47.5%
D08 Captains encourage their crew to speak-up if they are concerned with decisions made by the Captain.	4.5%	14.5%	81.0%	10.2%	17.8%	71.9%
D09 The company values my contribution to its well-being.	40.8%	32.8%	26.4%	50.9%	25.4%	23.7%
D10 I feel this company returns the effort put in by its pilots.	58.2%	24.2%	17.6%	66.3%	17.2%	16.5%
D11 The company really cares about my wellbeing.	55.3%	27.4%	17.3%	66.4%	19.9%	13.7%
D12 The issue of fatigue is taken seriously by this company.	49.4%	27.4%	23.2%	56.4%	22.0%	21.6%
D13r The company fails to appreciate any extra effort from me.	52.7%	25.1%	22.2%	56.5%	20.0%	23.4%

Project: Resolving the organizational accident
Reference ID: FSS_P5_LSE_D5.4
Classification: Public



Items	Contract type					
	Typical contract			Atypical contract		
	Unfavourable	Neutral	Favourable	Unfavourable	Neutral	Favourable
D14 The company cares about my general satisfaction at work.	54.4%	28.0%	17.6%	63.0%	22.8%	14.2%
D15r Even if I did the best job possible, the company would fail to notice.	52.8%	25.3%	21.9%	57.8%	22.6%	19.6%
D16r The company would ignore any complaint from me.	18.3%	29.5%	52.2%	33.2%	29.3%	37.4%
D17 I feel fully supported by my company if I report unfit to fly.	29.9%	26.1%	44.0%	47.8%	22.9%	29.3%

Table 45 Favourable/Unfavourable responses by Training background (excluding other category)

Items	Training background																				
	Military			Airline funded cadetship			Self-funded cadetship, with an airline (integrated) training			Self-funded, modular training			University - State funded			Self-funded, self improver (non-modular)			National flight school - state funded		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
B01 My colleagues are committed to safety.	2.8%	5.4%	91.8%	1.4%	1.4%	97.2%	2.2%	2.3%	95.5%	2.9%	5.7%	91.4%	2.4%	9.5%	88.1%	18.2%	4.5%	77.3%	2.0%	2.7%	95.3%
B02 Voicing concerns about safety is encouraged.	7.7%	13.7%	78.6%	4.9%	10.3%	84.8%	7.8%	10.2%	82.0%	10.7%	14.7%	74.7%	7.1%	11.9%	81.0%	4.5%	13.6%	81.8%	7.4%	11.1%	81.4%
B03 We have sufficient staff to do our work safely.	24.8%	20.9%	54.2%	22.6%	23.2%	54.2%	26.7%	20.5%	52.8%	33.3%	21.7%	45.1%	16.7%	26.2%	57.1%	59.1%	13.6%	27.3%	15.9%	22.6%	61.5%
B04 Everyone I work with in this company feels that safety is their personal responsibility.	13.0%	20.3%	66.8%	10.9%	18.7%	70.4%	9.8%	19.4%	70.8%	13.7%	19.9%	66.3%	9.5%	7.1%	83.3%	22.7%	22.7%	54.5%	14.9%	19.3%	65.9%
B05 My direct manager is committed to safety.	12.0%	16.9%	71.1%	9.3%	18.7%	72.0%	10.6%	15.7%	73.8%	14.1%	18.8%	67.1%	11.9%	14.3%	73.8%	9.1%	31.8%	59.1%	8.8%	17.9%	73.3%
B06 Pilots have a high degree of trust in management with regard to safety.	35.1%	24.6%	40.3%	40.2%	28.8%	31.1%	34.0%	24.4%	41.6%	39.6%	23.3%	37.1%	31.0%	21.4%	47.6%	54.5%	27.3%	18.2%	35.5%	27.4%	37.2%
B07 I have confidence in the people that I interact with in my normal working situation.	5.3%	11.0%	83.8%	3.2%	9.8%	87.0%	4.2%	11.3%	84.5%	7.5%	13.3%	79.2%	0.0%	2.4%	97.6%	9.1%	9.1%	81.8%	5.8%	11.5%	82.7%
B08 Pilots who report safety-related occurrences are treated in a just and fair manner.	12.1%	17.2%	70.7%	6.5%	13.5%	80.0%	11.1%	15.3%	73.6%	15.7%	19.3%	65.0%	11.9%	9.5%	78.6%	22.7%	9.1%	68.2%	9.8%	15.5%	74.7%
B09 People in this company share safety-related information.	14.4%	15.9%	69.8%	5.2%	13.3%	81.5%	10.6%	13.3%	76.2%	16.8%	16.4%	66.8%	7.1%	19.0%	73.8%	27.3%	9.1%	63.6%	9.5%	15.9%	74.7%

Items	Training background																				
	Military			Airline funded cadetship			Self-funded cadetship, with an airline (integrated) training			Self-funded, modular training			University - State funded			Self-funded, self improver (non-modular)			National flight school - state funded		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
B10 My direct manager takes action on the safety issues we raise.	16.2%	25.7%	58.2%	12.9%	31.3%	55.8%	14.0%	24.4%	61.7%	17.9%	27.2%	54.8%	11.9%	26.2%	61.9%	18.2%	40.9%	40.9%	11.8%	31.1%	57.1%
B11 Information about safety-related changes within this company is clearly communicated to staff.	15.0%	21.1%	63.9%	11.0%	19.2%	69.8%	13.9%	16.9%	69.1%	18.1%	20.7%	61.1%	16.7%	16.7%	66.7%	18.2%	22.7%	59.1%	11.8%	20.3%	67.9%
B12 We get timely feedback on the safety issues we raise.	24.2%	27.7%	48.2%	21.6%	31.9%	46.4%	23.8%	27.9%	48.3%	28.1%	29.2%	42.7%	14.3%	26.2%	59.5%	45.5%	36.4%	18.2%	20.3%	33.4%	46.3%
B13 My involvement in safety activities is sufficient.	8.6%	22.5%	68.9%	5.9%	22.5%	71.6%	7.2%	22.5%	70.3%	10.4%	26.5%	63.1%	7.1%	14.3%	78.6%	27.3%	36.4%	36.4%	7.1%	23.3%	69.6%
B14r Pilots who raise safety issues are seen as troublemakers.	18.8%	17.4%	63.9%	11.5%	17.0%	71.5%	15.3%	16.7%	67.9%	21.4%	19.8%	58.8%	16.7%	19.0%	64.3%	22.7%	13.6%	63.6%	11.8%	18.2%	69.9%
B15 I am prepared to speak to my direct manager when unsafe situations are developing.	6.7%	10.8%	82.5%	8.2%	15.5%	76.3%	7.6%	12.0%	80.4%	9.2%	11.8%	79.0%	4.8%	2.4%	92.9%	4.5%	4.5%	90.9%	7.8%	11.6%	80.6%
B16 There is good communication up and down the company about safety.	23.1%	26.0%	50.9%	20.4%	27.6%	52.0%	19.6%	24.5%	55.9%	28.0%	24.4%	47.6%	16.7%	26.2%	57.1%	36.4%	18.2%	45.5%	19.6%	24.0%	56.4%
B17 Changes to the company, systems and procedures are properly assessed for safety risk.	24.7%	29.5%	45.8%	30.3%	30.5%	39.2%	21.8%	25.5%	52.7%	24.2%	28.1%	47.7%	16.7%	40.5%	42.9%	27.3%	36.4%	36.4%	25.3%	30.1%	44.6%
B18 Safety is taken seriously in this company.	13.6%	19.9%	66.5%	8.8%	20.4%	70.8%	10.3%	13.8%	75.8%	13.9%	19.6%	66.6%	4.8%	14.3%	81.0%	18.2%	22.7%	59.1%	9.1%	16.2%	74.7%

Items	Training background																				
	Military			Airline funded cadetship			Self-funded cadetship, with an airline (integrated) training			Self-funded, modular training			University - State funded			Self-funded, self improver (non-modular)			National flight school - state funded		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
B19 We learn lessons from safety-related incident or occurrence investigations.	10.7%	14.6%	74.7%	5.2%	11.1%	83.7%	6.7%	11.1%	82.2%	12.2%	14.5%	73.2%	7.1%	7.1%	85.7%	18.2%	18.2%	63.6%	6.1%	12.8%	81.1%
B20 My direct manager would always support me if I had a concern about safety.	15.4%	27.1%	57.4%	12.2%	31.9%	55.9%	13.2%	27.3%	59.5%	18.1%	28.0%	53.9%	11.9%	26.2%	61.9%	4.5%	40.9%	54.5%	12.9%	24.4%	62.7%
B21 We have sufficient practical support from our safety manager/department.	20.0%	26.6%	53.4%	13.5%	27.4%	59.1%	15.9%	24.7%	59.4%	22.3%	28.3%	49.4%	14.3%	23.8%	61.9%	31.8%	27.3%	40.9%	13.9%	30.5%	55.6%
B22 I have good access to information regarding safety incidents or occurrences within the company.	21.3%	22.0%	56.7%	11.5%	17.9%	70.6%	21.9%	18.5%	59.6%	29.1%	21.7%	49.2%	23.8%	7.1%	69.0%	45.5%	13.6%	40.9%	21.7%	19.0%	59.3%
B23r There are people who I do not want to work with because of their negative (e.g. loose, careless) attitude to safety.	20.3%	16.2%	63.5%	17.0%	14.3%	68.7%	22.8%	14.7%	62.5%	24.2%	18.5%	57.3%	23.8%	14.3%	61.9%	22.7%	22.7%	54.5%	22.6%	18.9%	58.4%
B24 Other people in this company understand how my job contributes to safety.	12.8%	26.0%	61.2%	15.2%	23.3%	61.6%	13.2%	19.8%	67.0%	14.2%	25.3%	60.5%	16.7%	23.8%	59.5%	18.2%	36.4%	45.5%	11.1%	25.3%	63.5%
B25 When I am unwell, I do not go to work.	12.6%	13.4%	74.0%	8.4%	12.5%	79.1%	13.8%	14.0%	72.2%	17.9%	13.7%	68.4%	14.3%	14.3%	71.4%	14.3%	19.0%	66.7%	12.2%	14.9%	72.9%
B26 If I see unsafe behaviour by any of my colleagues I would talk to them about it.	3.3%	8.7%	88.0%	2.4%	8.5%	89.1%	3.7%	11.5%	84.8%	5.1%	12.9%	82.0%	2.4%	11.9%	85.7%	0.0%	9.1%	90.9%	4.7%	17.3%	78.0%

Items	Training background																				
	Military			Airline funded cadetship			Self-funded cadetship, with an airline (integrated) training			Self-funded, modular training			University - State funded			Self-funded, self improver (non-modular)			National flight school - state funded		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
C01 We have the resources needed to do our work safely.	15.3%	17.5%	67.2%	11.4%	18.3%	70.2%	15.2%	14.8%	70.0%	18.3%	19.0%	62.6%	9.8%	19.5%	70.7%	31.8%	27.3%	40.9%	11.0%	18.5%	70.5%
C02 I read reports of incidents or occurrences that are relevant to our work.	5.6%	9.8%	84.6%	1.6%	3.8%	94.6%	3.9%	6.7%	89.4%	4.8%	9.6%	85.6%	0.0%	9.8%	90.2%	4.5%	4.5%	90.9%	4.3%	7.5%	88.3%
C03 We have procedures that are focused on appearing to follow the rules, rather than improving practice.	20.6%	24.8%	54.7%	17.7%	33.3%	49.0%	22.0%	30.6%	47.4%	19.8%	26.2%	54.0%	19.5%	39.0%	41.5%	22.7%	13.6%	63.6%	25.2%	29.9%	45.0%
C04 Good communication exists between pilots and Engineering/Main tenance to ensure safety.	12.9%	22.4%	64.7%	8.6%	22.7%	68.8%	11.9%	20.7%	67.4%	17.5%	22.1%	60.4%	19.5%	9.8%	70.7%	27.3%	27.3%	45.5%	13.9%	21.0%	65.1%
C05 I am satisfied with the level of confidentiality of the reporting and investigation process.	16.9%	21.5%	61.6%	12.2%	17.0%	70.8%	17.9%	18.7%	63.4%	25.4%	20.7%	54.0%	24.4%	14.6%	61.0%	27.3%	27.3%	45.5%	17.1%	17.4%	65.5%
C06r We often have to deviate from procedures for safety reasons.	5.2%	16.5%	78.3%	3.2%	11.4%	85.4%	4.4%	13.4%	82.2%	7.5%	17.7%	74.8%	2.4%	12.2%	85.4%	9.1%	13.6%	77.3%	5.0%	14.2%	80.8%
C07 I have sufficient opportunity to regularly practice my manual flying skills.	19.9%	16.3%	63.8%	20.7%	16.9%	62.4%	22.0%	12.6%	65.3%	22.1%	13.0%	65.0%	9.8%	17.1%	73.2%	54.5%	9.1%	36.4%	16.7%	16.0%	67.3%
C08 Maintenance are able to promptly repair technical deficiencies to the aircraft.	21.0%	22.7%	56.2%	22.2%	24.2%	53.5%	20.9%	19.5%	59.6%	22.6%	19.1%	58.3%	19.5%	17.1%	63.4%	27.3%	18.2%	54.5%	15.7%	22.8%	61.6%



Items	Training background																				
	Military			Airline funded cadetship			Self-funded cadetship, with an airline (integrated) training			Self-funded, modular training			University - State funded			Self-funded, self improver (non-modular)			National flight school - state funded		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
C09 Adequate training is provided when new systems and procedures are introduced.	36.4%	25.1%	38.5%	42.4%	27.4%	30.1%	31.7%	23.4%	44.9%	34.3%	24.9%	40.8%	31.7%	14.6%	53.7%	50.0%	27.3%	22.7%	34.2%	25.3%	40.6%
C10r I have to take risks that make me feel uncomfortable about safety.	6.8%	12.7%	80.5%	5.3%	9.6%	85.1%	6.1%	10.0%	83.9%	9.2%	13.3%	77.5%	2.4%	7.3%	90.2%	9.1%	18.2%	72.7%	7.5%	7.9%	84.6%
C11 Good communication exists between pilots and Air Traffic Control to ensure safety.	8.4%	22.5%	69.2%	5.4%	15.9%	78.7%	7.4%	14.0%	78.6%	8.8%	16.3%	74.9%	7.3%	9.8%	82.9%	4.5%	13.6%	81.8%	8.6%	17.1%	74.3%
C12 A staff member who takes unacceptable risks would be disciplined or corrected in this company.	13.6%	19.7%	66.7%	12.0%	21.7%	66.4%	10.9%	18.4%	70.7%	13.1%	18.5%	68.4%	12.2%	9.8%	78.0%	9.1%	4.5%	86.4%	18.9%	24.2%	56.9%
C13 I feel entirely confident to fly my aircraft.	1.8%	5.8%	92.4%	1.7%	5.7%	92.6%	2.3%	4.9%	92.8%	3.1%	7.0%	89.9%	2.4%	0.0%	97.6%	4.5%	9.1%	86.4%	.7%	6.0%	93.2%
C14 The SOPs associated with my work are appropriate to ensure safe operations.	7.3%	11.6%	81.1%	5.5%	13.9%	80.6%	4.6%	10.7%	84.7%	6.5%	11.0%	82.4%	4.9%	12.2%	82.9%	0.0%	22.7%	77.3%	4.3%	9.6%	86.1%
C15 Good communication exists between flight crew and cabin crew to ensure safety.	4.1%	15.6%	80.3%	4.1%	10.8%	85.1%	6.3%	14.3%	79.4%	9.2%	17.5%	73.2%	4.9%	7.3%	87.8%	9.1%	31.8%	59.1%	4.3%	15.6%	80.1%



Items	Training background																				
	Military			Airline funded cadetship			Self-funded cadetship, with an airline (integrated) training			Self-funded, modular training			University - State funded			Self-funded, self improver (non-modular)			National flight school - state funded		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
C16 I have sufficient training to understand the procedures associated with my work.	6.0%	10.7%	83.3%	6.2%	12.2%	81.6%	5.0%	10.0%	85.0%	6.2%	11.1%	82.7%	7.3%	0.0%	92.7%	9.1%	18.2%	72.7%	6.4%	9.6%	83.9%
D01r Pilots in this company are often tired at work.	55.5%	23.0%	21.6%	47.2%	28.8%	24.0%	57.8%	18.2%	24.0%	65.0%	20.1%	14.9%	56.1%	26.8%	17.1%	81.8%	13.6%	4.5%	47.3%	29.7%	22.9%
D02 First officers are willing to challenge Captains on their decision making.	13.1%	17.3%	69.6%	9.1%	14.2%	76.6%	7.2%	13.5%	79.3%	11.0%	19.4%	69.6%	4.9%	12.2%	82.9%	4.5%	22.7%	72.7%	15.8%	14.7%	69.4%
D03r The company shows very little concern for my well-being.	41.5%	28.3%	30.2%	37.0%	32.9%	30.0%	43.5%	23.2%	33.3%	50.5%	24.2%	25.3%	51.2%	26.8%	22.0%	40.9%	31.8%	27.3%	35.5%	30.8%	33.7%
D04 My national aviation authority manages safety reports well.	32.8%	44.9%	22.3%	25.9%	48.5%	25.6%	22.8%	48.8%	28.4%	31.7%	45.8%	22.5%	27.5%	57.5%	15.0%	36.4%	40.9%	22.7%	29.7%	51.1%	19.2%
D05 The company takes pride in my accomplishments at work.	35.5%	40.2%	24.3%	44.9%	37.7%	17.3%	44.4%	31.4%	24.2%	45.0%	32.8%	22.2%	39.0%	39.0%	22.0%	50.0%	36.4%	13.6%	42.8%	33.1%	24.1%
D06 I would feel comfortable to complete a fatigue report.	20.2%	15.1%	64.7%	18.5%	18.1%	63.5%	25.4%	11.8%	62.8%	27.5%	13.2%	59.4%	24.4%	12.2%	63.4%	36.4%	18.2%	45.5%	20.8%	12.5%	66.7%
D07 My national aviation authority takes safety seriously.	23.7%	31.3%	45.0%	17.8%	31.2%	51.0%	20.1%	28.8%	51.1%	26.4%	31.8%	41.8%	31.7%	31.7%	36.6%	31.8%	40.9%	27.3%	17.7%	33.2%	49.1%
D08 Captains encourage their crew to speak-up if they are concerned with decisions made by the Captain.	5.9%	16.7%	77.3%	3.5%	11.5%	85.0%	3.9%	13.8%	82.4%	6.5%	16.6%	76.9%	7.3%	14.6%	78.0%	4.5%	22.7%	72.7%	4.7%	15.1%	80.2%

Items	Training background																				
	Military			Airline funded cadetship			Self-funded cadetship, with an airline (integrated) training			Self-funded, modular training			University - State funded			Self-funded, self improver (non-modular)			National flight school - state funded		
	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav	Unfav	Neut.	Fav
D09 The company values my contribution to its well-being.	33.6%	37.7%	28.6%	43.7%	35.9%	20.4%	40.3%	27.0%	32.7%	43.5%	30.3%	26.2%	35.0%	37.5%	27.5%	36.4%	45.5%	18.2%	44.8%	29.7%	25.4%
D10 I feel this company returns the effort put in by its pilots.	52.8%	26.7%	20.5%	61.4%	26.8%	11.8%	57.0%	20.0%	23.0%	60.3%	22.1%	17.7%	58.5%	14.6%	26.8%	63.6%	22.7%	13.6%	58.1%	23.7%	18.3%
D11 The company really cares about my wellbeing.	51.1%	31.0%	17.9%	56.9%	30.5%	12.6%	54.6%	23.0%	22.4%	58.5%	24.4%	17.0%	65.9%	22.0%	12.2%	63.6%	27.3%	9.1%	54.8%	26.5%	18.6%
D12 The issue of fatigue is taken seriously by this company.	45.4%	28.8%	25.9%	48.6%	30.0%	21.4%	45.9%	25.7%	28.4%	54.6%	24.2%	21.2%	39.0%	34.1%	26.8%	72.7%	13.6%	13.6%	43.7%	31.5%	24.7%
D13r The company fails to appreciate any extra effort from me.	46.9%	28.1%	25.0%	56.8%	25.6%	17.6%	52.0%	23.4%	24.7%	52.7%	23.8%	23.4%	48.8%	26.8%	24.4%	72.7%	18.2%	9.1%	53.0%	23.3%	23.7%
D14 The company cares about my general satisfaction at work.	49.5%	31.1%	19.4%	57.1%	31.4%	11.5%	52.7%	25.2%	22.1%	57.0%	25.4%	17.6%	53.7%	29.3%	17.1%	63.6%	31.8%	4.5%	52.0%	25.4%	22.6%
D15r Even if I did the best job possible, the company would fail to notice.	48.4%	28.8%	22.8%	55.5%	25.6%	18.9%	51.7%	22.6%	25.7%	53.9%	24.8%	21.3%	56.1%	24.4%	19.5%	63.6%	27.3%	9.1%	50.9%	24.4%	24.7%
D16r The company would ignore any complaint from me.	18.4%	30.0%	51.6%	15.4%	30.9%	53.7%	19.2%	25.6%	55.2%	23.4%	29.9%	46.8%	17.1%	29.3%	53.7%	22.7%	36.4%	40.9%	19.4%	28.0%	52.7%
D17 I feel fully supported by my company if I report unfit to fly.	25.2%	26.4%	48.4%	26.6%	28.5%	44.9%	31.4%	25.2%	43.5%	37.9%	24.0%	38.1%	24.4%	26.8%	48.8%	18.2%	31.8%	50.0%	19.4%	25.1%	55.6%