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Under-reporting in aviation: An investigation of factors that affect reporting of
safety concerns

A thesis presented in partial fulfilment of the requirements for the degree of

Doctorate of philosophy

in

Aviation

at Massey University, Manawatu

New Zealand

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2010

Abstract

A substantial body of evidence suggests that reporting safety concerns and wrongdoing could contribute to improving safety if diligently applied within organisations. A number of aviation accidents suggest that the principles of reporting have not been embraced by the aviation industry; for example, there is evidence that aviation incidents are not always reported even when reporting is mandated by law. This thesis seeks to uncover factors influencing individuals' intentions to report safety concerns in aviation and to whom such reports might be made.

A case study of a New Zealand based example of how under-reporting in aviation may have contributed to the cause of a fatal accident was first presented as evidence of the research problem. Subsequently, four empirical studies of participants working or intending to work in the aviation industry were reported. The empirical findings provided consistent evidence of six factors (seriousness of wrongdoing, direct or indirect involvement in wrongdoing, working environment, legal protection of the reporter, motive of the wrongdoer, and relationship to the wrongdoer) that may influence both individuals' perceptions of safety issues at the workplace, and their intentions to report wrongdoing. Evidence was also found that when participants do act upon being confronted with wrongdoing situations, they may not do so in a manner that is fully consistent with improving aviation safety.

The implications of the empirical findings were discussed and a means of communicating information about what to do when confronted with evidence of wrongdoing in the aviation workplace was proposed.

In conclusion, there is confusion in the aviation workplace regarding what matters should be reported to the regulatory authorities and to whom reports should be made. Until such confusion is resolved, the notion that all aviation accidents are preventable is somewhat unrealistic.

Acknowledgements

It is my privilege to express my gratitude to the numerous persons for their part as various capacities in various stages of the completion of this thesis.

To my father, I dedicate this thesis. Although you have passed away, your lasting spirit and memories gave me the motivation and courage to complete this endeavour. I miss you and will continue to love you each and every day.

I thank my friends and family for their constant encouragement. My deepest love and respect go to my mother for her love and support.

Special thanks go to my Supervisor — Dr. Andrew Gilbey who has been a tremendous source of inspiration and engine to this thesis. He has painstakingly edited my coarse draft. My big thanks also go to Dr. Jose Perezgonzales for peer reviewing my work and for the invaluable advice given throughout my PhD journey.

I also would like to acknowledge the much-needed funding granted by the Freemasons and Massey Alumni. I am very grateful for the funding which made the thesis go smoother.

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Glossary

The following terms and their corresponding definitions are used in the context of this thesis:

Terms	Definition
AAIB (EUR)	The Aircraft Accident Investigation Board is an agency of the government of Iceland which investigates aircraft accidents and incidents.
AAIB (SIN)	The Air Accident Investigation Bureau of Singapore is an investigation authority in Singapore for air accidents and serious incidents in the country for local and foreign civil aircraft.
ASI-NET	The Aviation Safety Information network was established in Japan in 1999 to exchange confidential safety information among Japanese airlines.
ASRS (AUS)	The Aviation Self-Reporting System which replaced CAIR in Australia 2004 is a voluntary non-punitive incident reporting scheme allows Civil Aviation Authorisation holders who are seeking to claim protection from administrative action by CASA to self report unintentional regulatory breaches.
ASRS (US)	The Aviation Safety Reporting System instituted by NASA in The United States of America 1976 to promote reporting of concerns throughout the pilot, cabin crew and engineering communities.
ATCEUC	The Air Traffic Controllers' European Union Co-ordination was created in 1989 to put forward the views of European Air Traffic Controllers, and make sure that ATCOs are involved in the definition of the European ATM system and kept informed on upcoming developments.
ATCOs	Air Traffic Controllers Organisations.
ATM	Air Traffic Management.
ATSB	The Australian Transport Safety Bureau was established by the Transport Safety Investigation Act 2003 and conducts its investigations in accordance with the provisions of the Act. ATSB is an independent Commonwealth Government statutory Agency. The Bureau is managed by a Commission and is entirely separate from transport regulators, policy makers and service providers. The ATSB's function is to improve safety and public confidence in the aviation, marine and rail modes of transport.

ANSP	An Air Navigation Service Provider is an organisation that separates aircraft on the ground or in flight in a dedicated block of airspace on behalf of a state or a number of states.
BEA	The Bureau d'Enquêtes et d'Analyses pour la Sécurité de l'Aviation Civile BEA (Bureau of Enquiry and Analysis for Civil Aviation Safety) is an agency of the French government that was created in 1946, and is responsible for investigating aviation accidents and making safety recommendations based on what is learned from those investigations.
CAA NZ	The Civil Aviation Authority of New Zealand is the regulatory authority of civil aviation in New Zealand.
CAA Rules	The Rules are regulations, which define the minimum standards for entering and operating within the civil aviation system. The Minister, through the Ministry of Transport, contracts the CAA NZ to develop the Civil Aviation Rules and undertake consultation with interested parties. These Rules are mostly around safety and security.
CAA UK	The Civil Aviation Authority of the United Kingdom is the regulatory authority of civil aviation in the United Kingdom.
CAHRS	The Confidential Aviation Hazard Reporting System was re-launched by the South African Civil Aviation Authority in 2005 in South Africa, in an attempt to improve efficiency in the interests of aviation safety.
CAP	The Concept Alignment Process is a decision making model developed by Patankar and Taylor (2005) for Decision Making Under Varying Levels of Uncertainty in Aviation Maintenance.
CASA	The Civil Aviation Authority of Australia is the regulatory authority of civil aviation in Australia.
CHIRP	The Confidential Human Factors Incident Reporting Programme introduced in 1982 to improve safety in the UK, by providing an independent confidential reporting system for individuals employed or linked with the aviation industry (and the maritime industry).
CIRS	The Confidential Incident Reporting Scheme was introduced between 1987 and 1991 in New Zealand.
EUCARE	Safety occurrence reporting system that was introduced in 1992 in Germany and was declared unsuccessful in 1999 due to lack of full support from the aviation-community.

EUROCONTROL	The European Organisation for the Safety of Air Navigation is an intergovernmental organisation made up of 38 Member States and the European Community that was originally founded in 1960 as a civil-military organisation to deal with air traffic control for civil and military users in the upper airspace of its six founding European Member States.
FAA	The Federal Aviation Administration is the regulatory authority of civil aviation in the United States of America.
ICAO	The International Civil Aviation Organization is an agency of the United Nations established in 1947, which codifies the principles and techniques of international air navigation and fosters the planning and development of international air transport to ensure safe and orderly growth. Its headquarters are located in the <i>Quartier International</i> of Montreal, Canada.
<i>Icarus</i>	The Information Confidentially Accepted then Reported Universally for Safety was introduced between 1996 and 2001 in New Zealand.
IFATCA	International Federation of Air Traffic Controllers' Association.
IPMS	Institute of Professional Managers and Specialists.
IFR	The Instrument Flight Rules are regulations and procedures for flying aircraft by referring only to the aircraft instrument panel for navigation.
ILS	The Instrument Landing System is a ground-based instrument approach system which provides precise guidance to an aircraft approaching a runway, to enable a safe landing during meteorological conditions, such as reduced visibility due to fog, rain, or blowing snow.
KPMG	The letters K, P, M and G stand for the names of the four founding fathers of the organisation of KPMG which was founded in 1987 and is one of the largest professional services firms in the world and one of the Big Four auditors, along with PricewaterhouseCoopers (PwC), Deloitte Touche Tohmatsu (Deloitte) and Ernst & Young (EY). Its global headquarters are located in Amstelveen, Netherlands. KPMG has three lines of services: audit, tax, and advisory.
NASA	The National Aeronautics and Space Administration is an agency of the United States government established by the National Aeronautics and Space Act on July 29, 1958, and is responsible for the American civilian space program.

PRU	The Performance Review Unit was established in 1998 to support the Performance Review Commission in its task of helping to "ensure the effective management of the European ATM system through a strong, transparent and independent performance review and target-setting system". The PRU reports, for administrative purposes only, to the EUROCONTROL Director General.
REC	The Confidential Environment for Reporting was established in 2000 by BEA to facilitate reporting of minor safety events by an employee in the industry.
REPCON	Report Confidentially was implemented in 2007 as a separate scheme to ASRS (AUS) to allow any person who has an aviation safety concern to report it to the ATSB confidentially.
RCSV	The Flight Safety Confidential Report was launched by the Brazilian Aviation Safety Centre in 1997 for the prevention of accidents.
SECURITAS	The Confidential Aviation Safety Reporting Program was implemented in 1995 by TSB to allow reporting of unsafe acts or situations relating to the Canadian transportation system that would not normally be reported through other channels.
SCASS	The Sino Confidential Aviation Safety System was instituted in 2004 in China.
SINCAIR	The Singapore Confidential Aviation Incident Reporting programme was established by AAIB in 2004 to enhance aviation safety through encouraging reporting of minor incidents that would not otherwise not be reported through other channels.
SMS	Safety Management System is the specific application of quality management to safety.
SNS	The Safety Occurrence Reporting System was setup in 2007 in Spain.
TACARE	Taiwan Confidential Aviation Safety Reporting System was launched by the Aviation Safety Council of Taiwan in 1999 to promote flight safety by encouraging all personnel in the aviation community to report safety concerns.
TAIC	The Transport Accident Investigation Commission is an independent Crown entity established by Act of the Parliament of New Zealand on 1 September 1990, to determine the circumstances and causes of accidents and incidents with a view to avoiding similar occurrences in the future, and may make recommendations to improve transport safety.

TSB	The Transportation Safety Board of Canada, officially the Canadian Transportation Accident Investigation and Safety Board is the agency of the Government of Canada responsible for maintaining transportation safety in Canada. The TSB was convened for the first time under the Canadian Transportation Accident Investigation and Safety Board Act, which was enacted on March 29, 1990, and is responsible for investigating accidents and making safety recommendations in several modes of transport, including aviation, rail, marine and pipelines.
VASRP	The Voluntary Aviation Safety Reporting System was introduced in 1992 in Russia.
VFR	The Visual Flight Rules are a set of aviation regulations under which a pilot may operate an aircraft in weather conditions sufficient to allow the pilot, by visual reference to the environment outside the cockpit, to control the aircraft's attitude, navigate, and maintain safe separation from obstacles such as terrain, buildings, and other aircraft.

CHAPTER ONE

Introduction

1.1 The Thesis Context

According to the New Zealand Civil Aviation Act 1990, aviation employees are required to report all aviation accidents and incidents they have been involved in, or have witnessed, to the regulatory authority (Civil Aviation Authority of New Zealand (CAA NZ), 1990). However, the aviation authorities claim an accurate number of near-misses cannot be achieved because many pilots were not reporting incidents despite the legal requirement to do so. Moreover, the CAA NZ released a report detailing 34 near collisions around New Zealand which according to a senior pilot and safety campaigner were “the top of the iceberg” as it is believed that the real number of near misses could potentially be at least 10 times higher (although it was reported that the CAA NZ could not be reached to confirm over what period of time these near collisions occurred) (New Zealand Press Association, 2006).

Failure to report near-misses is also believed to be common amongst air traffic controllers in the United Kingdom (UK). An Air Traffic Controller in the UK publicly admitted frequent safety breaches some of which he was personally involved in but had not reported (Lashmar, 2000). Similarly, the New Zealand Air Line Pilots’ Association [NZALPA] (2005) estimated that up to 80% of incidents are not reported.

Misunderstanding about what should or should not be reported, and about how to report wrongdoing or simple concerns about safety practices may be some of the reasons why aviation professionals do not always report their concerns to the regulatory authority. Whilst aviation is governed by laws, rules and procedures, safety is also dependent upon self-regulation as well as policing the actions of employees. It could be argued that it is clear when accidents and incidents occur, and regulations are straight forward in stating that accidents and incidents should be reported once they have occurred. However, there is little guidance on what may constitute a safety concern and how to report it (e.g., instances of wrongdoing or concerns about one's colleagues) before such occurrences become accidents or incidents. Also, there is a lack of empirical evidence of how many concerns simply go unreported.

A substantial body of evidence suggests that reporting guidelines could contribute to improving public safety if diligently applied within organisations (Leape, 2002). However, several aviation accidents provide anecdotal evidence that the principles of reporting have not been entirely embraced by the aviation industry. For example, the Air Adventures' fatal accident involving Michael Bannerman and seven other passengers in 2003 in New Zealand, potentially raises questions about peers' obligations towards their employers, towards themselves and towards each other. A Civil Aviation Authority medical assessor expressed how the Air Adventures pilot's well known erratic behaviour labelled him as an 'accident waiting to happen'. After the investigation, it was revealed that several people held concerns about the pilot's attitude towards safety since well before the tragedy. Had this information been communicated, the authority claimed, it would have compelled them to review the pilot's performance:

“Had we known what we know now, we would have put this operator under much more intense scrutiny” (CAA NZ, 2006a).

There are at least four reasons why safety concerns may go unreported. First, people may be influenced by intra-or inter-personal factors that affect whether they report their concerns. Second, there may be an aphorism not to report on one’s friends, colleagues, or generally, which may be difficult to overcome even when so doing, could cumulatively improve aviation safety by making aggregated information available to act upon. Third, there is a lack of clear guidelines about how to report safety concerns. Fourth, there may be a low level of knowledge of, or trust in, legislations protecting reporters against organisational retaliation. For example, despite the airline Pacific Blue’s claim of “a culture encouraging open reporting of the minor incidents”, a pilot, fearing his career would be over if he identified himself, anonymously raised concern about the rapid expansion of the airline and its inability to maintain standards: “We haven't gone to the CAA because we know if we do, within an hour it will be back to Pacific Blue and our careers will be over” and that “anyone going to the CAA would be seen as a traitor to the airline”. Reassuringly, the pilot’s safety concerns seemed to precede any other matter “I'm prepared to do that [voice concerns]. I think it's important for things to be said” (The Press, 2007).

Unfortunately, pre-emptive reporting does not always result in improved safety, as demonstrated by the events surrounding the SilkAir accident and the Space Shuttle Challenger accident. The cause of the SilkAir Boeing 737-700 crash in 1997 that killed 104 passengers was allegedly a deliberate act of a demoted captain. Prior to the crash, the captain was informally reported for his non-compliance with the airline standards,

but there was no evidence that the reported concerns were followed up by management. In the Space Challenger disaster, despite evidence presented by engineers urging to delay the launch of the Space Shuttle, the launch was agreed to by the vice-president of the engineering company following orders from his manager to 'take off his engineering hat and put on his management hat' (Davis, 1991). It is thus evident that safety is not only the responsibility of individual witnesses of wrongdoing but also that of those individuals in a position to influence the outcome of wrongdoing situations once they become aware of them. Within an organisation, it is clear from the above mentioned accidents that commitment to safety should not be role-specific (for example, management's responsibility only) but rather should be the personal responsibility of employees at all levels. The issue of safety is therefore not only the absence of a safety culture within an organisation, but the employees' application of safety procedures, and the organisation's way of handling employees' reporting.

1.2 Reporting, Past and Present

In la Sala della Bussola in the Venetian Doge's Palace, one could see that reporting one's concern is by no means a recent phenomenon. When Venice was a city state in the 14th century, the Venetian government encouraged exposure of wrongdoing by providing "Bocca di Leone", a carved stone representing a lion's face where the mouth was a slot through which citizens could anonymously post concerns about official misconduct (Doge's Palace, 2002). Although the government's drive behind establishing such a system was primarily to increase security, it was nevertheless a strong indication that efforts aiming to expose, curtail and prevent what was perceived as wrongdoing were just as intrinsic to progress then as they are today.

The role of employees in the prevention and detection of wrongdoing within organisations has been widely acknowledged. For example, a fraud survey conducted by KPMG (2008) found that the most likely perpetrators of major fraud within Australian and New Zealand organisations were those working within the organisations. The KPMG Fraud Survey indicated that 42% of fraud cases were detected through internal controls. The second method of fraud detection was notifications from external parties and employees, which were responsible for 23% and 22% of detected cases respectively. The survey reported a significant increase in notification of fraud cases by external parties, increasing from 15% in 2006 to 23% in 2008. This increase in external reporting may suggest that organisations are improving their external reporting channels allowing more external parties to report concerns of fraud (of course there is a possibility that the rate of fraud may have increased between 2006 and 2008). The KPMG survey found that ‘whistleblowing’ was one of the common detection controls used within organisations to discover fraud. Other surveys reported that whistleblowing was found to be more effective in detecting fraud than other control mechanisms such as internal or external audit processes. The Australian Compliance Institute Survey (2004, as cited in Sawyer, 2005) reported that less than 2% of fraud is uncovered through the audit process. Consistently, whistleblowing was found to be the second most likely means to detect fraud (Ernst & Young global survey, as cited in Sawyer, 2005) and the fourth highest effective tool in the fight against corruption (Institute for Security Studies Survey, as cited in Camerer, 2001).

Whistleblowing is defined as “the disclosure of wrongdoing that threatens others, rather than a complaint about one’s own treatment” (Dehn & Calland, 2004, p. 6). Rothschild and Miethe (1994) also agreed that whistleblowing is “the disclosure of illegal,

unethical or harmful practices in the workplace to parties who might take actions” (p. 254). The term ‘whistleblowing’ was believed to have been conceived in 1963 in the USA after Otto Otopka released confidential information concerning security risks in the new administration (Petersen & Farrell, 1986).

Over the years, public and media perceptions of whistleblowing have evolved. Cases like the ‘Big Tobacco’ case where Jeffrey Wigand exposed his company’s intentions to manipulate the effect of nicotine in cigarettes in 1993; the case of the U.S ambassador Joseph Wilson, who exposed pretexts for the 2003 invasion of Iraq; and the exposure of prisoners’ abuse at Abu Ghraib prison in Iraq by Samuel Provan in 2006; have all suggested that whistleblowers are individuals highly devoted to their cause and determined to defeat silence. This highlighted that whistleblowers may not only be “current or past employees of an organisation who make accusations against that organisation” (McMillan, 1988, p. 120), but may also be concerned citizens who may act out of concern for the public good (Clarke, 1999).

As whistleblowing is a form of reporting, in the context of this thesis, both ‘whistleblowing’ and ‘reporting’ are used to imply the act of voicing one’s concerns about a wrongdoing situation. Also in the context of this thesis, wrongdoing is used to imply instances of behaving or acting in a way that is inconsistent with safety practices, not limited to practices that are against the law.

Viewpoints about reporting vary considerably. Individual values, corporate values, cultural environment and personal benefits are but some of the few elements that decide whether the action of reporting wrongdoing is “[a]n important source of information

vital to honest government, the enforcement of laws, and the protection of the public health and safety” (Kohn & Kohn, 1988, p. 51), or whether it is a disloyal act deserving punishment (Lewis, 2001). Whatever la raison d'être of reporting may be, it can be argued that reporters of wrongdoing are highly devoted to their cause, determined to defeat silence and act in a way that they perceive right. Such individuals find themselves balancing conflicting loyalties, obligations and values none of which are right or wrong (Dehn, 1999). There is the conflict between the right to privacy and the right to know; employer and colleagues' loyalty vis à vis the good citizen's duty to uphold the law; and the conflict between individualism and being a team player (Camerer, 2001). Set against these imperatives is the fear of being disloyal and losing the trust of the employer and colleagues, the fear of being wrong, and the fear of accepting responsibility for one's actions and their resulting consequences (Dehn, 1999).

There may still be a stigma attached to submitting information to authorities that goes back to the Nazi regime where informing by ordinary citizens was widespread, affecting social cohesion and trust (Gobert & Punch, 2000). Whether disclosing of information is vital in ensuring or enhancing the accountability of organisations (Camerer, 2001), or whether it is rather a step towards pervasive and intrusive private policing (Gobert & Punch, 2000) is an on-going debate. Dehn (1999) submitted that blowing the whistle is an effective mechanism against authoritarian bureaucracies, and an excellent verification of possible government arrogance. What remains clear is that early exposure of wrongdoing within an organisation is not only in the public interest, but also in the interest of organisations as it gives them a chance to fix problems before they grow into full-blown scandals (Barnett, 1992). This, according to Dehn and Calland

(2004), is a key aspect of effective self-regulation which creates opportunities for organisations to deal with their own misconduct in an effective and responsible manner, hence precluding external disclosure of information and its resulting damage.

According to the KPMG (2008) fraud survey, more organisations are providing a means for employees to report their concerns; however, the survey reported that there was a decrease in the percentage of organisations offering anonymous reporting facility. Responses indicated that the greater the number of employees, the more likely the organisation will have anonymous reporting line and protection policies of reporters. KPMG believed that anonymous reporting systems are crucial to the detection of fraud, particularly when reporters are concerned about retribution should their identity become known. An anonymous reporting system, KPMG stated, is one of the most cost effective fraud detection strategies that can be employed by organisations of all sizes.

CHAPTER TWO

Literature Review

2.1 Chapter Overview

This chapter presents a review of the key concepts in the literature that are pertinent to this research. More specifically, reporting actions at the workplace and safety reporting schemes will be first discussed. Second, reporting and how it fits within the concept of organisational culture is reviewed. Third, the action of reporting is reviewed from a legal perspective, then from an ethical perspective. Fourth, models of ethical decision making are reviewed. Fifth, there is a discussion about the subject of ethics in aviation education. This chapter concludes with the research problem and the research questions that will be addressed in this thesis.

2.2 Workplace Reporting

According to Feldman (1999), an employee has five initial choices when perceiving wrongdoing at work: to ignore, acquiesce, participate, object or walk away (these are not mutually exclusive over time). Dehn and Calland (2004) suggested four choices: silence, internal disclosure, external disclosure or leaking the information anonymously. While Skopinker (2004) suggested three options: try to change the situation, mentally isolate yourself or resign. The multitude of opinions demonstrates that reporting issues, and the approach to dealing with wrongdoing situations, could be complex. One would

argue that in a situation where wrongdoing has clearly been committed, there should only be one option, that of reporting wrongdoing to those who are in a position to rectify the situation.

It could be said that reporting is beneficial to organisations and society as a whole; however, it is important to expose the other face of reporting, reporting that is motivated by 'bad' intentions, some of which may lead to bad actions and bad consequences. Such reporters could be seeking financial rewards, revenge or even fame. When faced with a reporting event, it is often hard for organisations to determine the true intentions of the reporter; this may explain why organisations sometimes retaliate against such actions. In the absence of internal support, reporters may be faced with no option but to disclose information externally through external reporting channels such as the media, where they can be heard and get the attention they believe is required.

Encouraging internal reporting gives managers more control over the problem at hand and creates opportunities for organisations to deal with their own misconduct in an effective and responsible manner, hence precluding the need for external reporting and its resulting damage. Contrarily, many employees would disclose information externally if they have no confidence in management's actions or believe their concerns will not be considered properly. For these reasons, organisations must be able to provide sufficient responses to internal reporting (Miceli & Near, 1994) and develop robust support systems through which employees would not hesitate to report their concerns.

2.3 Safety Reporting Schemes

The notion of using incidents to prevent future accidents originated from the work of Heinrich (1931) whose Incident Pyramid posits that for every 300 unsafe acts there are 29 minor injuries and one major injury. However, this estimation seems unrealistically specific, and it is questionable whether Heinrich's ratio would hold today, given the development in error management strategies available nowadays. Yet, there is a need to identify factors that contribute to the occurrence of an incident so that future occurrences may be prevented. Heinrich's Incident Pyramid inspired the implementation of the first confidential reporting system in 1976, in The United States of America (US).

Reporting schemes have been initiated in a number of regions of the world, some are discussed hereafter. For example in the US, UK, Canada, Australia, Brazil, Japan, France, Taiwan, Korea, and Singapore.

Interestingly, a number of countries have experienced difficulties in maintaining long-term success of their incident reporting schemes. For example, in South Africa, the Confidential Aviation Hazard Reporting System (CAHRS) was re-launched by the South African Civil Aviation Authority in 2005 in an attempt to improve efficiency in the interest of aviation safety, as it originally faced lack of support from the regulatory authority (African Pilot, 2005). Likewise, the European Confidential Aviation Safety Reporting Network (EUCARE) was introduced in 1992 in Germany and was declared unsuccessful in 1999 due to lack of full support from the aviation community (EUCARE, 1992). In New Zealand, the Confidential Incident Reporting Scheme (CIRS)

(operated from 1987 to 1991) and the Information Confidentially Accepted then Reported Universally for Safety (Icarus) (operated from 1996 to 2001), both failed due to breach of confidentiality over one of the reports and funding difficulties, respectively (European Transport Safety Council, 1996).

It was not possible to review a number of other reporting schemes in other regions due to a lack of available information. These included: Russia's Voluntary Aviation Safety Reporting System (VASRP) introduced in 1992; Denmark's reporting system for Danish Air Traffic Control initiated in 2001; China's Sino Confidential Aviation Safety System (SCASS) instituted in 2004; Italy's confidential aviation safety reporting system introduced in 2006; and Spain's Safety Occurrence Reporting System (SNS) set up in 2007.

2.4 Existing Reporting Schemes

2.4.1 United States: Aviation Safety Reporting System

The Aviation Safety Reporting System (ASRS (US¹)) instituted by NASA in 1976 was introduced to promote reporting of concerns throughout the pilot, cabin crew and engineering communities, to help prevent future decision making problems (Wilford, 1986). The system allows employees to complete and mail a form to the Batelle Memorial Institute in Ohio where a team of investigators investigate employees' claim and forward an anonymous copy to the appropriate NASA officials. If concerns occur the day before a scheduled launch of a space shuttle then these can be communicated via telephone to a launch safety officer (ASRS (US), 1976). In operating this system,

¹ASRS (US) to differentiate between ASRS of the United States and ASRS of Australia.

NASA makes an assumption that concerns sent by employees are received and dealt with appropriately. However, as there was evidence that NASA's bureaucracy was resisting any meaningful reform (Zimmerman, 2005), this suggests that NASA's cultural environment may not support this assumption. The new NASA policy may therefore fail to prevent the "sad series of missed opportunities for assertive action" as in the case of the Challenger accident (Fink, 1986, p. 13).

2.4.2 United Kingdom: Confidential Human Factors Incident Reporting Programme

The Confidential Human Factors Incident Reporting Programme (CHIRP) for Aviation has been in operation since 1982, and was introduced to improve safety in the UK by providing an independent confidential reporting system for individuals employed or linked with the aviation industry (and the maritime industry). CHIRP gives individuals the ability to raise safety concerns without being identified to management, peer groups, or to the regulatory authority. CHIRP processes include a validation step that relies upon the reporter's disclosure of any additional information, which may be required by investigators prior to progressing to investigation. This validation step requires reporters to be contacted for further information. Confidentiality is maintained by holding depersonalised data on a database, and returning all personal details to the reporter after closure of the report.

Although CHIRP may claim to be efficient in maintaining confidentiality of reporters (CHIRP, 1982), the validation step requiring reporters to be contacted for further information may, however, prevent the programme from being effective as this validation step precludes anonymity of reporters. As a result, individuals who seek

guaranteed protection against retaliation may resort to silence as concerns raised anonymously are not ‘normally’ acted upon (CHIRP, 1982).

2.4.3 Canada: Confidential Aviation Safety Reporting Program

The Confidential Aviation Safety Reporting Program (SECURITAS) was implemented in 1995 by the Transportation Safety Board of Canada (TSB) to allow reporting of unsafe acts or situations relating to the Canadian transportation system, which would not normally be reported through other channels. To protect reporters’ confidentiality, the TSB regulations prohibit disclosure of a reporter’s identity without the reporter’s written authorisation (SECURITAS, 1995).

In investigating a new submitted report, the TSB matches the new reported occurrence with past data and reports that share similar concerns, in order to determine whether further investigation of the new report is required. Thus, a new report that does not share similar concerns with past reports may not necessarily result in an action taken by TSB. This suggests that reporters may feel that the concerns they raised have not been deemed worthy of further analysis. In view of the latter, such reporting systems might not effectively serve their purpose as reporters’ confidence in them could be the determining factor in whether they are used to communicate concerns or not.

2.4.4 Australia: Aviation Self Reporting System and Report Confidentially

The Aviation Self-Reporting System (ASRS (AUS²)) is a voluntary non-punitive incident reporting scheme that started operating in 2004. ASRS (AUS) allows civil aviation personnel who are seeking to claim protection from punitive action by Civil Aviation Authority of Australia (CASA), to self report unintentional regulatory breaches. However, to be eligible for acceptance under ASRS (AUS), the report must be about the reporter's own contravention. To offset this limitation, Report Confidentially (REPCON), a separate scheme to ASRS (AUS) was implemented in 2007 which allows any person who has an aviation safety concern to report it to the Australian Transport Safety Bureau (ATSB) confidentially.

Both ASRS (AUS) and REPCON's primary objective is to protect reporters' identities whilst collecting information. Data held internally by ATSB are de-identified and no information that could identify reporters is disclosed without the reporter's written consent. That said, no anonymous reports are accepted by the ATSB (since no contact with anonymous reporters for further verification of reports could subsequently occur). Reporters who decide to raise concern through ASRS (AUS) or REPCON are then faced with no option but to place blind confidence in the protection offered by the two schemes, so that their concerns may be voiced.

²ASRS (AUS) to differentiate between ASRS of Australia and ASRS of the United States.

2.4.5 Brazil: Flight Safety Confidential Report

The Flight Safety Confidential Report (RCSV) was launched by the Brazilian Aviation Safety Centre in 1997 with the primary aim of accident prevention. RCSV guarantees anonymity to reporters by not holding any of their personal information on file or on the database. An 'Identification Slip' containing all information related to a reporter is returned promptly to the reporter after processing of the report (International Civil Aviation Organization (ICAO), 2004).

The RCSV prides itself in exercising extreme caution with maintaining confidentiality of reporters, but it is yet another system where anonymous reporting is not encouraged (ICAO, 2004).

2.4.6 Japan: Aviation Safety Information Network

The Aviation Safety Information network (ASI-NET) was established in Japan in 1999 to exchange confidential safety information among Japanese airlines. Reports can be submitted by a participating airline and its employees using unique identification and password, and then accessed by member organisations after a process of de-identification (ASI-NET, 1999).

ASI-NET protects reporters' confidentiality through restricting regulatory authorities' access to the system, and ensuring that each of the member airlines operate under a non-punitive policy protecting reporters (ASI-NET, 1999).

Although ASI-NET potentially provides a platform for sharing safety information among member organisations, it may be limited in that it only receives and shares information sent by reporters who belong to a member organisation. Non-members therefore may have no means of raising safety concerns. Moreover, ASI-NET relies on protection policies provided by member organisations and thus, does not itself protect reporters from organisational retaliation.

2.4.7 France: Confidential Environment for Reporting

The Confidential Environment for Reporting (Le Recueil d'Événements Confidentiels [REC]) was established in 2000 by the Bureau of Enquiry and Analysis for Civil Aviation Safety (Bureau d'Enquêtes et d'Analyses pour la sécurité de l'aviation civile [BEA]) to facilitate reporting of minor safety events by an employee in the aviation industry (BEA, 2008).

Like the previous reporting systems, REC guarantees reporters the confidentiality of the information supplied as well as the anonymity of the information kept on files, but does not encourage anonymous reporting, as interviewing reporters is a mandatory step in the REC process. With regard to protection, REC refers reporters to the Civil Aviation Act for information regarding protection from administrative or disciplinary sanctions, and draws their attention to the fact that the Act does not provide protection for convictions arising out of criminal or civil legal proceedings. With no guaranteed protection and no strong support in place, reporters might not feel confident enough to use such system to voice safety concerns for fear of reprisal.

2.4.8 Taiwan: Confidential Aviation Safety Reporting System

To promote flight safety, the Aviation Safety Council of Taiwan launched the Taiwan Confidential Aviation Safety Reporting System (TACARE) in 1999. TACARE encourages all personnel in the aviation community to report safety concerns, strictly prohibits disclosure of reporters' details by making each TACARE working group member sign a 'Non-disclosure Agreement', and deletes all personal details as soon as confirmation of a report's content is accomplished. Reporters' identities are thus kept confidential at all times (TACARE, 2000).

TACARE encourages reporting by offering reporters small rewards as an appreciation of their participation in the scheme. Although this may not encourage anonymous reporting, it might, along with the emphasis on being 'confidential, voluntary and non-punitive' (TACARE, 2000), entice reporters to come forward and help achieve TACARE's objective of elevating Taiwan's aviation safety.

2.4.9 Singapore: Confidential Aviation Incident Reporting

The Singapore Confidential Aviation Incident Reporting (SINCAIR) programme established by the Air Accident Investigation Bureau of Singapore (AAIB (SIN³)) in 2004 is described as a voluntary, non-punitive confidential incident reporting system aiming to enhance aviation safety through encouraging reporting of minor incidents that would not otherwise be reported through other channels (Ministry of Transport of Singapore, 2008).

³AAIB (SIN) to differentiate between AAIB Singapore and AAIB Europe.

The SINCAIR programme pays particular attention to protecting the identity of reporters. Reports are validated by the programme manager, and information is de-identified before being recorded on SINCAIR database. SINCAIR forms are then sent back to reporters and no copies of the report are created or retained (Ministry of Transport of Singapore, 2008).

The AAIB (SIN) reiterates Reason's (1990) argument that the most detrimental error is failing to learn from errors, and stresses the need for focusing on learning from incidents as well as learning from reporters' experiences to enhance safety. SINCAIR's focus on systems, human factors, procedures and equipment, rather than on individuals, helps towards shifting reporters' attention from being concerned about potential blame, to focusing on the need for reporting and its importance in contributing towards achieving the common goal.

2.4.10 Further Exploring of the Need of Safety Occurrence Reporting in Europe

The Performance Review Unit (PRU) of the European Organisation for the Safety of Air Navigation (EUROCONTROL) conducted a survey in 2001-2002, to investigate legal constraints to non-punitive Air Traffic Management (ATM) safety occurrence reporting in Europe. The survey also aimed to explore other factors such as management culture, that might affect reporting ATM safety occurrences for fear of blame or punishment (EUROCONTROL, 2002). The survey was sent to 28 EUROCONTROL member states that have an Air Navigation Service Provider (ANSP); 3 Air Traffic Controllers Organisations (ATCOs); the International Federation of Air Traffic Controllers' Association (IFATCA); the Air Traffic Controllers'

European Union Co-ordination (ATCEUC); and the Institute of Professional Managers and Specialists (IPMS). States were invited to have the questionnaire completed by their ANSP, the safety regulator, and by the Aircraft Accident Investigation Board (AAIB (EUR⁴)) where applicable. Responses were received from 25 States, 6 IFATCA and 5 ATCEUC.

The survey provided evidence that factors such as punitive and strict legislations, lack of management commitment to safety, the existence of internal reporting procedures within the workplace and employees' perception of these internal procedures, can seriously inhibit the development of a reporting system. A potential solution to some of the limitations of occurrence reporting highlighted by PRU may lie in educating individuals to create and maintain environments where reporting is voluntary, non-punitive and where utmost confidentiality is guaranteed. That said, it is worth noting that despite PRU guaranteeing that information provided by all participants would be de-identified prior to publication, not all of those targeted responded to the survey.

2.4.11 Summary

Incident reporting schemes vary in a number of respects. Some schemes are aimed at aviation communities (such as ASI-NET), whereas others are promoted throughout all communities (such as SINCAIR, REPCON, and ASRS (US)). Some schemes offer more protection for reporters than others (such as REPCON vs. ASRS (US)), some allow various ways of reporting (e.g. TACARE allows reporting through post, fax, email, telephone and website) while others allow reporting through post only

⁴AAIB (EUR) to differentiate between AAIB Europe and AAIB Singapore.

(SINCAIR). Some are very well promoted and provide ample and easily accessible information about the reporting process (ASRS (US), CHIRP, TACARE, SINCAR, REPCON and SECURITAS), while others provide little (REC), or no information in the English language (SCASS, ASI-NET, VASRP, RCSV and SNS) even though English is the mandated international Language of Aviation (e.g. ICAO has recently set English language proficiency requirements to be met by pilots and air traffic controllers by 2008 (ICAO, 2004)). The funding and operating agencies of these reporting schemes also differ, with regulatory authorities, safety centres, accident investigation units, or government departments as sources of funding. For example, CHIRP was funded by the CAA UK and is operated by an independent organisation, ASRS (US) was funded by the American Federal Aviation Administration (FAA), and operated by NASA, TACARE was instituted by the Civil Aeronautic Administration of Taiwan, and is operated by the Aviation Safety Council.

It could be argued that reporting of incidents is reliant upon employees' confidence in existing reporting schemes, in that reporters must have the utmost confidence that their confidentiality will not be breached, and that self-reporting or reporting in general, will not result in any punishment of the reporter. To preserve this confidence, reporters should be allowed to raise concerns confidentially or anonymously. The reporting schemes discussed above have opted for the confidential rather than anonymous option as it enables further contact with reporters for further information or clarification of concerns. Reporters with little trust in such reporting schemes could still raise concerns anonymously but presumably run a risk of their reports being ignored.

Confidence in incident reporting schemes could also be affected by the type of organisation funding the scheme. For example, reporters might not be confident that their identities will not be made known to their employer or to the regulatory authority, if either of these organisations is the source of funding of the reporting scheme. For these reasons, a reporting scheme should ideally be funded and operated by independent organisations, to increase the likelihood that all concerns are dealt with impartially and with complete integrity.

In recognising the role incident reporting schemes could play in enhancing safety, Transport Canada aims to implement a Safety Management System (SMS) for civil aviation by 2010. SMS is a documented process for managing risks that integrates operations and technical systems to ensure aviation safety and the safety of the public (Transport Canada, 2007). SMS will require that the aviation industry introduce policies and systems designed to reduce safety risks such as implementing incident reporting systems. While acknowledging that cultural change of any organisation can be a challenge, Transport Canada believes that a move away from prescribing regulations and measuring organisations adherence to them, and towards setting out objectives for organisations and measuring their achievement of these objectives would increase the safety of civil aviation.

Hudson (2001) stated that Safety Management Systems “define sound systems, practices and procedures, but those are never enough if they are practiced mechanically; they require an effective safety culture to *flourish*” (p. 3). Hudson (2001) posited that two important aspects are required for the aviation industry to achieve improvement in safety performance: Safety Management Systems and safety culture. According to

Hudson, “people involved in aviation, at all levels, need to be ready for disaster, to seek out its roots and cope when things go wrong, as they invariably will” (p. 4). It appears thus, that safety culture may be an important concept in achieving aviation safety.

2.5 Safety: Is it a Question of Culture?

The importance of safety culture within aviation organisations has been extensively discussed in the literature (e.g. Lauber, 1994; Reason, 1997; and Westrum, 2004). Reason (1997) stated that “like a state of grace, a safety culture is something that is striven for but rarely attained” (p. 220). According to Reason, a safety culture is equivalent to an informed culture where employees are prepared to report their errors and near-misses.

Hudson (2001) stated that safety culture is “Who and what we are, what we find important, and how we go about doing things around here” (p. 1). Hudson links organisational culture and safety culture to the organisation’s development evolution, which agrees with the work of ShamRao (1999) suggesting that there are three main cultural developments. The first is an organisation’s passive compliance with regulations, the second is active compliance with regulations involving individuals and encouraging them to take personal responsibility, and the third is behavioural development which focuses on teaching individuals to identify and avoid potential behaviours that could prevent them from behaving safely. Westrum’s (2004) concept of information flow in organisations suggested three distinct patterns: pathological, bureaucratic, and generative. Westrum posited that organisations where there is a great degree of disagreement about work related issues are thought to have a pathological

pattern of information flow, while organisations that are good at dealing with routine situations are believed to have a bureaucratic pattern. The third pattern Westrum identified was the generative pattern, which is found within highly reliable and highly creative organisations. The author stated that in these organisations, employees believe they are permitted both to think and to communicate.

Although organisational culture is often regarded as a characteristic of groups and subgroups within an organisation, it is nevertheless also about the mindset of each individual that constitutes these groups (Hopkins, 2002). However, Reason (1997) posited that the concept of safety culture should not be used to describe the behaviour of individuals, instead, it should be used to describe organisational events. Reason acknowledged that safety culture influences individuals' behaviours and that organisational accidents are "events that occur within complex modern technologies...a product of recent times or, more specifically, a product of technological innovations which have radically altered the relationship between systems and their human elements" (p. 1).

The influence of culture on pilots' behaviour has been widely reported (Johnston, 1993; Meshkati, 1996; Helmreich & Merritt, 2001). Indeed, Meshkati (1996) believed that the culturally driven habits of operators are a more potent predictor of behaviour than their intentions. In addition, Merritt and Helmreich (1996a) argued that organisational culture shapes workers' perceptions of safety, the relative importance placed on safety, and their activities regarding safety. For example, in exploring the link between organisational culture constructs (e.g. safety culture, and job attitudes) and pilot performance, Sexton and Klinec (2001) found that pilots with positive perceptions of

safety culture had better overall crew performance ratings than crew with negative perceptions of safety culture. Sexton and Klinec (2001) stated that negative perceptions are associated with sub-optimal safety practices and performance, whereas positive perceptions reflect above average performance.

Reason (1997) described a negative organisational culture as a latent condition that could contribute to an accident. A positive organisational culture, on the other hand, was believed to be the driving force behind the outstanding safety record and financial growth at Southwest Airlines (Freiberg & Freiberg, 1996). According to Freiberg and Freiberg, a positive culture nurtures and values contributions of its members while a negative culture exploits its members, suppresses their creativity and communication.

A study conducted by Boeing (as cited in Lauber, 1994) examining safety records of airlines, concluded that airlines with safety records better than average, invariably used training methods such as Crew Resource Management (CRM). In addition, the study also found that the management of airlines with good safety records seemed more committed to safety than the management of airlines with safety records less than average. Safety experts at Boeing expressed that airline safety “begins at the very top of the corporation--indeed in the Board Room--and filters down to the very bottom thus infusing every player, no matter what role that individual plays in the functioning of the company, with a personal responsibility for safety. The successful establishment of such a safety culture is the greatest safeguard against accidents an organization can possess” (Lauber, 1994, p. 2). Safety culture aspects are thus found in the shared attitudes of care and concern throughout organisations (O’Leary & Pidgeon, 1995), and in senior management’s visible commitment to safety (Droste, 1997).

2.5.1 Just Culture

One component of an effective safety culture is the Just Culture introduced by Reason. According to Reason (1997), a Just Culture is “an atmosphere of trust in which people are encouraged, even rewarded, for providing essential safety-related information but in which they are also clear about where the line must be drawn between acceptable and unacceptable behaviour” (p. 193). For an organisation to be a just organisation, Reason maintained that it should operate within a no-blame culture. However, Reason asserted that a fully effective safety culture must be more than just in its approach, it must first be a learning culture where reports are used as means to learning about implementing what needs to be done to improve the organisation safety. Second, it must be a reporting culture where errors and near misses are reported, so that management is aware of what is happening within the organisation. Third, it must be a flexible culture allowing organisations to adapt their decision-making processes to demands and circumstances.

Arguably, a Just Culture is necessary to achieve an effective safety culture. A reporting culture is unlikely to exist where “punishment is believed to be a probable outcome” (Reason, 1997, p. 196), or if uncertainty exists “about what can happen with a report” (Dekker, 2007, p. 43). Dekker (2008) posited that in punitive cultures “errors are not deterred: reporting is” (p. 2).

As such, implementation of a Just Culture requires that open and transparent reporting systems are established, and that full support and protection are offered to reporters using such systems. If organisations are to be committed to a Just Culture, then such culture must be founded upon trust between employees, and a shared understanding of

safety goals, both of which would enable effective communication of safety information.

So if a reporting culture is an important indication of safety culture, what is it exactly? And, how can organisations achieve it?

2.6 Attitudes and Reactions towards Disclosures of Information

Dehn and Calland (2004) suggested that reporters are often highly competent and professional individuals with a strong commitment to moral or ethical principles and personal integrity. As for Lewis (2001), reporters are “rather troublemakers who deserve punishment for their disloyalty” (p. 170). Dichotomy of opinion about who reporters are is also revealed through the alternative names given to a reporter, each of which is a statement indicative of the attitudes towards reporting. There is a whole agenda behind referring to those who disclose information as ‘dobbers’, ‘snitches’, ‘crackpots’ (Near & Miceli, 1996), ‘villains’ or ‘traitors’ (Sawyer, 2005), and between referring to them as ‘saints’ (Grant, 2002), ‘heroes’, ‘lighthouse keepers’ (Johnson, 2003), or ‘martyrs’ (Bouville, 2008) .

Interviews with one official at the FAA revealed the harsh consequences that could potentially occur as a result of reporting. In an interview with one of the FAA official about the Alaska Airlines MD-80 accident that happened near Port Hueneme, California on January 31, 2000, the FAA official explained that while they get potential reporters all the time, she warns them that they better be prepared to leave aviation and pursue a career in a completely different field of work (FAA Whistleblower, 2002). Such

response is an indication that organisations may not welcome reporting actions of their employees, and may, as implied by the response of the FAA official, result in negative consequences for those who raise concerns at the workplace.

The importance of reporting is reinforced by a number of media reports relating to real-life examples of those who disclose information about questionable behaviour in the workplace. These incidences range from the case of the three American women ‘whistleblowers’ (as referred to by the media) hailed ‘Persons of the Year’ by Time magazine (2002) for blowing the whistle on misconduct within their organisations. Also, the Big Tobacco case of in 1993 where Jeffrey Wigand exposed his company’s intentions to manipulate the effect of nicotine in cigarettes, and the exposure of prisoners’ abuse at Abu Ghraib prison in Iraq by Samuel Provan in 2006.

The notion that employees inform those in a position of authority about questionable practices in the workplace may be hard for organisations to accept. The above mentioned whistleblowing cases raise concerns that firstly, someone in a position of authority at the workplace should have been aware of the wrongdoing. Secondly, if suspicions were arisen before blowing the whistle externally, there should have been clear guidelines and channels for disclosing information within the organisations. However, it could be argued that if a concerned employee is to disclose information about the employer, they must be either very brave or even slightly mad to be a whistleblower (Clarke, 1999), or be sure about protection from potential organisational reprisals ensuing from disclosing information against them.

It may not be easy to estimate how many instances of whistleblowing result in positive outcomes for the whistleblower, as it is assumed that only cases where an organisation has responded negatively to the disclosure of information (e.g. by reprimanding the whistleblower) reach tribunals and media headlines. Camerer (2001) posited that without legal protection, individuals are often too intimidated to speak out or 'blow the whistle' on corrupt activities which they observe in the workplace.

Gobert and Punch (2000) maintained that many whistleblowers engage in significant struggles, and that whistleblowing can have long and bitter resonance. Indeed, a US study found that 100% of whistleblowers were fired, 90% suffered depression and anxiety, 80% experienced health problems, 54% were harassed by colleagues, 17% lost their homes, 15% were divorced and 19% attempted suicide (Drew, 2003).

In an investigation into whistleblowers' experiences during and after their allegations, the Research Triangle Institute (1995) identified effects of whistleblowing actions on whistleblowers' personal and professional life. It was found that pressure to drop allegations was ranked by respondents as the number one whistleblowing outcome, followed by ostracism, reduction in support, threats with lawsuits, and less common negative outcomes including suspension, and refusal of salary increase, travel funds, promotion and tenure. The majority of respondents claimed to have experienced at least one negative outcome as a result of their whistleblowing. Respondents who experienced outcomes such as suspension stated that they would definitely not 'blow the whistle' again.

According to Alant and Uys (1999), organisational retaliation is a sign of deficiencies in the organisation's structure, communication channels and management efficiency. Retaliation against whistleblowers for their 'deviant act' due to fear of damaging results is a common organisational response to disclosures of wrongdoing (Alant & Uys, 1999), although interestingly, Rothschild and Miethe (1999) observed that whistleblowers often did not anticipate organisational retaliation. Dehn and Calland (2004) suggested that it is relatively easy for an employer to disguise the real reason for retaliation (e.g. withholding salary increases, isolation and generally limiting the reporter's career) by alleging incompatibility or diminished performance.

Rothschild and Miethe (1999) identified three factors that influence organisational retaliation: external disclosure, degree of wrongdoing and the ranking of the whistleblower, however, the authors found that whistleblowers experience reprisals regardless of their gender, educational level, age or length of employment. A survey conducted by Keenan and Krueger (1992) to examine whistleblowing and communication climates within organisations revealed that there was a link between attitudes towards whistleblowing and the position held by an individual or the length of service or level. Additional findings of the survey indicated that whistleblowers publicising misconduct are more at risk of adverse outcomes than discreet whistleblowers, especially if they are employees of a lower rank.

Dworkin and Baucus (1998) posited that employers' retaliation against external whistleblowing is more extensive than that against internal whistleblowing. Similarly Sawyer, Johnson, and Holub (2006) reported that the occurrence of retaliating against internal whistleblowing was on average 10% to 15% lower than for external reporting.

Consistent with the reprisal from internal or external reporting, Keenan and Krueger's (1992) survey found that management favoured disclosing information internally and considered it to be in the best interest of the organisation.

Internal whistleblowing is a 'key aspect of effective self regulation', encouraging it gives managers more control over the problem at hand and creates opportunities for organisations to deal with their own misconduct in an effective and responsible manner, hence precluding external whistleblowing and its resulting damage (Dehn & Calland, 2004). As such, potential whistleblowers are often advised to first raise their concerns internally, giving organisations 'a chance to fix problems before they develop into full-blown scandals' (Barnett, 1992). Organisations must be able to provide sufficient responses to internal reporting (Miceli & Near, 1994) and develop robust support systems through which employees would not hesitate to report their ethical concerns. Many employees would 'go external' if they have no confidence in management's actions or believe their concerns will not be considered properly. For these reasons, organisations should adopt a positive attitude vis-à-vis whistleblowers, the latter should be treated as 'informers', people seeking change, acting out of loyalty to the organisation, moreover, management should recognise that if managed properly, whistleblowing could have a positive effect on the organisation.

Despite the number of concerns associated with whistleblowing, it has also been shown that some organisations respond positively to whistleblowing incidents: they carry out investigations of issues raised, ensure appropriate actions are taken, and seek to resolve issues amicably (Dehn, 1999). For example, Enron, the employer of one of the three women nominated 'Persons of the Year', issued notepads to employees bearing the

following quote: “Our lives begin to end the day we become silent about things that matter.” (Time, 2002).

Evidence from Keenan and Krueger’s (1992) survey underlined management’s negative perception of organisation protection of whistleblowers. The largest percentage of respondents had no confidence in their organisation’s ability to effectively protect whistleblowers from retaliation. Sawyer et al. (2006) stated that if reporters “believe in laws, they may be encouraged to come forward and rely on protections” (p. 14). Seven principles were proposed by Vaughin, Devine, and Henderson (2003) describing an ideal model law of reporter protection:

1. Focus on the information disclosed and not on the whistleblower.
2. Relate to freedom of expression laws.
3. Permit disclosure to different agencies in different forms.
4. Include compensation or incentives for disclosures.
5. Protect any disclosure, whether internal or external, whether by a citizen or by an employee.
6. Involve whistleblowers in the process of evaluating their disclosure.
7. Have standards of disclosure.

These principles, however, do not address whistleblowers’ protection from a ‘less visible’ retaliation (Sawyer et al., 2006), they are only effective when retaliation is observed. The authors asserted that the key to the survival of whistleblowers is a legislation that is designed to protect against the retaliatory actions of the organisation. Sawyer et al. posited that regardless of the public benefit derived from whistleblowers’

actions, their persecution will not stop until retaliation has consequences for the organisations concerned.

2.7 Disclosure of Information– The Statutes

Employment laws and policies have existed since the 19th century. Discrimination Acts, Equal Employment Opportunity Acts, Safety Laws, are but a few of the well known mechanisms established to secure the welfare of employees. However, many of these laws and policies may not have been explicitly protective of reporters but have evolved to subsume issues relating to the reporting of wrongdoing within organisations. As an example, since the accident of the Space Shuttle Challenger, NASA has introduced a formal policy protecting employees who report information (Boisjloy & Curtis, 1990).

In the aviation industry, protective legislation for reporters is increasingly attracting the attention of authorities. With the increasing pressure on the aviation industry to maintain air safety, authorities are determined to expose any action that may endanger the safety of people. For example, in the year 2000, the Ford Aviation and Reform Act for the 21st Century was signed into American law, to protect airline employees who disclose concerns from organisational retaliation (FAA, 2004). CASA in Australia had similarly introduced a protected disclosure policy in 2004 in response to the Minister's request for an internal reporting mechanism on organisational shortcomings (CASA, 2004). However, fear of speaking-out remains dominant throughout the aviation community. A Canadian staff reporter stated that Canadian aviation workers believe that sharing what they know would jeopardize their livelihoods and careers in aviation; with families to support, they cannot take that risk (Cribb, 2006).

2.7.1 New Zealand Statute – The Protected Disclosures Act

The primary statute in New Zealand regulating protected disclosures at the workplace is the Protected Disclosures Act 2000. The New Zealand Protected Disclosures Act's 2000 prime purpose is to protect and make it easier for employees to voice concerns about serious wrongdoing within both public and private organisations, and assist involved organisations in investigating disclosures of information made against them. For example, disclosures made according to the provisions of the Act are immune from civil and criminal proceedings (Section 18). The Act also encourages reporting in that it provides strong protection of reporters' confidentiality. The Act maintains that reporters' identities will not be disclosed unless written consent from the reporter is received, or the recipient of the disclosure believes on reasonable grounds that revealing the identity of the reporter is crucial to prevent serious risk to public health, safety or the environment, or it is crucial to the effectiveness of the investigation of the wrongdoing (Section 19). Under the Act, confidentiality of reporters is maintained to the extent of refusing requests for information made under the 'Official Information Act', if the identity of the whistleblower is under a risk of being revealed (Section 19[2]).

Under New Zealand's Protected Disclosures Act 2000, entities permitted to receive and handle disclosure of wrongdoing are labelled as 'appropriate authorities'. These entities include: the Director of the Serious Fraud Office, an Ombudsman, the Commissioner of Police, the Police Complaints Authority, the Controller and Auditor-General, the Parliamentary Commissioner for the Environment, the Solicitor-General, the State Services Commissioner, and the Health and Disability Commissioner. The Minister of the Crown may also receive disclosures of wrongdoing in particular cases. Although the

Act requires that “disclosures must be made in accordance with internal procedures” (New Zealand Protected Disclosures Act 2000, Section 7), it does however permit bypassing the internal procedures in that:

- Disclosures may be made to the head of the organisation in certain circumstances such as the absence of internal procedures within the organisation. Internal reporting procedures could also be bypassed if the reporter believed that the person to whom wrongdoing should be reported is or may be involved in the wrongdoing. Also, if the reporter believes that the person to whom the wrongdoing should be reported, is or may be associated with the person who is or may be involved in the wrongdoing (New Zealand Protected Disclosures Act 2000, Section 8).
- Disclosure may be made to the appropriate authority in certain circumstances such as if the reporter believes that the head of the organisation is or may be involved in the wrongdoing, or when there has been no action on the disclosure within 20 working days after the report was made. Disclosure to the appropriate authority can also be made if it is justified by reason of the urgency of the matter to which the wrongdoing relates or some other exceptional circumstance (New Zealand Protected Disclosures Act 2000, Section 9).
- Disclosures may be made to the Minister of the Crown or Ombudsmen in certain circumstances such as if the reporter has already made the same disclosure in accordance with section 7, section 8, and section 9, or the reporter believes on reasonable grounds that the person or appropriate authority who received the disclosure has decided to investigate or investigated but has not made progress

within a reasonable time, or has not taken any action in respect of the matter (New Zealand Protected Disclosures Act 2000, Section 10).

The Act provides guidelines and standards that organisations must comply with when using internal reporting channels (Section 11): comply with principles of natural justice; identify the persons in the department who may receive disclosures; and include references to the disclosure procedures, both internally and to the ‘appropriate authorities’, and outlines criteria for protection as follows (Section 6):

- (1) the disclosure is about a form of wrongdoing committed in or by the organisation in the public or private sector;
- (2) the whistleblower reasonably believes that the information is true or likely to be true;
- (3) the whistleblower wishes to disclose the information so that the serious wrongdoing can be investigated; and
- (4) the whistleblower wishes the disclosure to be protected.

The Act defines serious wrongdoing as: (1) an unlawful, corrupt, or irregular use of public funds or public resources; (2) a serious risk to public health or public safety or the environment; (3) a serious risk to the maintenance of law, including the prevention, investigation and detection of offences and the right to a fair trial; (4) an offence; and (5) an act or omission by a public official that is oppressive, improperly discriminatory, or grossly negligent, or that constitutes gross mismanagement (Section 3). As long as whistleblowers are not consciously making false or dishonest disclosures of wrongdoing (Section 20), and all disclosures are made according to the provisions of the Act,

whistleblowers suffering reprisals can seek personal grievances and get immunity from civil and criminal proceedings (Section 17).

Other New Zealand statutes also recognise the value of early detection of wrongdoing. The Agricultural Compounds and Veterinary Medicines Act 1997 (1997) talks about encouraging and facilitating the reporting by any person of any adverse effects from the use of agricultural compounds (Part 3, section 36). The Children, Young Persons, and Their Families Act (1989) states that “[a]ny person who believes that any child or young person has been, or is likely to be, harmed (whether physically, emotionally, or sexually), ill-treated, abused, neglected, or deprived may report the matter to a Social Worker or a member of the Police” (Part 2, section 15), and that “[n]o civil, criminal, or disciplinary proceedings shall lie against any person in respect of the disclosure or supply, or the manner of the disclosure or supply, by that person pursuant to section 15 of this Act of information concerning a child or young person (whether or not that information also concerns any other person), unless the information was disclosed or supplied in bad faith” (Part 2, section 16). Similar in purpose, is the Financial Transactions Reporting Act (1996) which stresses the importance of reporting suspicious transactions within institutions, and assures immunity and protection in respect of those who have or are intending to raise their concern.

2.7.2 International Statutes

With the public becoming increasingly familiar with the idea of reporting, organisations worldwide are encouraged to build systems protecting individuals making disclosures from reprisals. For examples, a number of countries have established and legislated

processes for disclosing wrongdoing; these include The Public Service Act 1999 of Australia; the Anti-Corruption Act 2001 of Korea; the State Comptroller Law 1958 of Israel; the Protected Disclosures Act 2000 of South Africa; the Public Interest Disclosure Act 1998 of the United Kingdom; and the Whistleblower Protection Act 1989 of the United States (Public Sector Integrity Office, 2006).

2.7.3 Summary

Although legislations vary by country, in principle, each provide some degree of protection for reporters of wrongdoing from retaliation. The New Zealand Protected Disclosures Act 2000 encourages internal reporting as it provides some constraints around external reporting. Furthermore, and in comparison to other acts, the Act provides strong protections of reporters' confidentiality.

It is clear that there are many differences between the legislation of each country, for example, De Maria (2002) stated that the New Zealand Act is the only one that provides for disclosures on military intelligence matter, and the UK Act is the only one that specifically excludes such disclosures from protection. In addition, De Maria indicated that UK, New Zealand and South African legislations share a major weakness: they do not provide any protection for disclosing material classified by the military as secret.

2.8 Ethical Decision Making

It could be argued that disclosing information about wrongdoing is doing the right thing. However, this relies upon individuals recognising the morality of actions and

their ability to differentiate between right and wrong. In practice, individuals may face an ethical dilemma in that it may not be so easy for them to determine the right action to take. According to McDonald (1998), the action of reporting may be socially undesirable as people may be indoctrinated from childhood into believing that ‘telling’ is wrong. Chen (2001) similarly posited that individuals have different ethical perceptions which may be due to different socio-economical influences. However, if reports are not made, the relevant authorities may lose a valuable source of information that could be used to proactively improve aviation safety. Thus, from this perspective, reporting may be viewed positively.

According to the literature (e.g. Hunt & Vitell, 1986; Rest, 1986; Ferrell, Grehsam, & Fraedrich, 1989; Jones, 1991), an ethical dilemma first emerges from the environment and becomes recognised as a moral issue. After recognising the moral issue, individuals pass into a moral judgment stage (Rest, 1986; Trevino, 1986), this stage involves individuals’ level of cognitive moral development (Trevino, 1986; Rest, 1986), and moral reasoning processes (Ferrell, et al., 1989; Hunt & Vitell, 1986). It could therefore be suggested that what makes one decision morally right and another morally wrong depends on the moral framework within which the decision is fashioned.

2.8.1 Ethics and Morality

Ethics and morals are closely related and the two terms are often used interchangeably (Oderman, 2002). Ethics is a set of standards of right and wrong, good and bad, while morals deal with the application of these ethical standards. Because of their close

relationship, the two are often discussed together especially when dealing with a real-life issue (Oderman, 2002). Jones (1991) explained:

A moral issue is present where person's actions, when freely performed, may harm or benefit others...A moral agent is a person who makes a moral decision...An ethical decision is defined as a decision that is both legal and morally accepted to the larger community...An unethical decision is either illegal or morally unacceptable to the larger community (p. 8).

Ethics has been defined as “inquiry into the nature and grounds of morality where the term morality is taken to mean moral judgments, standards, and rules of conduct” (Taylor, 1975, p. 1). Beabout and Wennemann (1994) defined ethics as the study of “how to live life well” (p. 1) while Ferrell et al. (1989) defined it as “the study and philosophy of human conduct with an emphasis on the determination of right and wrong” (p. 56). Beabout and Wennemann (1994) suggested that motive is one of the key elements of the moral decision making process. According to Mill (1863), when a motive makes no difference in the act, it makes no difference in the morality.

In defining motive, Muirhead (1910) stated that “...it is agreed by all that it [motive] is equivalent to an end or aim representing something that is to be realized...A motive is universally admitted to be a final cause” (p. 56). Mill (1863) stated that while motives may throw light on character, they should not affect our judgment of acts. A good character according to Mill's assertion may be easily identified insofar as a good motive results in a good act. However, according to Dehn and Calland (2004), it is often

impossible to distinguish between the true and driving motive of an individual, ethical judgment may thus, be based upon concrete acts that can be measured by way of effect of their rightness or wrongness on society. This implies that on becoming aware of a bad act, one might assume that the character is also bad. In view of Dehn and Calland's suggestion, Mill's argument may be questionable in that if a good motive of a good character results in a bad act, then individuals may base their judgment upon the resulting act which may render the character a 'bad' character. As such one might struggle to understand why, in Mill's view; a good motive may result in a 'bad' character.

2.8.2 Kohlberg's Theory of Moral Development

Kohlberg's proposed that an individual's level of cognitive moral development strongly influences the person's decision regarding what is right or wrong; the rights, duties and obligations involved in a particular ethical dilemma. Kohlberg model of moral development suggested that there are six stages of moral reasoning grouped into three major levels: pre-conventional, conventional, and post-conventional as displayed on Figure 1. In the pre-conventional level (level 1), behaviour is motivated by anticipation of pleasure or pain. In Stage 1 of this level it is suggested that people are compelled to obey orders to avoid punishment. Stage 2 is characterised by a view that the right action consists of what instrumentally satisfies one's own needs.

The conventional level (level 2) is about acceptance of the rules and standards of one's group. In stage 3, individuals seek approval of others. Good behaviour is that which pleases others within the group. Stage 4 is oriented to abiding by the rules and

respecting laws. Often this stage yields to a transitional sub-stage in which individuals come to see conventional morality as relative and arbitrary (Kohlberg, 1976).

The last level Kohlberg identified is the post-conventional level (level 3) where ethical principles are considered. Kohlberg felt that the majority of adults do not reach level 3. In stage 5, individuals act out of mutual obligation and a sense of public good. Right actions tend to be defined in terms of general individual rights, and in term of standards that have been critically examined and agreed upon by the whole society. Stage 6 is based on respect for universal principles. While Kohlberg (1984) always believed in the existence of stage 6, its existence has not been confirmed by empirical evidence (Zimbardo, 1988).

Level 1	Level 2	Level 3
Pre-conventional	Conventional	Post-conventional
<u>Stage 1</u> Obedience and Punishment	<u>Stage 3</u> “Good boy / girl”	<u>Stage 5</u> Social Contract and Individual Rights
<u>Stage 2</u> Instrumental Purpose and Reciprocity	<u>Stage 4</u> Law and Order	<u>Stage 6</u> Universal Ethical Principles

Figure 1. Kohlberg’s Theory of Cognitive Moral Development (1984)

Kohlberg (1976) believed that individuals could only progress through these stages one stage at a time; one cannot get to a higher stage without passing through the stage immediately preceding it. Individuals could only come to comprehending a moral rational one stage above their own, thus, it was important to present them with moral

dilemmas for discussion, which would help them see the reasonableness of a higher stage morality, and encourage their development in that direction. However, Rest, Narvaez, Bebeau, and Thoma (1999) stated that unlike Kohlberg's sequential description of moral development stages, the authors viewed moral development as a shifting distribution. The authors suggested that people's moral reasoning may not necessarily be confined to their stage of moral development, in that although an individual's moral reasoning can, overall, be on a specific moral development stage, the individual could nevertheless use ethical reasoning from lower or higher moral development stages.

Kohlberg's model posited that as individuals progress from childhood to adulthood, their reasoning processes of moral decision advances to higher levels of moral development stages. The emphasis, Kohlberg asserted, should be on the reasoning process rather than on the decision itself. In other words, the focus should be on the reasons justifying individuals' choices rather than the choices themselves. Kohlberg claimed that individuals at higher stage of the model are morally superior to those at a lower stage. This suggests that decisions made at a higher level are morally superior to those made at a lower stage. For example, abiding by rules and respecting laws (stage 4) is more moral than satisfying one's own needs (stage 2). Similarly, making moral choices with the aim of avoiding punishment (stage 1) is morally inferior to seeking approval of others (stage 3).

Kohlberg's Moral Development theory was later challenged by the domain theory advanced by Turiel (1983). According to the domain theory, morality and convention are two distinctive elements that are parallel to development frameworks. Actions

within the moral domain are believed to have intrinsic effects (such as causing harm to others) on the welfare of others, while actions that are more of a social convention nature have no intrinsic consequences (by definition, conventions are means of managing social relations between groups through a set of pre-determined set of rules and modes of conducts). In light of the domain theory, Turiel distinguished moral rules from conventional social rules and demonstrated that, unlike Kohlberg's system of moral development, morality and social convention are distinct, as opposed to being a single entity. According to the domain theory, children's concepts of morality are constructed through their social experiences with adults (Turiel, 1983).

Some critics also argued that to speak of moral development, one must have suitable criteria for measuring such development. A problem with Kohlberg's cognitive moral development that has been widely acknowledged is that the theory was gender-biased in favour of males (Gilligan, 1977; Levine, Kohlberg & Hower, 1985; Goolsby & Hunt, 1992). Kohlberg's sample comprised an all-male population which he used to develop generalisations about the stages of cognitive moral development. These generalisations were applied to both males and females, thus questioning the suitability of Kohlberg's approach to measure the development of moral judgment. The problem with generalising of Kohlberg's theory was also highlighted by other theorists. It was demonstrated that moral values can be defined and measured differently to Kohlberg's approach (e.g. Ewell, 1954; Rettig & Pasamanick, 1959; Rokeach, 1968).

Other criticisms of Kohlberg were in respect of the stages of his moral development theory. Psychologists (e.g. Keil, 1981; Flavell, 1982) have suggested that Kohlberg may have attempted to build a schema that resembles other stage theories, such as Freud's

theory of psychosexuality and Piaget's theory of cognitive development. Phillips (1987) posited that the importance of Kohlberg's claim that individuals must pass through the stages in a certain sequence is that it applies to all cases and persons. Therefore, if there are instances where individuals regress in their cognitive moral development or use different moral reasoning strategies in different situations, then Kohlberg's theory becomes invalid (Fraedrich, Thorne, & Ferrell, 1994). Moreover, Kohlberg's model was criticised for being too limited in that it was based on cognitions rather than behaviour (Trevino, 1986). The relationship between moral reasoning and moral actions (Fishbein & Ajzen, 1975; Blasi, 1983) had been ignored by Kohlberg; as such, the model was believed to measure the reasoning of moral dilemmas but not the actions taken in decision situations.

Kohlberg posited that individuals sequentially progress through stages in the development of moral reasoning, and maintained that the stages are invariant such that individuals do not regress or otherwise fluctuate between stages. However, empirical evidence has shown that people carry a portion of lower stage 'baggage' to higher stages of morality (Rest, 1979). Flanagan (1991) also questioned the adequacy of the stage theory and maintained that even if Kohlberg's stages did form an invariant sequence, it cannot be said that they form an order of increasing adequacy. To illustrate his argument, Flanagan (1991) used an example of a race car driver and stated that although being able to drive is a necessary prerequisite for being a race car driver, it does not follow that to be a race car driver is better than to be an ordinary driver. Lower stages as such are prerequisites for higher stages but it cannot be proposed that higher stages are better than lower ones.

Other theorists have also questioned the validity of Kohlberg's cognitive moral development theory. Kohlberg's theory was believed to be biased towards a particular type of philosophy (Fraedrich et al., 1994) as it emphasises rights and justice principles at the expense of other inputs into moral decision making (Derry, 1989). One alternative to rights and justice necessity in moral judgment is the "ethics of caring" proposed by Gilligan (1982). Gilligan argued that ethical decisions based on justice and fairness were incomplete, and believed that Kohlberg's justice-based theory ignored relationships between individuals. Gilligan therefore could not agree with Kohlberg's universal rules, which in her opinion were detrimental to individuals or individual relationships. However, Flanagan (1991) argued that since morality is multifarious, it is wrong to equate it to justice or care or a combination of both: "even with justice and care together, it will not be enough to exhaust what we call moral personality" (p. 233).

2.8.3 Gilligan's Theory of Care

As a young colleague of Kohlberg at Harvard University, Gilligan challenged his approach to moral reasoning through her book 'In a Different Voice: Psychological Theory and Women's Development' (1982). Gilligan's interviews with women purportedly uncovered a different dimension in moral reasoning: unlike men, women were thinking more about caring for the individual rather than adhering to the rules. If, according to Gilligan (1982), there are differences in the way women and men conduct their moral reasoning, then in a male dominated environment such as the aviation industry, female employees may increasingly wish to "appear analytical than emotional" (Burke & Miller, 1993, p. 94) in order to fit in the male-centred group.

Based on her findings, Gilligan produced her own stage theory of moral development for women as displayed in Figure 2: pre-conventional, conventional, and post-conventional. For Gilligan, the transitions between the stages are dependent on changes of the self and the environment in which the self lives, rather than the Kohlbergian changes in cognitive capability. Unlike Kohlberg's approach, Gilligan's model was based on "Freud's approach to ego development" (Alavudeen, Kalil Rahman, & Jayakumaran, 2008, p. 68).

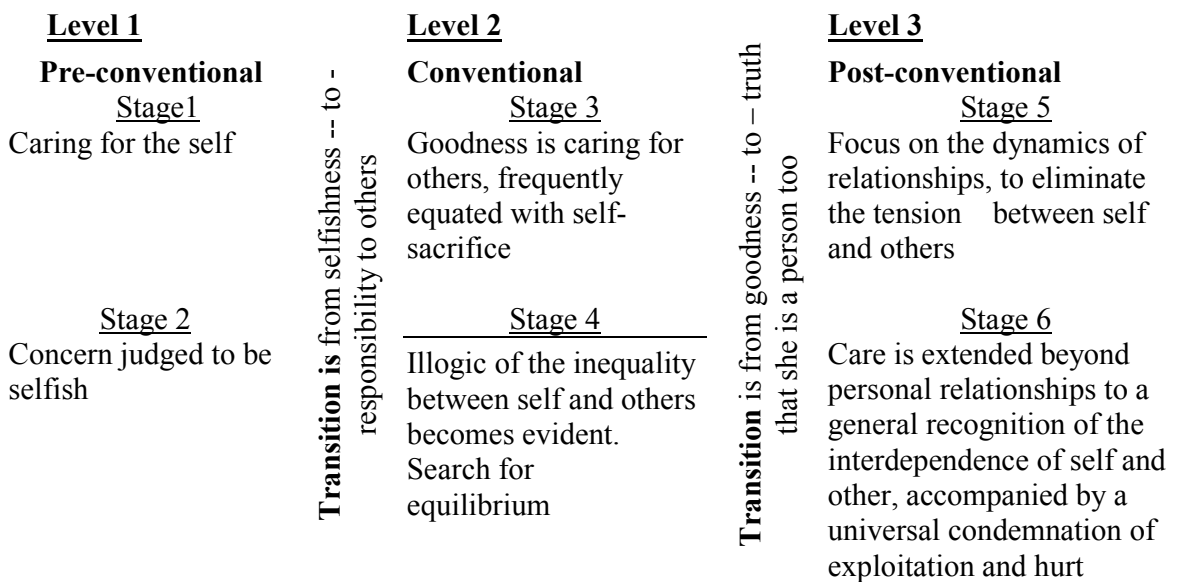


Figure 2. Gilligan's Stages of the Ethic of Care (Gilligan, 1982)

The first stage in Gilligan's pre-conventional level is characterised by caring for the self in order to ensure survival (a typical behaviour of children). This evolves to stage 2 where attitude in stage 1 is viewed as selfish by others, resulting in women beginning to see connections between themselves and others.

The conventional level is characterised by responsibility: 'Good' is equated with caring for others (as in the traditional role of mothers and wives). Stage 3 is based on devotion that often leads to ignoring the self and transitioning to stage 4, where women seek equilibrium between their caring for others and their desire to have their own needs met.

Finally, in the post-conventional level, stage 5 is characterised by the focus on eliminating tensions between self and others. In stage 6, the focus is on accepting the principle of care as a universal ethical principle which condemns exploitation and hurt in our life and others.

When Kohlberg's moral development model was administered on a large scale, it was discovered that females often scored a full stage below their male counterparts. In light of these differences of scores between males and females, Kohlberg suggested that females were less morally developed than males. Gilligan's investigations suggested that morality was androgynous: females and males had different but equally valuable moral voices. In Gilligan's view, care and responsibility to others become the fundamental ethical principles, rather than justice and individual rights. Gilligan defined ethical issues mainly in terms of helping others and minimising harm, and stated that goodness is a service, and morality is helping others and meeting one's obligations and responsibilities to others.

Gilligan's concept of voice attempted to demonstrate that men and women have different but equally valuable moral voices. However, in asserting these differences, Gilligan reinforces the stereotypical belief that men are from Mars and women are from Venus (Gray, 2004). This in turn may suggest that men and women are incapable of

learning from each other, and devalues the group of individuals whose moral voice happen to be similar to the voice of their opposite sex. It should be noted that this view could be biased in that it could be an artefact of interpretation from a feminism perspective. Furthermore, Gilligan's criticism of Kohlberg's claim of male superiority appears to bring about another form of superiority, that of female superiority. Gilligan's theory is based on comparison and competition between women and men, which render Gilligan's androgynous morality exclusionary.

2.8.4 Gilligan vs. Kohlberg

Gilligan is one of many theorists that opposed Kohlberg's claim for universality (i.e. actions must be based on reasons that all could agree on). Through her own investigations, Gilligan suggested differences between female and male moral development, and showed that Kohlberg's theory was based on a male-centred view. According to Gilligan, women and men look at ethical situations through different 'lenses', and these differences lead to different values (Gilligan, 1982). Looking at an ethical situation through Kohlberg's lens, then through Gilligan's lens, could further understanding of the differences between the two theories. Consider the recent ban on use of mobile phones while driving, which reads:

A driver must not, while driving a vehicle, create, send, or read a text message on a mobile phone or make, receive, or terminate a telephone call on a mobile phone or use a mobile phone in any other way (New Zealand Transport, 2009, Clause 7.3A).

Consider that two drivers have been caught using their mobile phones while driving. Driver 1 is a good citizen who has never been in trouble with the law, and has been waiting for a call from the hospital to hear about the outcome of an operation that a family member has undergone. Driver 2 has a criminal history and it was suspected that the mobile phone was used to challenge the recent laws against using mobile phones while driving.

From Kohlberg's ethics of justice perspective, the problem is that of fairness. The law is explicit and it has helped maintain a focused safe environment for drivers and pedestrians. The ethical problem becomes whether both drivers should be treated the same or differently.

One might feel sorry for driver 1, but the law is clear and has to apply to all drivers. Moreover, treating driver 1 differently to driver 2 would not be fair on driver 2. According to Kohlberg's hierarchy, acting to satisfy one's own needs is ethically inferior to acting according to a principle of fairness. Rules have to be applied impartially. On the other hand, giving both drivers another chance would not be fair to drivers who were suspended for using their mobile phones while driving, nor would it be fair to other drivers, many of whom may want or need to use their mobile phones but, in view of the new law, they refrain from so doing. Making exceptions could result in every driver expecting special treatment. Decisions could become arbitrary and the public's safety could be at stake.

Gilligan's 'care' perspective however, makes the problem look quite different. Responsibility to help someone in need makes treating both drivers the same hard to

defend. According to the scenario, driver 1 needs help more than driver 2. Making special arrangements for driver 1 will not harm other drivers, in fact, it may reassure them that the law will help them too should they find themselves in a similar situation. Not helping driver 1 will mean violation of the principle of care.

From Gilligan's care point of view, the issue is around what needs to be done ethically to address the special circumstances of the situation. Treating driver 1 differently does not mean repeatedly making exceptions to the policy. The special circumstances of driver 1 need to be taken into consideration, and tailor-made solutions guided by the facts of the situation need to be found to detect and ease the real and recognisable trouble of this world (Gilligan, 1982).

Having looked at the scenario through both lenses, one can say that since both drivers are in very different situations, treating them the same would be unfair. The problem of driver 1, who is a good citizen, is serious and real, the circumstances of the situation are beyond control. The two situations are indeed so different that it may be questionable whether both drivers ought to be treated the same.

Both Gilligan and Kohlberg's theories depart from a self-centred view, in that Kohlberg's theory is from a male perspective which emphasises authority, and Gilligan's theory is from a female perspective which focuses on the importance of others. Both theories lead to a fundamental moral principle shaped by one's own ethics; yet, the moral principles reached are strikingly different. Kohlberg's principle of justice focuses on treating people objectively, whereas Gilligan's principle of care is more personal, as it concentrates on caring for others and minimising harm. Although both theories are

important, helping others and responding to their needs to minimise their suffering (Gilligan, 1982) touches the life of others more directly than respecting their rights.

Gilligan's findings also addressed the struggle of women against the traditional stereotyping governed by gender-moulded roles. According to the stages of Gilligan's ethics of care, women hold the key to their own independence; they can achieve it by transitioning to a different level of thinking, where they are able to reject the idea that women's role revolves around self-sacrifice for the wellbeing of others, and where there is a recognition that the principle of care should be applied to their own life as much as applying it to others. Kohlberg's stages do not reflect such struggle for men.

As both Gilligan's and Kohlberg's approaches are equally valuable theories, it would be logical to consider both when analysing ethical situations. However, in practice, attaining that balance could easily become a complicated matter. Baier (1985) stated that "[L]ike any other theory, it [moral theory] will need not ignore the partial truth of previous theories. So it must accommodate both the insights men have more easily than women, and those women have more easily than men" (p. 56). The best moral theory is summarised by Baier (1985) as the "cooperative product of women and men has to harmonize justice and care" (p. 46).

2.9 Ethical Decision Making Models

Ethical concern within organisations has been the focus of much literature (e.g. Stewart, Ledgerwood & May, 1996; Schulman, 1998; Cole, 1999). Researchers have addressed ethical concerns at the workplace through models that aim to better understand the

ethical decision making processes of individuals (e.g. Ferrell & Gresham, 1985; Trevino, 1986; Hunt & Vitell, 1986; Rest 1986; Bommer, Grato, Gravander & Tuttle, 1987; Jones 1991; Patankar & Taylor, 1999). These theoretical frameworks represent ethical decision making processes within organisations, and focus on moral evaluation that individuals use to make their ethical judgment. These models could therefore give an insight into the topic of ethical decision making in aviation.

2.9.1 Ferrell & Gresham's (1985) Contingency Framework for Understanding Ethical Decision Models in Marketing

Ferrell and Gresham (1985) proposed a Contingency Framework for Understanding Ethical Decision Making in marketing with an aim to “clarify and synthesise the multiple variables that explain how marketers make ethical/unethical decisions” (p. 87). According to Ferrell and Gresham, unethical situations are fairly common amongst marketers as the opportunity to deviate from ethical behaviour in marketing is defined by the “link [of] the task environment to the organization by defining consumer needs and satisfaction” (p. 88). This model could also apply to other industries, such as the aviation industry, where such unethical situations may also occur. For example, an airline poaching passengers by offering them rewards to cancel their booked flights with a competitor airline. Other examples could include airline companies advertising low fares that do not exist in order to attract passengers, and airlines not advertising hidden costs or fees that passengers may be subject to.

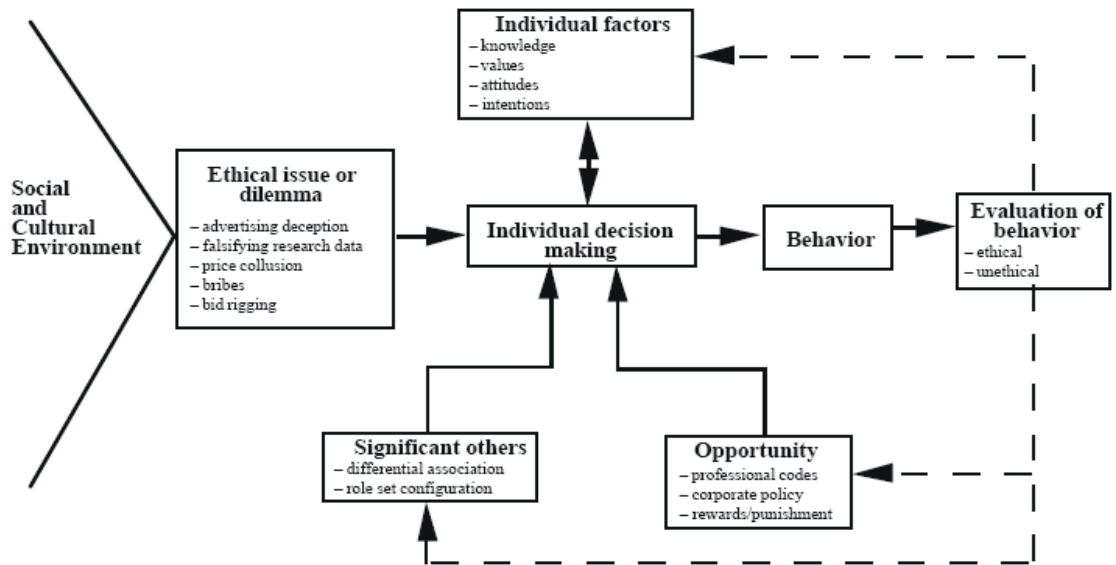


Figure 3. A Contingency Model of Ethical Decision Making in marketing organization (Ferrell & Gresham, 1985)

Ferrell and Gresham's model, as shown in Figure 3, included perception of the ethical problem as the first step of the ethical decision making process. This perception is related to the stages of cognitive moral development; that is, whether one perceives a situation as an ethical dilemma will depend on one's level of moral development. Ferrell and Gresham suggested that perception of an ethical dilemma leads to the evaluation of various options or alternatives, which produces an intention to pursue a course of action (the final stage of the model). As these several stages are perceived, each is influenced by individual factors (e.g. moral development), and organisational culture (e.g. opportunity and behaviour of significant others in the organisation).

Although Ferrell and Gresham (1985) proposed variables that are relevant to ethical decision making, the model treated ethical issues as a pre-determined set of issues, and ignored positive ethical decision making. As a result, human behaviour appeared to be

instrumentalised so that it complied with the ‘correct’ ethical standards. Ferrell and Gresham stated that developing pre-set ethical standards may help “understand more about individual factors related to beliefs, values, attitudes, or intentions” (p. 95), and that “logical decision rules for individual decision making also contributed to understanding individual factors” (p. 95). This suggests that the individual factors (knowledge, values, attitudes and intentions) are variables that are controlled by situations and contexts, hence emphasising the instrumentality of decision makers’ characteristics and bypassing their freedom of choice, all in service of the desired behaviour.

2.9.2 Rest’s (1986) Four-Component Model

While Kohlberg aimed at developing a model to represent ethical reasoning, Rest (1986) took Kohlberg’s work further and developed a four-component model to measure ethical reasoning. Rest’s model depicts the process used in ethical decision making and behaviour. The four-component model is summarised as Figure 4 shows.

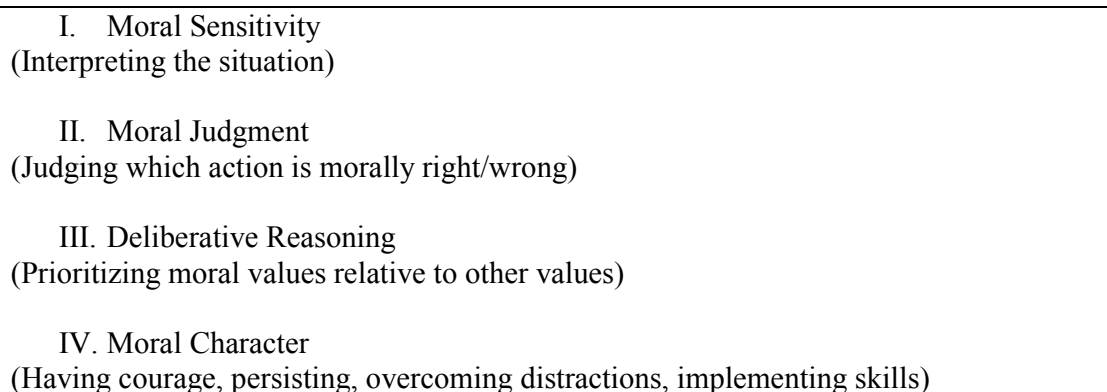


Figure 4. Four Psychological Components Determining Moral Behavior (Rest & Narvaez, 1994)

In component I, the person must be able to interpret particular situations in terms of what actions are possible, who would be affected by each course of action, and how the interested parties would regard such effects on their welfare (Rest, Bebeau, & Volker, 1986). However, studies have shown that identifying moral dilemmas is a hard task for many people (Staub, 1979). This has also been supported by Bebeau, Reifer, and Speidel (1981), who developed a moral sensitivity scoring system to measure individuals' ability to identify ethical dilemmas. The findings asserted differences in individuals' sensitivity to the welfare of others. The authors concluded that individuals scoring low on their moral sensitivity scoring system was an indication that these individuals focused primarily on technical problems rather than on the moral issue itself. The aviation industry may face similar problems insofar as in this highly technical industry, employees could focus on the technical aspects when evaluating ethical situations.

In component II, the person must be able to make a judgment about what action is morally right (or fair, just or morally good), as such, determining one possible action to take in that situation (Rest et al., 1986). Rest (1986) defined perspective reasoning as the consideration of what should be done to appropriately handle and ethical dilemma. Rest based component II on Kohlberg's cognitive stages of moral development, which assumed that individuals could only progress through the stages one stage at a time, one cannot get to a higher stage without passing through the stage immediately preceding it, hence the assumption that individuals of lower order ethical reasoning are unable to process higher order ethical reasoning (Rest, 1986). In the absence of ethics education, such as is the case in aviation curricula (Oderman, 2002), it may be challenging for aviation employees to morally judge an ethical situation.

In component III, deliberate reasoning was defined as what action will actually be taken to handle an ethical dilemma (Rest et al., 1986). In this component, the person must prioritise moral values to other personal values such that the person has an intention to do what is morally right (Rest et al., 1986).

Component IV entails execution of the moral plan. In this component, the person must have sufficient perseverance to be able to follow through on their moral intention (Rest et al., 1986). The moral evaluation process, leads to the establishment of the moral intention (Hunt & Vitell, 1986; Rest, 1986) and subsequently leads to moral behaviour (Ferrell & Grehsam, 1985; Trevino, 1986). Educating aviation employees in how to better handle ethical situations could therefore, increase the moral intentions of these employees and subsequently, their moral behaviour. The link between moral intentions and moral behaviour has also been reported in the current literature. For example, Weber and Gillespie (1998) found that intentions to report wrongdoing were associated with a high moral reasoning stage.

2.9.3 Trevino's (1986) Person-Situation Interactionist Model for Ethical Decision Making in Organizations

Based on Kohlberg's cognitive moral development model, Trevino (1986) proposed a Person-Situation Interactionist model (Figure 5) that incorporated individual and situational variables. It was posited that it is the interaction between the two components that explains decision making. The model begins with the perception of an ethical dilemma, to which the individual responds with cognitions. These cognitions interact with individual moderators (such as ego strength; field dependence; and locus of control) and with situational moderators (such as immediate job context; organisational culture; and characteristics of the work), before influencing the individual's ethical

or unethical behaviour. Trevino also suggested that situational moderators feedback and affect cognitions.

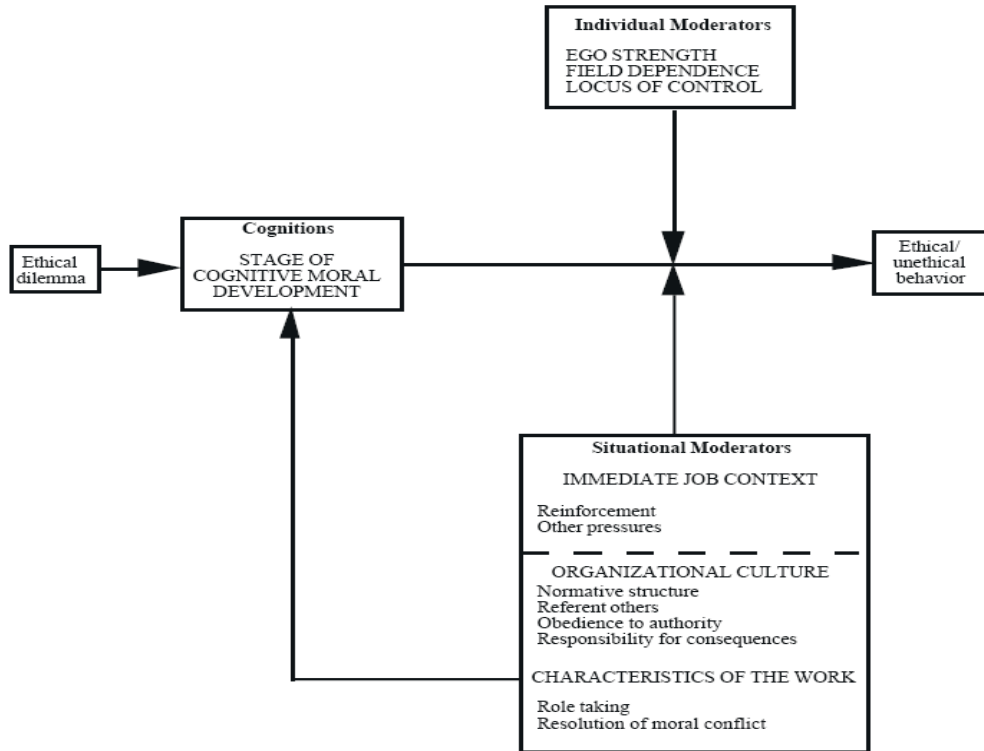


Figure 5. A Person-Situation Interactionist model (Trevino, 1986)

Trevino maintained that un/ethical behaviour is a result of the interaction between individuals’ characteristics and the situations they are in. Trevino’s model demonstrated that situational moderators influence cognitive moral development through immediate job context via organisational culture and the characteristics of the job itself.

Trevino (1986) defined organisational culture as “the common set of assumptions, values, and beliefs shared by organizational members” (p. 611) and suggested that “democratic” cultures may improve individuals’ cognitive moral development, while

“authoritarian” cultures may not. Trevino posited that organisational culture moderates the relationship between cognitions and behaviour in four ways: through normative structure, which represents an organisation’s collective norms about the correct behaviour; by identifying and proposing desirable referent others and changing behaviour of existing referent others; through obedience to authority, and through accepting responsibility for consequences.

Trevino stated that opportunities for role taking (i.e., taking into consideration the perspectives of others) and responsibility for resolution of moral conflict are two characteristics of the job that contribute to individuals’ cognitive moral development. For Trevino (1986) “individual behavior is a result of its consequences” (p. 613) which is influenced by pressures such as personal costs and time pressure. Trevino posited that the moral is to “provide a context that supports ethical behavior and discourages unethical behavior” (p. 614) if organisations are to expect moral behaviour from their employees.

According to Trevino (1986), “[m]oral judgments are prescriptive assessments of what is right or wrong...judgments of value, social judgments involving people, and prescriptive judgments of rights and duties” (p. 604). Trevino uses ‘ethical decision making’ and ‘moral judgment’ interchangeably, as opposed to two distinct components as it is proposed in the models by Ferrell and Gresham (1985), and Hunt and Vitell (1986). Furthermore, neither of these two components is a variable in Trevino’s model; instead, they are subsumed in the author’s proposed cognitions stage.

Although Trevino's Kohlbergian methodology intended to emphasise the link between cognitive moral development and ethical behaviour, Trevino does not explain what constitutes un/ethical behaviour. Trevino relies on the reader's own interpretation of immorality of actions and behaviours.

Trevino's Person-Situation Interactionist model contributes to the accentuation of the cognition stage in moral reasoning. However, Trevino relied on individuals' perception of moral dilemmas in order to operate, and seemed to address ethics from a psychological perspective, ignoring philosophical ethical issues. Ethics, according to the model, is a negative subject whose remedy is to comply with a set of rules and generally accepted standards of right and wrong (Bartlett, 2003).

2.9.4 Bommer, Grato, Gravander and Tuttle's (1987) Behavioural Model of Ethical and Unethical Decision Making

In an attempt to identify the causes influencing ethical and unethical decision making, Bommer, Grato, Gravander, and Tuttle (1987) constructed a model where the decision making process is influenced by the wide environment and the individual attributes.

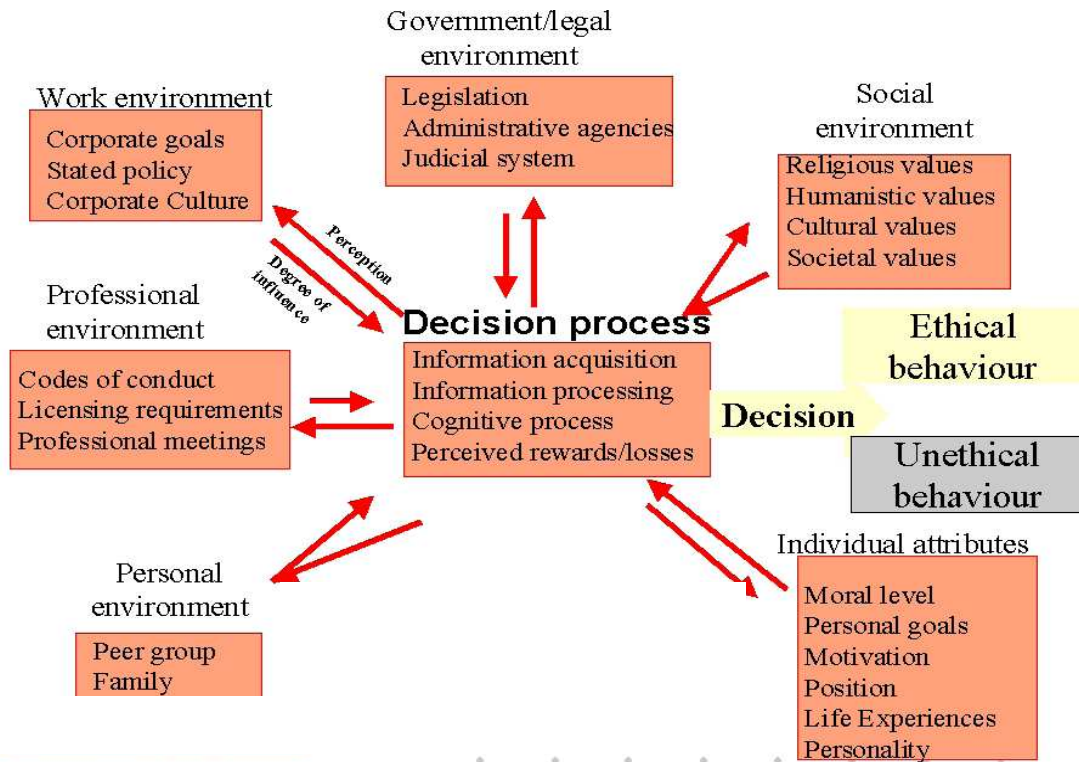


Figure 6. A Behavioural Model of Ethical/Unethical Decision Making (Bommer et al., 1987)

The model, as displayed in Figure 6, focuses on the environmental factors, such as individual, work, professional, political, legal and social that according to Bommer et al., affect the ethical decision making. The decision making process involves the decision makers’ “acquisition and processing of information within their system of values and cognitive limits” (Bommer et al., 1987, p. 274).

Bommer et al., posited that several factors in the work environment could influence a manager’s decision to act ethically or unethically, and observed that managerial behaviour is influenced by the company’s focus on short-term profitability goals. Bommer et al. stated that an efficiently stated policy of a company encouraged ethical behaviour and that managerial behaviour was also affected by corporate culture. However, the authors noted that laws must be enforced in order to be effective.

Managers, according to Bommer et al., adhere to social values only if those values are incorporated into their work environment. Clear and accurate communication as well as policies, the authors claim, effectively encourage ethical behaviour and reduce the frequency of unethical behaviour.

In a field with an established licensing procedure, individuals strongly identify themselves with that profession if they hold a licence. Bommer et al. (1987) stated that losing one's licence is a "powerful deterrent to unethical behaviour. Management however, the authors added, is not a licensed profession; hence this factor's implicit impact on managerial behaviour" (p. 270).

Moreover, Bommer et al. (1987) claimed that research on the family influence on ethical professional behaviour was under-investigated, current literature rather focus on the "influence of the professional life on the family" (p. 272). Furthermore, peer group pressure was regarded as a significant variable in predicting deviant behaviour among adolescents (Grasmick & Green, 1980), and may cause the group to make immoral decisions (Janis, 1972).

The model proposed by Bommer et al. (1987) may enhance our understanding of the ethical decision making process as it approached the decision making process from a different angle, by probing deeper into the environmental variables and bringing them together with the individual attributes to determine the ethicality of decisions. Similarly to other models (e.g. Jones's Issue Contingent Model), Bommer et al.'s model was influenced by Kohlberg's model of moral development, hence inheritance of its

normative values. As such, the decision maker is expected to know what a moral action is before applying it.

2.9.5 Jones's (1991) Issue Contingent Model

Jones's (1991) model, as displayed in Figure 7, employs Rest's (1986) four-component model of individual ethical decision-making: moral issue, moral judgment, moral intent and moral action. Jones (1991) observed that existing ethical-decision models failed to incorporate elements of the moral issue itself, hence introduced a set of variables referred to as 'moral intensity' with the purpose to "introduce concepts not present in prior models and to offer a model that supplements, but does not replace, other models" (p. 367). Jones (1991) focused on the moral issue as "an independent variable affecting all four stages of moral decision making and behaviour" (p. 371), rendering his model 'issue contingent'. Jones explained that "specifically, ethical decision making is issue contingent; that is, characteristics of the moral issue itself, collectively called moral intensity "are important determinants of ethical decision making and behaviour" (p. 371).

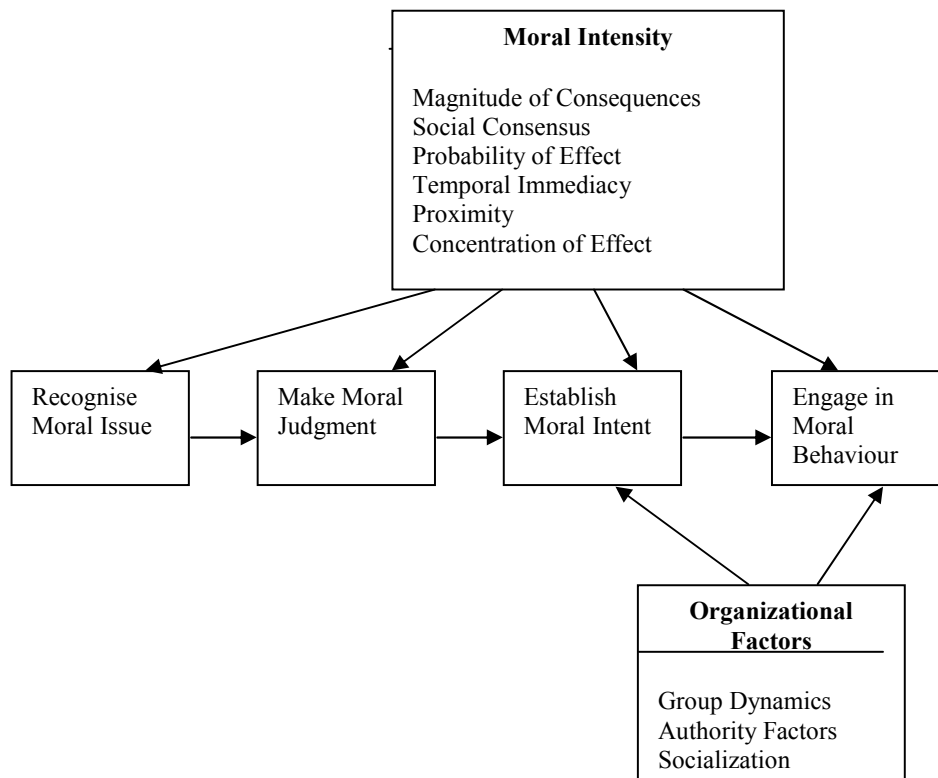


Figure 7. Issue Contingent Model of Ethical Decision Making in Organizations (Jones, 1991)

Jones (1991) proposed that “issues of high moral intensity will elicit more sophisticated moral reasoning [higher levels of cognitive moral development] than will issues of low moral intensity” (p. 381). Jones (1991) suggested that a person’s intention to perform a behaviour, is a strong predictor of the person’s behaviour. Jones also pointed to the role of moral intensity in establishing moral intent, and proposed that “moral intent will be established more frequently where issues of high moral intensity are involved than where issues of low moral intensity are involved” (p. 381). Moreover, it was proposed that moral behaviour will be affected by the ‘proximity’ component of the moral intensity. Jones stated that people will be more willing to help those in closer ‘proximity’, in that “ethical behavior will be observed more frequently where issues of

high moral intensity are involved than where issues of low intensity are involved” (Jones, 1991, p. 381).

In sum, Jones’s Issue-Contingent model tackled the ‘moral issue’ that Rest’s (1986) four-component model fails to address. Jones’s model may increase our understanding of ethical decision making but nevertheless made no attempt to indicate what is meant by an ‘ethical decision’. Similarly to Bommer et al.’s model, Jones used Kohlberg’s values and as a result, the decision maker is expected to know what a moral decision is before applying it. Moreover, Jones did not address neither how individuals develop a capacity to deal with morally high issues, nor the relationship between high and low moral issues.

2.9.6 Patankar and Taylor’s (2005) Concept Alignment Process for Decision Making Under Varying Levels of Uncertainty in Aviation Maintenance

The Concept Alignment Process (CAP), as shown in Figure 8, is a communication process that can be used to resolve inconsistencies in knowledge among different parties. According to this process, a concept is an “idea, a remark, or an observation that is stated by one person and is either affirmed, or challenged by a co-worker” (Patankar & Taylor, 2005, p. 14). The CAP follows steps to minimise the reoccurrence of differences between different parties where all parties have to present their concepts. If a difference between the concepts is stated, parties must validate their concepts from a third party source. If none of the concepts can be validated, the most conservative concept is executed, and if multiple concepts can be validated, the senior ranking person has the authority to choose any one of the valid concepts. Moreover, when multiple

concepts are stated, whether valid or not, the parties are required to investigate the rationale of multiple concepts (Taylor & Patankar, 2000).

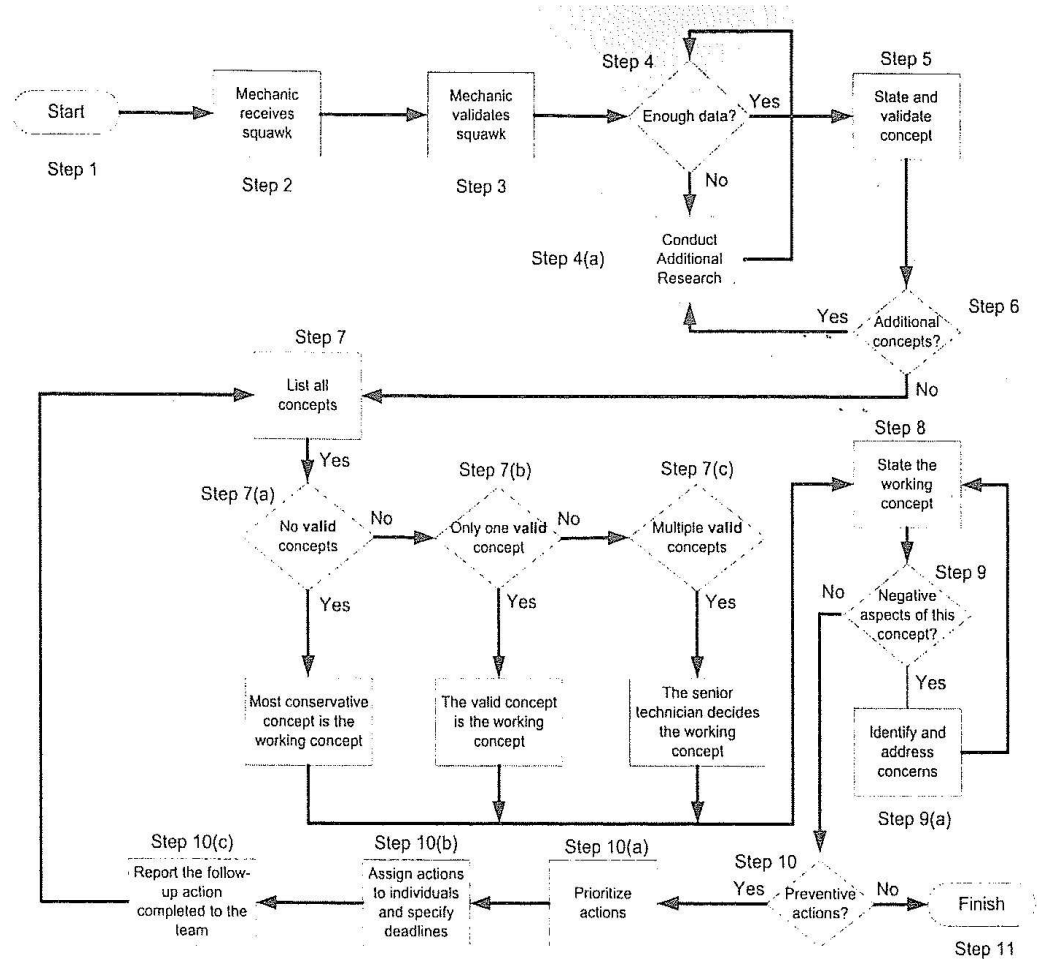


Figure 8. The Concept Alignment Process (Patankar & Taylor, 2005)

Validation of the concepts through the CAP, as displayed on Figure 8, goes through the following 10 steps (Patankar & Taylor, 2005):

- Step 1: the pilot writes an action item in the logbook for maintenance
- Step 2: the mechanic receives the action item
- Step 3: the mechanic validates the action item

Step 4: the mechanic analyses background information and operating conditions

Step 4 (a): the mechanic analyses further information

Step 5: the mechanic states and validates concept (s)

Step 6: parties state additional concepts

Step 7: list all concepts and validate

Step 7 (a) no valid concepts: most conservative concept executed

Step 7 (b) one valid concept: the valid concept is the working concept

Step 7 (c) multiple valid concepts: third party decides working concept

Step 8: select and state the working concept

Step 9: determine negative aspect of the working concept

Step 9(a): address concept weaknesses and deficiencies

Step 10: determine preventative actions

Step 10 (a): priorities preventative actions

Step 10 (b): assign preventative actions to individuals and specify deadlines

Step 10 (c): report follow-up action completed to parties

Taylor and Patankar (2001) argued that the CAP provides several benefits to the aviation maintenance environment. The CAP shows transparency of the decision making process which allows all involved parties to collaborate and achieve effective resolution of issues in a conflict-free environment. The application of the CAP in real life situations has, according to Taylor and Patankar (2001), “worked as an outstanding strategy to unify and strengthen the organizational culture” (p. 26). A survey of members of a large corporate aviation, where flight crew and maintenance members were trained to use the CAP as a mandatory communication and decision making protocol, reported positive effects on aviation employees’ behaviour and attitude

towards safety and towards the use of the process. Management of the corporate aviation organisation required all their flights and maintenance crew members, as well as management, to base their decision on the CAP. As a result, the organisation was able to raise its performance standards at an individual as well as organisational level (Taylor & Patankar, 2001).

According to Taylor and Patankar (2001), consistent use of the CAP could help “employees gain confidence and build safety as a shared value ...Such an approach shows strong potential for long-term changes in the aviation safety culture” (p. 21). However, a number of assumptions made by Taylor and Patankar may be challenged. First, the safety culture of the corporate aviation organisation prior to the survey underpinning their statement was unknown, making it hard to determine the extent to which the CAP has had an effect on the performance of the employees, and on the organisation’s safety culture as reported. Second, since employees were required to practise the CAP and were rewarded and penalised based on their ability to follow the process, it would seem that no choice was left to these employees but to abide by rules (for example, out of fear of punishment); as such, it could be argued that the CAP could have resulted in employees’ regression to Kohlberg’s level 1 of moral development. This seems to contradict the objectives of any ethics-centred model of promoting ethical decision making by creating opportunities for individuals to reach higher moral development levels. Third, the authors’ approach appeared to bypass employees’ freedom of will, since employees were required to practise the CAP as opposed to being offered the choice to do so, it remains debatable whether the same statement would hold true should the CAP have been a voluntary process. Fourth, the CAP is rather a reactive process as it relies heavily on a person initiating the process; in other words, without

being triggered by a person, the model may not be a useful tool to use in the decision making process. Fifth, where none of the concepts can be validated, it is suggested through the CAP to execute the most conservative concept. However, it is unclear what was meant by 'conservative' and unclear what criteria are used in selecting the conservative concept; in such case, it is debatable whether regardless of the effect of the CAP outcomes on employees, the latter would "really gain confidence and build safety as a shared value regardless of the resulting recommendations" (p. 22). Sixth, although the CAP claimed to encourage involvement of all parties in the decision making process, where multiple concepts can be validated, the decision making process seems to become singular; in that it becomes the responsibility of the "senior ranking person" (p. 19) to choose any of the validated concepts. The judgment phase of the CAP could be seen as a territory of senior management only. Finally, questions could be raised about the validity of the CAP in high pressure environments. It is questionable whether the process of validation of concepts that make unique contributions to the CAP would have been practical in highly demanding and political situations requiring quick decision making such as was the case prior to the Space Shuttle Challenger accident.

2.9.7 Summary

Although the reviewed ethical decision-making models add to our understanding of ethical and unethical decision making, they are nevertheless subject to criticism. First, the models reviewed in this thesis did not provide clear understanding of what constitute morally right or morally wrong behaviours. It seemed that the decision maker is expected to know the moral component of a decision before applying it. Second, the models were prescriptive in a way that they showed decision makers how to avoid

wrong behaviour, rather than helping them determine the right behaviour or what must be done in ethical situations. Third, the models did not address outcomes and their effects on decision making, and did not seem to be flexible in terms of giving decision makers the right to apply morally alternative decisions.

Herndon (1996) asserted that the goals of ethics have a direct association with ethical decision making models, in particular, with Ferrell et al.'s (1989) Synthesis of Ethical Decision Models for marketing. Herndon (1996) believed that the latter provides a "more unified theoretical/empirical base" (p. 501). As such, Herndon believed that the objectives of ethics should be rooted in the subject of ethical decision making models which has been "shown to be influential in ethical decision making" (p. 501).

2.10 Educating Ethics

While ethical decision making frameworks may have focused on different aspects of decision making, they nevertheless share some commonalities. For example, they have been developed to analyse the ethical issues and establish the ethical process of decision making. These common features in principle, may offer practitioners some guidance towards resolving ethical dilemmas and adopting an ethical conduct. However, a fundamental question remains regarding how ethical conduct can be improved?

Hegel (2001) stated that education is "the art of making men ethical" (p. 136) and explained that ethical education begins from a very young age. It shows pupils the way to change their instinctive nature into an intellectual nature and makes this intellectual

level habitual to them. That is, Hegel was more concerned with how to encourage individuals to do the ‘right thing’.

Callahan (1980) stated that the goals of ethics education include “stimulating the moral imagination, developing the ability to recognize ethical issues, eliciting a sense of moral obligation, developing analytical skills, and promoting a tolerance of ambiguity and disagreement” (p. 501). In addition, Kohlberg (1984) posited that education is also a way of promoting moral development and a way of endorsing the importance of the subject of ethics.

Indeed, Rhode (1995) stated “Faculty who decline, explicitly or implicitly, to address ethical issues encourage future practitioners to do the same” (p. 6). Rest’s (1986) Defining Issues Test, through which moral intervention programs were analysed, indicated that older subjects (i.e., graduate and professional school subjects rather than junior high school subjects) were “especially receptive to moral education programs designed to foster moral judgment development” (Rest & Narvaez, 1994, p. 20). As such, it was posited that “in contrast to the view that college or professional school is too late to attempt moral education, the evidence shows that such educational programs are not at all too late” (Rest & Narvaez, 1994, p. 20).

In the aviation industry, both Oderman (2002) and Patankar, Brown, and Treadwell (2005) investigated the subject of ethics and reported that there is a lack of ethics courses in aviation curricula in accredited American universities (the extent to which these findings would apply to non-American universities is, of course, unknown). Oderman (2002) conducted a three-part study to examine the need and status of ethics

education in university aviation management programmes taught at American universities. Oderman's findings supported the initial assumption that little is done to include the subject of ethics in aviation programme. Findings also demonstrated that faculty members had strong interest in including and teaching ethics as part of their curriculum.

Patankar (2005) also investigated whether ethics is taught in aviation programmes in the United States. Consistent with Oderman's findings, it was found that no efforts appeared to have been made to include ethics education in aviation programmes. Indeed, review of curricular options indicated that the subject of ethics was generally not a requirement, although it was offered as an elective course in most aviation curricula. However, no information regarding the rate of choosing this elective paper was provided.

Additionally, Patankar raised the issue of offering the subject of ethics for aviation programmes at universities through non-aviation departments. Patankar argued that these 'external' departments offer ethics from different perspectives; instead, the focus should be aviation-centred. Ethics courses in aviation programmes, Patankar (2005) stated, should be "specific to the aviation field, where specific ethical challenges could be addressed" (p. 58). Patankar et al. (2005) maintained that for aviation educators to increase and maintain students' interest and application of ethical decision making, the subject needs to be incorporated into the regular technical courses and "aviation educators need to act as role models in the field to gain trust, respect and have a positive influence on their students" (p. 61).

2.11 Research Problem

The literature review of this thesis points to the existence of a research problem; that is, not all of the available information about safety concerns, incidents, accidents and wrongdoing in general, is communicated in a manner whereby it can be used to make proactive safety improvements. Specifically, there is evidence that some of those who gain access to information which could be used to proactively improve aviation safety, fail to forward such information to aviation regulators, or those in a similar position to do something about it.

In a controlled environment such as aviation, authorities need to be aware of any actions that may endanger the safety of individuals. Although the regulatory authority of New Zealand sends a clear message to the aviation community about the importance of reporting accidents and incidents: “If you don't report your accidents and incidents, you are breaking the law, but more importantly, you are letting down all the other pilots, engineers, aircraft owners and passengers who rely on you to do your bit” (CAA NZ, 2006b, p. 3), there is evidence that the aviation industry has not fully succeeded in promoting reporting as a monitoring tool of safety standards.

For safety concerns to be used in a proactive manner for improving aviation safety, they have to be first reported. The aim of this thesis is therefore to identify factors that may influence the likelihood that individuals report concerns about aviation safety, and to whom they would make such reports.

2.12 Research Questions

A series of research questions were developed in order to understand the context in which the research problem occurs, and to examine how it can be managed.

2.12.1 Development of Research Question 1

According to the New Zealand Civil Aviation Act 1990, aviation employees are required to report all aviation accidents and incidents they have been involved in, or have witnessed, to the regulatory authority (CAA NZ, 2006c). However, it is believed that not all accidents and incidents are reported. Indeed, NZALPA (2005) estimated that up to 80% of incidents are not reported. Misunderstanding about how to report wrongdoing or concerns regarding unsafe practices may be one of the reasons why aviation professionals do not always report their concerns to the regulatory authority.

In the highly regulated aviation environment, safety is dependent upon self-regulation as well as policing the actions of aviation employees. Consequently monitoring, recording, investigating and aggregating data about all accidents and incidents is critical to determine how to reduce similar occurrences in the future. Although accidents and incidents should be reported once they have occurred, there is little guidance on reporting safety concerns (e.g., wrongdoing or concerns about one's colleagues) before they become accidents or incidents. There is also little evidence of how many concerns simply go unreported.

A substantial body of evidence suggests that reporting principles could contribute to improving public safety if diligently applied within organisations. However, aviation accidents like that involving Air Adventures in New Zealand, resulting in the deaths of 8 people, suggested that the principles of reporting have not been embraced by the aviation community. Investigating a real life under-reporting case study could uncover further characteristics of reporting that make it vulnerable to resistance and difficult to market as a monitoring tool of ethical standards within the aviation industry. Thus, the first research question is posited as follows:

Research Question 1: How could accidents such as that of Air Adventures have happened? Were there antecedents to the Air Adventures accident that could potentially have led to the regulatory authority not having information that could have been used to possibly avert the accident?

2.12.2 Development of Research Question 2

Potential reporters may face a dilemma as they decide whether to report concerns. These dilemmas revolve around dealing with conflicting loyalties, obligations and values none of which are right or wrong (Dehn, 1999). For example, there is the conflict between the right to privacy and the right to know; employer and colleagues' loyalty vis à vis the good citizen's duty to uphold the law; and the conflict between individualism and being a team player (Camerer, 2001). Set against these obligations is the fear of being disloyal and losing the trust of the employer and colleagues, the fear of being wrong, and the fear of accepting responsibility for one's actions and their resulting consequences (Dehn, 1999).

Dehn and Calland (2004) stated that reporters of wrongdoing are often highly competent and professional individuals with a strong commitment to moral or ethical principles and personal integrity. According to Clarke (1999), reporters of wrongdoing are concerned citizens who may act out of concern for the public good. However, Dehn and Calland (2004) stated that it is often impossible to distinguish between the true and driving motive of the reporter. Thus, as much as some reporters act out of public good, other reporters may well be less purely-motivated individuals who report for revenge, profit or other motives.

The current literature suggested that an employee could deal with the perceived wrongdoing by ignoring, acquiescing, participating, objecting or walking away (Feldman, 1999); by retrieving to silence, internal disclosure, external disclosure or leaking the information anonymously (Dehn & Calland, 2004); or by trying to change the situation, mentally isolating oneself or resigning (Skopinker, 2004). Thus, a second research question is formulated as follows:

Research Question 2: What actions will participants take when they have concerns about safety within their aviation workplace? Specifically, will participants report their concerns to senior management or to the regulatory authority, would they talk to the person involved in the questionable practices, or would they do nothing?

2.12.3 Development of Research Question 3

The moral reasoning literature suggested that higher levels of moral reasoning may be linked to reporting of wrongdoing (Brabeck, 1984; Rushton, 1984). Specifically, it

suggested that moral perceptions of wrongdoing influenced individuals' ethical decision making (Kohlberg, 1984), including their decision to report wrongdoing (Trevino, 1986). An action that is perceived as morally wrong is more likely to be reported than an action that is not perceived as morally wrong (Trevino, 1986).

Moral development theories (Kohlberg, 1976; Gilligan, 1982) posited that individuals advance along a stage-sequence continuum in their moral development, whereby an individual at a higher level of moral development may be more likely to act ethically compared to an individual at lower level of moral development. As such, a relationship between reporting intentions and moral development may exist. This suggests that on becoming aware of aviation wrongdoing, individuals who are at a higher level of moral development may be more likely to intervene in a wrongdoing situation. Thus, a third research question is posited as follows:

Research Question 3: Is there a relationship between individuals' level of moral development and their intentions to report wrongdoing?

2.12.4 Development of Research Question 4

The literature has also shown that the relationship between the individual observing wrongdoing and the individual committing wrongdoing is a strong factor that may influence the intentions of the former to report the observed wrongdoing (Hamilton, 1993; Burnstein, Crandall, & Kitayama, 1994; Kruger, 2001). The literature suggested that individuals favoured relatives over non-relatives when deciding whom to help, and that cooperation between unrelated individuals increased when there had been a

previous, sustained, history of caring (Roberts & Sherratt, 1998). This suggests that individuals' intentions to intervene in a wrongdoing situation may differ according to the level to which they are related to the person responsible for wrongdoing. Moreover, studies in gender differences in ethical reasoning have reported disparities in the way women and men analyse ethical issues (e.g. Beltramini, Peterson, & Kozmetsky, 1984; Miesing & Preble, 1985; Jones & Gautschi, 1988; Ameen, Guffey, & McMillan, 1996). In general, women were believed to be more morally developed than men (Shaub, 1994; Sweeney, 1995; Sweeney & Roberts, 1997). Thus, a fourth research question is formulated:

Research Question 4: Is there a relationship between individuals' intentions to report wrongdoing and the level of their relatedness to the wrongdoer? And is this relationship likely to be influenced by the gender of the observer?

2.12.5 Development of Research Question 5

Like any other individuals, pilots are affected by life changes; they are also affected by stressors that are unique to aviation activities such as interaction with complex aircraft, frequent family separation, adverse weather, etc. The U.S. naval flight surgeon's manual (The United States Army School of Aviation Medicine, 2004) explained that the student pilot's responsibility of solo flight and the student-instructor relationship during the training period could initiate symptoms such as airsickness, anxiety and depression, all of which are common among flight students. For a professional pilot, the manual stated that one has to look beyond aviation to search for clues to the pilot's discomfort, in the professional years; a pilot could experience anxiety and phobias such as the fear

of flying. According to the manual, the thrill of flying declines through the years; a senior pilot then becomes more aware of the limitations of the aircraft, of risks and of their own family responsibilities, resulting in a more realistic and conscious anxiety, depression and substance abuse.

Pilots undergo compulsory health routine checks every 12 months (or 6 months for pilots over the age of 40) (CAA NZ, 1990). These routine checks are an opportunity to assess the health of pilots; however, it has been suggested that such routine checks may not always include psychological assessments. In general, medical assessments are more concerned with the physical assessment of the pilot. Although most airlines include psychological testing in the initial pilot selection process, only a minority of them include it on their routine medical checks, yet, it is but a short questionnaire that could be easily deflected by pilots. Responsibility for detecting and disclosing psychological symptoms may, at times, fall upon peers and families of affected pilots, as revealed after accidents such as those of Air Adventures and Japan Airlines.

In the aftermath of the investigations of the Air Adventures and Japan Airlines accidents, it was reported that concerns about the pilots' attitudes towards safety were raised since well before the tragedies, yet no efforts were made to assess the psychological wellbeing of the pilots. For example, it was not until the accident has occurred that the Japan Airlines' captain was put into a psychiatric institution. Similarly, in the aftermath of the Air Adventures accident, the authority claimed that information about the pilot's 'erratic behaviour' could have obligated them to review the pilot's performance: "Had we known what we know now, we would have put this operator under much more intense scrutiny" (CAA NZ, 2006a). What these examples

show is that for an untrained person, spotting symptoms underlying psychological disorders is not an easy task. According to Simms and Halfon (1994), these unobvious health problems might remain undetected and therefore neglected in terms of care and treatment. Thus, a fifth research question is formulated as follows:

Research Question 5: What actions would members of the New Zealand aviation community take on discovering symptoms of stress they believed could affect aviation safety?

2.12.6 Development of Research Question 6

There are at least two reasons why safety concerns may go unreported in aviation. First, there may be a lack of clear guidelines about how to report safety concerns. In addition, there may be a low level of knowledge of, or trust in, legislations protecting reporters against organisational retaliation. For example, despite Pacific Blue's claim of a culture encouraging open reporting of minor incidents (The Press, 2007), a pilot fearing his career would be over if he identified himself, anonymously raised concerns about the rapid expansion of the airline and its inability to maintain standards: "We haven't gone to the CAA because we know if we do, within an hour it will be back to Pacific Blue and our careers will be over" and that "anyone going to the CAA would be seen as a traitor to the airline". It is, however, reassuring that the pilot's safety concerns seemed to precede any other matter, as he also stated "I'm prepared to do that. I think it's important for things to be said" (The Press, 2007). Second, there is an aphorism not to report on one's friends, colleagues or generally, which may be difficult to overcome even when so doing, could cumulatively improve aviation safety by making aggregated

information available to act upon. Given the lack of clear guidelines on reporting concerns, those who do report their concerns may become known as reporters rather than people simply complying with the general meaning of reporting legislation. Thus, a sixth research question is posited as follows:

Research Question 6: What appear to be the key factors affecting aviation employees' decision making process, and to what extent do they have an effect on individuals' evaluation of wrongdoing and reporting intentions?

2.13 Methodological Assumptions

The research problem and the associated research questions could be investigated within the guiding framework of either the positivist or interpretivist research paradigms using either quantitative or qualitative methodology, respectively. For example, either positivist methods (e.g., questionnaires or experiments) or interpretivist methods (e.g., ethnography or case-study) could be used to investigate the research problem and provide answers to the research questions.

As the aim of this thesis is to investigate objective factors that affect people's propensity to report safety concerns that can in principle be generalised beyond the samples under test, it is argued that the aims of this thesis are better aligned with the methodological assumptions of the positivist paradigm and quantitative methodology (Collis & Hussey, 2009). However, as the aim of study 1 was essentially to generate ideas for further research using quantitative methodology, it would be guided by the assumptions of interpretivism and would use case-study method.

The methods used to explore each of the research questions will be described in each of the corresponding studies.

CHAPTER THREE

Study 1

The Air Adventures Crash: Speculation on the Possible Antecedents

3.1 Chapter Overview

Despite increasing regulation and legislation, the aviation industry is still striving to control the rate of under-reporting. In this context, blowing the whistle on wrongdoing may be seen as the precursor capable of tipping the scales to the side of control (Nader, Petkas, & Blackwell, 1972), as those who report concern have early access to information about wrongdoing, and have the ability to get that information to those who can correct the wrongdoing behaviour (Callahan & Dworkin, 1992). Indeed, in the case of the Air Adventures New Zealand Limited (Air Adventures) accident, it was reported that only after the fatal crash did witnesses come forward with information about the behaviour of the pilot in command. This information, according to the CAA NZ, would have made the authority to act in a way to ensure that the pilot was not in a position to make bad decisions: “Had we known what we know now, we would have put this operator under much more intense scrutiny” because “without hard evidence of wrongdoing, nothing more could be done” (CAA NZ, 2006a).

In this case study, analysis of the Air Adventures accident of June 6, 2003 is presented as a case study of under-reporting of wrongdoing in aviation. Evidence from the crash,

involving a Piper Chieftain on a night flight carrying nine Food and Crop executives from Palmerston North to Christchurch, showed that more could have been done to prevent such tragedy from happening if concerns had been communicated and dealt with according to aviation safety regulations.

The aim of this case study was to identify potential problems observed in the case of the Air Adventures accident, and link these problems to research topics in the field of reporting and aviation safety. Specific aspects that might have been applied in order to minimise some of the observed problems that led to the tragedy of June 6, 2003 are highlighted.

3.2 Methodology

3.2.1 Materials

The secondary data for this case study were drawn from the Aviation Occurrence Report of the Transport Accident Investigation Commission New Zealand (TAIC) (2004) and the Coroner's Report (CAA NZ, 2006d). It is assumed that such reports provided an accurate source of information and detailed account of the events surrounding the occurrence of the Air Adventures accident.

3.2.2 Procedure

The history of the flight is first described, and then sections that were believed to illustrate the more significant events that determined the occurrence of the accident are

noted. Each excerpt is then analysed and discussed. A total of seven excerpts were included, which, for the study reported here, are classified into the following four categories: i) Medical information; ii) Risk taking behaviour of pilot; iii) Incident record of pilot; and iv) Culture at Air Adventures.

3.3 History of the Flight and Air Adventures

Air Adventures began operations in 1994, and was based in Christchurch, New Zealand, of which Michael Bannerman was a co-owner, and initially operated a 6-seat single engine aircraft which Bannerman used for scenic flights around the South Island of New Zealand. In 1998, Air Adventures purchased another Christchurch company which operated twin engine aircraft that Bannerman started flying in 1999 on Visual Flight Rules (VFR) charter flights. A twin-engine type aircraft, Piper Navajo PA31, was acquired in May 2000 which Bannerman flew on VFR scenic flights as one of two pilots until September 2001 when he qualified to fly the twin-engine aircraft as a single pilot on Instrument Flight Rules (IFR) flights. In October 2002, Air Adventures phased out its single-engine aircraft operations, and thereafter, Bannerman flew the PA31 on a mixture of IFR and VFR operations.

The aircraft that was involved in the accident, a Piper PA31-350 Navajo Chieftain, with registration ZK-NCA, was chartered from Air Adventures by an agricultural research company to fly a group of senior staff from Christchurch to Palmerston North and return on Friday 6 June 2003. The flight to Palmerston North departed from Christchurch Aerodrome and proceeded without incident.

The flight back to Christchurch was planned to depart at 17:30. The pilot in command, Michael Bannerman, reportedly gave passengers a routine passenger briefing, which included advising them that they could use their mobile phones and computers during the flight. At 17:34, just after the end of daylight, the pilot obtained clearance for a flight route to Christchurch via Foxton, Paraparaumu North, and Tory. The flight proceeded normally until the aircraft crossed the coast north of Christchurch, where low clouds were obscuring Christchurch and Christchurch Aerodrome, at which point the pilot disengaged the auto-pilot and started to hand-fly the aircraft. Christchurch Control advised the pilot that Christchurch Special Aerodrome Report reported visibility at 500m, scattered cloud at 200 feet and overcast at 700 feet. The aircraft was cleared for an instrument landing system (ILS) approach, and a descent to 2000 feet. Christchurch Control requested the aircraft to reduce ground speed from 202 knots to less than 175 knots, and to contact Christchurch Tower. The pilot reported to Christchurch Tower that the aircraft was established on the ILS, at that time, the aircraft was 7 nautical miles (nm) from the runway threshold at 2100 feet. Christchurch Tower asked a Boeing 737 that landed before the Piper Chieftain to roll ahead, Christchurch Control then cleared Bannerman to land. The aircraft was 2.5 nm from the runway threshold and descending through 600 feet. No further transmissions were heard from the pilot. The last Air Traffic Control radar return recorded the aircraft descending through 200 feet and 1.2 nm from the threshold (TAIC, 2004).

When all further attempts to contact the aircraft failed, it was then reported as missing on final approach. Aircraft crash emergency response was then initiated and a search for the aircraft was conducted by the Fire and Police Services. Due to the general area being sparsely populated farmland with limited road access and no illumination, it was

deemed unsuitable for a helicopter search. Ground visibility was poor due to fog, darkness, and unavailability of additional position guidance such as witnesses or an emergency locator beacon signal. The aircraft wreckage was found at 21:24 with 2 survivors and 8 fatalities including the pilot. One survivor was seated in the co-pilot seat, and the second survivor was seated behind the first survivor (TAIC, 2004).

At the time of the accident, the pilot in command, 52 year old Michael Bannerman, was the chief executive, director of operations, chief pilot and instructor of Air Adventures, with 4325 hours total flying experience and 820 hours on the PA31 type aircraft. Michael Bannerman had 151 hours instrument flying and 24 hours night flying experience.

3.4 Excerpts and Discussion

3.4.1 Medical Information

Excerpt 1

Dr Dougal Watson, the principal medical officer for the CAA confirmed that the CAA allows pilots to self-prescribe corrective lenses for near-vision problems by buying off-the-shelf reading glasses from the local drugstore. Michael Bannerman has been diagnosed with near-vision problems and, after picking up a pair of glasses, passed a flight test. The families said that not only was the regulation flawed, its implementation was also suspect. Bannerman demonstrated he could meet the standards' on the test flight, which was done in daylight. The Piper Chieftain he was flying crashed [1.2

miles]⁵ short of the runway at Christchurch during a night flight. The glasses have never been found and investigations can't say for sure that Bannerman was wearing them (Niles, 2004).

3.4.1.1 Analysis and Discussion

The requirement of wearing half-spectacles was endorsed on the pilot's medical certificate routine check, which resulted in the pilot self-prescribing glasses. The pilot's action of buying glasses over the counter was not contrary to aviation law (as described above). Excerpt 1 suggests that family were likely to have been aware of the pilot's decision to self-prescribe glasses to correct his vision, but it was not until after the accident that they questioned the regulations permitting pilots to self-prescribe corrective lenses. A possible explanation as to why the pilot's family questioned the regulations after the event, is that prior to the event, the family were not aware of potential threats to safety. What this therefore suggests, is that at least after the event, people appear to be wise about safety. An ideal situation would be where people are aware of what might affect safety before an event, and that would lead to reporting of safety concerns, which may therefore create an opportunity to avert, or at least, minimise the rate of safety incidents.

As the pilot's medical certificate was due for renewal on 22 June 2003, just a few days after the accident, there was no evidence as to how the self-prescribed glasses may have stabilised the pilot's near-vision issue, or whether the pilot's vision had deteriorated. Two possible reasons could explain why Bannerman has not reported issues with his

⁵The distance stated in this Article was corrected from 1.6 miles to 1.2 miles in line with the actual accident reports

vision throughout the year where he used the self-prescribed glasses. First, the self-prescribed glasses could have stabilised Bannerman's vision. Second, Bannerman may have been aware that his vision was deteriorating, but factors such as fear of losing his medical certificate, fear of being grounded, time constraints due to his responsibilities at Air Adventures, as well as his attitude towards safety, could have prevented the pilot from self-reporting his vision problems. Indeed, self-medicating is believed to be a popular phenomenon among pilots (Antolick, 1994). Responses to a survey conducted to determine pilots' stance on medical treatments showed that a significant number of pilots would rather self-medicate than seek medical assistance for fear of losing their medical certificates (Cubbin, 2000). If the regulations allow self-medication for certain health problems (i.e. glasses), then this could encourage pilots who are reticent to seek medical treatment to deal with other health issues that could well be more serious than Bannerman's vision problem.

Analysis of Excerpt 1 suggests that a lack of awareness of issues that may affect aviation safety, and a lack of knowledge of what needs to be reported, or at least questioned in order to maintain aviation safety, are factors that may influence individuals' perceptions of problems in aviation and affect the likelihood of communicating safety concerns.

3.4.2 Risk Taking Behaviour of Pilot

Excerpt 2

[The] coroner this week found the crash was preventable and that Mr Bannerman's decision to fly in marginal weather conditions was always going to test the outer limits of competency (Pierard, 2006).

Excerpt 3

The sole pilot Mr Bannerman called home minutes before landing – an action which could have caused electronic interference and distracted the pilot at a vital time (TAIC, 2004).

Excerpt 4

Dr Newton drove back to Christchurch and refused to fly with Mr Bannerman again. After the Crop & Food tragedy, she told police Mr Bannerman was "an accident waiting to happen". Dr Newton did not report her concerns to the Civil Aviation Authority (New Zealand Herald, 2004).

3.4.2.1 Analysis and Discussion

Before departure from Palmerston North, the weather forecast indicated that conditions at Christchurch were temporarily below minima for an ILS approach. The pilot amended his navigation plan identifying an alternate aerodrome with suitable weather, and proceeded with the flight. According to one of the survivors, thick fog could be seen just before the airport but there was no recollection of flying into fog (TAIC, 2004).

The poor visibility at the time of final approach to land prevented the pilot from making visual contact with the runway, despite the regulation stating that “on instrument approach, the aircraft’s descent must be stopped at the minimum altitude (MDA) unless the pilot can continue visually. However, the pilot did not stop at the minimum altitude as regulations state, but rather continued descending. It would be normal practice for a pilot to advise air traffic control if flying an approach differing from the one that has been cleared by air traffic control, but Bannerman was not believed to have done so. In the prevailing weather conditions, it was believed that the approach the pilot was taking probably would not have been successful because of the higher MDA, and a missed approach would have been required (TAIC, 2004).

There were a number of factors that could have contributed to the pilot’s risk-taking behaviour: the pilot may not have had a choice but to juggle multiple responsibilities and undertake multiple roles due to financial pressures Air Adventures was facing around the time of the accident (the pilot was believed to be the chief executive, director of operations, chief pilot and instructor at Air Adventures). As such, in addition to common challenges of the pilot profession, the pilot has had to deal with additional stresses resulting from the increased workload and multiple responsibilities. According to Stokes and Kites (1994), organisational factors and adverse management situations can be some of the most potent stressors and threats to the safety of flight. The authors stated that regardless of any mystique concerning pilots’ fearless coolness, rationality and courage, they are no more a society of Spocks or Stepford Wives than are, for instance, nurses or lawyers.

A CAA NZ medical assessor, Dr Newton, who flew with Bannerman several times believed the pilot was “an accident waiting to happen” (New Zealand Herald, 2004). More statements addressing concerns about the pilot’s behaviour and actions were expressed, after the crash, by different passengers who previously flew with the pilot. For example, a group of businessmen described how they feared for their lives on a trip between Christchurch and Takaka, where they flew blindly above the clouds and were forced to make an unscheduled landing as they were lost. Also, another passenger who flew with Bannerman at least 5 times refused to fly with him again after fearing for her life on two flights: once when the wings of the aircraft began to ice up while traversing the Southern Alps, and the second time when the pilot landed the aircraft illegally in a different location to the flight plan, using reflectors on the edge of the runway reserved only for emergencies (New Zealand Herald, 2004).

The pilot was also believed to have used his mobile phone during the flight disregarding the CAA NZ rules banning the use of mobile phones on aircraft operating under IFR. The CAA Rule part 91.7(a) states:

No person may operate, nor may any operator or pilot-in-command of an aircraft allow the operation of, any cellphone or other portable electronic device that is designed to transmit electromagnetic energy, on any aircraft while that aircraft is operating under IFR (CAA NZ, 2006c).

The path of Bannerman’s approach was below the track set by the instrument landing method he had chosen for the landing. The investigation stated that the pilot’s own

mobile phone was the closest to the aircraft equipment and was the only one operating during the approach; this might have caused erroneous indications on the glide slope indicator instrument resulting in the pilot flying below the glide slope. However, previous tests conducted by the civil aviation authority of the United Kingdom (CAA UK, 2003) found that the impact of mobile phones transmission did not affect the glide slope indicator. For the aircraft involved in the crash, the glide slope receiver could not be tested as it was severely damaged by the accident.

Although the interference of the pilot's mobile phone with the glide slope indicator could not be substantiated, the potential for distraction arising from using a mobile phone and performing any task cannot be denied. One of the survivors of the crash confirmed that the pilot was using a mobile phone whilst on approach to land. Taking risks such as using a mobile phone while flying, could have affected the pilot's focus on landing the aircraft in poor visibility conditions.

The pilot's decisions may have been a way to show to himself that he was in control over events. As such, the pilot was perhaps the typical personality whose speciality was being in control (Richardson, 1986). McEwan (2000) also noted that a lack of control on the job has been implicated as having adverse health consequences such as stress. The pilot's decisions, however, could have been questioned by peers especially as it was believed that the pilot 'boasted about his close calls to death during Friday night drinks at Air Adventures' (New Zealand Herald, 2004). This suggests that there were reasons why people who have been aware of, and disagreed with, the behaviour of the pilot chose not to report their safety concerns to the authorities.

First, observers of Bannerman's behaviour may have considered not only the pilot's wrongdoing, but whether there were norms against peer reporting or not. According to Trevino and Victor (1992), group norms may affect the communication of wrongdoing. Research on group behaviour and peer reporting also suggested that "powerful group concerns suggest that members' reactions to peer reporters may be even stronger and more emotional than reaction to whistle-blowers" (Trevino & Victor, 1992, p. 40). As such, it may be that since before the event, those with concerns about the behaviour of Bannerman failed to openly question the actions or behaviour of the pilot. These observers may have perceived the problem to be not serious or may have felt that correcting the pilot's behaviour was not their responsibility, they may also have assumed that the problem was common knowledge and accepted by other observers. Previous literature (e.g. Trevino & Victor, 1992; Victor, Trevino, & Shapiro, 1993) noted that peer reporting may be perceived as a type of role responsibility assumed by some employees within the organisation. Trevino and Victor (1992) defined role responsibility as the extent to which an employee feels a personal obligation for communicating questionable behaviour of a co-worker to a supervisor or other employees within the organisation. One way of influencing perceptions of role responsibility, and encouraging employees' responsibility to communicate observed wrongdoing within organisations would be to enforce codes of ethics within organisations. Research also suggested that employees whose norms and codes of conduct support ethical behaviour may be more likely to report wrongdoing (e.g. Glazer & Glazer, 1989; Miceli & Near, 1994). For example, in the medical sector, there is a strict code of ethics with regard to providing quality patient care. Wrongdoing, such as patient abuse, is ground for disclosure within the organisation (LaRocco, 1985). Similar codes of conduct also exist in the accounting and law professions to influence

employees' ethical behaviour (Glazer & Glazer, 1987). It is unclear whether employees at Air Adventures operated according to a code of ethics. It is also unclear whether observers of Bannerman's wrongdoing behaviour were, within their organisations, working in accordance to codes of ethics, this may explain why before the event, these observers have not displayed a 'proper conduct' following observation of the pilot's wrongdoing behaviour.

Second, the perceived power (Schachter, 1964; Allen, 1965) of the pilot may have influenced the decision to report concerns to the authorities. Bannerman may have been perceived by observers as a powerful figure given his multiple roles at Air Adventures. It may be that observers may have broken their silence if Bannerman was perceived less powerful, that is, if Bannerman was not, amongst other roles, the chief executive of Air Adventures.

Third, observers of Bannerman's behaviour may have perceived they were in powerless positions to bring about effective change to the pilot's behaviour; as such, did not communicate their concerns. These observers of wrongdoing may be less likely to disclose wrongdoing to avoid negative consequences such as retaliation of Air Adventures, peer groups retribution and damage to relationship with Air Adventures. A way to dealing with these factors could be through anonymous reporting through which observers of wrongdoing behaviour could communicate their concerns without fear of reprisal.

Lastly, the sheer number of people who had concerns but did not report them may have indicated that these observers had felt less of a responsibility to intervene as any

feelings of responsibility may have been diffused among other witnesses (Darley & Latané, 1968).

In light of the discussion above in respect of Excerpts 2, 3, and 4, group norms, social conformity, lack of knowledge of safety practices at the workplace, role of the wrongdoer and consequences of reporting, may induce observers of wrongdoing to remain silent about their safety concerns.

3.4.3 Incident Record of Pilot

Excerpt 5

No area will be left unturned, [the auditor general] said after admitting that the authority had not stuck to its “non-compliance no-fly rule” when it let a pilot with a poor compliance record continue to fly and he went on to crash, killing himself and seven other passengers...[The coroner] found that Mr Bannerman had broken several aviation rules on the flight and that the authority seemed to have ignored its own risk assessment of his operation, despite having a record of more than 20 previous incidents involving Mr Bannerman (McNicholas, 2006).

3.4.3.1 Analysis and Discussion

The CAA NZ faced more criticism when the investigation revealed the way previous complaints against Bannerman were handled. Records held by the CAA NZ showed 20 incidents involving Bannerman which were all denied by the pilot. The authority claimed to have put the pilot under close surveillance during 2000 and 2001 and have audited his operation five months before the crash. The audit found that Bannerman was

flying duty hours in excess of those registered in his logbook, an action for which he received a warning. In the aftermath of the crash, it was found that Bannerman had clearly ignored this warning. However, there was evidence that in the year and a half prior to the crash, the pilot's safety performance was improving, and that his competence to fly under ILS was adequate (CAA NZ, 2006a). One can assume that with a record of 20 incidents, a pattern showing potential risks to aviation safety could have been identified, while it may have also revealed common underlying problems of which the authority was not aware. The repetition of occurrences involving Bannerman should have been a strong indication of a problem at Air Adventures. This has brought the adequacy of the investigation processes into doubt.

It can also be suggested that even though records showed 20 incidents against Bannerman, these may have been 'the tip of the iceberg' and many incidents may have gone unreported. Although it may never be known for sure, it is possible that had the regulatory authority heard of additional people's concerns, these may have been enough for the authority to have revoked Bannerman's licence and averted the fatal accident.

There was evidence that the pilot denied being involved in the 20 incidents investigated by the CAA NZ. This suggests that the pilot may have been one of those pilots who deny stress as well as other physical and psychological problems (Deitz & Johnson, 1991), or believed he was able to cope effectively with his job stressors. Given the financial pressure Air Adventures was under (Claridge, 2004) it is perhaps not surprising that Bannerman would have tried to eliminate the possibility of additional pressure that may be exercised on the company as a result of investigations by the regulatory authority, by denying incidents reported against him.

The incident record of Bannerman suggests that the previous investigation processes had not adequately addressed the issues raised by concerned observers. Indeed, after the event, the coroner stated that the civil aviation system is “not able to intervene in processes that might make a pilot a better pilot” (Civil Aviation Action Tracking Sheet, 2006, paragraph 597). After the event, the CAA NZ agreed to undertake further policy work on the safety benefits of monitoring individual pilots, as well as monitoring operators and/or organisations (CAA NZ, 2006d).

The role of the air accident investigators is to review and analyse incident reports, as means of recommending and overseeing risk management actions to maintain or improve flight safety. The analysis work of investigators is therefore heavily oriented to the identification of previously unknown or hidden risks. However, in practice, it may be challenging for a limited number of investigators to analyse incident reports, due to the large quantities of data that may be reported to the regulatory authority. While risks of serious consequences to flight safety may be investigated and managed, routine operational events with minor or no immediate adverse consequences on safety may not be prioritised. As such, not every reported incident may be fully followed up by investigators. What this suggests, is that there may be ways to improve the processes of the investigating agency. One way would be to introduce an incident reporting system that will allow all risks to be captured and monitored. Such a system could have allowed investigators to relate incidents where Bannerman was allegedly involved, with the broader frame provided by past major events, and not be limited to the immediate incidents reported against the pilot. Establishing such connections with past events may not present the authority with significant results, but they could have revealed instances where the safety of Air Adventures activities was questionable.

In light of the discussion above in respect of Excerpt 5, it is suggested that job stressors, consequences of reporting, seriousness of wrongdoing and safety investigation processes may affect individuals' evaluations of problems, and affect the likelihood of dealing with wrongdoing in a manner that may prevent potential safety occurrences.

3.4.4 Culture at Air Adventures

Excerpt 6

Pilot Dennis Hill told the court there was a culture of bravado, where Mr Bannerman would drink red wine and recount his close calls: a landing in Alex "Grizz" Wylie's paddock in North Canterbury; the near miss with a deer fence at Haast. Mr Hill said Air Adventures lacked a culture of "safety and responsibility" and so, in 1999, he quit (New Zealand Herald, 2004).

Excerpt 7

[Bannerman] boasted about his close calls to death during Friday night drinks at Air Adventures (New Zealand Herald, 2004).

3.4.4.1 Analysis and Discussion

According to Feldman (1999), an employee has five initial choices when perceiving wrongdoing at work: to ignore, acquiesce, participate, object or walk away. In the current example, Excerpt 6 indicates that some of those who had not questioned Bannerman's wrongdoing behaviour, were frequently socialising with the pilot as such, these social events may have been offering social support to Bannerman's attitude towards safety (Rice, 1999) and as a result, re-enforcing and endorsing the pilot's risk-

taking behaviour. Furthermore, it could very well be that frequent social gathering of these observers with the same members of the group may have strengthened the group's culture norms, therefore making it hard for some of these observers to deviate from the group and question what might have been perceived as unacceptable practices. In addition, any new comers to Bannerman's social group may have perceived the range of expertise, wide experiences and opinions of the group members as credible, and as a result, may have increased new member's conformity to the group norms. Of course, there is the possibility that the group members may have chosen to ignore Bannerman's wrongdoing for reasons such as feeling or believing that correcting the questionable behaviour of Bannerman was not their responsibility. Moreover, Bannerman's 'drinking sessions' (Excerpt 7) may have been but an indication that the pilot was experiencing stress related symptoms which he, or his peers, may not have been unaware of. According to McEwan (2000), alcohol use is a common behavioural response to stress. The author stated that while these behaviours serve to relieve the person from trouble, they may also intensify stress consequences.

Conversely, those who disagreed with Bannerman's behaviour and Air Adventures culture at the time, sought employment away from that environment they objected to. The employee's resignation due to the lack of safety culture (Excerpt 6) is an indication that management have a critical role in maintaining safety culture within organisations. According to Dedobbeleer and Beland (1991), two factors can significantly support safety culture within organisations; that of management commitment to safety, and employee involvement in safety. In the current example, there was no evidence that a strong safety culture existed at Air Adventures, which suggests that management's (Bannerman) commitment to safety may also have been lacking at Air Adventures. This

also suggests that employees who were not safety conscious, and whose perception of role responsibility (Victor et al., 1993) to maintain safety had not been influenced (for example, via an established code of conduct) may have been left with three choices: ignore, acquiesce, or participate in wrongdoing. On the other hand, employees who were safety conscious may have been left with two choices: report the observed wrongdoing, or resign, with the latter being more common than the former. Indeed, within a climate that lacks safety measures, it is likely that such climate would be unsupportive of employees voicing their concerns about safety practices.

The possibility of organisational as well as peer retaliation may also prevent concerned employees from communicating their safety concerns. It would seem that for the safety conscious employee, removing oneself from such environment may be the easiest way to dealing with questionable behaviour at the workplace. One way that could improve the cultural environment of organisations such as that of Air Adventures at the time, would be for the regulatory authority to encourage aviation organisations to conduct regular safety self-assessments or self-audit and involve employees in these self-assessments, for example by allowing employees to complete anonymous safety surveys or checklists about the safety practices of the organisation. Such measures may help organisations to better measure their safety margins, and may assist the regulatory authorities in their monitoring of aviation safety levels.

In light of the discussion above, in respect of Excerpts 6 and 7, organisational culture, social support, group norms, and retaliation, may affect both observers' perception of wrongdoing and intention of reporting it.

3.5 General Discussion

It is suggested that there were numerous additional opportunities where the behaviour and actions of the pilot responsible for the accident, could have been questioned by the pilot's peer and family groups and other aviation employees. However, analysis of the events surrounding the accident suggests that there may have been a number of reasons why concerns were not openly communicated to the authorities by people who were aware of the pilot's wrongdoing behaviour.

Given that existing concerns about the pilot's attitudes towards safety were then raised after the accident, it is possible that witnesses felt uneasy to report the pilot's behaviour. This could be because he was the chief executive, director of operations, and chief pilot and instructor at Air Adventures. Furthermore, the social networks built through the frequent social events attended by the pilot may also have precluded peer and friend groups from reporting the pilot's behaviour when they happened.

There was evidence that although many people believed they had been aware that the pilot's behaviour may have compromised safety, hindsight bias may explain at least some such instances. Indeed, a number of people believed that they had observed wrongdoing behaviour and actions of the pilot and that they had been concerned about them. However, it may be that they were not really aware that those behaviours or practices were detrimental to safety until after the accident had occurred.

King and Hermodson (2000) examined factors that may affect peer reporting of questionable behaviour committed by a colleague and suggested that various individual,

situational (such as severity of the wrongdoing) and organisational issues (such as compliance or non-compliance with policy and procedures) may affect an employee's decision to either report or not report unethical behaviour committed by a colleague. Trevino and Victor's (1992) studies into the factors that affect people's inclination to report their peers found that in the absence of social structures supporting peer reporting, people operate under difficult pressures that may prohibit such peer reporting. Trevino and Victor also found that when an established code of conduct made peer reporting the responsibility of group members, people were more inclined to report peers' misconduct. However, the case of Air Adventures clearly suggests that this may only be possible if management was committed to safety.

It also unclear whether under a management structure such as that proposed by Trevino and Victor (1992), people would have the same inclination to report senior staff or the management who imposed the structure. For example, a structure imposed by the chief executive of Air Adventures may not have made a difference given that the pilot with the questionable behaviour was the chief executive, the chief pilot, and also the director of operations. Furthermore, it is unclear whether even under a structure imposed by the management of Air Adventures, reporting of concerns about faulty equipment, that were later found unserviceable after the accident, would have resulted in a positive outcome given that the maintenance controller and the person in charge of quality assurance at Air Adventures was the chief executive's (and responsible pilot's) partner. It is therefore suggested that additional factor such as the relationship between the reporter and the person with the questionable behaviour, as well as the position of the latter within the organisation, can affect whether employees act in ways that are consistent with safety.

The coroner's report into the Air Adventures accident included a recommendation (Civil Aviation Action Tracking Sheet, 2006) pressing for the establishment of an independent confidential air safety reporting system in New Zealand, with particular reference to mandatory reporting of colleagues where aviation practice falls below acceptable professional standards (paragraphs 575 and 581). A survey on reporting of concerns in the UK health sector reported that blowing the whistle was thought to have contributed to the decrease of fraud incidences for the first time in five years (Dehn, 1999). However, the CAA NZ investigation into the Coroner's recommendation concluded that a 'Just Culture' concept holds better prospects for advancements in aviation safety', than establishing a reporting system which the CAA NZ believed it to be 'an outmoded concept'. The 'Just Culture' favoured by the CAA NZ refers to a risk-based approach which provides 'an effective management of human error'; in that it aims to find a balance between a punitive environment and a blame-free environment. This approach, according to the CAA NZ, should reduce the incidence of non-reporting, and over time, should make confidential reporting schemes redundant (Civil Aviation Action Tracking Sheet, 2006, Appendix 1, paragraph 581).

Even within a 'Just Culture' environment, reporting of wrongdoing or 'mistakes' is still the underpinning input to eliminating future risks and improving employees' behaviours. For individuals to "report their mistakes without fear of prosecutions" (Civil Aviation Action Tracking Sheet, 2006, Appendix 1, paragraph 581), they need to strengthen their confidence in legislation protecting against organisational retaliation. The role of legislation is to establish a clear, robust and operational process focusing on achieving and maintaining a safety culture within organisations, and where the only victims are potential mishaps.

3.6 Summary and Conclusion

In summary, the case study of Air Adventures where witnesses raised their safety concerns after the accident, reflects the state of under-reporting in aviation. That is, a number of individuals observing wrongdoing committed by the Air Adventures pilot, Michael Bannerman, did not report their concern to the regulatory authorities. There were at least five reasons that could explain such under-reporting.

First, the under-reporting may have been due to the lack of guidelines around reporting of wrongdoing. Confidence in the CAA NZ may have been impaired due to the lack of clarity on how reporting of wrongdoing is dealt with by the regulatory authority.

Second, the under-reporting may have been due to a lack of understanding of indicators that could impair aviation safety. In other words, individuals allegedly observing wrongdoing may not have been aware of the consequences of this behaviour on safety. This includes indicators of possible stress related symptoms that the pilot may have been displaying as a result of the workload and external pressures he was operating under. Another aspect of this is that the pilot himself may not have been aware of these indicators and their ultimate effect on his safety and the safety of others.

Third, individuals may have been well aware of the consequences of the wrongdoing behaviour displayed by the Air Adventure pilot. For reasons such as financial pressures, fear of damaging their relationship with the pilot in question or fear of losing one's job, these observers may have chosen not to get involved and take no corrective actions. For example, these observers chose not to talk to the pilot, report safety concerns to the

CAA NZ. Or in the case of the pilot himself, admit to the wrongdoing accusations he was confronted with by the CAA NZ.

Fourth, what was believed to be examples of under-reporting shown through this case study may in fact have been a result of hindsight bias. That is, only after the fact did individuals actually realise that they had concerns.

Finally, it could be argued that a record of twenty wrongdoing occurrences involving the same pilot could indicate that there could clearly be some issues that require thorough investigation. However, the findings suggest that when concerns were raised to the CAA NZ, the authority investigated these reports and placed the pilot in question under surveillance. The CAA NZ were then satisfied that the pilot's safety performance was improving. Nevertheless, the regulatory authority were heavily criticised for not doing more to prevent the accident from happening, to which they replied that "without hard evidence of wrongdoing, nothing more could be done" (CAA NZ, 2006a). It can be argued that investigations rely on hard evidence and without individuals providing this hard evidence, it becomes difficult to monitor performance of pilots closely.

CHAPTER FOUR

Study 2

Aviation Employees' Reporting Intentions on Becoming Aware of Wrongdoing in Aviation

4.1 Introduction

According to the CAA NZ in a statement made after the Air Adventures accident in 2006, more could have been done to scrutinise the performance of the operator and potentially, avoid the accident that ultimately occurred “had information about the pilot’s behaviour been disclosed before the tragedy” (CAA NZ, 2006a). The Air Adventures accident and subsequent comments from the CAA NZ, therefore highlighted the possibility that a lack of effective communication of concerns within the aviation industry may negatively affect safety. Specifically, it is proposed that a problem potentially exists within the aviation industry, whereby concerns about behaviour that could potentially avert future accidents may not always be communicated to those with the authority to intervene.

In the context of this thesis, the primary focus is upon the reporting of behaviour that could broadly be categorised as involving wrongdoing. For the purpose of this thesis, wrongdoing is defined as any act that participants felt was unsafe, unethical, or illegal. Wrongdoing could, therefore, include both accidents and incidents if they were not

reported, but primarily was intended to capture behaviours other than accidents or incidents. For example, observing a pilot sleeping in the cockpit while on duty.

There are at least four reasons why the research problem is not as straightforward as it might appear. First, people may simply not become aware of all instances of wrongdoing, which may explain why not all such instances are brought to the attention of the regulatory authority.

Second, people's concerns may not be communicated because they do not understand all aspects of the regulatory authority definitions of wrongdoing; for example, people may be less clear as to what constitutes an unethical act.

Third, although people may become aware of behaviours that are inconsistent with safety, the way in which they become aware may affect the likelihood that they communicate their concerns in a way likely to lead to improved safety. For example, some people may have indirectly 'heard' about the wrongdoing (e.g., during social events), whilst others may have directly witnessed it first-hand (i.e., they personally witnessed wrongdoing behaviour). There is reason to hypothesise that the method by which people become aware of wrongdoing may therefore affect whether they communicate any concerns they may have. Whilst studying the phenomenon of 'bystander intervention', Darley and Latané (1968) discovered that the more people witness an event, the less likely they are to respond or otherwise become involved. Darley and Latané named this effect 'diffusion of responsibility'. In the context of the current study, because those who hear of wrongdoing (indirectly involved in wrongdoing, referred to as indirect hereafter) may be more likely to assume someone

else will take any necessary action or will know better how to react, they may be less likely to feel they are personally responsible or required to get involved than a person who directly witnesses wrongdoing (referred to as direct hereafter). In other words, a different pattern of actions might reasonably be expected between those that indirectly hear of wrongdoing and those that directly witness wrongdoing.

Fourth, it is possible that at least some of the people who believed they had information before the Air Adventures accident had occurred (CAA NZ, 2006a) were in reality exhibiting 'hindsight bias'. Hindsight bias is defined as the tendency for people considering a past event to overestimate their likelihood of having predicted its occurrence (Arkes, Guilmette, Faust, & Hart, 1988). Therefore, in the context of the study reported here, only after the accident did happen, that people actually realised they were aware of information that perhaps could have been used proactively to help prevent it. Specifically, people who may have believed that they had information which could have been used to improve safety, in fact may not have had such information.

Therefore, the first five research questions derived from the broad research problem are as follows: i) do people know what to do if they hear of wrongdoing (indirect)?; ii) if Yes, what would they do?; iii) do people know what to do if they find themselves in a situation where they witness wrongdoing (direct)?; iv) if Yes, what would they do?; and v) have participants ever heard or observed any behaviour or action that they later wondered if they should have done something about? (Yes responses to this question would indicate that hindsight bias was not an explanation for why reports were not made to the regulatory authority).

No hypotheses were raised for the exploratory questions i), ii), iii), and iv). However, for question v), it was predicted that, consistent with the theory of diffusion of responsibility, people will be less likely to become involved or respond when indirectly witnessing wrongdoing than when directly witnessing it. Therefore it is hypothesised that:

Hypothesis 1: People who directly witness wrongdoing will be more likely to report or communicate it than people who have indirectly witnessed wrongdoing.

Additionally, if it is assumed that at least some people were genuinely aware of their concerns before the accident occurred (i.e., they were not displaying hindsight bias) but nevertheless did not communicate their concerns, then one contributing factor may be a lack of clear guidelines or reporting channels through which they could have raised their concerns. Therefore, two additional research questions were raised: vi) within their working environment, do people have any written procedure to report wrongdoing? and if so, vii) would they use such internal reporting channels to raise concern? Given the exploratory nature of questions vi) and vii), no hypotheses for these two questions were raised.

In the broader context of wrongdoing, the CAA NZ guidelines on reporting may not be as clear as they could be. For example, whilst the regulatory authority defines accidents as ‘injuries to people or damage to aircraft’; and incidents as ‘anything that affects or could affect the safety of aircraft operation’, and insists that incidents and accidents must be reported to the regulator (CAA NZ, 2006c), it makes no mention of what a person would do if they became aware of wrongdoing of a more subtle nature. One

could argue that unlike evidenced accidents, people are more likely to avoid reporting of smaller incidents and more likely to hide evidence of smaller occurrences that do not affect the safety of aircraft operation at the first instance, but may affect the safety of the aircraft operator, or could build up to become the sort of accidents the CAA NZ encourages individuals to report. Therefore, the final research question is, viii) would participants see value in clearer guidelines from the regulatory authority being provided? No hypothesis was raised due to the exploratory nature of this final question.

Finally, to enable between-group comparisons to be explored, participants were asked their gender, position in the organisation, and whether they had flying experience.

4.2 Method

4.2.1 Participants

The sampling frame was 116 aviation establishments in New Zealand. In total, 110 (95%) participants were recruited. Participants consisted of 88 pilots (16 females and 72 males) of whom 24 were also managers (6 females and 18 males), and 22 non-pilot participants (9 females and 13 males) of whom 12 were also managers (1 female and 11 males).

4.2.2 Materials

Eight questions were designed to address the eight research questions of study 2. This was conducted in a format appropriate for administering them via a telephone interview of NZ aviation industry employees. Although it would have been possible to

administrate the questionnaire by other means (e.g., internet, post, face to face), a telephone survey was chosen as, for a short questionnaire, it is quick to administrate and may return a relatively high response rate (De Vaus, 2002).

Question 1 (addressing research question i): Do you know what to do if you ‘hear’ (indirect) of wrongdoing? Response options to question 1 were in a forced choice format (*Yes/No*) to which a *Yes* answer would lead to the question 2. A *No* answer would lead to the question 3.

Question 2 (addressing research question ii): If the answer to question 1 was *Yes*, would you *talk to the person* involved in wrongdoing, *report wrongdoing to someone senior*, *report wrongdoing to the CAA*, or *do nothing*?

Question 3 (addressing research question iii): Do you know what to do if you ‘witness’ (direct) wrongdoing? Response options to question 3 were in a forced choice format (*Yes/No*) to which a *Yes* answer would lead to question 4. A *No* answer would lead to the question 5.

Question 4 (addressing research question iv): If the answer to question 3 was *Yes*, would you *talk to the person* involved in wrongdoing, *report wrongdoing to someone senior*, *report wrongdoing to the CAA*, or *do nothing*?

Question 5 (addressing research question v): Have you ever heard or observed any behaviour or action that you later wondered if you should have done something about? (*Yes/No*).

Question 6 (addressing research question vi): In the place where you work, do you have any (or do you know whether you have any) written procedure to report wrongdoing? Response options to question 6 were in a forced choice format (*Yes/No*) to which a *Yes* answer would lead to question 7. A *No* answer would lead to the question 8.

Question 7 (addressing research question vii): If the answer to question 6 was *Yes*, would you follow your internal procedure to report concern? (*Yes/No*).

Question 8 (addressing research question viii): Would it be useful to have a more detailed directive from the CAA about reporting procedures? Response options to question 8 were in a multiple choice format. Participants were asked to indicate whether it would be *useful*, *may be useful*, *not necessary*, or *not sure* about having clearer reporting guidelines from the CAA.

Question 9: Finally, is there anything you can think of that you think may influence whether you would report your concerns? Question 9 was an open question where participants expressed what factors they believed would affect their intentions to report their concerns.

Participants were also asked to provide the following demographic information: gender (Female/Male), position (Staff/Management), and whether participants classified themselves as pilots (Pilot/Non-Pilot).

4.2.3 Procedure

Telephone numbers of New Zealand aviation businesses were collected using the search engines Google and Yahoo (with the domain extension for New Zealand) using the keywords ‘aviation’ AND ‘schools’, ‘aviation’ AND ‘clubs, and ‘aviation’ AND ‘organisations’. Telephone numbers would be extracted from the first 100 search returns for each keyword pair (duplicated numbers would be counted once only).

Potential participants were contacted by telephone during the weekday daytime hours (between 10 a.m. and 5 p.m.) of November, 2006. Those who could not be contacted at this time were called in the early evening (between 5.30 p.m. and 7 p.m.).

Participants were informed about the aim of the study and were provided with a link to the researcher’s website where more information about the research and researcher could be inspected if they so wished. Next, participants were informed that the study had undergone a process of ethical review⁶ and that they were guaranteed confidentiality by assuring them that no questions through which a participant could be identified were included in the interview. Should personal or identifiable information be disclosed by a participant, that information would not be recorded on the data sheet. It was explained that participation was entirely voluntary and that the researcher was independent of the regulatory authority. Participants were also informed that they held the right to decline answering any questions should they so wish, and withdraw their

⁶A review of the ethics of this study was undertaken by the School of Aviation, Massey University using the guidelines provided by the Massey University Human Ethics Committee. The project was deemed to be of low risk and therefore suitable for a ‘low level notification’ to Massey University Human Ethics Committee.

participation at any point. Answering questions was taken to imply consent to participate.

Participants were then provided with the context in which the term wrongdoing was used (any act that participants felt was unsafe, unethical, or illegal). The researcher read each of the nine questions in turn, and recorded the participants' answers. Responses were recorded on a data sheet during the interviews (using Microsoft Excel 2002 version). Statistical analyses were conducted using SPSS version 14.

4.3 Results

The level of statistical significance, alpha, was set at $p = .05$ for all statistical tests, and all tests were conducted as two-tailed.

Inspection of the demographic data, using Chi-Square test of independence, suggested that there was no evidence of a relationship between participants' gender and the position (Staff/Management) that they held in the establishment being surveyed, $\chi^2 (1, n = 110) = .33, p = .567$. However, there was significant evidence of a relationship between gender and whether participants had flying experience, $\chi^2 (1, n = 110) = 5.18, p = .043$, with a greater proportion of females having flying experience than males, and evidence of a relationship between position held at the establishment (Staff/Management) and flying experience (pilot/non-pilot), $\chi^2 (1, n = 110) = 5.95, p = .015$, with those reporting they were in management positions more likely to report that they were pilots.

Responses to question 1 showed that all participants ($n = 110$) believed they knew what they would do if they (indirectly) heard of wrongdoing; that is, all participants answered, *Yes*. Responses to question 4 showed that overall, 61 (56%) participants believed that they would *report* wrongdoing that they heard of *to someone senior*, 44 (40%) would *talk to the person* concerned, and 5 (5%) would *do nothing*. No participant responded that they would *report* wrongdoing they heard of direct *to the CAA*.

Due to low expected cell counts, participants' responses *talk to person* and *do nothing* were collapsed into a single heading of 'safety inconsistent', and the responses *report wrongdoing to someone senior* or *report to the CAA* were collapsed into a single heading 'safety consistent' to enable comparison of responses to question 2 by gender, position, and flying experience. Chi-square test of independence suggested that there was significant evidence that the intended action upon hearing about wrongdoing differed according to the participants' position in the company (Staff/Management), $\chi^2(1, n = 110) = 23.93, p < .001$, with management less likely than staff to make safety consistent responses; and that there was significant evidence that responses significantly differed according to the participants' gender (Female/Male), $\chi^2(1, n = 110) = 21.53, p < .001$, with females less likely than males to make safety inconsistent responses. However, there was no evidence of a difference in safety responses of pilots and non-pilot participants, $\chi^2(1, n = 110) = .009, p = .924$. A summary of participants' safety consistent and safety inconsistent responses, by position, flying experience, and gender, is shown in Table 1.

Table 1. Responses to question 2 (Data collapsed into safety inconsistent and safety consistent responses) by gender, position, and flying experience

Factor title	Factor level(s)	Response modality	
		Safety inconsistent <i>n</i> (%)	Safety consistent <i>n</i> (%)
Position	Management	28 (26%)	8 (7%)
	staff	21 (19%)	53 (48%)
Gender	Female	1 (1%)	24 (22%)
	Male	48 (44%)	37 (34%)
Flight status	Non-Pilot	10 (9%)	12 (11%)
	Pilot	39 (36%)	49 (45%)

Note: Where percentages do not add up to 100%, this is due to rounding-up of figures.

Responses to question 3 showed that all participants ($n = 110$) believed they knew what they would do if they directly witnessed wrongdoing; that is, all participants answered, *Yes*. Responses to question 4 showed that overall 72 (66%) participants reported that they would *report wrongdoing* that they witnesses to someone senior, 35 (32%) would *talk to the person* concerned, 2 (2%) would *do nothing* and 1 (1%) would *report to the CAA*.

Due to some low expected cell counts, participants' responses *talk to person* and *do nothing* were collapsed into a single heading of 'safety inconsistent', and the responses *report wrongdoing to someone senior* or *report to the CAA* were collapsed into a single heading, 'safety consistent', to enable comparison of responses to question 4 by gender, position and flying experience. Chi-square test of independence, suggested that: there was significant evidence that the intended action upon directly witnessing wrongdoing differed according to the participants' positions in the company (Staff/Management), $\chi^2(1, n = 110) = 15.937, p < .001$, with management less likely than staff to make safety consistent responses; there was no evidence of a difference in responses of pilot and

non-pilot participants, $\chi^2 (1, n = 110) = 2.02, p = .155$; and there was evidence that responses differed significantly according to the participants' gender, $\chi^2 (1, n = 110) = 6.31, p = .012$, with females less likely than males to provide safety inconsistent responses. Participants' responses to question 4 by gender (Female/Male), position (Staff/Management), and flying experience (Pilot/Non-Pilot) are shown in Table 2.

Table 2. Responses (Data collapsed into safety inconsistent and safety consistent responses) to question 4, by gender, position and flying experience

Factor name	Factor level(s)	Response modality	
		Safety inconsistent <i>n</i> (%)	Safety consistent <i>n</i> (%)
Position	Management	21 (19%)	15 (14%)
	Staff	15 (14%)	59 (54%)
Gender	Female	3 (3%)	22 (20%)
	Male	33 (30%)	52 (47%)
Flight status	Non-Pilot	10 (10%)	12 (10%)
	Pilot	26 (36%)	62 (45%)

Note: Where percentages do not add up to 100%, this is due to rounding up of figures.

McNemar's test of symmetry was used to test if there was a relationship between how participants became aware of wrongdoing (indirectly vs. directly) and their intention to report. There was evidence of a significant relationship between the safety responses of participants who indirectly heard of wrongdoing (question 2) and participants who directly witnessed wrongdoing (question 4), McNemar's test $(1, n = 110) = 4.68, p = .015$ suggested that participants who directly witnessed wrongdoing were more likely to make safety consistent responses than participants who indirectly heard of wrongdoing. Participants' responses to question 2 and question 4 are shown in Table 3.

Table 3. *Participants' responses (safety consistent vs. safety inconsistent) to question 2 and question 4*

Mode of becoming aware of wrongdoing (i.e., question 2 vs. question 4)	Response modality	
	Safety consistent <i>n</i> (%)	Safety inconsistent <i>n</i> (%)
Indirectly (question 2)	61 (56%)	49 (45%)
Directly (question 4)	74 (67%)	36 (33%)

Note: Where percentages do not add up to 100%, this is due to rounding up of figures.

Question 5 tested whether participants believed that they had heard or observed any behaviour or action that they later wondered if they should have done something about. This question therefore sought to test whether hindsight bias could explain some instances of under reporting. Fifty-four (49%) participants claimed to have heard of or observed wrongdoing that they later thought they should have done something about, while 56 (51%) participants did not. Chi-Square test for goodness of fit suggested that there was no difference between the number of participants answering *Yes* and *No*, $\chi^2(1, n = 110) = .036, p = .849$. Using Chi-square test of independence, there was no evidence that responses (*Yes/No*) differed according to the participants' positions in the company (Staff/Management), $\chi^2(1, n = 110) = .895, p = .344$; there was no evidence that responses (*Yes/No*) differed according to flying experience (pilot/non-pilot), $\chi^2(1, n = 110) = 1.10, p = .294$; and there was no evidence that responses (*Yes/No*) differed according to the participants' gender (Female/Male), $\chi^2(1, n = 110) = 1.07, p = .301$.

For question 6, participants were asked if the aviation establishment where they worked had an internal reporting procedure in place that they knew how to/or could use to raise concern. Responses to question 6 showed that 109 participants believed they had a written procedure to report wrongdoing and 1 believed they had not. Responses to

question 7 suggested that all 109 participants would be prepared to follow their internal procedure to report safety concerns.

Question 8 asked participants how useful it would be to have much more detailed directives from the CAA NZ about what actions or behaviours must be reported. Responses showed that 63 (57%) participants expressed that they thought it would be *useful* to have a much more detailed directive from the CAA NZ listing what actions or behaviours must be reported, 38 (35%) thought it *may be useful* to have, while 4 (4%) thought it *not necessary*, and 5 (5%) were *not sure* of the usefulness of much more detailed directive from the CAA NZ around reporting procedures.

Due to the low expected cell counts, data for the response *not necessary* and *not sure* were excluded from the following analyses for question 8. Chi-square test of independence, suggested that there was no evidence that the usefulness of further guidelines from the CAA (*useful* vs. *may be useful*) differed according to the participants' positions in the company (Staff/Management), $\chi^2(1, n = 101) = .03, p = .855$; no evidence that the usefulness of further guidelines from the CAA (*useful* vs. *may be useful*) differed according to flying experience (pilot/non-pilot), $\chi^2(1, n = 101) = .06, p = .806$; and no evidence that responses (*Yes/No*) differed according to the participants' gender (Female/Male), $\chi^2(1, n = 101) = .02, p = .890$.

Chi-Square test of independence was used to explore if the reporting intentions (safety consistent vs. safety inconsistent) for questions 2 (direct) and 4 (indirect) differed according to whether participants believed further guidelines from the regulatory authority would be *useful* and participants who believed further guidelines *may be*

useful. Chi-square test of independence, suggested that there was no relationship between participants' actions for question 2 (safety consistent vs. safety inconsistent) and whether they believed that further guidelines from the CAA would be *useful*, $\chi^2 (1, n = 110) = .01, p = .980$, and no evidence of a relationship between participants' actions for question 4 (safety consistent vs. safety inconsistent) and whether they believed that further guidelines from the CAA would be *useful*, $\chi^2 (1, n = 110) = 1.157, p = .282$.

Finally, for question 9, 49 (45%) participants named factors that they believed may affect whether they would report concerns. Of these, 38 (35%) stated that the perceived seriousness of the wrongdoing would affect whether they reported their concerns (e.g., one participant stated they would not report someone who consistently arrived late for work, but they would report someone who smelled of alcohol). Seven (6%) participants reported that they would let someone else make a report if at all possible and that they felt it was other people's responsibility rather than theirs; that is, they would defer their personal responsibility to others. Four (4%) participants said they would avoid making reports to avoid making trouble. Two participants (2%) stated that they would not report someone senior as presumably their seniority and work experience implies they have a justifiable reason for their actions which may not be easily understood by individuals in lower positions, and two participants (2%) stated that they would not report someone who is a new employee with little experience in the field. (Note: Three participants gave more than one reason).

4.4 Discussion

As evidenced by Air Adventures accident discussed in Study 1, safety concerns may not always be communicated to those with an authority to intervene (e.g., someone senior or the CAA NZ), in order to reduce either the occurrence rate or the severity of negative outcomes. This study sought to explore what aviation employees would do if they became aware of wrongdoing in an aviation context.

All participants reported that they believed they would know what to do if they either indirectly (heard) or directly (witnessed) became aware of wrongdoing in their workplace. This demonstrated that participants were confident in how they would act irrespective of whether they indirectly or directly witnessed wrongdoing in an aviation context.

However, whilst all participants expressed that they were confident in knowing what they would do when becoming aware of wrongdoing; their responses when asked what they would actually do suggested that upon becoming either indirectly or directly aware of wrongdoing, information would not always be communicated to a level where it would be likely to be used to improve safety. For example, when indirectly hearing about wrongdoing only 61 (56%) respondents stated they would report the behaviour to someone senior, and none said they would report to the regulatory authority (CAA NZ). As senior employees may still do nothing with information given to them, this suggests that at least 44% of wrongdoing would be unlikely to be communicated to a level where it could be used to proactively improve safety. Even when directly witnessing wrongdoing, only 74 (67%) respondents stated they would report the behaviour to

senior personnel, and just 1 (1%) said they would report direct to the regulatory authority.

Comparison of the rate of safety consistent responses by mode of becoming aware of wrongdoing, suggested that there was a significant difference in the pattern of responses; that is, participants who became indirectly aware of wrongdoing were significantly less likely to make safety consistent responses than participants who became directly aware of wrongdoing. Hypothesis 1 was therefore supported. This finding suggested that diffusion of responsibility may play a part in the under-reporting of wrongdoing. Although this finding would, of course, require replication, in principle it suggested that aviation employees could be encouraged to 'take ownership' of wrongdoing situations in which they find themselves, rather than assuming someone else is responsible for doing the right thing. Indeed, in a discussion with a senior aviator, it was commented that there would be many occasions when it would be appropriate to ignore evidence of wrongdoing on the premise that someone else was responsible (personal communication).

Evidence was found to suggest that hindsight bias may sometimes lead people to believing they were aware of information before the accident had occurred, when in fact they were not. Indeed, the finding of this study showed that 54 (49%) respondents believed that they had heard or observed behaviour or actions in which they later wondered if they should have intervened. This suggests that at least some of those who could have communicated concerns to the regulatory authority could have done so, although they did not. Contrarily, the 56 (51%) of participants who answered No to this question suggests that 'hindsight bias' may be a viable alternative explanation for why

concerns are not communicated. Again, whilst this finding would require replication, it nevertheless suggested that in the case of the Air Adventures accident, at least some of those who after the event stated that they did indeed have information that perhaps would have been useful to the regulatory authority, were indeed correct and that such views were not readily explained by hindsight bias.

This finding is interpreted as being broadly consistent with the CAA NZ's statement that "had information about the pilot's behaviour been disclosed before the tragedy, more could have been done to scrutinise the performance of the operator, and potentially avoid the accident that ultimately occurred" (CAA NZ, 2006a). That is, the findings of the current study support the possibility of the research problem, whereby behaviour that could potentially avert future accidents may not always be communicated to those with an authority to intervene.

All except one participant believed that the place where they were employed had an internal reporting procedure for reporting concerns, and all of those who had an internal reporting procedure would be prepared to follow it. This suggests that the one participant who answered No to this question may have been unaware of reporting procedures in their workplace. However, the extent to which reports through internal procedures would be communicated beyond the level of the employer (i.e., to the regulatory authority) is unclear. Given the pattern of responses for questions 2 and 4, it seems reasonable to assume that many concerns known internally would be unlikely to be communicated to a higher level (e.g., to the regulatory authority).

Consistent with the possibility that deciding what to do with information about wrongdoing is a difficult decision to make, only nine (9%) participants did not think further guidelines from the regulatory authority on the reporting of wrongdoing would be useful, or at least were unsure of their use. More interestingly, there was no evidence of a relationship between reporting intentions and whether extra guidelines were perceived to be useful; that is, participants who thought additional guidelines were necessary were not less likely to report to someone senior or to the CAA NZ. It is possible that this comparison was prey to *Type II* error, due to the low number of participants who thought extra guidelines were unnecessary, or who were not sure they were required. Although experimental investigation would be required to test if there is a causal relationship between reporting intentions and additional guidelines being made available, these findings did not suggest that the provision of additional guidelines on how to behave when becoming aware of wrongdoing in the workplace were likely to be effective.

The findings of the current study found evidence that female aviation employees may be more likely to behave in a way likely to improve aviation safety as, in the sample being surveyed, they were more likely than males to communicate their concerns regarding wrongdoing to someone senior, rather than talk with the person. Although this finding may in principle have been explained by differences in their position in the organisational hierarchy (management vs. staff), this could not be tested due to low cell counts. However, as there was no statistical relationship between participants' position and their gender, this possibility was considered unlikely. Studies in disciplines other than aviation have also found a significant relationship between reporting wrongdoing and gender, for example women were believed to be more ethical than men (Ricklets,

1983), more morally developed than men (Shaub, 1994; Sweeney, 1995; and Sweeney & Roberts, 1997), and less likely to break the rules to achieve success than men (Gilligan, 1977; Ameen et al., 1996). The current study therefore suggests that there may be a need for males to be educated about the need to communicate wrongdoing rather than to try to resolve issues with the person concerned.

The current study also found some evidence that participants who classified themselves as 'management' were less likely to make safety consistent responses upon becoming aware of wrongdoing, than were employees who classified themselves as 'staff'. A potential explanation for this finding is that participants who reported that they were 'management' perceived themselves as being more able to judge the importance of a wrongdoing situation and concluded that talking to a person would be a better response than reporting to someone more senior. It is also possible that in some of the establishments approached, there was no one more senior and the only options available were to talk to the person, or to report to the CAA. Contrarily, it is possible that making the decision to talk to the person is simply more difficult for staff than for management. Nevertheless, at face value the current findings suggested that the problem of under-reporting in aviation may warrant further investigation of why the management-staff difference in safety consistent reporting exists.

When asked what other factors could affect whether people reported concerns about safety, the main reason was perceived seriousness. In principle, this would make sense and would avoid, for example, the regulatory authority or management being overwhelmed with trivial concerns about matter irrelevant to safety. However, in practice, it is possible that the average employee is not best placed to determine what is

and what is not serious. For example, on its own, a pilot who arrives a little bit late for a flight may not seem serious, but it could be that the pilot was not getting enough sleep due to personal or health issues. Whilst at face value such an example may seem far-fetched, such scenario could have conceivably occurred with the pilot of the Continental Connection flight that crashed on 12 February 2009, where the pilot was believed to have commuted across the country overnight to make the flight (National Transportation Safety Board, 2010).

Other factors that participants mentioned included the seniority of the wrongdoer. Two participants stated that they would not report someone senior to them as presumably senior staff have reason for taking certain actions that they (the participant) may not understand, and two participants stated that they would not report a junior person as the limited experience of the wrongdoer may justify their wrongdoing act. The effect of seniority on intention to report wrongdoing might be expected to feature even more highly in cultures where there is a high power gradient, such as in Asian countries (Schultz, 2002). Furthermore, seven participants reported that they would leave reporting to someone else, if at all possible. That is, they would deny their personal responsibility and leave it to someone else to make a report. Lastly, four participants stated they would avoid making reports to avoid making trouble.

There were potentially a number of limitations to the current study that could reduce its validity. First, as in most studies of ethics, it is important to note the findings here are based on proposed responses to a survey rather than actual behaviour. Although such responses tend to reflect the direction and relative magnitude of behaviour, they are not always consistent with actual behaviour (Jones et al., 1990).

Second, as this was a telephone based study, the gender of the experimenter was impossible to hide from the participants, this might have interacted with the responses of participants. Therefore, although there were clear benefits of using a telephone based methodology, in hindsight this could have led to risk of interaction due to gender. It was therefore decided that future studies would not involve a direct approach from the experimenter (as it would be difficult to assign gender to the experimenter's name).

Third, it was possible that participants' answers were confounded by their wish to provide socially desirable responses rather than answers that were true. Indeed, this possibility might be more likely given the implied safety context of the study. Although social desirability is likely to affect any study in which opinions are sought, some evidence (De Vaus, 2002) suggested that social desirability may be greater with more personalised methods of questionnaire administration. This possibility confirmed the decision that future studies would not involve a direct approach from the experimenter.

Fourth, the decision to collapse the responses to question 2 and question 4 into two categories (safety consistent and safety inconsistent) may have artificially inflated the number of responses interpreted as being safety inconsistent. That is, if a person who performed wrongdoing were identified and 'talked to', then they may have realised the error of their ways and never have performed wrongdoing again. Thus the findings of the current study may be more pessimistic than is warranted; that is, the findings may provide an indication of the worst case scenario.

In conclusion, the current study indicated that under-reporting of wrongdoing and safety concerns in aviation may be widespread. There was strong evidence that how observers

become aware of wrongdoing may affect their reporting intentions, and that a participant's position in their organisation (management vs. staff) and also their gender may interact with their reporting intentions.

CHAPTER FIVE

Study 3

Exploring the Effect of the Relationship between the Observer and the Wrongdoer on Reporting Intentions, and the Relationship between Observers Reporting Intentions and their Level of Moral Development

5.1 Introduction

In Study 2, it was found that although many people (60% and 56% for direct and indirect witnessing of wrongdoing respectively) stated they would communicate their concerns about wrongdoing in ways that in principle would be likely to improve aviation safety (i.e., to someone senior), only one participant stated that they would directly report wrongdoing they had directly witnessed to the regulatory authority (i.e., the CAA NZ).

Of particular relevance, in the context of this thesis, is that many participants (27% and 34% for direct and indirect witnessing of wrongdoing respectively) stated that they would talk to the person rather than report to someone senior. The extent to which this outcome would be consistent with safety is debatable (and beyond the defined scope of this thesis). For example, it is possible that a person who has their wrongdoing brought to their attention may immediately realise and acknowledge the error and never commit such an action again, which at face value, could be interpreted as a safety consistent

outcome. However, there are at least two potentially negative outcomes to the option of talking to the person, irrespective of whether it resulted in changing the erroneous behaviour. First, talking to the person inevitably precludes the regulatory authority becoming aware of a particular type of problem that may be widespread in the aviation industry. This means that similar behaviours could eventually lead to accidents or incidents as the regulatory authority would be unable to put measures in place to counter such behaviour. Second, talking to the person may give the person an opportunity or incentive to hide their behaviour in the future, rather than motivating them to focus on the effect their actions may have on self and others.

There are two frameworks within which these findings could be further explored: a moral framework, and an evolutionary framework. The moral framework assumes that the person witnessing wrongdoing does what they believe to be the 'right thing', within the limits of their understanding of right and wrong. In other words, participants' responses could be related to their level of moral development. Kohlberg's (1976) and Gilligan's (1982) cognitive moral development theories are two prominent theories which propose that individuals' progress in stages of moral reasoning and tend to operate at a particular stage at any point in time. Kohlberg's cognitive stages of moral development propose that an individual's level of cognitive moral development strongly influences their decision regarding what is right or wrong and focuses upon the rights, duties and obligations involved in a particular ethical situation. Contrarily, Gilligan defines ethical issues mainly in terms of helping others and minimising harm and argues that moral behaviour results from meeting one's obligations and responsibilities to others.

As the level of people's moral judgment can be raised by education (Kohlberg, 1984; Oderman, 2002), the first aim of Study 3 was therefore to investigate aviation employees' level of moral reasoning when confronted with wrongdoing situations. If a relationship between reporting intentions and moral development is suggested, then ethics education may be one means by which under-reporting in aviation can be reduced. The following hypothesis was therefore proposed:

Hypothesis 1: Aviation employees indicating they would intervene upon becoming aware of aviation wrongdoing operate at a higher level of moral development (according to moral development theories of either Kohlberg or Gilligan) than aviation employees who would not intervene in a wrongdoing situation.

The evolutionary framework in which to further explore under-reporting of aviation wrongdoing is that of inclusive fitness. Although people are believed to operate at a particular level of moral reasoning (Flanagan, 1984), it seems reasonable that their behaviour (e.g., whether they decide to intervene upon becoming aware of wrongdoing) may be affected by the extent to which the person committing the act of wrongdoing has a close relationship with, or is even genetically related to the person witnessing wrongdoing. Broadly in line with the arguments of Hamilton's (1964) biological concept of inclusive fitness, individuals help those to whom they are related in preference to those with whom they share no genetic ties. Social researchers' field analyses have been used to corroborate the efficacy of the inclusive fitness theory as applied to human behaviour. For example, people are more likely to donate an organ for transplant if the intended recipient is related than if the intended recipient is unrelated (Borgida, Conner, & Manteufal, 1992). Moreover, researchers (e.g. Burnstein et al.,

1994; Kruger, 2001) have applied the inclusive fitness model to human's altruistic decisions in experiments by adopting role playing and vignette techniques, and concluded that humans, like many animals (Fletcher & Michener, 1987), favoured relatives over non-relatives when deciding whom to help. When an individual in need is not related to a potential altruist, Trivers' (1971) model of reciprocal altruism indicated that unrelated individuals care for one another to different degrees, and innate psychological mechanisms ensure that individuals provide help to those from whom they have previously benefited. Roberts and Sherratt's (1998) computer simulations based on the prisoner's dilemma paradigm indicated that cooperation between unrelated individuals increased when there had been a previous, sustained history of caring. In the context of the study reported here, it might be expected to find that when witnessing wrongdoing, the witness might be less likely to report a 'friend' or a 'family member', than a person with whom they share no such relationship. The second hypothesis was therefore:

Hypothesis 2: Whether participants felt they had to take action in the situation presented to them would differ according to the level to which they are related to the person responsible for wrongdoing.

In Study 2, there was evidence that females responded differently to males when becoming aware of wrongdoing; specifically, they may act in a way that may be more likely to lead to improvements in safety (e.g., they were more likely to *report wrongdoing to someone senior*). As such, a third hypothesis was:

Hypothesis 3: Female aviation employees are more likely to take action in a wrongdoing situation than male aviation employees.

The primary aims of the current study were therefore: i) to investigate the level of moral reasoning of aviation employees, when faced with evidence of wrongdoing, in relation to their intentions to intervene in wrongdoing situations, and ii) to investigate the effect of the relationship between the witness and the act of wrongdoing in aviation. As in the previous empirical study, the independent variable of gender was explored.

5.2 Method

5.2.1 Participants

One hundred and seventy-five (175) participants were recruited from 142 aviation organisations within New Zealand: flying clubs (91), flight training schools (15), aviation associations (5), air services (16), and air charters (15). Of these participants, 163 held a pilot's licence at the time of participation, consisting of 51 female pilots ($M = 6.14$ years flying experience, $SD = 6.34$), and 112 male pilots ($M = 7.58$ years flying experience, $SD = 8.77$).

5.2.2 Materials and Design

5.2.2.1 Overview

A scenario based study was designed to investigate participants' moral reasoning and the effect of the relationship between observer and protagonist when evaluating

wrongdoing situations in the aviation industry. Using nine separate scenarios, participants were asked what they would do upon becoming aware of wrongdoing and then to explain their decisions in the context of established theories of moral reasoning.

A scenario based methodology was used in the current study as scenarios are a common method used in business ethics research. Scenarios are short and concrete stories to which participants can respond in a variety of formats (Lampe & Finn, 1992), and are “a vehicle for investigating an individual’s ethical principles and ethical behavior” (Fritzsche, 1985, p. 291). Additionally, it would be unviable, both ethically and practically, to attempt to conduct this study using real behaviours.

Investigation of the effect of the relationship between the observer and the protagonist when evaluating wrongdoing situations in the aviation industry was therefore a within-subjects experimental design. Investigation of the relationship between participants’ level of moral reasoning and whether they chose to act upon hearing of wrongdoing was correlational design.

5.2.2.2 Development of Scenarios

Nine scenarios were developed from accident and incident reports for the years 2000 to 2006 published on the CAA NZ website (www.caa.govt.nz). Real-life examples of accidents and incidents were chosen as the basis for developing the scenarios for the current study as they represented the kind of situations that aviation employees are known to have encountered in real life. The accident and incident reports were selected so that the scenarios used in the study could be short, easy to understand, cover different

examples of wrongdoing, and be manipulated as required for the purpose of the current study. Any identifiable features in the original reports were omitted from the scenarios (e.g., names, places and dates).

Each of the scenarios was developed to satisfy the following criteria: i) it should describe an example of wrongdoing in aviation that was based upon a real example of wrongdoing; ii) it should be written from the perspective of a person (e.g., the participant) becoming aware of the described situation; iii) the scenario should have a protagonist who is responsible for the wrongdoing; and iv) should be short (e.g., 3–4 sentences) and worded in plain language.

To explore whether aviation employees' actions and reasoning behind these actions were affected by the level to which they personally were related to the protagonist, the scenarios were further divided into three groups. Each group contained three scenarios worded so that the relationship between the participant and the protagonist would be: i) participant *not related* to the protagonist (e.g., the wrongdoing behaviour was committed by someone that the participant does not personally know); ii) participant *related* to the protagonist (e.g., the wrongdoing behaviour was committed by a colleague); and iii) participant *closely related* to the protagonist (e.g., the wrongdoing behaviour was committed by a friend or a family member).

To attempt to reduce the possibility that the level of relatedness in each scenario would interact with the perceived seriousness of the wrongdoing described in the scenario, the wrongdoing behaviour in each of the nine scenarios was assigned a seriousness rating of 1 to 10 (where 1 = not very serious, and 10 = very serious) by the researcher, an

academic with an interest in the study, and an independent third party. By summing the three seriousness ratings for each scenario, an overall seriousness rating was then calculated for each scenario (possible scores range from 3 to 30, with higher scores indicating higher perceived seriousness). The nine scenarios were arranged in descending order of seriousness and then manipulated so that the total seriousness rating for each level of relatedness (*not related, related, closely related*) were as similar as possible. The nine scenarios and the seriousness scores thus allocated are shown in Table 4. The order in which scenarios were presented to participants in the actual study was randomly determined.

Table 4. *The nine scenarios and level of relatedness of respondent to hypothetical person(s) with wrongdoing behaviour*

Scenarios	Level of Relatedness	Perceived Seriousness score
<p><u>Scenario 1:</u> You met someone who was applying for a medical certificate for their pilot's licence. Talking to this person you found out that in the past the recently suffered from chronic fatigue syndrome and were depressed. Talking to this person led you to believe that they have no intention of informing the medical examiner of their past condition.</p>	Not Related	21
<p><u>Scenario 2:</u> You were told by a student learning to fly that their flying instructor often lets their students try activities that are not part of their training. You feel this instructor ought to abide by the training programme as it was safely designed and approved by regulatory authorities for the particular flying training.</p>	Not Related	13
<p><u>Scenario 3:</u> Management of the charter airline where you are working plan to make some 'unofficial' changes to the flight crew leave and flying roster. The original Flight & Duty scheme was approved by the CAA and was expected to run for at least a period of 12 months. You are concerned that the new leave and flying roster will create more workload and stress.</p>	Related	13
<p><u>Scenario 4:</u> A close member of your family is involved in commercial flying operations. They own 2 aircraft which take people on scenic flights. However, although both aircraft are involved in commercial operations, only one is declared as such. Your family member is not willing to declare the other aircraft.</p>	Closely Related	14
<p><u>Scenario 5:</u> It has come to your attention that a colleague has had 2 recent (minor) accidents in their aircraft and has not reported any to the CAA.</p>	Related	20
<p><u>Scenario 6:</u> You have noticed that a captain at your workplace amended the arrival time on their flight log to enable them to depart on time the next morning. Apparently, this is not the first occasion and it appears that this practice is ignored by the local management.</p>	Related	20
<p><u>Scenario 7:</u> You have heard that fuel gauges of some training aircraft at a local flying club read incorrectly. Apparently, they have been defective for a while and no action has been taken to rectify them</p>	Not related	20
<p><u>Scenario 8:</u> Your family runs a flying club business where an aircraft needs repairing. Due to some financial difficulties your family can neither afford the required part, nor can your family afford leaving the aircraft on the ground for much longer. However, an ex-avionics technician has said he knows how to simply repair the part and will do so as a favour. Your family has decided to make use of this offer.</p>	Closely Related	21
<p><u>Scenario 9:</u> You recently gained a PPL. On your birthday, your friend who is also a holder of a PPL (for a few years) suggested going for a flight together. On landing the aircraft, your friend lost control and the wing clipped a fence. The aircraft suffered minor wing damage. Your friend wants you to take the blame by saying you accidentally knocked the rudder when the aircraft touched down.</p>	Closely Related	20

5.2.2.3 Development of Response Options for Scenarios

After reading through each scenario, participants would be requested to answer two questions: question 1 to determine whether participants believed that they would take action in the wrongdoing situation, and question 2 to provide an indication of the participants' moral reasoning associated with their answer to question 1.

Therefore, for each of the nine scenarios, participants would first be asked if they would take action in each of the situations (*Yes/No*). An alternate forced-choice response format was used, as opposed to more detailed type of responses (as used in Study 2), as the aim of this study was primarily to investigate whether there were differences in people's moral reasoning associated with whether they would or would not feel they should intervene, and whether intentions to intervene were affected by the level of relatedness to the protagonist, as opposed to what they would actually do if they did intervene. For each scenario, participants were therefore asked: do you feel you have to do something about the situation?

To explore the association between participants' level of moral reasoning and their response to whether they would or would not take action in wrongdoing, participants were also asked to select from a series of six response options that best explain their answers to the question 1.

A series of response options were therefore developed for question 2 to attempt to measure whether a participant's level of moral reasoning was Pre-conventional, Conventional, or Post-conventional. To develop the response options for question 2 of

each scenario, a brainstorming session with the researcher, an independent postgraduate student, and an academic with an interest in the project was conducted. The aim was to develop six response options, one of which would be consistent with each of the three cognitive levels of moral development of either Kohlberg or Gilligan moral development theories. The current study used both Kohlberg's and Gilligan's stage theory of moral reasoning as it has been argued that people may have distinctly different orientations towards moral reasoning, based upon a 'justice' perspective or a 'care' perspective. As both theories essentially relate to three levels of moral development (i.e., Pre-conventional, Conventional, or Post-conventional (Kohlberg, 1976; Gilligan, 1982)), a participant's reasoning would be considered at a higher level if, for example, they selected Gilligan's Conventional level rather than Kohlberg's Pre-conventional level of reasoning.

Table 5 summarises the cognitive levels of moral development which were collated from Kohlberg (1976) and Gilligan (1982) and the corresponding response option for each scenario, developed for question 2, which aimed to assess which stage of moral development participants thought best explained their answer to question 1. Response options for each scenario were labelled K1, K2, K3, G1, G2, and G3, relating to the explanations corresponding to levels 1, 2, and 3, of Kohlberg's and Gilligan's theories of moral reasoning, respectively.

Table 5. *Cognitive levels of moral development that underpinned development of the scenarios (summaries collated from Kohlberg, 1976 and Gilligan, 1982) and the corresponding response options for question 2 for each scenario*

Moral Level	Level Description	Response option for question 2
Kohlberg Level 1 (K1)	<u>Pre-conventional level:</u> Behaviour is motivated by anticipation of pleasure or pain. This includes obey orders to avoid punishment and a view that the right action consists of what instrumentally satisfies one's own needs	Either to avoid making trouble for my self or to get some reward (e.g., promotion)
Kohlberg Level 2 (K2)	<u>Conventional level:</u> Increasing attention to others. Individuals' focus on good interpersonal relationships and acceptance of the rules and standards of one's group. Good behaviour is that which pleases others within the group. This often yields to a transitional sub-stage in which individuals come to see conventional morality as relative and arbitrary	It's what other people like me would do
Kohlberg Level 3 (K3)	<u>Post-conventional level:</u> Individuals act out of mutual obligation and a sense of public good. Right actions tend to be defined in terms of general individual rights, and in term of standards that have been critically examined and agreed upon by the whole society	Because it's the right thing to do
Gilligan Level 1 (G1)	<u>Pre-conventional level:</u> Caring for the self in order to ensure survival (a typical behaviour of children). This attitude is viewed as selfish by others, and women begin to see connections between themselves and others	To care for my own interests
Gilligan Level 2 (G2)	<u>Conventional level:</u> Good is equated with caring for others. This devotion often leads to ignoring the self, and transitions to a phase where women seek equilibrium between their caring for others and their desire to have their own needs met	To care for the interests of those involved
Gilligan Level 3 (G3)	<u>Post-conventional level:</u> The focus is on eliminating tensions between self and others and accepting of the principle of care as a universal ethical principle, which condemns exploitation and hurt in our life and others	To care for everyone's interest (including mine)

Finally, to enable between-group comparisons, participants were asked to report their gender and whether they held a pilot's licence (and if so, how long it had been held).

5.2.3 Procedure

Email addresses of New Zealand aviation businesses were collected using the search engines Google and Yahoo (with the domain extension for New Zealand) using the Keywords 'aviation' AND 'schools', 'aviation' AND 'clubs, and 'aviation' AND 'organisations'. A total of 142 aviation businesses in New Zealand were selected, from which a total of 310 email addresses consisting of 102 personal email addresses (personal email addresses of staff), and 208 general email addresses (email addresses beginning with 'info', 'enquiries', organisation's name, etc) were extracted. Each personal email address was sent a personalised email invitation to anonymously participate on the online survey. For the general email addresses, the email invitation asked the receiver to anonymously participate and also distribute the email invitation among their colleagues. Potential participants were informed that the study had undergone a process of ethical review⁷ and that they were guaranteed confidentiality by assuring them that no questions through which a participant could be identified were included in the interview, and that should personal or identifiable information have been disclosed by a participant, that information would not be recorded on the data sheet. Potential participants were also informed that they held the right to decline answering any questions should they so wish.

The survey was administered electronically via a website developed by the researcher to which participants were directed to complete the survey. Participants were asked to

⁷A review of the ethics of this study was undertaken by the School of Aviation, Massey University using the guidelines provided by the Massey University Human Ethics Committee. The project was deemed to be of low risk and therefore suitable for a 'low level notification' to Massey University Human Ethics Committee.

anonymously participate on the online survey; their anonymity was maintained by not asking questions through which they could be identified, and by submitting the survey online hence precluding usage of their personal email addresses through which they could be identified. Appendix A illustrates an example of the survey used in this study.

5.3 Results

The level of statistical significance, alpha, was set at $p = .05$ for all statistical tests, and all tests were conducted as two-tailed.

Overall, there were 175 completed surveys. However, as it is not known how many participants were approached (as email respondents were asked to distribute the original invitation to others aviation employees within or outside their organisations), it is not possible to calculate the exact response rate. That said, if only original invitations were considered, this would equate to a response rate of 56%. Although this may seem high, similarly high responses rates have been found in New Zealand aviation research (e.g. 60% in Gilbey, Fifield, & Rogers, 2006).

For each of the nine scenarios, participants were asked whether they would take action in the wrongdoing situation (*Yes/No*). For each scenario, Chi-Square test for goodness of fit was used to ascertain if there was a statistically predominant response (*Yes/No*). In scenarios 1, 5, 6, and 8, there was evidence that participants were statistically more likely to report that they would take action, but there was no statistically predominant response for scenarios 2, 3, 4, 7, and 9 (i.e., in the latter, participants were equally likely to report that they would take action or not take action). Participants' responses and the results of the Chi-Square test for goodness of fit for each scenario are shown in Table 6.

Table 6. *Whether participants would take action in each of the scenarios presented*

Scenario Number	Yes		No		Missing Response		Chi-Square test (Yes/No)			
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	X^2	<i>df</i>	sig
1 nc	138	78.4	37	21.0	1	.6	175	58.30	1	<.001
2 c	74	42.0	93	52.8	9	5.1	167	2.16	1	.14
3 c	75	42.6	96	54.5	5	2.8	171	2.56	1	.11
4 cc	91	51.7	76	43.2	9	5.1	167	1.35	1	.27
5 nc	153	86.9	15	8.5	8	4.5	168	113.36	1	<.001
6 c	152	86.4	21	11.9	3	1.7	173	99.20	1	<.001
7 nc	95	54.0	77	43.8	4	2.3	172	1.88	1	.17
8 cc	110	62.5	62	35.2	4	2.3	172	13.40	1	<.001
9 cc	85	48.3	86	48.9	5	2.8	171	.01	1	.94

Note: nc = not related; c = related; cc = closely related

For each scenario, the relationship between the seriousness ratings and the percentage of participants who stated that they would take action was tested using Spearman's rank order correlation. (Spearman's rather than Pearson's correlation was used, as inspection of a scatter plot suggested that the relationship between the two variables was non-parametric). There was evidence that the relationship between the assigned seriousness ratings and participants' intention to take action was significant, $r_s = .694$, $n = 9$, $p = .04$; that is participants were more likely to take action in the scenarios that were judged to be more serious.

Chi-Square test of independence was used to explore whether females and males differed in their responses to whether they would take action (question 1) in each of the presented scenarios. The results for each of the nine scenarios are shown in Table 7.

Table 7. *Differences in females and males intentions to take action, by scenario*

Scenario	Take action				Chi-Square test			
	No		Yes		<i>n</i>	X^2	<i>df</i>	sig
	Female	Male	Female	Male				
1 nc	8	29	48	90	175	2.32	1	.165
2 c	22	71	31	43	167	6.33	1	.013
3 c	27	69	28	47	171	1.64	1	.248
4 cc	18	58	36	55	167	4.77	1	.032
5 nc	4	11	49	104	168	.182	1	.778
6 c	3	18	52	100	173	3.38	1	.081
7 nc	19	58	37	58	172	3.95	1	.051
8 cc	11	51	43	67	172	8.39	1	.006
9 cc	22	64	32	53	171	2.88	1	.102

In Table 7, it can be seen that there were significant differences in the responses (*Yes/No*) of males and females in three of the nine scenarios. In each case where the association was significant, females were more likely to report that they would take action (*Yes* responses) than were males.

To investigate the relationship between intention to take action and flight experience amongst participants who were pilots, a median split of the time a pilot licence was held was calculated (value 4 years). A Chi-Square test using flying experience (low = less than 4 years vs. high = equal to or greater than 4 years) and reporting intention (*Yes/No*) were conducted for each scenario⁸. Results of the Chi-Square test of independence are shown on Table 8, where it can be seen that no comparisons achieved statistical

⁸Although anecdotal evidence suggests that 1000 hours (personal communication) is a useful value for determining experience (high/low), in the current study, the term low and high are used simply to denote to which half of the median split a participant was assigned.

significance, which suggested that a pilot's flying experience did not appear to be related to their decision to take action for any scenario.

Table 8. *Relationship between participants' flying experience and their responses to whether they would take action in each of the situations presented to them on each scenario*

Scenario	<i>n</i>	χ^2	<i>df</i>	Sig
1 nc	163	1.02	1	.336
2 c	156	.74	1	.423
3 c	159	.24	1	.635
4 cc	155	.02	1	1.0
5 nc	156	1.03	1	.390
6 c	161	.48	1	.633
7 nc	160	.06	1	.874
8 cc	160	.01	1	1.0
9 cc	160	.00	1	1.0

To test whether participants were more likely to take action was associated with how close they were to the hypothetical protagonist in each scenario, the number of each participant's *Yes* response was calculated for the 3 scenarios of each level of relatedness (thus, the range of scores for each level of relatedness for each participant was 0-3). Application of Friedman's test suggested evidence of statistically significant changes in the distribution of responses associated with the level of relatedness to the event, $\chi^2 = 65.55$, $df = 2$, $p < .001$. Follow-up pair-wise applications of the Wilcoxon Test show that participants were more likely to intervene if they were *not related* ($M = 2.27$) than closely related ($M = 1.71$) to the protagonist, ($Z = 6.46$, $n = 159$, $p < .001$), and more likely to take action if they were *not related* ($M = 2.27$) than *related* ($M = 1.75$) to the protagonist ($Z = 6.67$, $n = 161$, $p < .001$). There was no statistically significant

difference in the likelihood of taking action between *related* ($M = 1.75$) and *closely related* (1.71) ($Z = .68, n = 157, p = .496$).

Inspection of the descriptive statistics for the mean rate of taking action by level of relatedness suggested that gender may interact with the level of relatedness when deciding whether to take action. The mean number of times participants would take action by gender and level of relatedness are shown in Table 9. (Standards deviations are not reported as the data was measured on a nominal scale of measurement, and statistical test would be non-parametric).

Table 9. *Descriptive statistics showing the mean number of interventions (question 1) by gender and level of relatedness*

Gender	Closely Related	Related	Not Related
Male	1.49	1.66	2.19
Female	2.10	2.02	2.45

Chi-Square test of independence was used to test the relationship between gender and intention to intervene for each level of relatedness. There was evidence that females are more likely than males to take action when their relationship with the protagonist is *closely related* $\chi^2 = 7.75, df = 3, p < .005$. There was no evidence that females or males differed in their intention to take action when their relationship to the protagonist was either *related* $\chi^2 = 5.23, df = 3, p = .115$ or *not related* $\chi^2 = 4.65, df = 3, p = .157$. (Note: Fisher's exact test was used for *related* and *not related* due to expected cell counts less than 5).

In each of the nine scenarios, for question 2, the number of participants' explanations for whether they would or would not take action in the situations described in each scenario are reported in Table 10.

Table 10. *Participants' explanations for intended action*

Scenario	Yes/No	K1		K2		K3		G1		G2		G3	
		n	(%)	n	(%)	n	(%)	n	(%)	n	(%)	n	(%)
1 nc	No	5	(3)	11	(7)	0	(0)	16	(10)	0	(0)	2	(1)
	Yes	3	(2)	10	(6)	47	(28)	9	(5)	52	(31)	11	(7)
	Total	8	(5)	21	(13)	47	(28)	25	(15)	52	(31)	13	(8)
2 c	No	33	(23)	9	(6)	1	(1)	21	(14)	3	(2)	8	(6)
	Yes	1	(1)	7	(5)	7	(5)	2	(1)	37	(26)	16	(11)
	Total	34	(23)	16	(11)	8	(6)	23	(16)	40	(28)	24	(17)
3 c	No	29	(19)	27	(18)	3	(2)	20	(13)	2	(1)	1	(1)
	Yes	2	(1)	7	(5)	22	(15)	1	(1)	30	(20)	5	(3)
	Total	31	(21)	34	(23)	25	(17)	21	(14)	32	(21)	6	(4)
4 cc	No	18	(12)	28	(18)	0	(0)	20	(13)	0	(0)	2	(1)
	Yes	0	(0)	16	(10)	26	(17)	2	(1)	24	(16)	17	(11)
	Total	18	(12)	44	(29)	26	(17)	22	(14)	24	(16)	19	(12)
5 nc	No	6	(4)	0	(0)	0	(0)	3	(2)	4	(3)	1	(1)
	Yes	4	(3)	9	(6)	38	(24)	22	(14)	57	(37)	12	(8)
	Total	10	(6)	9	(6)	38	(24)	25	(16)	61	(39)	13	(8)
6 c	No	5	(3)	4	(2)	2	(1)	1	(1)	2	(1)	4	(2)
	Yes	6	(4)	5	(3)	11	(7)	18	(11)	63	(39)	41	(25)
	Total	11	(7)	9	(6)	13	(8)	19	(12)	65	(40)	45	(28)
7 nc	No	39	(25)	6	(4)	0	(0)	13	(8)	6	(4)	2	(1)
	Yes	2	(1)	4	(3)	7	(4)	8	(5)	66	(42)	3	(2)
	Total	41	(26)	10	(6)	7	(4)	21	(13)	72	(46)	5	(3)
8 cc	No	25	(15)	6	(4)	0	(0)	7	(4)	13	(8)	6	(4)
	Yes	0	(0)	2	(1)	36	(22)	2	(1)	54	(33)	15	(9)
	Total	25	(15)	8	(5)	36	(22)	9	(5)	67	(40)	21	(13)
9 cc	No	25	(15)	14	(8)	0	(0)	18	(11)	20	(12)	6	(4)
	Yes	1	(1)	2	(1)	20	(12)	1	(1)	53	(32)	5	(3)
	Total	26	(16)	16	(10)	20	(12)	19	(12)	73	(44)	11	(7)

Due to low expected cell counts for some combinations of responses (cells), it was not possible to statistically explore the relationship between all possible answers for question 2 in relation to responses to question 1. Therefore, to test whether participants who answered *Yes* to question 1 for each scenario tended to operate at a higher level of moral reasoning than participants who answered *No*, the level of moral reasoning (i.e., Pre-conventional, Conventional, Post-conventional) was used for question 2, rather than the more detailed levels of either Kohlberg's or Gilligan's moral development theories (thus making the analysis 2 x 3, rather than 2 x 6). Chi-Square tests of independence were then calculated for each scenario using participants' responses to question 1 (*Yes/No*) and their corresponding level of moral reasoning to question 2, Pre-conventional (PreC), Conventional (Conv), Post-conventional (PostC) as data. The results of the Chi-Square tests of independence are shown in Table 11. (Raw data may be inspected in Table 10).

Table 11. *Relationship between response to question 1 and level of moral reasoning indicated in question 2*

Scenario	Chi-Square test of independence				Modal Response	
	<i>n</i>	<i>df</i>	X^2	<i>sig</i>	<i>Yes</i> (n)	<i>No</i> (n)
1 nc	166	2	49.81	<.001	Conv (22)	PreC (21)
2 c	145	2	69.95	<.001	Conv (44)	PreC (54)
3 c	149	2	57.80	<.001	Conv (37)	PreC (49)
4 cc	153	2	70.86	<.001	PostC (40)	PreC (38)
5 nc*	71	2	12.99	<.001	Conv (66)	PreC (9)
6 c*	75	2	2.98	.231	Conv (68)	PreC/Conv/postC (6)**
7 nc	156	2	72.84	<.001	Conv (70)	PreC (52)
8 cc	166	2	70.92	<.001	Conv (56)	PreC (32)
9 cc	165	2	53.95	<.001	Conv (55)	PreC (43)

*Fisher's exact test was used, due to one or more expected cell counts being less than 5

** There was no single modal response to question 2 for participants who answered *No* to question 1; that is, each level was chosen the same amount of times.

With the exception of scenario 6, there was evidence of a significant relationship between participants' decision to become involved and their reason for their decision; that is, participants who reported that they would take action appeared to operate at a higher level of moral reasoning than participants who reported that they would not take action. Table 11 shows that when participants responded that they would take action (*Yes*), the modal explanation for why they did so, in all except scenario 4, was consistent with conventional reasoning. Contrarily, when participants responded that they would not take action, the modal level of moral reasoning was most likely to be Pre-conventional.

To explore whether participants' level of moral reasoning was related to their degree of relatedness to the protagonist, participants' answers to question 2, indicating their level of moral reasoning for each scenario, were assigned a numerical value (i.e., Pre-conventional = 1, Conventional = 2, Post-conventional = 3). The numerical values were then summed for the three scenarios of each level of relatedness (the range of possible scores for each participant's answer to question 2 would therefore be 3–9 for each level of relatedness, with lower values suggesting lower levels of moral reasoning and vice versa). Application of Friedman's test suggested that there were no statistically significant changes in the distribution of levels of moral reasoning associated with the level of relatedness to the event, $\chi^2 = 3.35$, $df = 2$, $p = .188$. The mean scores were: *closely related* = 6.15 ($SD = 1.45$); *related* = 5.87 ($SD = 1.20$); and *not related* = 5.99 ($SD = 1.47$).

5.4 Discussion

The first aim of this study was to explore whether differences in the level of moral reasoning were associated with differences in intentions to intervene in wrongdoing situations as one means of understanding under-reporting in aviation. There was evidence that, for eight of the nine scenarios tested, there was a significant association between whether participants believed that they would intervene upon becoming aware of wrongdoing and their level of moral reasoning. Specifically, with the exception of scenario 6, the modal level of moral reasoning was higher for participants who stated that they would intervene than participants who stated they would not intervene. As such, the relationship between participants' level of moral reasoning and their intentions to intervene in wrongdoing provides evidence to support Hypothesis 1.

Finding evidence that there is a relationship between people's level of moral reasoning and whether or not they would intervene (e.g., report their concerns about something they perceive to be wrongdoing) suggested at least two potential directions for future research. One approach would be to carry out an intervention study using participants that stated they would not take action in wrongdoing situations and provide half of them with, for example, a short course in business and workplace ethics, whilst the other half would serve as a control condition. If, subsequently, there was found to be a causal relationship between level of moral reasoning and intention to intervene, then this would be good evidence that ethics education would be a potentially efficacious means to increase safety in aviation. A second and perhaps more pragmatic approach would be to investigate ways in which information about what should be reported could be made available to aviation employees. Nevertheless, there is some evidence to support the

former approach as research has suggested that education may indeed help to improve people's levels of moral reasoning (Rest, 1986; Self, Baldwin, & Wolinsky, 1992; Holm, Nielsen, Norup, Vegner, Guldmann, & Andreasen, 1995), whilst it would be difficult to ensure that a list of what should be reported would be exhaustive.

Similarly to Study 2, the findings of the current study indicate that when people become aware of wrongdoing in aviation, there is a great deal of uncertainty in their evaluation as to whether they believe that they would or would not become involved (i.e., Yes/No answers). For example, in five of the nine scenarios there was no statistically predominant response for what they would do on becoming aware of wrongdoing – that is, in five of the nine scenarios participants were equally likely to not intervene than to intervene. However, in four of the scenarios there was a statistically predominant response (take action), but nevertheless, the percentage of participants who would not intervene still ranged between 8% and 35%. In principle, this finding confirms that despite reporting of safety concerns being a legal requirement, under-reporting is still one of the key problems facing the aviation industry (NZALPA, 2005). Communicating safety concerns through the appropriate channels, as seen in the case of the Air Adventures accident, could have helped avoid the accident that ultimately occurred (CAA NZ, 2006a). Thus, this study again shows that under-reporting is likely to occur and on occasions, it could lead to accidents such as that of Air Adventures.

Although there was a low rate of intentions to intervene in wrongdoing situations, which was arguably consistent with accidents such as the Air Adventures accident, there was however, a strong relationship between perceived seriousness of the wrongdoing and likelihood of a participant acting upon such wrongdoing. Although a causal

relationship would need to be determined, this relationship does suggest that emphasising the importance and potential negative implications of any wrongdoing could be a means of raising the level of reporting.

This study also manipulated the level of relatedness between the person assessing the situation (i.e., the participant) and the person(s) involved in wrongdoing, to investigate whether this affected participants' reporting intentions. Hypothesis 2, stating that participants would differ about whether they felt they had to intervene or not depending on the level to which they were related to the actor in the wrongdoing scenario was supported. The results suggested that overall, participants believed that they were more likely to intervene in wrongdoing situations if they were not related to the person(s) involved in such wrongdoing, than if they were related or closely related to them. The findings showed no difference in the likelihood of intervening if the participant was either related or closely related to the person(s) involved in wrongdoing. As such, this finding supports the evolutionary perspective argued by Hamilton (1964), and demonstrates that 'relatedness' is a factor likely to affect aviation employees propensity to report wrongdoing in aviation.

Arguably, the nature of aviation is that it is indeed a tight knit community where many people who work together may socialise together. For example, "The aviation industry is a unique business made up of a tight-knit community with a special bond in common" (Dawson Aircraft, 2010). This means that in some instances where people become aware of wrongdoing, it is likely that they have a relationship to the protagonist. If this relationship is closely related, or even just related, then the current findings indicate that this could result in higher levels of under-reporting. Indeed, there are reasons to suspect

that the lack of communication of concerns prior to the Air Adventures accident was an example of this possibility. The influence of close relationships may prove difficult to overcome, as the aphorism ‘not report on people’ may be even more likely to occur if there is a close relationship between the wrongdoer and the observer of wrongdoing. Nevertheless, it is possible that ethical education or clearer reporting guidelines could allow the effect of close relationships to be set aside when considering the potential implications of not reporting wrongdoing.

The findings of the current study provided evidence of a significant relationship between gender and intentions to intervene for three of the nine scenarios, with females more likely than males to take action in a situation where wrongdoing was apparent, more so if there was a close relationship between the witness and the person involved in wrongdoing. This finding therefore provided partial support for Hypothesis 3. The significant relationship between gender and intention to intervene in wrongdoing was also found in Study 2, where females were more likely to report wrongdoing than males.

An exploratory test of the relationship between the length of time a pilot had held a pilot’s licence and their stated intention to intervene failed to find any evidence of a relationship. However, it is possible that this lack of evidence may have been confounded by other factors; for example, pilots who had held their licence longer may in principle be less likely to intervene and also have built more close friendships in their industry. Moreover, the use of median split as a basis for comparison between groups may have failed to reveal that a difference could exist if a different value had been used.

Overall, there was evidence that when people become aware of wrongdoing that involves a person to whom they are closely related, they will be less likely to intervene. However, there was evidence that gender may interact with the level of relatedness when deciding whether to intervene, as there was evidence that females may be more likely than males to intervene in wrongdoing situations where there was a close relationship between the witness and the person involved in wrongdoing. In line with the arguments of inclusive fitness concept (Hamilton, 1964), it could therefore be assumed that the more related the individual to the person involved in wrongdoing, the less likely that the individual will take corrective action in the wrongdoing situation, although this may be less so when the observer is female.

A number of potential limitations are noted in the current study. First, as participants were a self-selecting sample, this may limit the generalisability of the results to all aviation employees. For example, it is possible that people who are more likely to volunteer to take part in research studies differ somehow, on variables of interest, from those who do not volunteer to participate. Second, it should be acknowledged that there may have been differences in interpretation of wrongdoing scenarios presented to participants. Although the scenarios were based on real-life wrongdoing situations and have been reported on the regulatory authority's incident and accident database, there is a possibility that given people's differences in background, education and experiences, not all participants would have viewed the presented scenarios as wrongdoing situations, or agreed with the level of seriousness assigned to each of these scenarios (although it was noted there was a significant relationship between seriousness ratings and intention to intervene). Third, it has long been recognised that people do not always behave in a way that is consistent with the beliefs that they express (LaPiere, 1934). As

such, it is unclear to what extent these hypothetical findings would hold true in real life situations, although later studies have shown that attitudes are a good predictor of behaviour (e.g., Sheppard, Hartwick, & Warshaw, 1988). Fourth, the reliability and validity of participants' answers to question 2 are difficult to ascertain and it is possible that these answers measure something other than moral reasoning.

In conclusion, the findings of the current study suggest that there is an association between participants' level of moral reasoning and their likelihood to intervene upon observing wrongdoing in an aviation context. Similarly, as in Study 2, there was clear evidence that whether or not wrongdoing is communicated depends very much upon who it is that observes it and also upon their relationship to the person committing the wrongdoing. Finally, there is some evidence that female aviation employees may be more likely to intervene upon becoming aware of wrongdoing in an aviation context.

CHAPTER SIX

Study 4

The Relationship between Psychological Stress and Aviation Employees’ Reporting Intentions

6.1 Introduction

The Air Adventures accident raised questions about obligations of co-workers towards their employers, towards themselves and towards each other, as after the accident had occurred, many then expressed they had concerns about the pilot. (The findings from Study 3 indicated that hindsight bias was not necessarily a viable alternative explanation for why concerns were not communicated). A CAA NZ medical assessor expressed how Michael Bannerman’s well known ‘erratic behaviour’ labelled him as an “accident waiting to happen” (New Zealand Herald, 2004). Michael Bannerman was also believed to have been involved several times in events that the pilot later “boasted about during Friday night drinks at Air Adventures” (New Zealand Herald, 2004). Although ‘erratic behaviour’ was not further defined, the fact that the pilot was described as ‘an accident waiting to happen’ implies that his behaviour may have been inconsistent with the professional demeanour and characteristics one might reasonably expect in pilots.

Similarly, in the Japan Airlines DC-8 crash in 1982 that killed 24 passengers and injured 141, it was alleged that the captain suffered from a mental instability which management were aware of, but no efforts were made to assess his psychological

wellbeing. It was not until the accident had occurred that the captain was put into a psychiatric institution. More accidents such as the SilkAir Boeing 737-700 crash in 1997 that killed 104 passengers, and the Egypt Air Boeing 767 crash in 1999 that killed 217 passengers (Morse & Bor, 2006), found no evidence of mechanical failures but rather, pointed to pilots' actions as the underlying cause of these accidents. In the case of the SilkAir crash, the cause of the crash was allegedly a deliberate act of a demoted captain. Prior to the crash, the latter was informally reported for his non-compliance with airline standards. Likewise, investigations into the Egypt Air crash also indicated that the captain may have deliberately caused the accident, as no evidence of mechanical failure could be found (Morse & Bor, 2006).

In the latter examples, at face value, it seems hard to believe that a pilot who is capable of deliberately committing a suicidal act or is 'an accident waiting to happen' could have been able to mask the imbalance of their mental health from their friends, family and peers. This supposition therefore suggests that friends, family and peers were either unable to detect symptoms, such as psychological stress, that might indicate the imbalance of the mental health of the aforementioned pilots, or did not realise that they were possible signs of stress that could turn detrimental to aviation safety. It could also be suggested that friends, family and peers decided not to communicate any concerns that they may have had, or perhaps, employers and authorities fail to understand the effect that psychological problems might have on safety. This has been evidenced by the case of a pilot working at Qantas airline, who was allowed to continue flying passenger jets despite his self reporting of psychological problems, which he believed made him unfit to fly. The pilot repeatedly complained to his colleagues of urges to crash the planes he was flying. Although the pilot was treated by numerous doctors, he

was allowed to return to the cockpit, which according to the pilot, worsened his mental condition (Sydney Morning Herald, 2010).

Niaz (1997) noted that the aviation profession demands high physical and psychological standards of its participants like no other profession. Interaction with high complex aircraft, concerns about job security, frequent family separation, and adverse weather are some of the factors that continue to exercise pressure on today's pilots, and that in principle could contribute to psychological stress.

In aviation, to issue a medical certificate, an approved medical examiner must be satisfied that the applicant is physically and psychologically fit to fly. However, more emphasis is given to the physical examination, and no psychological assessment exists as such. A medical examiner relies on the mental health history provided by the applicants themselves and on their performance history as pilots. Butcher (2002) stated that most airlines' current psychological assessments are but minimal strategies that do not effectively detect serious mental health problems in pilots, and therefore are incapable to sufficiently address mental health problems that may exist.

One further reason that pilots' medical examinations may not be able to detect potential symptoms of stress is because they are not always apparent or may, for short periods of time at least, be able to be masked. However, although symptoms may not be apparent at the time of a medical examination, it seems unlikely that they could be hidden all of the time from people with whom pilots interact frequently; for example, family, friends, colleagues and passengers might be more likely to witness signs of stress that either do not occur or are hidden during a medical examination.

In defining stress, Campbell and Bagshaw (1991) stated that “the simplest way to understand human stress is to relate it to the material strength of an aircraft. The demands placed on it by the pilot or the environment, in which it flies, must not exceed its capacity to meet them. In relation to the human body too, this is what stress is all about” (p. 158). Roscoe (1978) noted that associating the word stress with flying implies danger.

In several studies (e.g., Sloan & Cooper, 1986; Fiedler, Della Rocco, Schroeder, & Nguyen, 2000), pilots reported that life stresses have a negative effect on their performance. Although it would be challenging to investigate the direction of this relationship, that is, whether poor performance triggers life stresses or vice versa, or whether indeed the relationship is a causal one, several studies (e.g. Alkov & Borowsky, 1980; Chappelow, 1989; Stokes & Kite, 1994) reported a significant relationship between stressors and accidents. Some studies have also suggested routes by which life stress may directly or indirectly impair pilot performance. For example, Little, Gaffney, Rosen, and Bender (1990) and Sloan and Cooper (1986) noted the following symptoms of stress: irritability, fatigue, inability to concentrate, increased risk taking, worry, memory difficulty, and a tendency to not listen carefully. Parsa and Kapadia (1997) found that some U.S. Air Force fighter pilots admitted to the following symptoms of stress: insomnia, irritability, dissatisfaction, fatigue, self-accusation/blaming/guilt, and pessimism, all of which are consistent with the common clinical notion of stress (American Psychiatric Association, 2000). Other common symptoms of stress include headaches, increased heartbeats and sighing, depression, boredom and irritability, substance abuse and binge eating, and indecisiveness, loss of productivity and forgetfulness (Flight Safety Foundation, 2006).

Cubbin (2000) conducted a survey to explore pilots' willingness to disclose medical conditions to the authority. The findings indicated that 46% ($n = 567$) of pilots have had a medical condition for which they chose not to seek treatment for fear that disclosure might jeopardise their flying; 32% ($n = 563$) have sought treatment but failed to disclose their condition on their medical application for fear that disclosure might jeopardise their flying; and 21% ($n = 561$) took medication without knowledge of the authority. These findings arguably highlight the significant problem of under-reporting in aviation, particularly with regard to symptoms of psychological stress. That is, if the pilots themselves do not disclose this information, then safety may be reliant upon others to voice their concerns.

In light of these findings and those of Study 2, pointing to the usefulness of further reporting guidelines from the regulatory authority, and given the mediocrity of the information produced by the regulatory authority regarding safety from the perspective of an aviation worker exhibiting stress symptoms, the current study sought to explore aviation professionals' beliefs and reporting intentions upon becoming aware of a series of stress symptoms that may in principle indicate a propensity towards unsafe actions and behaviours. Specifically, it was the aim of this study to explore the extent to which participants varied in their evaluation of whether stress symptoms might be expected to affect aviation safety, and what actions they would take if such symptoms were exhibited by someone within their aviation environment.

6.2 Method

6.2.1 Participants

Two hundred and two participants (57 females and 145 males) were recruited from 142 aviation organisations within New Zealand flying clubs (91), flight training schools (15), aviation associations (5), air services (16), and air charters (15). Participants with flying experience ($n = 182$) varied from flight students with less than 1 year flying experience, to senior aviators with 50 years experience ($M = 6.77$, $SD = 7.91$). Non-pilots (20) consisted of air traffic controllers, managers, and administrators.

6.2.2 Materials and Design

6.2.2.1 Overview

A questionnaire was designed to: i) investigate participants' perception of the effect of stress-related symptoms on aviation safety, and ii) the action participants would take upon becoming aware of someone displaying such symptoms in the aviation environment.

Stress symptoms were collated from current literature and a list of 48 symptoms was compiled. This list was first pre-tested on a group of 9 lay individuals to determine which symptoms would be perceived to lead to unsafe behaviour. Of the 48 symptoms, 25 symptoms were perceived as most likely to lead to unsafe behaviour. These 25 symptoms were then used to develop a questionnaire that participants were asked to complete, with the aim to measure the extent to which they believed the stress

symptoms were likely to have a negative on aviation safety and the actions they would take if such symptoms were exhibited by someone in their work environment.

6.2.2.2 Development of Questionnaire

Current literature was consulted to extract stress-related symptoms that may be more common amongst those working in the aviation industry. As such, a total of 48 stress-related symptoms were collated from available literature (Niaz, 1997; Rice, 1999; Flight Safety Foundation Journal, 2006). The stress-related symptoms were selected to satisfy the following criteria: i) they should not contain medical jargon; ii) they should be worded in plain language so that they could be understood by a lay person, with no background in psychology, medicine, or counselling.

To select which of the 48 stress symptoms would be used to form the final questionnaire, a pilot study was conducted whereby 9 lay individuals (whom had no formal qualifications in psychology, medicine, or counselling) were presented with the list of 48 symptoms (as shown in Appendix B), and asked to identify which symptoms they believed may be indicative of a person suffering from the kind of stress that could lead to unsafe behaviour.

As displayed on Appendix B, responses obtained from the pilot study indicated that some symptoms were perceived as significantly more likely to be indicative of a problem that may lead to unsafe behaviour. As 25 items would be a reasonable number for participants to be questioned upon, the top 25 items selected by participants of the pilot study would be used.

Table 12. *The 25 Symptoms selected by participants of pilot study*

Symptoms
1. Substance abuse
2. Impaired judgment
3. Slow and irregular hand-eye coordination
4. Decreased attention
5. Panic attacks
6. Trembling
7. Forgetfulness
8. Increased risk taking
9. Anxiety
10. Indecisiveness
11. Self-destructive behaviour
12. Increased heart rate (Complaining of)
13. Work mistakes and loss of productivity
14. Difficulty concentrating
15. Depression
16. Nervousness
17. Obsessions
18. Hostility
19. Decreased motivation
20. Social isolation (e.g., being a loner)
21. Mood swings
22. Difficulty sleeping
23. Carelessness
24. Low self esteem
25. Short temperedness

6.2.3 Procedure

A World Wide Web based survey was developed and administered electronically via a website developed by the researcher. Email addresses of personnel for each of the 142 aviation organisation were compiled using internet search engines (Google and Yahoo search engines). A total of 310 email addresses consisting of 102 personal email addresses (personal email addresses of staff), and 208 general email addresses (email addresses beginning with a generic name such as organisation's name, 'info', or 'enquiries'). Each personal email address was sent a personalised email invitation to

anonymously participate on the online survey. For the general email addresses, the email invitation asked the receiver to anonymously participate and widely distribute the email invitation among interested colleagues. Potential participants were informed that the study had undergone a process of ethical review⁹ and that they were guaranteed confidentiality by assuring them that no questions through which a participant could be identified were included in the interview, and that should personal or identifiable information have been disclosed by a participant, that information would not be recorded on the data sheet. Potential participants were also informed that they held the right to decline answering any questions should they so wish.

Participants were asked to indicate their gender and previous flight experience, including how long the pilot's licence was held. Then they were asked two questions:

Question 1: Do you think this symptom would negatively affect aviation safety? The response options were *Yes*, *No*, and *Not sure*. Participants were asked to tick one option against each of the 25 listed symptoms.

Question 2: If *Yes*, what would you do if you learned about someone suffering from any of the above symptoms? The response options were *do nothing*, *talk to the person*, *report to senior staff*, and *report to the CAA*.

See Appendix C for a sample of the questionnaire used in this study, as it appeared on the researcher's World Wide Web page developed for this study.

⁹A review of the ethics of this study was undertaken by the School of Aviation, Massey University using the guidelines provided by the Massey University Human Ethics Committee. The project was deemed to be of low risk and therefore suitable for a 'low level notification' to Massey University Human Ethics Committee.

6.3 Results

The level of statistical significance, alpha, was set at $p = .05$ for all statistical tests, and all tests were conducted as two-tailed.

Question 1 aimed to determine which of the 25 symptoms participants believed to be negatively affect aviation safety if exhibited by someone within the aviation environment. Participants' responses showed that *impaired judgment* (83%) and *substance abuse* (81%) were considered to be the most likely to affect aviation safety. Conversely, *short-temperedness* (5%), and *difficulty sleeping* (1%) were thought to be least likely to affect aviation safety. To test whether there was a statistically predominant response for each symptom (negatively affect/not affect aviation safety); Chi-Square test for goodness of fit was conducted on participants' responses for each symptom. As only the participants who perceived each symptom to have a negative effect on aviation safety would be likely to take any form of action (e.g., *do nothing*, *talk to the person*, *report to senior staff*, or *report to the CAA*), *No* and *Not sure* responses were collapsed into one heading, 'no negative effect on aviation safety'. Table 13 displays the symptoms presented to participants, whether each symptom is deemed to have a negative effect on aviation safety, and the results of the Chi-Square tests.

Table 13. *Participants' responses to question 1*

Symptoms that would affect aviation safety	Yes	(%)	No	(%)	Not sure	(%)	<i>n</i>	Chi Sq test Test <i>df</i> = 1	(sig)
Impaired judgment	168	(83)	17	(8)	10	(5)	195	101.95	<.001
Substance abuse	163	(81)	29	(14)	5	(2)	197	84.47	<.001
Increased risk taking	130	(64)	41	(20)	20	(10)	191	24.93	<.001
Depression	129	(64)	42	(21)	31	(15)	202	15.53	<.001
Forgetfulness	119	(59)	48	(24)	25	(12)	192	11.02	.001
Indecisiveness	113	(56)	53	(26)	20	(10)	186	8.60	.003
Slow and/or irregular hand-eye coordination	109	(54)	38	(19)	45	(22)	192	3.52	.061
Panic attacks	106	(52)	59	(29)	32	(16)	197	1.14	.285
Trembling	97	(48)	74	(37)	20	(10)	191	.08	.828
Decreased attention	94	(47)	67	(33)	35	(17)	196	.327	.568
Anxiety	83	(41)	88	(44)	16	(8)	187	2.36	.125
Difficulty concentrating	81	(40)	67	(33)	36	(18)	184	2.63	.105
Work mistakes and loss of productivity	79	(39)	98	(49)	15	(7)	192	6.02	.014
Self-destructive behaviour	72	(36)	68	(34)	45	(22)	185	9.07	.003
Obsessions	67	(33)	82	(41)	37	(18)	186	14.54	.001
Mood swings	56	(28)	104	(51)	31	(15)	191	32.67	<.001
Nervousness	52	(26)	109	(54)	36	(18)	197	43.93	<.001
Decreased motivation	46	(23)	103	(51)	36	(18)	185	46.75	<.001
Increased heart rate	31	(15)	123	(61)	26	(13)	180	77.35	<.001
Social isolation	31	(15)	130	(64)	32	(16)	193	88.92	<.001
Low self-esteem	26	(13)	144	(71)	21	(10)	191	101.16	<.001
Carelessness	25	(12)	145	(72)	22	(11)	192	105.02	<.001
Hostility	15	(7)	130	(64)	47	(23)	192	136.69	<.001
Short-temperedness	10	(5)	144	(71)	27	(13)	181	143.21	<.001
Difficulty sleeping	3	(1)	178	(88)	11	(5)	192	180.19	<.001

The results on Table 13 are presented in descending order of perceived importance. Chi-Square tests showed that six symptoms were significantly more likely to be perceived to have a negative effect on aviation safety (shown in bold font), six symptoms had no statistically predominant response, and thirteen symptoms were not perceived to have a negative effect on aviation safety. No symptom received total consensus regarding whether it was or was not likely to affect aviation safety.

To explore whether there were differences in the rate of *Yes* responses of males and females, Chi-Square tests of independence were used to explore the relationship between participants' gender and their interpretation of the effect of each symptom on flight safety. There was no significant evidence that gender was related to whether a symptom was perceived to affect aviation safety.

To explore whether there were differences in the rate of *Yes* responses associated with pilots' level of flying experience, Chi-Square tests of independence were used to explore the relationship between pilots' level of flying experience and their interpretation of the importance of each symptom. Therefore, based upon a median split of flying experience ($M_d = 4$ years), up to or less than 4 years was considered as low experience. There was no significant evidence that flying experience was related to whether a symptom was perceived to affect aviation safety.

Regarding question 2, the full results for each symptom are shown in Table 14. (It should be noted that question 2 was only asked if participants perceived that the symptom would negatively affect aviation safety).

Table 14. *Participants' responses to question 2*

Symptoms	Do nothing	Talk to the person	Report to senior staff	Report to the CAA	Overall % of safety consistent intentions**	Total n*	Chi-Square statistic (df = 1)	Sig
Impaired judgment	46	38	51	33	50%	168	0.0	1.0
Substance abuse	9	16	61	77	85%	163	82.08	<.001
Increased risk taking	32	23	70	5	58%	130	3.08	.079
Depression	56	26	47	-	36%	129	9.50	<.001
Forgetfulness	57	33	29	-	24%	119	31.27	<.001
Indecisiveness	38	27	43	5	42%	113	30.26	<.001
Slow and/or irregular hand-eye coordination	43	23	43	-	39%	109	4.85	.028
Panic attacks	37	24	39	6	42%	106	2.41	.120
Trembling	34	22	40	-	42%	96	2.67	.102
Decreased attention	39	21	33	1	36%	94	7.19	.007
Anxiety	28	35	19	1	24%	83	22.27	<.001
Difficulty concentrating	40	16	13	12	31%	81	11.86	.001
Work mistakes and loss of productivity	47	16	16	-	20%	79	27.96	<.001
Self-destructive behaviour	46	15	10	1	15%	72	34.72	<.001
Obsessions	33	8	26	-	39%	67	3.36	.067
Mood swings	49	4	3	-	5%	56	44.64	<.001
Nervousness	35	11	6	-	12%	52	30.77	<.001
Decreased motivation	36	6	4	-	9%	46	31.39	<.001
Complaining of increased heart rate	24	7	-	-	0%	31	-	-
Social isolation	25	5	1	-	3%	31	27.13	<.001
Low self-esteem	21	5	-	-	0%	26	-	-
Carelessness	16	9	-	-	0%	25	--	-
Hostility	12	2	1	-	7%	15	11.26	<.001
Short-temperedness	6	4	-	-	0%	10	-	-
Difficulty sleeping	3	-	-	-	0%	3	--	-
Overall	812	396	555	141	37%	1904	137.68	<.001

* n refers to the subset of participants who perceived each symptom to have a negative effect on aviation safety

** Percentage of participants who answered *Yes* who then made a safety consistent action

To test if participants' intended action for symptoms perceived as likely to have a negative effect on aviation safety would in fact be consistent with safety (i.e., the participant would communicate their concerns to those likely to take action), the four response options to question 2 were collapsed into two dichotomous categories: 'safety consistent' (*report to senior staff*, and *report to the CAA*); and 'safety inconsistent' (*do nothing*, and *talk to the person*,). Chi-Square tests for goodness of fit were then conducted using participants' answers regarding which action they would take if they believed a symptom would negatively affect aviation safety. The results of the Chi-Square tests for goodness of fit are shown in Table 14.

It can be seen on Table 14, that only the symptom *substance abuse* elicited a statistically significant predominant response that was 'safety consistent'. Four of the five symptoms which were statistically more likely to have been perceived as likely to have a negative effect on aviation safety (i.e., *increased risk taking*, *depression*, *forgetfulness*, and *indecisiveness*), elicited a statistically predominant response that was 'safety inconsistent', whilst one (i.e., *impaired judgment*) failed to elicit a statistically significant response. The predominant response was 'safety inconsistent' for the 19 symptoms that were not perceived to have a negative effect on aviation safety.

Chi-Square tests of independence were used to explore the relationship between participants' gender and their intended action (safety consistent vs. safety inconsistent) upon becoming aware of symptoms that they believed could potentially have a negative effect on aviation safety. Due to a number of low expected cell counts, these tests were not applied to the following symptoms of stress: *self destructive behaviour*, *mood swings*, *nervousness*, *decreased motivation*, *complain of increased heart rate*, *social*

isolation, low self-esteem, carelessness, hostility, short temperedness, and difficulty sleeping. Of the remaining 14 stress symptoms, there was no evidence that gender was related to intended action.

Chi-Square tests of independence were also used to explore the relationship between pilots' level of flying experience and their intended action. As before, based upon a median split of flying experience ($M_d = 4$ years), up to or less than 4 years was considered as low experience. Due to a number of low expected cell counts, these tests were not applied to the following symptoms of stress: *self destructive behaviour, mood swings, nervousness, decreased motivation, complain of increased heart rate, social isolation, low self-esteem, carelessness, hostility, short temperedness, and difficulty sleeping.* There was evidence that *flying experience* was related to whether the intended action for the symptom of stress *anxiety*, whereby pilots with more than 4 years flying experience were more likely to believe they would make a safety consistent response, $\chi^2 = 4.19$, $df = 1$, $p = .043$. No other Chi-Square tests of independence approached statistical significance.

Although it was not possible to ascertain which of the 25 symptoms were objectively believed to have a negative effect on aviation safety, it was possible to explore the extent to which the action taken by participants for symptoms perceived to have greater negative effect on aviation safety were more likely to be safety consistent. That is, the number of times each symptom was perceived to have a negative effect on aviation safety was plotted against the number of times each symptom elicited a 'safety consistent' response to question 2. Following inspection of a scatter plot of the two variables, which suggested evidence of a linear relationship, Pearson's correlation was

conducted on the number of *Yes* responses to question 1 and the rate of safety consistent responses to question 2, for each symptom. There was significant evidence of a strong relationship between perceived effect of a symptom on flight safety and the likelihood of it being reported in a way that would be consistent with aviation safety, $r = .904$, $n = 25$, $p < .001$.

Of the responses to question 2 for the 25 symptoms, there were 696 'safety consistent' responses and 1208 'safety inconsistent' responses. Chi-sq test for goodness of fit indicated that 'safety inconsistent' was the statistically predominant response, overall, $\chi^2 = 137.68$, $df = 1$, $p < .001$.

6.4 Discussion

Consistent with the findings of Studies 2 and 3, the current study found a wide degree of variability in participants' responses; that is, there was evidence of difference in opinion about whether many symptoms of stress were indeed likely to have a negative effect on aviation safety and what would be the intended course of action if they were indeed deemed to have a negative effect on aviation safety. Overall, a clear result emerged whereby participants' actions having observed symptoms of stress that they believe could affect aviation safety, if exhibited by someone within the aviation environment, was 'safety inconsistent.' That is, they would 'do nothing' or, at best, 'talk to the person' who exhibited the symptom.

The findings suggested that six specific symptoms of stress (i.e., impaired judgment, substance abuse, increased risk taking, depression, forgetfulness, and indecisiveness)

are perceived, overall, as significantly likely to have a negative effect on aviation safety. Contrarily, the remaining symptoms were not, overall, perceived to have such effect.

The symptoms that participants perceive as likely to have a negative effect on aviation safety might reasonably be expected to be the symptoms that participants would be most likely to report to someone such as a manager or the regulatory authority. Indeed, there was evidence to support this expectation, as the perceived importance of the stress symptoms was found to be positively related to the likelihood of the participant performing safety consistent behaviour, such as reporting their concerns.

Although the relationship between perceived severity of symptoms and the likelihood of safety consistent behaviour may appear at face value to be a positive finding, there are in fact important negative implications of the overall pattern of results. That is, only for one symptom perceived to have a potential negative effect on aviation safety (substance abuse) was the statistically predominant response consistent with safety (i.e., reporting). Whilst it is reasonable that a participant might not see the need to report a symptom such as short-temperedness and difficulty sleeping to someone more senior or to the regulatory authority—not least because the statistical majority of participants indicated these symptoms were not likely to have a negative effect on aviation safety—it is somewhat counter intuitive that for symptoms such as impaired judgement and increased risk taking, safety consistent response (i.e. reporting) was not the statistically predominant response.

This finding may suggest that there is some reluctance to report psychological issues in aviation. Indeed, given that the majority of participants will have had no training in how

to recognise symptoms of stress or understanding of the effect they could potentially have on the behaviour of a person exhibiting them, such reluctance is perhaps understandable. However, what these findings very clearly demonstrate is a pathway via which aviation accidents could occur without the authorities ever becoming aware before the event that a problem may exist. That is, these findings suggest that after another event such as the Air Adventures accident, there would potentially have been observers of pilots' questionable behaviours who took no action. Indeed, symptoms of stress were allegedly observed in pilots in a number of high profile accidents; for example, impaired judgment, carelessness and increased risk taking were allegedly observed in the Air Adventures pilot; and decreased motivation and hostility were allegedly observed in the SilkAir pilot (Morse & Bor, 2006). Similarly, a pilot working for Qantas airlines pilot resigned with severe obsessive compulsive disorder, anxiety, and depression (Sydney Morning Herald, 2010). Although the Qantas pilot was not involved in a fatal accident, one would argue that it was only a matter of time until the pilot's "urges to scream and cry, ignoring instructions, repeatedly missing radio and altitude calls, and repeated urges to crash the aircraft" would have contributed to a serious accident.

The findings of this current study indicated that gender had no effect on participants' interpretation of the seriousness of the symptoms, and no effect on the intended actions of participants when becoming aware of someone experiencing any of the 25 symptoms of stress. This finding is inconsistent with findings of Study 3, where evidence was found to suggest that females were more likely than males to act in a way that is consistent with safety practices, that is, report concerns to senior staff.

Under-reporting stress symptoms in the context of this study may occur for at least three reasons: first, it is possible that individuals are not fully aware of the effect that stress has on those working on the aviation field; second, even when they are aware of these effects, internal and external pressures may make it less likely that an individual will report, or a pilot will seek help for, symptoms (e.g., fear of losing face in the eyes of peer groups, or of being restricted from flying, or because of the stigma associated with mental health). Pilots deny stress as well as other psychological problems (Deitz & Johnson, 1991) and in general, do not like being interviewed by mental health professionals (Bor, Field, & Scragg, 2002). A senior fighter pilot stated that "...aviators are notorious for avoiding flight surgeons and would disavow the very existence of mental health professionals if given the opportunity. Both occupations [flight surgeons and mental health professionals] represent a threat to a pilot's flying status" (Hamilton, 2005, p. 43). Third, the expectation that lay observers of stress symptoms might understand whether they are likely to affect aviation safety and whether they should report them and to whom, may simply be asking too much of people who otherwise are diligent in maintaining a safe working environment, but who may not be qualified in a discipline (e.g. health, medicine, or psychology) which would allow them to understand such stress symptoms and their potential consequences.

The findings presented here suggest there is potentially a need for more directives from regulatory authorities to address reporting of safety concerns from a psychological perspective, hence raising awareness of psychological issues that could have an effect on flight safety. Addressing this need would be a complicated matter indeed, and may in practice be difficult to implement for all members of a workforce. However, it may in principle be viable to educate at least some key staff members (e.g., managers) to be

aware of some symptoms of stress and how to act should they become aware of any concerns.

A number of potential limitations apply to the study reported here. First, it is not known whether individuals' actions in hypothetical situations such as these would hold true in real-life situations. Indeed, LaPiere (1934) argued that attitudes and actual behaviour can differ significantly, although later studies suggested that such differences may have been an artefact of LaPiere's design and that a person's attitudes are a good predictor of their subsequent behaviour (Sheppard et al., 1988). Second, a lack of empirical, rather than anecdotal, evidence of under-reporting of stress symptoms in aviation makes investigation of the relationship between stress and pilot performance hard to achieve. As such, it is largely unknown to what extent the stress symptoms would impair pilot performance and flight safety.

In conclusion, the current study provides evidence that there is significant amount of variation in the perception of symptoms of stress. Indeed, amongst participants who deemed any given symptom of stress as likely to have a negative effect on aviation safety, there was significant variation in the extent to which their subsequent actions would be consistent with improvements in safety. Overall, there was strong evidence that many people who have concerns about aviation safety, do nothing or, at best, only talk to the person concerned. This pattern of findings potentially demonstrates why aviation regulatory authorities are often unable to adopt a truly proactive approach to aviation safety: because they only learn about existing problems after accidents occur.

CHAPTER SEVEN

Study 5

Factors that Affect Intentions to Report Wrongdoing in Aviation

7.1 Introduction

Studies 1 to 4 provided evidence that there are a number of factors that may influence whether a person reports any aviation safety concerns. Study 1, the case of Air Adventures accident sought to identify factors that led the authority to wonder how the accident could have happened. Study 2 sought to investigate what actions participants would take upon becoming aware of or observing wrongdoing within their aviation establishments. Study 3 sought to examine the effect of the relationship between the level of moral development, gender and relatedness between those involved in wrongdoing, on intentions to report wrongdoing in aviation. Study 4 sought to examine the extent to which individuals believed symptoms of psychological stress affect aviation safety, and determine what actions they would take following discovery of symptoms they believe could affect aviation safety.

Overall, the evidence so far (findings from Studies 1 to 4 and literature review) suggests that each of the following factors may influence whether information is communicated in a way that it is likely to be able to be used to improve aviation safety: working environment; social consensus; direct or indirect involvement in the wrongdoing; status

of the wrongdoer; status of the observer; gender of the observer; moral values; relationship to the wrongdoer; perceived seriousness of act; legal protection of the reporter; and motive of the wrongdoer.

The aim of the study reported here was to explore the extent to which the findings of Studies 1 to 4 are reliable (i.e., whether they hold true for other populations and for different examples of wrongdoing). In addition, the aim of this study was to examine all potential factors of interest in the same study and with the same sample. This may improve understanding of the extent to which each factor affects reporting intentions.

7.2 Proposed Factors and Research Hypotheses

In this section, the factors to be investigated are defined and hypotheses are developed to test the effect of each factor on individuals' decision making processes, when becoming aware of wrongdoing in the aviation workplace.

7.2.1 Factor 1: Working Environment

In Study 1, there was evidence that management structure, and organisational culture may influence people's attitudes towards safety and their intentions to report wrongdoing.

The working environment of an organisation is composed of the organisation's culture, its management style, its structure, and its communication style (Trevino, 1986). Zohar (1980) stated that "based on a variety of cues present in their work environment,

employees develop coherent sets of perceptions and expectations regarding behaviour-outcome contingencies and behave accordingly...” (p. 96). King and Hermodson (2000) stated that an employee's decision of whether or not to report wrongdoing goes far beyond the issue of doing the right thing. King and Hermodson suggested that norms against peer reporting may be clearly established and understood by employees, as such, a potential peer reporter would consider not only the wrongdoing, but whether there are organisational norms against reporting within the organisation. The following question is therefore proposed:

Question 1: Is there a relationship between the extent to which wrongdoing is perceived as a problem, and the nature of the work environment? For example, is wrongdoing more likely to be perceived as serious within an unsupportive environment?

Similarly, the organisation's climate (Miceli & Near, 1985), and interpersonal communication climate (Keenan, 2002) are believed to play a major role in the likelihood that people will report concerns about wrongdoing. Interpersonal communication climate, according to Costigan and Schmeidler (1984), can be examined in terms of the degree of supportiveness and the degree of control that exists in an interpersonal communication situation. Gibb (1961) suggested that there will be more openness in the communication situation if it is dominated by supportiveness and a lack of a need to control. A supportive climate, Keenan (2002) stated, is a climate “in which there is empathy and an attempt to understand, listen, and maintain feelings of mutual respect” (p. 21). Within such a climate, it can be expected that concerns will be more likely to be communicated openly (Combs, 1981; Brief & Motowidlo, 1987). The following three hypotheses are therefore proposed:

H1a: Within a supportive environment, individuals will be more likely to report concerns that they may have in a way that is consistent with safety than within an unsupportive environment.

H1b: There will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent in a supportive environment.

H1c: There will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent in an unsupportive environment.

7.2.2 Factor 2: Social Consensus

In Study 1, there was evidence that perceived social support influences people's intentions to take an action on becoming aware of wrongdoing, whereby the person may act in a way that is consistent with the way they believe peers, friends and family groups might act or approve.

Nisan (1984) suggested that a strong social consensus provides instructions for ethical behaviour, and that the higher the degree of social consensus, the less ambiguous a decision maker is about what constitutes good ethics (Jones, 1991). Social consensus was found to have a significant influence on both moral judgment and moral intent (Harrington, 1997). Harrington stated that "as social consensus weakens, all subjects

tended to go along with (i.e., show less disagreement with) the unethical moral judgment or intent” (p. 371).

According to both Bandura (1971) and Cohen (1976), family and peer groups are important determinants of moral thinking. Similarly, Kreie and Cronan (1998) stated that “although there is no written standard of behavior within the individual environment, a person might ask “What does mom or my close friend say?” when trying to decide if a particular behavior is acceptable” (p. 71). Dubinsky and Loken (1989) suggested that if the referent other thinks the individual should engage in ethical behaviour and the individual is motivated to comply with the referent other, then the individual is more likely to engage in ethical behaviour.

According to Brass, Butterfield, and Skaggs (1998), an individual is less likely to engage in an unethical behaviour if they believe they are being observed by other member of the organisation. In addition, a person’s concern that friends and associates may find out about their unethical behaviour could prevent the person from behaving unethically to preserve their reputation. As such, the following hypotheses are proposed (in the context of the study reported here, social consensus refers to the extent that a person’s immediate social group agrees or disagrees with a particular behaviour):

H2a: Wrongdoing that is not condoned by the social group of the individual witnessing wrongdoing will be perceived as more of a problem to aviation safety than wrongdoing that is accepted by the individual’s social group.

H2b: An individual witnessing wrongdoing that is not condoned by their social group will be more likely to respond in a way that is safety consistent than individual witnessing wrongdoing that is accepted by their social group.

H2c: For wrongdoing that is accepted by the social group of the individual witnessing wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H2d: For wrongdoing that is not supported by the by the social group of the individual witnessing wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

7.2.3 Factor 3: Direct or Indirect Involvement in Wrongdoing

In Study 2, there was evidence that how a person becomes aware of wrongdoing may affect their intentions to report; specifically, participants were more likely to report wrongdoing they had directly witnessed than wrongdoing they had indirectly witnessed.

Extant literature provides support for this finding. Darley and Latané (1968) investigated the responsiveness of individuals in emergencies and found that the numbers of bystanders an individual perceives to be present at an emergency significantly influences the individuals' likelihood to report that emergency. Darley and Latané (1968) reported that bystanders in groups were less likely to intervene in an emergency than if they were alone. This suggests that if directly witnessing

wrongdoing, the witness may be more likely to intervene if they perceive no other onlookers are present. As such, in a situation where the individual is not directly involved, for example a situation that is described to the individual, the latter may feel less of a responsibility to intervene as this responsibility may be shared with individuals to whom the same situation may be described. With this diffusion of responsibility (Darley & Latané, 1968), pressure to intervene and potential blame or punishment are also shared among all bystanders. As such, it is hypothesised that:

H3a: Individuals directly witnessing wrongdoing will perceive it as more of a problem to aviation safety than those indirectly witnessing wrongdoing.

H3b: Individuals directly witnessing wrongdoing will be more likely to respond in a way that is consistent with safety than those indirectly witnessing wrongdoing.

H3c: For indirect involvement in wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H3d: For direct involvement in wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

7.2.4 Factor 4: Status of the Wrongdoer

In Studies 2 and 3, there was evidence that people were less likely to report those in a position higher than them than those who were their subordinates. Consistently, Schultz (2002) reported that on the flight deck, first officers may fail to question or challenge senior captains, even if they are aware of critical information they believe is unknown to the captain. Similarly, Merritt and Helmreich (1996b) found that the statement, “Crewmembers should not question the decisions or actions of the captain except when they threaten the safety of the flight,” elicited agreement between 15% and 93% among pilots, dependent upon their nationality. These findings lead to the following question:

Question 2: Would the extent to which participants perceive wrongdoing to be a problem for aviation safety be affected by the seniority of the person responsible for the wrongdoing?

Investigations into the crash of the Express II Airlines Inc. Flight 5719 in 1993 in Minnesota, USA, reported that the captain did not exercise proper crew coordination, and that the first officer did not properly monitor and alert the captain of the problematic descent. After the crash, it was revealed that the captain had a history of intimidating his first officers, which may have been why first officers never reported the fact that the captain did not fly by the book: the captain was believed to have been violating company policies on sexual harassment, sleeping in flights, and flying with mechanical irregularities (National Transportation Safety Board, 1994).

Ginnett (1993) noted that there is a tendency for the captain-first officer relationship to be too authoritarian in many instances, and stated that:

The authority dynamic surrounding the role of the captain must be extremely powerful. . . . [and] has resulted in crewmembers not speaking up when necessary. . . . This inclination may also result in excessive psychological dependence on the captain as leader to the extent that individual contributions to problem-solving are neither voiced nor attempted (p. 88).

Tarnow (2000) argued that up to 20% of all aircraft accidents may be preventable by the monitoring and challenging of errors of the flight crew, especially monitoring of the actions of the captain by the first officer.

It is therefore hypothesised that:

H4a: Individuals observing wrongdoing committed by a person of less seniority will be more likely to respond in a way that is consistent with safety than individuals observing wrongdoing committed by a senior person.

H4b For wrongdoing committed by an individual less senior to the observer, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H4c: For wrongdoing committed by an individual senior to the observer, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

7.2.5 Factor 5: Status of the Observer

In Studies 2 and 3, evidence was found that people in high positions were less likely to report wrongdoing than would people in lower positions within the workforce. (Note that this factor differs from the previous factor as the emphasis here is upon the position that the observer has achieved in their workplace (e.g., manager vs. staff), rather than the position of the observer relative to the wrongdoer). However, this was inconsistent with Harris's (1990) findings that employees with ten years of experience or more with the firm were less tolerant of unethical behaviour as opposed to those with less than ten years of employment within the same firm. Similarly, Kidwell, Stevens and Bethke (1987) reported that employees with more work experience displayed more ethical intentions than those with less work experience. Other studies however, did not find significant relationship between individuals' work experience and their ethical intentions. Surveys involving graduate and undergraduate students (Borkowski & Urgas, 1992), state employees (Callan, 1992), and firm employees (Serwinek, 1992) indicated that ethical attitudes and values were not influenced by work experience. As such, the following questions are raised:

Question 3: Do individuals in higher positions (e.g. manager) differ from individuals in lower positions (e.g. staff) in the extent to which they perceive wrongdoing as a problem to aviation safety?

Question 4: would individuals in higher positions differ from individuals in lower positions in the extent to which they make a safety consistent response upon becoming aware of wrongdoing?

It is also hypothesised that:

H5a: For individuals in lower positions, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H5b: For individuals in higher positions, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

7.2.6 Factor 6: Gender of the Observer

In Studies 2 and 3, there was evidence that females and males differed in their intentions to act in a way that is consistent with safety guidelines.

Studies have shown that there are differences in the way females and males resolve ethical issues (e.g. Beltramini, et al., 1984; Miesing & Preble, 1985; Jones & Gautschi, 1988; Ameen, et al., 1996). For example, in a study of 91 undergraduate accounting students and 217 professional auditors, Shaub (1994) reported a significant relationship between gender and moral development, with women being more morally developed than men. Similarly, Sweeney (1995) and Sweeney and Roberts (1997) also reported

that female auditors were more ‘morally developed’ than males. Whilst there is evidence to suggest that gender may predict the likelihood of more ethical behaviour, it is not clear whether gender affects how seriously people view any particular instances of wrongdoing. Therefore, the following question is raised:

Question 5: Will there be a difference in the extent to which males and females perceive wrongdoing as problematic for safety?

It is also hypothesised that:

H6a: Females will be more likely to make safety consistent responses than males.

H6b: There will be a significant (positive) association for females between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H6c: There will be significant (positive) association for males between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

7.2.7 Factor 7: Moral Values

In Study 3, there was evidence to suggest that there is a relationship between individuals’ level of moral reasoning and their intentions to report wrongdoing.

Rokeach (1973) defined a value as “an enduring belief that a specific mode of conduct or end-state of existence is personally or socially preferable to an opposite or converse mode of conduct or end-state of existence” (p. 5). Accordingly, values play an important role in human behaviour. Rokeach stated that because values occupy a central position within one's cognitive makeup, they may be viewed as the determinants of specific attitudes and behaviour.

Ethical decision making models have widely recognised the influence of moral values on ethical judgments. For example, Hunt and Vitell's (1986) General Theory of Marketing Ethics model considered that values have a potential influence on all stages of the ethical decision making process. Ferrell and Gresham's (1985) have also explicitly recognised the role of moral values in ethical decision making in their Contingency Framework.

In a study conducted by Singhapakdi and Vitell (1991) to investigate the relationship between perception of ethical problems and actions to solve the ethical problems, it was found that individuals who perceived ethical problems were more likely to take some sort of action to resolve the problems. Similarly, perception of ethical problems was also found to influence individuals' intention to behave unethically (Singhapakdi, Vitell, & Franke, 1999). It is therefore hypothesised that:

H7a: Individuals with higher moral values (i.e., those with higher levels of moral development) will perceive wrongdoing to be more of a problem for aviation safety than individuals with lower moral values.

H7b: Individuals with higher moral values will be more likely to respond in a way that is consistent with safety than individuals with lower moral values.

7.2.8 Factor 8: Relationship to the Wrongdoer

In Study 3, there was evidence that people were more likely to take action on becoming aware of wrongdoing if they were not related to the wrongdoer. The findings highlighted the relationship between the person witnessing a wrongdoing situation and the person witnessing the wrongdoing (for example, the witness could be a friend of the wrongdoer, a family member, a colleague, or a stranger) as a factor in deciding what action to take. In line with research suggesting that when deciding whom to help, humans favour relatives over non-relatives (Burnstein et al., 1994; Kruger, 2001), and that cooperation between unrelated individuals increases when there had been a previous, sustained history of caring (Roberts & Sherratt, 1998), it might be expected to find that when witnessing wrongdoing, the witness might be less likely to perceive wrongdoing committed by a ‘friend’ or a ‘family member’ as a problem to safety than if committed by a person with whom they have no such relationship (i.e. a stranger). Similarly, it might be expected that the witness of wrongdoing, may be less likely to report a wrongdoer with whom they share a relationship, for example, a friend or a family member. As such, it is hypothesised that:

H8a: Individuals will perceive wrongdoing to be more of a problem to aviation safety when committed by people with whom they do not have a relationship.

H8b: Individuals observing wrongdoing committed by a wrongdoer with whom they have a relationship will be less likely to respond in a way that is consistent with safety than individuals observing wrongdoing committed by wrongdoers with whom they do not have a relationship.

H8c: For wrongdoers with whom observers do not have a close relationship, there will be a significant (positive) association between the extent to which wrongdoing is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.

H8d: For wrongdoers with whom observers have a close relationship, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.

H8e: For wrongdoers with whom observers have a very close relationship, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.

7.2.9 Factor 9: Perceived Seriousness of Act

The findings of Studies 3 and 4 suggested that people are more likely to report wrongdoing they perceive either serious or likely to have serious consequences on safety. Consistent with these findings, Harrington (1997) stated that an evaluation of the

level of seriousness of the proposed act lies beneath the formation of social consensus and instructions for behaviour, adding that as the seriousness of consequences increases, the individual is more likely to perceive the behaviour leading to the consequences as wrong. Harrington's findings from a study conducted to test the use of decision making models in organisational decision making showed that the more serious the consequences, the lesser individuals were in agreement with unethical behaviour. It is therefore hypothesised that.

H9a: Individuals will perceive high seriousness wrongdoing as more of a problem to aviation safety than low seriousness wrongdoing.

H9b: People who observe wrongdoing that they perceive as highly serious will be more likely to respond in way that is consistent with safety than those that observe wrongdoing they perceive to be less serious.

H9c: For low seriousness wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H9d: For high seriousness wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

7.2.10 Factor 10: Legal Protection of the Reporter

In each of the studies so far, there was some evidence that the degree of confidence in the laws that govern the act of reporting may prevent the concerned individuals from taking actions that are consistent with safety. However, it is unclear whether this would affect the extent to which people would view instances of wrongdoing as a problem. As such, the following question is raised:

Question 6: Would individuals who believe they have the protection of the law perceive wrongdoing to be more of a problem to aviation safety than individuals who are not aware of current protective laws and regulations?

Employment laws and policies are integral to protecting both employers and employees from engaging in activities that do not abide by current laws. The findings of this research so far highlighted the need for additional policies, guidelines and laws that govern reporting of wrongdoing in the workplace. According to Turner, Taylor, and Hartley (1995), individuals who work in an organisation that has a code of ethics are less likely to engage in unethical behaviour than those who do not work under such codes. It is therefore hypothesised that:

H10a: Individuals who believe they have the protection of the law will be more likely to respond in a way that is consistent with safety than individuals who do not believe they have such protection.

H10b: For individuals who believe that they are not protected by the current laws and regulations, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.

H10c: For individuals who believe that they are protected by the current laws and regulations, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.

7.2.11 Factor 11: Motive of the Wrongdoer

It has suggested that the motive behind an action is a determinant of the morality of the action. For example, in an experiment (Piaget & Inhelder, 1969) where children were told a story with a moral dilemma then asked to indicate 'who is naughtier': a boy who accidentally broke fifteen cups or a boy who breaks one cup trying to reach a jam jar when his mother is not around, it was found that younger children attributed the 'naughty' behaviour to the boy who broke the most cups regardless of the other child's intent. This type of behaviour was called Objective Morality or Moral Realism (Piaget & Inhelder, 1969). However, when similar experiments were presented to older children, it was reported that they attributed bad behaviour to the boy who broke only one cup because his motives were bad. This more advanced form of moral reasoning was called Subjective Morality or Autonomous Morality (Piaget & Inhelder, 1969). According to Piaget and Inhelder (1969), children did not fully achieve this stage of moral development before the ages of twelve or thirteen.

In criminal law, motive and intent are particularly important in prosecutions for homicide. Murder requires the intent to kill, while manslaughter requires that the accused be provoked to commit the crime. However, the legal system typically allows motive to be proven in order to make plausible the accused's reasons for committing a crime. Homicides motivated by factors such as 'sudden heat of passion', an 'excess of rage or anger' are a lesser offence than murder 'in cold blood' (Manslaughter, 2010). (Note that in the context of this thesis, motive and intent are used interchangeably).

The following hypotheses are therefore proposed:

H11a: Individuals will perceive wrongdoing to be more of a problem to aviation safety if they believe the wrongdoer's motive behind committing the wrongdoing was bad than individuals believing that the wrongdoer's motive was good.

H11b: Individuals who believe that a wrongdoer's motive was bad will be more likely to respond in a way that is safety consistent than individuals believing that the wrongdoer's motive was good.

H11c: For individuals believing that the wrongdoer's motive was good, there will be a significant (positive) association between the extent to which wrongdoing is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.

H11d: for individuals believing that the wrongdoer's motive was bad, there will be a significant (positive) association between the extent to which wrongdoing is perceived

to be a problem for aviation safety and the degree to which the outcome is safety consistent.

7.3 Method

7.3.1 Participants

One-hundred-and-three students were recruited from a university where they were enrolled on one of two Bachelor of Aviation degrees (Aviation Management degree, or Air Transport Pilot degree). Twenty-six were Year-1 students, 35 were Year-2 students, and 42 were Year-3 students. There were 26 females, and 75 males (2 participants did not state their gender). Forty-two participants stated they had flying experience (mean flying hours = 135.49 hours, range = 28.70 to 300, *SD* = 57.40). Of these 42 participants, there were 8 females (mean flying hours = 132.34, range = 28.70 to 190, *SD* = 61.90), and 34 males (mean flying hours = 136.23, range = 34 to 300, *SD* = 57.25).

7.3.2 Materials and Design

7.3.2.1 Overview

A scenario based study was designed to test the effect of the eleven factors on participants' intentions to report wrongdoing in aviation. Specifically, participants would be asked to read two short scenarios and then, after reading each scenario, evaluate a series of described behaviours. Thus investigation of the effect of the

following factors would be a within-subjects experimental design: perceived seriousness of act; direct or indirect involvement in the wrongdoing situation; working environment; legal protection of the reporter; status of the wrongdoer; status of the observer; motive of the wrongdoer; relationship to the wrongdoer; social consensus. Investigation of the effect of gender and investigation of moral development would be a correlational design.

The independent variables would be each of the 11 factors. Nine of the independent variables (factors 1 to 5, and factors 9 and 10) had two levels: each level designed to tap opposite poles of the variable (e.g., legal protection provided vs. legal protection not provided). Each level would describe a behaviour corresponding to the level being tested. Data regarding factor 6 (gender) were collected through the demographic questions that participants were asked to provide (i.e., gender, year of study, and if applicable, the type of pilot licence and the number of flying hours). Factor 7 (moral values) was tested using six items, each corresponding to one of Kohlberg's six levels of moral development, whereby participants would provide one response for each scenario that would describe the level of moral development at which they operated. Factor 8, investigating the relationship of the observer to the wrongdoer, was measured using three levels (e.g., not close, close, very close).

For each independent variable, there would be two dependent variables: one to determine the extent to which participants perceived each level of each of the factors as a problem that could affect flight safety (excluding moral development and gender, as these would be investigated in a different manner), and the second to determine what

action participants would take following the witnessing of the behaviour described in each level of each of the factors.

Similarly to Study 3, a scenario based methodology was used in the current study as scenarios are a common method used in business ethics research. Additionally, it would be unviable, both ethically and practically, to attempt to conduct this study using real behaviours.

7.3.2.2 Development of Scenarios

Two generic scenarios were developed that would require participants to imagine that they were working in the aviation industry. (As all of the participants would presumably be aiming to work in aviation once they have graduated, it is reasonable to assume that they could comply with such a request). No factors that could bias the scenarios were included (e.g., position within the company, role, and authority). Each of the scenarios was developed to satisfy the following criteria: i) it should set the scene; ii) it should be written from the perspective of a person (e.g., the participant); iii) the scenario itself should not describe a problem; and iv) should be short and worded in plain language.

The first scenario presented a situation where the participants were asked to imagine that they were working at an airport, whilst the second scenario presented a situation where the participants were asked to imagine that they were working at an aviation company. Both scenarios suggested that during the course of their work participants acquired information about the people and the practices of the company. Scenarios 1 and 2 are as follows:

Scenario 1: Try to imagine that you've just graduated with your degree and you are now working in your first aviation job at an airport. During the course of your employment, you get to learn about your workplace and its practices, and about the people you are working with. When answering all of the questions that follow, please try to imagine you are now employed at an airport.

Scenario 2: Try to imagine that you are now in your first aviation job since you graduated, and it is at an aviation company. During the course of your employment, you get to learn about the company and its practices, and about the people you are working with. When answering all of the questions that follow, please try to imagine you are now employed at an aviation company.

7.3.2.3 Development of Items for Scenarios

Two separate sets of items (i.e., the described behaviours relating to each of the levels of each of the independent variables) were developed, one set corresponding to each of the two scenarios. Each set of items comprised a described behaviour that would correspond to each level of each of the 9 within-subjects experimental factors (e.g., high vs. low seriousness). The items were worded in a way to reflect the change in levels of each factor.

To develop the items for each factor, a brainstorming session with the researcher, two independent aviation employees, and an academic with an interest in the project was conducted. The aim was to develop two items for factors 1 to 5, and factors 9 and 10, where each item addressed the two opposite poles of the variable (e.g., legal protection provided vs. legal protection not provided). For factor 8, three items were developed to

address each of the three levels (e.g., not close, close, very close), and for factor 7, six items were developed that would correspond to each of Kohlberg's six moral development levels. No items were developed for factor 6 (gender) as data were collected through a demographic question.

The items were developed from the real life experiences of the two aviation professionals and the academic, and examples of wrongdoing collated by the researcher from sources such as accident reports. Real life examples were used as the basis for the items as they represented the kinds of situations that aviation employees are likely to encounter in real life. The items were thus developed to satisfy the following criteria: i) one item must relate to each of the levels of each of the 10 factors (excluding the gender factor); ii) items should be short (ideally one sentence), iii) easy to understand (for someone with a basic knowledge of aviation). Any identifiable features from the original reports or experiences were omitted from the items (e.g., names, places, and dates). In each item, the specific act of wrongdoing was underlined to ensure that participants would focus on the correct problem in each situation, as required for the completion of the questionnaires.

Items developed for each scenario were each given a unique identifier beginning with the scenario number (e.g., S1 or S2), followed by the factor number (e.g., F1 or F2), and finally the level of the factor being tested (e.g., Q1 or Q2). Tables 15 and 16 show the items and identifiers for scenario 1 and scenario 2 respectively.

Table 15. *Items for Scenario 1 hypotheses 1 to 11*

Identifier	Level	Item (problem underlined)
S1F1Q1	Unsupportive	You want to question <u>a colleague who frequently doesn't follow safety procedure</u> but have heard that management are more concerned about how to make profit than worrying about things that might happen
S1F1Q2	Supportive	You want to question <u>a colleague who frequently doesn't follow safety procedure</u> and have heard that management encourage reporting of all concerns
S1F2Q1	Low	You <u>found out that one of the pilots has been caught drink-driving</u> . You believe that your friends and family would encourage you to do something.
S1F2Q2	High	You <u>found out that one of the pilots has been caught drink-driving</u> . You believe that your friends and family would think you shouldn't get involved.
S1F3Q1	Indirect	You have heard that a mechanic is <u>rushing on his maintenance check</u> of an aircraft
S1F3Q2	Direct	You personally saw a mechanic <u>rushing on his maintenance check</u> of an aircraft
S1F4Q1	Low	A junior member of staff asked you to <u>cover up for an incident</u> they caused
S1F4Q2	High	Your manager asked you to <u>cover up for an incident</u> they caused
S1F5Q1	Low	You noticed that a junior staff member's <u>breath sometimes smells of alcohol in the afternoon</u>
S1F5Q2	High	You noticed that your senior manager's <u>breath sometimes smells of alcohol in the afternoon</u>
S1F8Q1	Not close	You heard an aviation security officer talking and they admitted that they <u>often fall asleep when on duty</u> . This security officer is not someone that you know
S1F8Q2	Close	You heard an aviation security officer talking and they admitted that they often <u>fall asleep when on duty</u> . This security officer is your colleague.
S1F8Q3	Very close	You heard an aviation security officer talking and they admitted that they often <u>fall asleep when on duty</u> . This security officer is a member of your family.
S1F9Q1	Low	A pilot appears to be <u>claiming for overtime that they haven't worked</u>
S1F9Q2	High	A pilot has <u>not reported an accident they had</u> to the CAA
S1F10Q1	No	You want to raise your <u>concerns about operating procedures</u> at the workplace but you think you will not be protected from retaliation
S1F10Q2	Yes	You want to raise your <u>concerns about operating procedures</u> at the workplace and you know you will be protected
S1F11Q1	Good	A Pilot told you they <u>flew through bad weather (when the knew they should have diverted)</u> so that their passenger won't miss the evening's rugby match
S1F11Q 2	Bad	A pilot told you they <u>flew through bad weather (when the knew they should have diverted)</u> so that they won't miss the evening's rugby match

Table 16. *Items for Scenario 2 hypotheses 1 to 11*

Identifier	Level	Item (problem underlined)
S2F1Q1	Unsupportive	<u>You don't have reporting procedures</u> at your workplace; you want to discuss the introduction of new safety reporting procedures but management are not interested in investing time and money in this.
S2F1Q2	Supportive	<u>You don't have reporting procedures</u> at your workplace; you want to discuss the introduction of new safety reporting procedures and management are keen to invest time and money in this.
S2F2Q1	Low	You <u>found out that one of the security officers often fails to check people's ID cards properly</u> . Your friends and family would think that you should do something.
S2F2Q2	High	You <u>found out that one of the security officers often fails to check people's ID cards properly</u> . Your friends and family would think you shouldn't get involved.
S2F3Q1	Indirect	You were told that a pilot <u>fail to conduct a before flight inspection</u> .
S2F3Q2	Direct	You personally saw a pilot <u>fail to conduct a before flight inspection</u> .
S2F4Q1	Low	You were writing a report about safety performance of the company aircraft and your colleague suggests you could <u>manipulate the figures</u> so that it looks better for the shareholders.
S2F4Q2	High	You were writing a report about financial performance of the company aircraft and the director of the company suggests you could <u>manipulate the figures</u> so that it looks better for the shareholders.
S2F5Q1	Low	You are a new and fairly junior member in a department. You became aware that one of the pilots is <u>self-medicating and often shows symptoms of fatigue</u> .
S2F5Q2	High	You are a member of management. You became aware that one of the pilots is <u>self-medicating and often shows symptoms of fatigue</u> .
S2F8Q1	Not close	You are on a flight and the passenger next to you, who is a stranger, appears to be sending text messages.
S2F8Q2	Close	You are on a flight and your friend in the seat next to you appears to be sending text messages.
S2F8Q3	Very close	You are on a flight and you parent in the seat next to you appears to be sending text messages.
S2F9Q1	Low	Several employees appear to be <u>leaving work before the end of their shift</u> .
S2F9Q2	High	<u>Two recent incidents have not been reported to the CAA</u> .
S2F10Q1	No	You want to <u>raise concerns about safety operating procedures</u> at the workplace but you know that the current laws won't protect against organisational retaliation.
S2F10Q2	Yes	You want to <u>raise concerns about safety operating procedures</u> at the workplace and you are confident that the current laws will protect against organisational retaliation.
S2F11Q1	Good	<u>You witnessed an employee cause an accident</u> at the workplace that will cost at least \$10,000 to put right. It occurred because he was trying to speed up luggage loading to avoid delays.
S2F11Q2	Bad	<u>You witnessed an employee cause an accident</u> at the workplace that will cost at least \$10,000 to put right. It occurred because he wanted to leave work before the Friday traffic jam got too bad.

7.3.2.4 Development of the Dependent Variables

Two dependent variables were developed in this study. The first dependent variable was related to perception of problems, and the second dependent variable was related to the action of reporting.

The first dependent variable was developed to measure the extent to which each described behaviour was a problem to aviation safety. Therefore, for each described behaviour, participants were asked: “In each of the statements described below, how much do you personally think the underlined behaviour is a problem for aviation safety?”, then asked to select one response from five provided (*not a problem, little bit of a problem, moderate problem, important problem, very important problem*).

For the purpose of statistical analysis, the extent to which each item was perceived to be a problem to aviation safety was assigned numerical values ranging from 1 to 5 (i.e., 1 = *not a problem*, 2 = *little bit of a problem*, 3 = *moderate problem*, 4 = *important problem*, and 5 = *very important problem*). The response options were deemed to be measured on an ordinal scale of measurement.

The second dependent variable was developed to determine the action a participant would take upon becoming aware of information about potential wrongdoing. Participants were asked: “What you would do?”, then asked to select one response from five provided (*do nothing, talk to the person, talk to a friend or colleague, talk to management, inform an external agency*). In this final study, a response additional to those used in Studies 2 to 4 was used, *talk to a friend or colleague*. This, it was

believed, would add richness to the data collected and was an additional idea that arose following elaboration of findings of previous studies reported in this thesis.

To enable analysis of data related to the second dependent variable with respect to the independent variables, the level of measurement would have to be at least at the ordinal level. However, with the inclusion of the additional response option, *talk to a friend or colleague*, a five-point scale could not logically be ordinal, but nominal (as it was not deemed possible to determine which of the responses *talk to the person*, and *talk to a friend or colleague*, would be more or less safety consistent). To facilitate statistical analysis, the two responses options, *talk to the person*, and *talk to a friend or colleague*, would be collapsed into a single heading, resulting in a four-point scale. Participants' responses would thus be re-classified according to the extent to which they would be consistent with facilitating proactive improvements to safety by, for example, the relevant regulatory authority. Specifically, the responses were re-classified as follows: *do nothing* was treated as *not safety consistent* = 1, *talk to the person* and *talk to a friend or colleague* were collapsed into a single heading *slightly safety consistent* = 2, *talk to management* was designated as *probably safety consistent* = 3; and *inform external agency* was designated as *most likely safety consistent* = 4. The response options were therefore deemed to be measured on an ordinal scale of measurement whereby scores of 1 to 4 would cover the range from not safety consistent to most likely safety consistent, respectively. An example of the questionnaire, as completed by participants, may be inspected in Appendix D.

To test participants' level of moral reasoning, for both scenarios they were asked: 'Which one of these 6 statements best explains how you would decide upon the action

that you would take?: i) To avoid getting into trouble, ii) Because my action would benefit me; iii) Because that's what most people would do; iv) To respect the law and regulations; v) Because a lot of people would benefit from this action; vi) Because this action takes into consideration the interest of individuals regardless of what the consequences of this action may be'. Each of these 6 statements relates to a stage of Kohlberg's moral development theory (stage 1 to stage 6, as illustrated on Figure 1).

The order that items were presented in the questionnaire was determined so that different levels of a factor did not appear consecutively. In practice, the order in which the two lists of items for both scenarios were presented to participants was as follows: items related to level one (for all factors excluding gender and moral development factors), followed by items related to level 2 for all factors (for all factors excluding gender and moral development factors), then the item related to level 3 (for the relationship factor). The order of the response options to the six items on moral development were also randomly ordered for both scenarios.

Although it would in principle be possible to test each factor just once, to improve both reliability and validity, each factor was tested twice (Lampe & Finn, 1992). Therefore, an overall response for each item would be derived from the mean response across the two similar items for each scenario. For example, the extent to which a participant perceives low seriousness wrongdoing would be the mean of their response to questions S1F9Q1 and S2F9Q1.

7.3.3 Procedure

The experiment was conducted at the beginning of an aviation management class that was to be of shorter length than the time allocated for the class. The researcher was introduced to the class by the lecturer, and then the students were informed of the research objectives and were handed the questionnaires. The researcher explained that participation was voluntary and that no reward would be given to the students for participation in the experiment. The completion of the entire questionnaire would take approximately 30 to 40 minutes. All instructions were attached to the questionnaires, and the researcher was present at the testing locations to answer participants' queries regarding the questionnaire. Potential participants were informed that the study had undergone a process of ethical review¹⁰ and that they were guaranteed confidentiality: no questions through which a participant could be identified were included in the interview, and no personal or identifiable information that may be disclosed by a participant would be recorded on the data sheet. Potential participants were also informed that they may decline to answer any individual question, should they so wish.

Participants were asked to read the first scenario and then, for each of the items that followed, answer the questions: i) how much of a problem the underlined behaviour was perceived, and ii) what would be their intended action upon learning of the wrongdoing behaviour. The same process was then followed for the second scenario.

¹⁰A review of the ethics of this study was undertaken by the School of Aviation, Massey University using the guidelines provided by the Massey University Human Ethics Committee. The project was deemed to be of low risk and therefore suitable for a 'low level notification' to Massey University Human Ethics Committee.

7.4 Results

The level of statistical significance, alpha, was set at $p = .05$ for all statistical tests, and all tests were conducted as two-tailed.

For each of the items, participants' mean response for the first question (i.e., their response regarding how much of a problem the specified behaviour was to aviation safety) and the second question (i.e., what action would they take) were calculated from their responses to scenarios 1 and 2. The resultant means for each of the levels of factors 1- 5, and factors 8 - 11 are shown in columns 3, 4, 7 and 8 of Table 17. For question 1, scores could range from 1 (*not a problem*) through to 5 (*very important problem*); for question 2, scores could range from 1 (not safety consistent) through to 4 (most likely safety consistent).

To test whether there was a difference in participants' responses attributable to the independent variable, Willcoxon's signed ranks test was applied to the values obtained for each factor (e.g., low seriousness vs. high seriousness). For example, the responses for question 1 for the mean of items S1F1Q1 and S1F1Q2, would be compared with the responses for the mean of items S2F1Q1 and S2F1Q2. (For factor 8, with 3 levels, Freidman's test was first applied, followed by Willcoxon's signed ranks test for subsequent *post hoc* comparisons.) Although the mean values of participants' responses to questions 1 and 2 for each of the items could in principle be interpreted as being measured on an interval scale, all data are treated as non-parametric for the purpose of statistical analyses (i.e., measured on an ordinal scale). However, in addition to the test

statistics, and level of significance shown in Table 17, the mean scores and standard deviations are presented as they are more informative than the modal score.

Table 17. Mean score for each level of each factor and test of difference statistics for each factor

Factor	Level	Perceived as a problem				Intended action			
		Mean	SD	Test of difference		Mean	SD	Test of difference	
				Z	p			Z	p
1. Working Environment	Unsupportive	2.95	.75	1.02	.309	2.20	.51	3.17	.002
	Supportive	3.03	.64			2.44	.46		
2. Social consensus	Low	3.04	.78	2.52	<.001	2.32	.56	1.68	.093
	High	3.32	.85			2.45	.53		
3. Direct / Indirect Involvement	Indirect	3.13	.76	.42	.674	2.21	.48	4.57	.010
	Direct	3.17	.74			2.38	.45		
4. Status of the wrongdoer	Low	3.07	.68	1.41	.159	2.28	.43	.74	.459
	High	2.93	.82			2.21	.55		
5. Status of the observer	Low	2.97	.76	.35	.730	2.43	.60	.87	.382
	High	2.94	.69			2.36	.56		
8. Relationship to the wrongdoer (Freidman's test)	Not close	3.46	.83	13.17	<.001	2.62	.65	35.10	<.001
	Close	3.43	.76			2.62	.66		
	Very close	2.75	.73			2.29	.56		
<i>Post hoc</i> comparisons for factor 8	Not close- Close			.27	.789			.53	.597
	Not close-Very close			5.44	<.001			3.65	<.001
	Close-Very close			5.56	<.001			3.73	<.001
9. Seriousness	Low	3.32	.79	5.04	<.001	2.41	.64	2.07	.038
	High	3.85	.56			2.57	.51		
10. Legal protection	No	2.92	.75	5.25	<.001	2.30	.53	4.53	<.001
	Yes	3.54	.73			2.63	.53		
11. Motive of the wrongdoer	Good	2.85	.73	1.71	.086	2.21	.63	4.59	<.001
	Bad	3.03	.74			2.58	.63		

In Table 17 it can be seen that there were statistically significant differences between participants' responses for the levels of four factors (*social consensus, relationship to the wrongdoer, seriousness, and legal protection*) regarding the extent to which they were perceived to be a problem to aviation safety. For the factor of *social consensus*, the described behaviour was perceived as more of a problem to aviation safety when there was social consensus. For the factor of *legal protection*, the described behaviour was perceived as more of a problem to aviation safety when there was legal protection. For the factor of *seriousness*, *high* seriousness was perceived to be more of a problem to aviation safety than *low* seriousness wrongdoing. *Post hoc* tests, Willcoxon's signed ranks test, showed that for the factor of *relationship to the wrongdoer*, when the wrongdoer's relationship to the participant was *very close*, this was perceived to be a significantly lower problem to aviation safety.

Contrarily, there was no evidence of statistically significant differences between the levels of the five other factors (*working environment, involvement, status of the wrongdoer, status of the observer, and motive of the wrongdoer*) regarding the extent to which they were perceived to be a problem to aviation safety.

In Table 17, it can also be seen that there were statistically significant differences between participants' responses for the levels of six factors (*working environment, involvement, seriousness, legal protection, motive of wrongdoer, and relationship to the wrongdoer*) regarding the degree to which their proposed action would be safety consistent. For the factor of *working environment*, the action was more likely to be safety consistent when there was a *supportive* environment. For the factor of *involvement*, the action was more likely to be safety consistent when participants were

directly involved. For the factor of *seriousness*, the action was more likely to be safety consistent when the described behaviour was perceived to be *high*. For the factor of *legal protection*, the action was more likely to be safety consistent when there was *legal protection*. For the factor of *motive of wrongdoer*, the action was more likely to be safety consistent when the motive was perceived to be *bad*. Post hoc tests, Willcoxon's signed ranks test, showed that for the factor of *relationship to the wrongdoer*, when the wrongdoer's relationship to the participant was *very close*, the action was less likely to be safety consistent than when the relationship was *close* or *not close*.

Contrarily, there was no evidence of statistically significant differences between the levels of the three other factors (*social consensus*, *status of the wrongdoer*, and *status of the observer*) regarding the extent to which the intended action would be safety consistent.

To investigate whether the extent to which each level of factors 1 – 5 and factors 8 – 11 was perceived to be a problem to aviation safety (*not a problem*, *little bit of a problem*, *moderate problem*, *important problem*, *very important problem*) was statistically [positively] related to participants' actions (*not safety consistent*, *slightly safety consistent*, *probably safety consistent*, *most likely safety consistent*), the association between the two dependent variables was investigated for each level of the mean value for scenarios 1 and 2 of each factor using Spearman Correlation. The results of these tests are shown in the column titled 'All participants' of Table 18.

Table 18. *Spearman correlations for the relationship between participants' perception (overall, and for females and males separately) of the extent to which the behaviour is perceived to be a problem to aviation safety and the extent to which their action is consistent with improvements to aviation safety*

Independent Variables (Factors)	Level	Spearman's Correlation (problem vs. action)								
		All participants			Females			Males		
		<i>rho</i>	<i>n</i>	Sig	<i>rho</i>	<i>n</i>	Sig	<i>rho</i>	<i>n</i>	Sig
1. Working environment	Unsupportive	.34	103	<.001	.44	27	.022	.26	74	.025
	Supportive	.25	100	.012	.21	27	.288	.32	72	.006
2. Social consensus	Low	.17	101	.114	-.18	25	.387	.34	67	.005
	High	.38	103	<.001	.35	27	.071	.39	74	.001
3. Direct / Indirect involvement	Indirect	.31	103	<.001	.28	27	.157	.33	74	.004
	Direct	.35	103	<.001	.51	27	.007	.28	74	.014
4. Status of the wrongdoer	Low	.28	103	.004	.10	27	.623	.34	74	.003
	High	.37	103	<.001	.41	27	.033	.35	74	.002
5. Status of the observer	Low	.19	103	.052	-.07	27	.721	.26	74	.028
	High	.09	103	.380	.03	27	.863	.08	74	.475
8. Relationship to the wrongdoer	Not close	.20	101	.054	.12	25	.555	.28	68	.022
	Close	.34	103	.001	.73	26	<.001	.21	71	.073
	Very close	.25	100	.014	.14	26	.479	.26	73	.028
9. Seriousness	Low	.33	103	<.001	.42	27	.028	.27	74	.020
	High	.06	102	.565	.19	27	.353	-.003	73	.978
10. Legal protection	No	.08	102	.426	.15	27	.466	.07	74	.555
	Yes	.39	102	<.001	.04	27	.854	.51	74	<.001
11. Motive of the wrongdoer	Good	.28	103	.004	.49	27	.009	.18	73	.124
	Bad	.35	102	<.001	.44	27	.021	.31	73	.007

In Table 18, it can be seen that, for all participants (male and female combined), there was evidence of a significant positive association between the extent to which a described behaviour was perceived to be a problem and the extent to which the self-reported intended action was safety consistent for 13 of the 19 tests. Specifically, in 13

instances, the self-reported action was more likely to be safety consistent when the described behaviour was perceived to be more of a problem for aviation safety. Contrarily, 6 of the 19 tests showed no evidence of a significant association; that is, there was no relationship between the extent to which the behaviour was perceived to be a problem and the intended action for these 6 examples. However, upon closer inspection, it was apparent that the relationship found for all participants did not always hold true for both males and females. For example, in the following levels of factors *supportive working environment; high social consensus; indirect involvement; low status of wrongdoer; low status of the observer; legal protection for the reporter; and very-close relationship to wrongdoer*, there was evidence that a significant positive relationship occurred for all participants and for males alone, but not for females. Contrarily, for the levels of factors *good motive of wrongdoer* and *close relationship to wrongdoer*, there was evidence of a significant positive relationship for all participants and for females, but not for males. (It is important to note that one reason why there may not have been a statistically significant relationship between the extent to which the behaviour was perceived to be a problem and the intended action for females alone, (when there was for all participants and for males alone) was that there were approximately three times more males than females.)

To explore whether participants' gender (factor 6) was associated with perceived problem ratings or reporting intentions for each of the factors, a series of Mann Whitney U tests were conducted. The results may be inspected in Table 19.

Table 19. *Mann Whitney U test for difference due to gender in the degree to which described behaviours are perceived to be a problem to aviation safety and the action that would be taken*

Independent Variables (Factor)	Level	Perceived problem		Intended action	
		Z	Sig	Z	Sig
1. Working environment	Unsupportive	.75	.452	1.48	.139
	Supportive	1.50	.132	.208	.835
2. Social consensus	Low	2.20	.028	1.74	.083
	High	1.83	.067	.048	.961
3. Direct / Indirect involvement	Indirect	.11	.915	.92	.356
	Direct	.27	.787	1.05	.293
4. Status of the wrongdoer	Low	.45	.650	1.65	.098
	High	.55	.581	.43	.67
5. Status of the observer	Low	.907	.364	.171	.864
	High	2.24	.025	.215	.830
8. Relationship to the wrongdoer	Not close	1.12	.230	.63	.530
	Close	2.33	0.20	1.79	.074
	Very close	.17	.866	.03	.977
9. Seriousness	Low	.41	.68	.40	.692
	High	1.31	.190	.46	.643
10. Legal protection	No	.69	.490	.78	.438
	Yes	.27	.79	.10	.921
11. Motive of the wrongdoer	Good	.36	.718	.98	.326
	Bad	.54	.592	.154	.877

In Table 19, it can be seen that there was some evidence of a difference in ratings associated with participants' *gender* for the extent to which a behaviour was perceived to be a problem for aviation safety (i.e., if the *status of the observer* was *high*, if the *relationship to the wrongdoer* was *close*, and if *social consensus* was *low*). When the *status of the observer* was *high*, males were significantly more likely to perceive the behaviour as a problem than were females. When the *relationship* of the participant to the wrongdoer was *close*, females were significantly more likely to view the behaviour as a problem than were males, and when the social consensus was *low*, females were

significantly more likely to perceive the behaviour to be a problem than were males. There was no evidence of differences associated with *gender* for intended action for any levels of any of the 9 factors.

To investigate the effect of participants' level of moral reasoning (factor 7) on reporting intentions, participants were asked to select one of the six options that best explained their decisions for all of the questions in each scenario. As a measure of reliability of participants' answers across the two scenarios, the Spearman correlation showed evidence of a significant correlation between participants' answers for scenario 1 and scenario 2, $\rho = .203$, $n = 103$, $p = .039$. The mean level of moral reasoning for scenario 1 was 3.47, $SD = 1.15$ (median = 4.00), and for scenario 2 was 3.65, $SD = 1.01$ (median = 4.00). Willcoxon's signed ranks test, provided no evidence of a significant difference between the answer to scenario 1 and scenario 2, $Z = 1.14$, $n = 103$, $p = .256$. The collapsed mean of both scenarios was 3.55 $SD = .85$ (median = 3.50), which equated to the conventional level of Kohlberg's moral development theory, specifically, to a level between stage 3 (Conformity) and stage 4 (Law and Order).

To explore whether there was a difference in participants' mean level of moral reasoning (factor 7) associated with the participants' gender (factor 6), a non-parametric test for difference between two means, Mann Whitney U test, was applied. This test showed no evidence of a difference in the level of moral reasoning associated with participants' gender, $Z = .758$, $n = 103$, $p = .448$.

To explore whether participants' level of moral reasoning (factor 7) was associated with their perceptions regarding perceived problem and intended action, Spearman's

correlation test was applied. The association between level of moral reasoning and mean ratings are shown in Table 20.

Table 20. *The relationship between participants' level of moral reasoning and their perception of the extent to which a behaviour is a problem to aviation safety and the extent to which their action is consistent with improvements to aviation safety*

Independent Variables (Factor)	Level	Perceived problem		Intended action	
		ρ	Sig.	ρ	Sig.
Working environment	Unsupportive	-.160	.107	.014	.890
	Supportive	-.023	.821	-.136	.178
Social consensus	Low	.047	.647	.043	.681
	High	.118	.236	-.047	.634
Direct / Indirect involvement	Indirect	-.022	.825	-.076	.444
	Direct	.145	.145	.095	.339
Status of the wrongdoer	Low	.118	.234	-.045	.651
	High	-.115	.248	-.114	.252
Status of the observer	Low	.119	.231	.048	.634
	High	.001	.992	.067	.500
Relationship to the wrongdoer	Not close	.038	.719	-.016	.881
	Close	.058	.719	-.082	.417
	Very close	-.021	.838	.029	.773
Seriousness	Low	-.037	.709	.002	.982
	High	.184	.063	-.016	.876
Legal protection	No	-.082	.415	.173	.083
	Yes	.002	.984	.039	.699
Motive of the wrongdoer	Good	.012	.905	-.121	.225
	Bad	.123	.218	.011	.914

In Table 20, it can be seen that no tests of association were statistically significant. Therefore, there was no evidence of an association between participants' level of moral reasoning and how problematic they perceived each described behaviour or their intended action.

7.5 Discussion

In the study reported here, 11 factors believed to affect intentions to report aviation safety concerns were tested, both for their perceived effect on aviation safety and to determine the extent to which subsequent actions are consistent with safety. The findings are first discussed by factor. A summary of hypotheses and questions posited in this study are summarised in Appendix E.

7.5.1 Factor 1: Working Environment

The findings provided evidence to support hypotheses H1a, H1b, and H1c. These findings suggested that consistent with Trevino (1986), within a supportive culture, individuals may be more in agreement about correct behaviour and may be more likely to act in a manner that is safety consistent to prevent wrongdoing. This finding is expected as within a supportive environment where management is committed to safety, stronger codes and norms may exist which influence employees' perceptions of role responsibility (Trevino & Victor, 1992). As such, employees may perceive reporting as a type of role responsibility and may feel a personal obligation to act in a way that agrees with the principles of the workplace (Trevino & Victor, 1992). In contrast, within an unsupportive environment, where managerial support is absent (or is perceived to be absent), observers of wrongdoing may be less likely to report wrongdoing for fear of retaliation (Near & Miceli, 1986).

For question 1, there was no evidence to suggest that there may be a relationship between the extent to which wrongdoing is perceived as a problem for aviation safety, and the nature of the work environment. This finding was in contrast to Merritt and

Helmreich's (1996a), who argued that organisational culture shapes workers' perceptions of safety, the relative importance placed on safety, and their activities regarding safety.

Merritt and Helmreich (1996a) also argued that a strong relationship exists between pilot perceptions of organisational culture and performance. Consistent with Merritt and Helmreich (1996a), the findings of hypotheses H1b and H1c suggested that, within both supportive and unsupportive cultures, a significant relationship exists between individuals' perception of problem behaviour and their intended actions. This implies that the more the individual perceives the observed wrongdoing as a problem, the more likely their intended action will be safety consistent.

Near and Miceli (1987) suggested that the belief that one has enough information about where to report fraudulent activities, and knowing where to report them, are important matters of concern for the potential reporter, especially if the wrongdoing involves one's immediate supervisor or someone at higher levels within the organisation. Prior research in the area of reporting suggested a positive association between organisational support, enough information, and knowledge where to report, and feelings of being obliged to report wrongdoing (Keenan, 1991, 1992, 1995).

The findings of question 1 may be due to the fact that the scenarios attempted to measure perceptions of wrongdoing of individuals who are not immersed in the culture that was going to be measured. As such, participants were indeed unfamiliar with the everyday working environment, therefore, not surprisingly; their perceptions of wrongdoing did not get affected by the culture of the hypothetical workplace.

For aviation organisations, the finding regarding this factor implies that if more efforts were to be invested into creating a working environment that supports safety procedures, the organisations may be in a better position to influence employees' perceptions of wrongdoing at the workplace, and their subsequent actions to be consistent with safety. It may of course be that an environment is supportive, but for some reason not perceived by employees as such.

Whilst the tests of the three hypotheses and question 1 are informative regarding what they show about the relationship between problem perception and subsequent actions in relation to this factor, they are arguably only half of the story. Also of importance are the descriptive statistics for participants' responses. That is, whilst the mean response for the extent to which a behaviour was perceived to be a problem was approximately equivalent to it being perceived as a *moderate problem*, the standard deviation indicated that some participants perceived it as only a *little bit of a problem* (whilst others viewed it as an *important problem*). Specifically, the variation in how participants believed that they would act means that it is possible the person who witnesses wrongdoing will be a person who, for whatever reason, does not perceive it is as a problem regarding aviation safety. Similarly, the variation of responses regarding subsequent actions means that there is a reasonable chance that the person who actually witnesses wrongdoing will be one of those who would not take a safety consistent action. Thus, the variation in responses within group provides evidence of how no safety action may be taken although wrongdoing is witnessed.

7.5.2 Factor 2: Social Consensus

The findings provided evidence to support hypotheses H2a, H2b, and H2c, but not H2d. This suggests that perceived social consensus about the ethicality of wrongdoing may influence individuals' perception of that wrongdoing, and their subsequent actions, in that when there was high social consensus that a behaviour is wrong, individuals were more likely to respond in a way that is consistent with safety. These findings also suggest that if group members within the organisation fail to question the actions or behaviour of the wrongdoer, the observer may perceive wrongdoing as less serious. One interesting way in which this could occur is in confidential disciplinary hearings.

Furthermore, when there was high social consensus about wrongdoing, a significant association was found between the extent to which individuals perceived wrongdoing as a problem to aviation safety, and their intended action. This relationship was not significant for low social consensus cases. This suggests that when high social consensus about wrongdoing is present, the more wrongdoing was perceived as a problem to aviation safety, the more likely the intended action of the person witnessing the wrongdoing is likely to be safety consistent.

Although an employee may witness wrongdoing, the decision to report may be challenged by peers. Moscovici and Faucheux (1972) suggested that group members may interact to redefine the wrongdoing or reshape the reality of the observer. For example, an observer may be told that certain practices are common knowledge and accepted by members of the group, or that correcting the wrongdoing is not the responsibility of the group member (Greenberger, Miceli, & Cohen, 1987).

Although the finding regarding this factor may be positive with regard to participants' safety consistent actions; that is, serious problems appeared to predict more safety consistent actions, the finding may however, indicate how problematic the effect of this factor is at the workplace. Since findings regarding this factor indicated that social consensus may affect individuals' ethical intentions, it could be suggested that within environments where social consensus is strong, employees may be less likely to think as individuals, but rather, may be more likely to think and act as a group. Employers should therefore encourage individuals to think and act independently of peers, in a way that is consistent with safety.

As for the previous factor, also of importance are the descriptive statistics for participants' responses. Again, whilst the mean response for the extent to which a behaviour is perceived to be a problem was approximately equivalent to it being perceived as a *moderate problem*, the standard deviation indicated that at least some of the participants perceived it as a *little bit of a problem* (and some as an *important problem*). Thus, again, it is possible that the person who witness wrongdoing will be a person who will not perceive it as a problem regarding aviation safety. Similarly, the variation of responses regarding subsequent actions means that there is a reasonable chance that the person who actually witnesses wrongdoing will be one of those who would not take safety consistent action. Thus, as for the previous factor, the within group variation in responses indicates how wrongdoing may be witnessed, but no safety action occurs: it simply depends upon who is the witness at the point in time the wrongdoing occurs.

7.5.3 Factor 3: Direct or Indirect Involvement in Wrongdoing

The findings provided evidence to support hypotheses H3b, H3c, and H3d, but not H3a. This suggests that there was no difference in the extent to which participants directly witnessing the wrongdoing may perceive the wrongdoing a problem as much as if indirectly witnessing the wrongdoing. However, individuals directly witnessing the wrongdoing were significantly more likely to act in a way that is consistent with safety (H3b). This finding is consistent with Darley and Latané (1968) who reported that responsiveness to an emergency situation was influenced by the number of other bystanders witnessing the same situation (all behaviours presented to participants in both scenarios implied that no other bystanders were present). This pattern of responding may suggest that when people are not direct witnesses, they may turn a blind eye to wrongdoing.

The findings of hypotheses H3c and H3d suggest that for both direct and indirect involvement in wrongdoing, the more the individual perceives the observed wrongdoing as a problem for aviation safety, the more likely the intended action of the observer is likely to be safety consistent.

Since there was a significant association between the extent to which participants perceived the behaviour as a problem and their intended actions, the finding regarding this factor could imply that by training employees to deal with hypothetical wrongdoing scenarios, their actions may increasingly become safety consistent so that in real life situations, employees would be better equipped to deal with observed wrongdoing, and be more likely to act in a way that is consistent with safety practices.

Again, the descriptive statistics for responses to this factor indicated the possibility that the person who witnesses the wrongdoing is one who will either perceive it as only a little bit of a problem to aviation safety or whose action will not be highly consistent with safety.

7.5.4 Factor 4: Status of the Wrongdoer

The findings provided evidence to support H4b and H4c, but not H4a. This suggests that individuals are equally likely to perceive wrongdoing independently of the wrongdoer's position within the organisation. This is a positive finding in that the intensity or seriousness of wrongdoing should be about the wrongdoing itself, and not dependent upon the status of the wrongdoer.

For question 2, there was no evidence to suggest that the extent to which participants perceived wrongdoing to be a problem regarding aviation safety was affected by the seniority of the person responsible for wrongdoing. However, significant relationships were found between individuals' perception of problems and their intended actions for both individuals in lower positions and individuals in higher positions (H4b and H4c). This suggests that regardless of whether the wrongdoer is in a senior or a junior position, the intended action of the individual witnessing the wrongdoing may be influenced by their perception of the wrongdoing in that the more the individual perceives the observed wrongdoing as a problem for aviation safety, the more likely the intended action of the observer is likely to be safety consistent.

Merritt and Helmreich (1996b) asked participants whether crewmembers should question the decisions or actions of their captains, and reported variations in responses. Similarly, the findings of this study found no evidence that wrongdoing committed by an individual in a lower position will be more likely to respond in a way that is safety consistent than wrongdoing committed by an individual in a higher position. A positive interpretation of this finding is that individuals may be willing to act in a way that is consistent with safety regardless of the status of the wrongdoer.

The mean responses and standard deviations for this factor indicated the possibility that the person who witnesses the wrongdoing may be one who will either perceive it as only a little bit of a problem for aviation safety or one whose action will not be highly consistent with safety.

7.5.5 Factor 5: Status of the Observer

None of the hypotheses of factor 5 were supported. Also, for questions 3 and 4, the findings did not suggest that individuals in higher positions would differ from individuals in lower positions in the extent to which they perceive wrongdoing as a problem to aviation safety, and the extent to which their response is safety consistent. Consistently with the findings of previous studies conducted to determine the relationship between ethical intentions and ethical attitudes and work experience (e.g. Borkowski & Urgas, 1992; Callan, 1992; Serwinek, 1992), the findings regarding this factor found no evidence of a relationship between individuals' positions in the workforce, their perceptions of problems and their intended actions. This is a positive

finding as it suggests that the seniority of a witness may not itself influence whether they question wrongdoers or report their actions.

The findings regarding this factor imply that the power relationship between individuals may not have an effect on individuals' perceptions of wrongdoing and their safety consistent actions. However, these findings may not hold true in different settings, in other words, a different pattern of power relationship between superior-subordinate may apply to different situations. For example, the participants involved in the current study were students undertaking aviation management or air transport pilot degrees with the aim of becoming managers or air transport pilots. Thus, they may have treated the scenarios from a manager or pilot's perspective, whereas the same scenarios may have exhibited a different level of power distance had they been presented to aviation personnel in lower positions, such as baggage handlers.

Although no hypotheses were supported for this factor, the mean responses and standard deviations nevertheless indicated the possibility that the person who witnesses the wrongdoing may be one who will either perceive it as only a little bit of a problem to aviation safety or one whose action will not be highly consistent with safety as there were a range of responses either side of the mean response.

7.5.6 Factor 6: Gender of the Reporter

Investigation of question 5 found some evidence of a difference in the extent to which males and females perceived a given behaviour to be a problem to aviation safety on 3 of 19 comparisons. However, to put this into perspective, it should be noted that by

chance alone, 1 in 20 comparisons would be expected to be significant if alpha is set at .05 (Hunter, 2001). Moreover, the pattern of differences was not consistent; that is, when the status of the observer was high, males were significantly more likely to perceive the behaviour as a problem for aviation safety than were females, whereas when the relationship of the participant to the wrongdoer was close and when the social consensus was low, females were significantly more likely to view the behaviour as a problem for aviation safety. Overall, the evidence of a relationship between gender and perception of problems in aviation was not particularly convincing. Moreover, tests of hypothesis H6a revealed no evidence that females are more likely to make safety consistent responses than males.

These two findings are in contrast to previous studies (Studies 2 and 3 of this thesis; Gilligan, 1977; Beltramini et al., 1984; Miesing & Preble, 1985; Ameen et al., 1996; Jones & Gautschi, 1998) where evidence was found to suggest that females are more ethical compared to males based on their evaluation of unethical academic activities. However, the finding was consistent with Rest's (1986) belief that gender differences are insignificant in moral reasoning.

Tests of hypothesis H6b and H6c revealed that for both males and females, there was some evidence of a relationship between the extent to which behaviours were perceived to be a problem for aviation safety and the extent to which participants' subsequent action would be safety consistent. However, although there was an overall significant relationship between the two variables of interest for 13 of the 19 levels of factors tested, the relationship was only significant for 7 of the 19 comparisons for females but was significant for 14 of the 19 comparisons for males. This difference may have been

directly attributable to there being approximately three times more males than females in this study.

The findings imply that gender may not be a significant factor related to an individual's perception of wrongdoing and what subsequent action they would take, although there was some evidence that males were more likely to take a safety consistent action the more they perceived a behaviour to be a problem regarding aviation safety.

7.5.7 Factor 7: Moral Values

None of the tests of hypotheses H7a and H7b were significant; thus there was no evidence that participants' level of moral development was related to the extent to which they perceived a given behaviour to be a problem with regard to aviation safety, or what subsequent action they would take. This was therefore not consistent with the findings of Study 3, and the findings of Singhapakdi and Vitell (1991), who suggested that individuals who perceived ethical problems were more likely to take actions to resolve the problems.

It is possible that the lack of significant findings related to this factor may be due to the lack of aviation work experience of the participants, as some evidence of a relationship between moral development and intentions to intervene in wrongdoing situations was found in Study 3, where participants were currently working in aviation. Given that participants were young students training to work in the aviation industry, it is possible that they did not possess sufficient working experience through which they may have had instances where moral values could have come into play.

7.5.8 Factor 8: Relationship to the Wrongdoer

The findings provided evidence to support H8a, H8b, H8d, and H8e, but not H8c. The findings indicated that individuals perceived wrongdoing to be more of a problem to aviation safety when the wrongdoing was committed by people with whom they do not have a close or a very close relationship. This could be interpreted as consistent with Hamilton's (1964) biological concept of inclusive fitness where the author reported that individuals help those to whom they are related in preference to those with whom they are not related.

Similar to the findings of Study 3, there was evidence in this study that individuals were more likely to respond in a way that is consistent with safety when wrongdoing was committed by people with whom they do not have a relationship. At face value, this finding contradicts Brass et al.'s (1998) suggestion that the likelihood of behaving ethically towards individuals is higher when the relationship between these individuals is a strong relationship. However, it is possible to reconcile the findings of this study with those of Brass et al. In this study, acting in a way that is consistent with safety may have an adverse effect upon the person whose wrongdoing is being reported; thus people may be motivated not to act when the person who could get into trouble is closely related to them. However, in the context of Brass et al, a close relationship predicted the person being treated fairly. Thus in both instances, the closely related person would potentially receive favourable treatment.

The findings related to this factor suggested that there may be a relationship between the extent to which wrongdoing is perceived to be a problem for aviation safety, and

participants' intended action for wrongdoers with whom they have a close or a very close relationship, but not with whom they do not have a relationship.

In aviation, this finding may not be of significance in large organisations such as international airlines, but for smaller aviation companies, for example in a family run flying club where employees may be part of the same family, these employees may be protective of the relationships between them, which may bias perception of wrongdoing at the workplace. Indeed, it has been suggested that many small businesses in New Zealand are family operated (New Zealand Herald, 2009). As an example, the greenstone case where the pilots, a father and his son, were convicted of stealing greenstone from South Westland in New Zealand (New Zealand Herald, 2007). Both pilots may have been aware that stealing the greenstone may have been illegal, but the relationship between the two pilots may have influenced their perception of their action. It could therefore be suggested that, to avoid negative influence of employees' perception of wrongdoing and increase the possibility of questioning actions and behaviours within the workplace, organisations could be wary of employing individuals between whom a strong or close relationship exists.

The mean responses and standard deviations for this factor once again indicated the possibility that the person who witnesses the wrongdoing may be one who will either perceive it as only a little bit of a problem to aviation safety or one whose action will not be highly consistent with safety.

7.5.9 Factor 9: Perceived Seriousness of Act

The findings provided evidence to support hypotheses H9a, H9b, and H9c, but not H9d. These findings suggested that people tend to perceive highly serious wrongdoing more of a problem for aviation safety than low serious wrongdoing, and are more likely to subsequently act in a way that is consistent with safety if the wrongdoing is serious. This is consistent with Harrington's (1997) finding that as the seriousness of behaviour increases, the individual perceives the behaviour as more problematic. Whilst at face value this finding suggests that important concerns would be more likely to be communicated in a safety consistent manner, it is debatable whether aviation employees are qualified to determine the extent to which particular behaviours may be problematic with regards to aviation safety.

According to King and Hermodson (2000), wrongdoing that has the potential of causing harm to employees, the organisation, as well as the general public, is more likely to be reported than a minor issue. The findings of the current study showed that individuals were more likely to act in a way consistent with safety if wrongdoing is perceived to be serious than if deemed to be less serious. This finding also supports Hunt and Vitell's (2006) suggestion that an individual's perception of an act and its consequences could influence the individual's behavioural intentions.

Overall, there was evidence that the more likely the behaviour was perceived to be a problem for aviation safety, the more likely the action taken would be safety consistent. However, this did not hold true for the problems likely to have more serious effects on aviation safety. In the latter case, there was no evidence of a relationship between the

extent to which a behaviour was perceived to be a problem for aviation safety and individuals' intended actions being consistent with safety. One potential explanation is that as problems affecting aviation safety get larger, there is an increase in uncertainty as to what action to take. Also, a lack of evidence of a relationship may be due to a *Type II* error.

Although the findings regarding this factor may, at face value, appear intuitively plausible, it is argued that they potentially highlight a pathway whereby concerns that may appear minor to an observer (e.g., hearing a pilot describe a 'close-call' as did the late pilot Michael Bannerman of Air Adventures), which may be more significant than interpreted by the participant (e.g., the pilot actually has one 'close-call' every second time that they fly), are not communicated in a way likely to improve aviation safety.

The mean responses and standard deviations for this factor indicated the possibility that the person who witnesses the wrongdoing may be one who will either perceive it as only a little bit of a problem to aviation safety, or one whose action will not be highly consistent with safety.

7.5.10 Factor 10: Legal Protection of the Reporter

For question 6, there was evidence to suggest that individuals who believe they have protection of the law may perceive wrongdoing more of a problem for aviation safety, than individuals who are not aware of current protective laws and regulations. One reason may be that individuals who are aware of current laws will consequently be in a better position to evaluate the legality of practices within their organisations, comparing

to individuals who are not aware of current laws and regulations. This is consistent with Honeycutt, Glassman, Zugelder, and Karande (2001) who posited that established laws and policies serve as indicators of the legality of actions.

The findings provided evidence to support hypotheses H10a and H10c, but not H10b. As expected, the findings indicated that individuals who believe they have legal protection were more likely to respond in a way that is safety consistent than individuals who did not believe otherwise (H10a). This finding is consistent with Turner et al.'s (1995) statement that established laws and regulations could prevent employees from engaging in unethical behaviour. The finding implies that individuals who believe they are protected by laws, may be in a much better position to evaluate the legality of actions within their organisation, and consequently these individuals may be less vague about what action to take following the observation of wrongdoing, comparing to individuals who do not believe they would be protected by current laws.

The findings also suggested that for individuals who believed they have protection of current laws and regulations, there was a significant relationship between their perception of problems and their intended actions (H10c). In contrast, for individuals who were not aware of current laws and regulations, no association between their perception of problems and their intended actions was expected (H10b). However, it has been argued that laws may not be explicit about the way they offer protection to potential reporters of wrongdoing (Sawyer et al., 2006), and potential reporters of wrongdoing may not fully understand their rights with regards to protection from retaliation (Keenan & Krueger, 1992). These findings provide evidence that, since a significant relationship was found between individuals' perception of problems and

their intended actions, establishing protective laws and reporting policies at the workplace may increase employees' likelihood to act in a way that is consistent with safety.

The mean responses and standard deviations for this factor again indicated the possibility that the person who witnesses the wrongdoing may one who will either perceive it as only a little bit of a problem to aviation safety or whose action will not be highly consistent with safety.

7.5.11 Factor 11: Motive of the Wrongdoer

The findings provided evidence to support H11b, H11c, and H11d, but not H11a. This suggests that individuals' perception of the extent to which wrongdoing is perceived to be a problem for aviation safety may not be influenced by the motive of the wrongdoer.

Sverdlik's (1996) stated that motives make a difference to the morality of an action. However, the findings suggested that individuals' perception of wrongdoing may not be influenced by the motive of the wrongdoer. This is consistent with Dehn and Calland's (2004) suggestion that since it is impossible to determine the true motive of a wrongdoer, the ethical judgment is based upon the concrete act of wrongdoing and the effect of its consequences on society. However, in this study, there was evidence that the motive of the wrongdoer did significantly influence the individuals' intended actions, in that, when the motive behind the wrongdoing was perceived as bad, the intended action of the person observing the wrongdoing was more likely to be safety consistent than that of the person perceiving the motive of the wrongdoer as good.

Moreover, in both cases where the motive behind the observed wrongdoing was good or bad, there was evidence of a strong relationship between the observers' perception of the wrongdoing and their intended actions. This suggests that for both bad and good motives, the more the wrongdoing is perceived as a problem for aviation safety, the more the intended action is likely to be safety consistent.

The mean responses and standard deviations for this final factor indicated the possibility that the person who witnesses the wrongdoing may be one who will either perceive it as only a little bit of a problem to aviation safety or one whose action will not be highly consistent with safety.

7.6 Limitations

There are potentially four limitations to the current study. First, was the use of non-probability sampling methods; specifically, the findings reported here may or may not generalise to other populations of the aviation industry. Second, as deception would be neither viable nor practical to use in the current study, participants' responses may not reflect how they would act were they to be confronted by a real life situation. Nevertheless, in the context of the current study, the methods must be treated as a potential limitation. A third limitation was that participants were students selected from one university only which limits the generalisability of the results. Furthermore, the sample included more males than females.

7.7 Conclusion

The findings of this study suggested that social consensus, relationship to the wrongdoer, and legal protection of the observer of wrongdoing may influence the extent to which those who become aware of wrongdoing may perceive it as threatening to aviation safety. In addition, the seriousness of wrongdoing, direct or indirect involvement in wrongdoing, working environment, legal protection of those observing wrongdoing, motive of the wrongdoer, and the relationship between those observing wrongdoing and those committing wrongdoing, may influence the intended action of those who become aware of wrongdoing behaviour in aviation.

It is suggested that there is evidence of the effect of these factors regarding problem perception and reporting intentions in both the SilkAir and Air Adventures accidents. For example, although the captain involved in the SilkAir crash was informally reported for his non-compliance with the airline standards, there was no evidence that the reported concerns were followed up by management (Morse & Bor, 2006). Specifically, it can be seen that had concerns been reported directly to the regulatory authority, this accident could have been averted. In this case, it could be assumed that there was a lack of support at the workplace; which in turn may have discouraged further reporting of the wrongdoing behaviour of the captain in question.

Regarding the Air Adventures accident, a lack of concerns being communicated directly to the regulatory authority may have been due to the nature of involvement in wrongdoing of those who later reported they had concerns about the pilot's unsafe practices. That is, it is possible that those who reported their concerns after the accident

may not have been directly involved in the alleged wrongdoing situations of the pilot, but instead, they may have heard of this wrongdoing during the frequent social gatherings they held with the pilot (New Zealand Herald, 2004). This may mean that any feelings of responsibility about the pilot's questionable behaviour may have been diluted by the number of those who had been socialising with the pilot. The nature of the relationships that may have developed between the pilot and those with whom the pilot socialised may also have been a factor could have implicated in the lack of reports being made before the accident. For example, in the current study there was evidence that a 'relationship factor' may compel individuals from acting in a way that is consistent with safety when they are 'closely related' to the wrongdoer. In the context of Air Adventures accident, those who were in reality mere drinking buddies may have been often viewed, at least by males, as close and intimate friends (Azrin, 1976). Thus, it seems reasonable that those who socialised with the pilot may have developed some kind of a relationship with him; one which may have prevented them from reporting their concerns about the pilot's wrongdoing before the accident.

In sum, the study reported here found evidence of the existence of person- and situation-based factors that may affect perception of aviation based problems and the subsequent actions that are taken. It is suggested that whilst these factors may have explanatory value insofar as they can be reconciled with the antecedents of some past accidents in which a lack of reporting was implicated, they may also have far more greater value insofar as they could be used to predict situations where reporting may be less likely. Thus, if some means by which their effect could be reduced, then they may help to achieve the aim that improvements to safety should be proactive, rather than reactive.

CHAPTER EIGHT

General Discussion

“We believe all aviation accidents are preventable - and that is the goal we are working to achieve”
(CAA NZ, 2006a)

8.1 Chapter Overview

This chapter discusses the implications and theoretical contributions of the studies that comprise this thesis. The research questions are first addressed, then implications for organisations are discussed. Speculation regarding solutions for the research problem is proposed in the recommendations section. This chapter concludes with directions for future studies and limitations of the research.

8.2 Summary of Findings

A review of the literature revealed that little research on the phenomenon of reporting in aviation currently exists. Investigation into occurrences such as the Air Adventures accident, where the cause was believed to be due to human error, raised intriguing questions about whether such events could have been anticipated, and whether those responsible could have been stopped from exposing themselves and others to life-threatening situations.

8.2.1 Research Questions

Six research questions were developed in order to investigate the research problem identified in this thesis, that not all people communicate concerns they may have about aviation safety in a manner whereby it can be used by the regulatory authorities to make proactive safety improvement.

Research Question 1: How could accidents such as that of Air Adventures have happened? Were there antecedents to the Air Adventures accident that could potentially have led to the regulatory authority not having information that could have been used to possibly avert the accident?

The findings of Study 1 speculated that some factors may contribute to the under-reporting of safety concerns in aviation. These factors may help explain how accidents such as that of Air Adventures could have happened. Subsequent investigation revealed that the following variables were evident prior to the accident: lack of knowledge of wrongdoing behaviour needed to be reported and how to report them, organisational culture and structure, group norms and social support for wrongdoing, financial pressures, fear of retaliation, role of the wrongdoer and role of the observer of wrongdoing within the organisation and relationship to the wrongdoer.

Research Question 2: What actions will participants take when they have concerns about safety within their aviation workplace? Specifically, will participants report their concerns to senior management or to the regulatory authority, would they talk to the person involved in the questionable practices, or would they do nothing?

The findings of Studies 2 to 5 showed that whether or not the regulatory authority was informed about a given behaviour deemed to be a threat to aviation depended greatly upon who became aware of the threat. In Study 2, participants' actions ranged from 'do nothing' to 'report to the regulatory authority'. In Study 3, in at least half of the behaviours tested, when asked if they would take some action, participants were as likely to respond 'no' as 'yes'. In Study 4, upon becoming aware of symptoms of stress exhibited by an aviation employee, such as a pilot or air traffic controller, only one symptom (substance abuse) was significantly more likely to be reported to senior staff or the regulatory authority; often the intended action was simply 'do nothing'. Lastly, in Study 5, participants responses again ranged from 'do nothing' to 'report to someone senior' or directly to 'the regulatory authority'.

Research Question 3: Is there a relationship between individuals' level of moral development and their intentions to report wrongdoing?

Research Question 3 was addressed through Studies 3 and 5. The findings of Study 3 provided evidence that there was a significant association between whether participants believed that they would intervene upon becoming aware of wrongdoing and their level of moral reasoning. However, in Study 5, no such relationship was found. One explanation that may reconcile these two opposing sets of findings is that participants of Study 5 were students, whilst participants of Study 3 were employees of aviation establishments. Specifically, when compared with individuals working in the aviation field, aviation students may have little experience of resolving dilemmas such as those faced in Studies 3 and 5, and may not have developed an approach to dealing with them.

Research Question 4: Is there a relationship between individuals' intentions to report wrongdoing and the level of their relatedness to the wrongdoer? And is this relationship likely to be influenced by the gender of the observer?

The findings of Study 3 provided evidence that the relatedness factor (i.e., how close was the relationship between witness and wrongdoer) influenced individuals' likelihood to report wrongdoing. Specifically, individuals were more likely to report wrongdoing if they were not related to the person(s) involved in wrongdoing. The importance of the relationship was also found to be significant in Study 5, where there was evidence that individuals were more likely to respond in a way that was consistent with safety when wrongdoing was committed by people with whom they did not have a close relationship.

In Study 3, there was evidence that gender may interact with the level of relatedness when deciding whether to intervene. Specifically, females were more likely than males to intervene in wrongdoing situations where there was a close relationship between them and the person involved in wrongdoing. However, in Study 5, there was no evidence that the gender of the observer interacted with the degree of relatedness of the wrongdoer.

Research Question 5: What actions would members of the New Zealand aviation community take on discovering symptoms of stress they believed could affect aviation safety?

Research Question 5 was investigated through Study 4. The findings highlighted a degree of variability in participants' responses; that is, there was evidence of differences in opinion about whether all of the 25 presented symptoms of stress were indeed likely to be threats to aviation safety. However, a potentially positive finding was that for symptoms that individuals perceived as likely to impair aviation safety, differences in perceived importance of these symptoms were found to be positively related to the likelihood of the individual performing safety consistent behaviour (such as reporting their concerns to either a person senior to them or directly to the regulatory authority). Overall, however, the findings indicated a significant variation in the extent to which individuals' subsequent actions would be consistent with improvements in safety.

Research Question 6: What appear to be the key factors affecting aviation employees' decision making process, and to what extent do they have an effect on individuals' evaluation of wrongdoing and reporting intentions?

Studies 2 to 5 attempted to test the effect of eleven factors that were believed to have an effect on reporting of wrongdoing in aviation: social consensus, relationship to the wrongdoer, seriousness of wrongdoing, legal protection of the reporter, seriousness of wrongdoing, direct or indirect involvement in wrongdoing, working environment, gender of the reporter, motive of the wrongdoer, moral values of the reporter, and relationship to the wrongdoer.

The effect of both the position of observer of wrongdoing and the individual's direct or indirect involvement in wrongdoing on individuals' intentions to report was examined in Studies 2 and 5. In both studies, there was evidence to support that a participant's direct

or indirect involvement in wrongdoing may interact with their reporting intentions. Additionally, the status that the observer has in their workplace was also found to have an effect in Study 2, but not in Study 5.

The effect of both the relationship between the wrongdoer and the observer of wrongdoing and the moral development level of the observer on individuals' intentions to report was examined in Studies 3 and 5. In both studies, significant association between the relationship to the wrongdoer and intentions to report wrong was found. The moral development factor was, however, significant in Study 3 but not in Study 5.

The effect of the extent to which an individual perceives behaviour was a problem for aviation safety and reporting intentions was examined in Studies 3, 4 and 5. In all three studies, a positive association was found between the individuals' perception of the seriousness of the wrongdoing and the likelihood of these individuals performing safety consistent actions (e.g. reporting).

The effect of the working environment, social consensus, the status of the wrongdoer has in their workplace, the legal protection of reporters and the motive of the wrongdoer, were all examined in Study 5. The findings suggested that the working environment, the legal protection of reporters and the motive of the wrongdoer were all found to have significant effect on intentions to report wrongdoing.

In Studies 2 to 5, the relationship between gender of the observer of wrongdoing and intentions to report was examined. A significant effect was found in Studies 2 and 3, but not in Studies 4 and 5.

The findings of Studies 2 to 5 provided evidence of a great deal of variation in peoples responses regarding the extent to which a behaviour was perceived to be a threat to aviation safety and how they would subsequently act. The implications of these variations in responses could imply that a number of observations of wrongdoing may not be communicated to management or to authorities, precluding opportunities to further improve aviation safety.

8.3 Discussion

8.3.1 Evidence for a Pathway via which Underreporting in Aviation Occurs

One of the key findings of this thesis appears to be that deciding whether any given behaviour is a potential threat to aviation safety and what action should be taken upon becoming aware of such behaviour is seldom easy, irrespective of whether one is a manager, a pilot, staff, or undergraduate student studying aviation.

First, for many examples of behaviour that could threaten aviation safety groups of individuals appeared not to reach a consensus regarding whether a particular behaviour was actually a threat to aviation safety; that is, whilst some may perceive any of the examples of behaviour used in Studies 2 to 5 of this thesis as a potential threat to aviation safety, others did not. Indeed, in no example did participants reach 100% consensus that a single behaviour was a problem to aviation safety.

Second, evidence found in Studies 2 to 5 suggested that there was no consensus regarding the action to take upon becoming aware of a behaviour that was perceived as

a problem for aviation safety. Specifically, for every single example of behaviour in Studies 2 to 5 that were perceived to be a potential threat to aviation safety, some participants reported that they would do nothing, whilst some participants stated that they would at least report their concerns to someone more senior.

It is argued that such variation in responses demonstrates a clear pathway via which underreporting in aviation can occur. Specifically, there will logically be times when people will become aware of behaviour that could truly threaten aviation safety. Of those who become aware of a behaviour that could truly threaten aviation safety, the findings of this thesis suggest that some may wrongly perceive the problem as no threat to aviation safety. Furthermore, of those who become aware of a behaviour that truly threatens aviation safety, and who correctly perceive it as such, some may do nothing at all, whilst others may at best simply talk to person responsible for the threat. These findings suggest that there will be occasions when aviation safety improvements can often only be reactive, as in many situations it must learn from accidents and incidents, rather than proactively from reports of concerns, as the latter often will not be communicated in a way that the regulatory authority will become aware. Therefore, current evidence of reporting intentions suggests that there will be times when the aviation industry can only retrospectively learn from accidents such as that of Air Adventures, rather than proactively fulfil their aim that “...*all aviation accidents are preventable - and that is the goal we are working to achieve*” (CAA NZ, 2006a)

Although these findings clearly demonstrate a pathway via which under-reporting can occur, it should not be overlooked that for every example of behaviours that might

threaten aviation safety used in this thesis, some individuals reported that they would behave in a way consistent with improving aviation safety.

In addition to variation in individuals' responses to examples of behaviours that may threaten aviation safety, varying degrees of evidence were also found of a number of factors that appeared to predict whether a person would perceive a behaviour as a threat to aviation safety and how they will subsequently act: social consensus, relationship to the wrongdoer, seriousness of wrongdoing, legal protection of the reporter, seriousness of wrongdoing, direct or indirect involvement in wrongdoing, working environment, gender of the reporter, motive of the wrongdoer, moral values of the reporter, and relationship to the wrongdoer.

It was found in Studies 2 and 5 that a person who becomes aware of wrongdoing in aviation may indeed report their concerns, but, for whatever reasons, not directly to the regulatory authority but instead to management or someone senior. Although reporting to management or someone senior was classified as being more safety consistent than, say, doing nothing, such an assumption may be overly simplistic as it assumes that management will inform the regulatory authority or act ethically and responsibly upon receiving information. Indeed, it is suggested that the Space Shuttle Challenger accident demonstrated that voicing concern does not necessarily result in appropriate corrective actions being taken by those to whom concerns are reported.

How management react upon being informed of wrongdoing or concerns about aviation safety generally, will depend in part upon the organisation culture and the environment in which it occurs. Although the scope of this thesis was limited to exploring the actions

and beliefs of individuals in the aviation workplace, a brief discussion of the case of the Space Shuttle Challenger usefully highlights how the role of the organisation can negate the efforts of those who are brave enough to stand up and be counted.

8.3.2 Reporting in Practice: The Case of the Space Shuttle Challenger

Six months prior to the Space Shuttle Challenger accident that occurred on January 28, 1986, engineers (Roger Boisjoly & Alan McDonald) working at Morton Thiokol, the company contracted by NASA to develop the solid rocket booster “O” rings, expressed concern over the faulty design of the “O” rings. The “O” rings problem, according to the investigation, was discussed in at least 25 communications prior to the accident (The Presidential Commission, 1986). Despite these previous communications, and despite evidence presented by engineers urging to delay the launch of the Space Shuttle, none of the concerns managed to stop the launch, resulting in the destruction of the Space Shuttle Challenger, and the death of its seven crew members (The Presidential Commission, 1986). After the accident, the concerned engineers voiced their concerns publicly, to draw attention to the safety issues that contributed to the cause of the accident.

In the aftermath of the Space Shuttle Challenger accident, many speculations were made as to why the previous safety concerns expressed by the engineers did not result in delaying the launch. Some speculation referred to a failure to communicate life-and-death problems up the chain of command in the space agency and among its contractors (Sanger, 1986); a ‘Russian roulette mentality’ of NASA managers who felt that since they got away with it last time, they could get away with it again (Boffey, 1987); poor

judgement because of fatigue and excessive overtime (Covault, 1986); and NASA's management structure that allowed the engineers of the booster project to make decisions with flight safety implications, without reviewing those decisions in depth by shuttle launch and flight operations (Covault, 1986).

There are at least three possible reasons why the engineers did not attempt to voice their safety concerns outside of their organisations before the accident. First, by using the internal procedures for reporting concern to communicate their concerns about the safety of the “O” rings to their superiors (Broad, 1986), the engineers placed the responsibility of dealing with the matter on those in a position to take action to resolve the situation. Second, the organisational culture may have prevented the engineers from voicing their concerns outside of the organisations. For example, the organisations may have been thought to be like a ‘close-knit families’ where concerns would stay within and never go outside the family (Broad, 1986). Third, the fear of organisational retaliation may have prevented the concerned engineers from communicating concerns outside of their organisation (and quite rightly so, as the concerned engineers were retaliated against for voicing their concerns externally after the accident).

A particularly interesting question arises, whereby had no accident occurred, would the concerned engineers have ever communicated their safety concerns externally? Given the history of the events surrounding the accident, which presented no evidence of external reporting of concerns before the accident, it can be assumed that had no accident happened, no concerns would have been voiced externally. A possible reason for why the concerned engineers have revealed their previous concerns about the launch to the public, may be due to the consequences of the accident. When faced with factual

consequences, these consequences may have outweighed the engineers' previous reasons for not communicating concerns externally.

As a result of bringing their concerns to the public's attention, both engineers suffered organisational retaliation. The engineers claimed to have increasingly faced alienation at the workplace, and isolation from the "O"rings seal redesign project. It was not until these changes to the engineers' job assignment were brought to national attention by the head of the Presidential Commission, that the engineers were re-assigned to their former assignments (Boisjoly et al., 1989). One engineer became the organisation's spokesperson and was re-assigned to head the booster rocket redesign task force. The second engineer requested an extended sick leave due to depression (Stewart, 1987), and later filed two lawsuits against his organisation, Morton Thiokol. The first suit was filed for knowingly providing NASA with defective "O"rings, and falsely certifying their safety. The second suit was filed for damage to his professional reputation and punishment for testifying against his organisation (Boffey, 1987).

If the importance of reporting of safety occurrences or concerns was the key message that emerged from the case of Air Adventures, then it is argued that the case of the Space Shuttle Challenger showed that on its own, reporting of safety concerns may not be enough. The Space Shuttle Challenger accident showed that a number of factors may render reporting of safety concerns an ineffective activity. Specifically, when wrongdoing occurs, reporting is almost certainly a necessary condition for safety improvement, but it may not be a sufficient condition.

8.3.3 Implications for Organisations

According to the New Zealand Civil Aviation Act 1990, aviation employees are required to report all aviation accidents and incidents that they have been involved in or have witnessed to the regulatory authority (CAA NZ, 2006c). However, it is believed that not all accidents and incidents are reported. NZALPA (2005) submitted that despite reporting of incidents being a legal requirement, up to 80% of incidents are not reported. Indeed, NZALPA claimed that a survey conducted by the organisation found that only 6% of pilots routinely file incident reports (although they also note that this survey was thought to lack statistical robustness). Clearly, this current situation is not consistent with the CAA NZ statement, “We believe all aviation accidents are preventable - and that is the goal we are working to achieve” (CAA NZ, 2006a) or with a proactive approach to aviation safety.

The results of this research suggested that some factors (seriousness of wrongdoing, direct or indirect involvement in wrongdoing, working environment, legal protection of the reporter, motive of the wrongdoer, social consensus, moral values, status of the wrongdoer, status of the observer, relationship to the wrongdoer and gender of the observer), may be important in explaining differences in intentions to report concerns about wrongdoing in aviation. Whilst it is acknowledged that further tests of these factors would be required to fully establish their robustness, these findings may ultimately be useful in determining the type of training needed for aviation staff to promote a culture within the aviation workplace where concerns are freely discussed.

Much has been discussed about under-reporting and factors that may influence individuals' intentions to communicate safety concerns to those who may be in a position to intervene. However, unless the findings of academic studies in aviation are communicated to aviation employees, then it is difficult to use research findings to improve aviation safety. The following section proposes a way to communicate the importance of reporting in the aviation workplace.

8.3.4 Putting Findings into Practice

In practice, the importance of reporting safety concerns could be communicated to the aviation community by, for example, highlighting the key points that contribute to the under-reporting of concerns through the use of posters or newsletters at the workplace. (Note that such an approach would need to be evaluated to determine its effect on a meaningful outcome, such as the rate of under-reporting). Indeed, such a simple and cost effective approach has previously worked well in the area of health behaviour. For example, the use of posters has been found to significantly increase the rate of hand-washing in hospitals (Pittet et al., 2000), the uptake of influenza vaccinations in hospitals (Qureshi, Hughes, Murphy & Primrose, 2004), safety awareness amongst scaffolders (Saarela, 1989), and significantly decrease the rate of smoking among a high risk population (Stevens, Thorogood, & Kayikki, 2002).

A possible example of a poster that could be trialled in the aviation industry is displayed in Figure 9. Figure 9 could, for example, be in a form of a poster displayed at the workplace, pamphlets given to new staff as part of their induction package. Alternatively, organisations could introduce 'safety awareness weeks' where examples

such as that displayed in Figure 9 could be distributed amongst existing staff. Such examples may help increase staff awareness of their responsibility towards communicating safety concerns, and maintaining a safe environment.

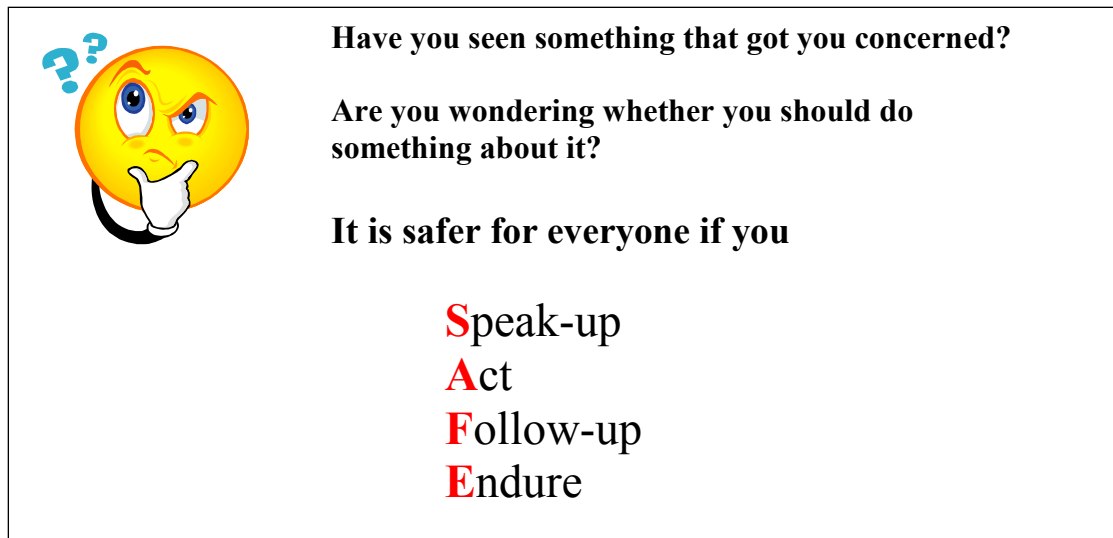


Figure 9. Keeping SAFE: An example of how acting safe can be encouraged in the aviation community

The basic idea is that the SAFE model could encourage aviation employees to discuss safety concerns, by showing them simple steps to take when they are faced with a situation that result in increasing their concerns. An individual with safety concerns can:

1. **Speak-up:** whether reasons for concerns have been directly or indirectly witnessed (reasons for concerns have been personally witnessed, or communicated by another concerned person), the first step the concerned person should take is to do at least one of these options:

1.1 Discuss concerns with senior staff: discussing concerns with senior staff will give the organisation a chance to control the wrongdoing situation, and take corrective action. A process for discussing concerns, whether formal or informal process, should be established within organisations. Organisational procedures for communicating concerns, policies and protective legislations should be visible to the concerned person.

1.2 Report concerns to the regulatory authority: although many individuals may not approach the authority in the first instance, this option should be available to those who have no confidence in the internal reporting mechanism of their organisation. Procedure to report concerns to the regulatory authority should be established. Protective legislations should be visible to the concerned person.

2. Act: if after reporting concerns no corrective action has been taken to deal with wrongdoing; that is, if concerns have been ignored, no satisfactory action has been taken, or if wrongdoing persists after reporting it to senior staff or to the authority, the concerned person should use external channels to raise concern such as informing the media, the police, Members of parliament, or transport agencies.
3. Follow-up: the concerned person should not hesitate to question the parties they are seeking help from with regards to what is being done about their concerns. The concerned person should demand regular updates and follow the progress of their discussion of concerns.

4. Endure: the concerned person should persist in pursuing their objective to maintaining safety at the workplace. This implies that the concerned person should stay determined to bringing change to the wrongdoing situation and improving the work environment. This will send a strong message to organisations whose commitment to safety may not be strong.

In addition, a 'Miranda Rights' type of approach to encourage people to act in a way that is consistent with the current laws could be introduced. The Miranda warning is a warning given by police in the United States to criminal suspects in police custody, or in a custodial situation, before they are interrogated. In 1963, Ernesto Miranda was arrested in Arizona, and while in police custody, he signed a written statement confessing to a crime. In 1966, Miranda's conviction was overthrown by the Supreme Court as it was established that the police did not inform Miranda of his constitutional right before asking him questions, and that his conviction was based entirely on the confession he signed, and not on any independent evidence in the state's possession. Since then, the Miranda Rights are read to anyone who is arrested by the police as a means of protecting their Fifth Amendment, the right to avoid coercive self-incrimination (US Constitution, 2010). Although the Miranda Law does not protect people from being arrested, it does however prevent people from incriminating themselves if they confess to a crime at the time of their arrest, or during interrogation (US Constitution, 2010). The typical warning states:

You have the right to remain silent. Anything you say can and will be used against you in a court of law. You have the right to an attorney. If you cannot afford an attorney, one will be appointed to you. Do you understand these rights as they have been read to you? (US Constitution, 2010).

Movies and television police dramas have done much to inform the public of the protection offered by the Miranda warning, and as a result, the popularity of the phrase 'you have the right to remain silent' has been recognised by the nations worldwide.

The popularity of the Miranda warning could be used to the advantage of aviation safety, in that a similar message could be introduced at the workplace to encourage employees to report wrongdoing. The use of a similar approach to the Miranda warning at the workplace may serve as a reminder to employees with safety concerns of their responsibility towards safety, and their rights to question wrongdoing. By explicitly showing commitment to protecting and supporting people who decide to come forward, organisations may increase employees' perception of safety at the workplace. According to Cooper (2002), the relationship between people's perceptions of safety and the influence of these on their subsequent behaviour are another aspect of safety culture. As a way of example, the 'Miranda Rights' for a concerned person at the workplace could be as shown in Figure 10:

- If you have concerns about safety:
1. You have the right to speak-up.
 2. Anything you say cannot and will not be used against you.
 3. You have the right to have a support person.
 4. If you don't have a support person, the authority appoints one for you if you wish.

Figure 10. A 'Miranda Rights' for people with safety concerns at the workplace

8.4 Directions for Future Research

The results compiled in this thesis suggested a number of areas for future research. First, future research may investigate the relationship between reporting and the rate of incidents and accidents. For example a retrospective study could be developed to investigate whether the action of reporting is likely to result in a decrease of safety occurrences at the workplace.

Second, a review of the literature indicated a relationship between national culture and reporting of wrongdoing. Surveys used in this thesis may therefore be translated into other languages to determine how the culture may affect employees' intentions to report wrongdoing in the aviation workplace. Aviation workers living and working in different cultures could participate in similar experiments to determine if culture influences ethical reasoning and reporting intentions in realistic aviation dilemmas.

Third, given people's negative attitudes and views they associate with the usage of terms such as 'reporting' and 'whistleblowing', it would be interesting to investigate

whether people would be more willing to talk about their safety concerns, if they believe they are not reporting or whistleblowing. For example, an experimental study could be conducted to explore if people are more likely to ‘communicate’ their safety concerns rather than ‘report’ their safety concerns.

Fourth, it is possible that some higher order interactions between factors may predict either higher or lower levels of reporting. Therefore, future research could be designed to explore two-way or higher order interactions between specific factors, for which there are *a priori* grounds to hypothesise they may affect the likelihood of reporting. For example, the interaction effect on reporting of gender of the reporter, gender of the wrongdoer, and motive of the wrongdoer.

8.5 Limitations of Research

It is important to note that there a number of potential limitations in the studies that comprise this thesis. First, some of the findings between studies were not wholly consistent. For example, Studies 2 and 3 found an effect of gender, whereby the gender of the reporter affect the likelihood of reporting wrongdoing, but Studies 4 and 5 did not. One possible reason for these inconsistencies may be due to *Type I* and/or *Type II* errors; that is, at least some results were actually false positives or false negatives. Further replication of the studies reported here would allow researchers to determine the extent to which this may have occurred and which factors are truly robust.

Second, non-probability sampling methods were used throughout this thesis. Therefore, the extent to which the findings of this thesis would represent those of the aviation

community of New Zealand as a whole is not known, as the answers of aviation employees not included in the original sampling frame may have been significantly different. Whilst it is acknowledged that the sampling methods used here may in principle reduce the validity and generalisability of the findings, in practice, it is often the case that random sampling is neither viable (e.g., unavailability of a full sampling frame) nor practical (e.g., time and costs), but the findings are adequately robust.

Third, the participants in this thesis were all located in New Zealand, although some may have immigrated to New Zealand having previously worked in the aviation industry in other parts of the world. In principle, this means that particular caution must be applied if the findings are to be generalised to aviation employees located in other areas of the world, particularly where cultures differ from that of New Zealand (e.g., in collectivist or oppressive cultures). However, the geographical constraints of the current study may be offset because aviation is essentially globally regulated (i.e., by ICAO), meaning that aviation employees throughout the world may be more similar than, for example, members of the police or armed forces in different parts of the world.

Fourth, due to both practical and ethical constraints, Studies 2 to 5 asked participants to self-report how they would act in a series of hypothetical scenarios. It is important to be aware that the same participants may not react in a similar way if they were confronted by the same events in real life situation. In principle, an experiment could have been conducted whereby people working in the aviation industry, with no knowledge of the real purpose of the experiment, could have been placed in (fabricated) wrongdoing situations. The extent of reporting could subsequently be measured. Whilst such methodology may in principle have higher validity than using imaginary scenarios, in

practice, it would be ethically dubious and could seriously undermine the experimenter-participant relationship. Although it has been suggested that the relationship between attitudes and behaviour is not always particularly strong (LaPiere, 1934), later evidence suggested that simulation studies may be more valid than initially thought (Little, Lindenberger, & Nesselroade, 1999). Ultimately, however, it is possible that people may act differently confronted by a real life wrongdoing situation to how they believe they would act when confronted by imaginary wrongdoing scenarios.

Finally, although the effect of more than two factors were explored in each of the empirical studies, there were at least two reasons why it was not possible to investigate all two-way or any higher order interactions between factors. First, the sample size and cell sizes precluded the possibility of investigating some two-way interactions and any higher order interactions. Second, the length of a questionnaire that would allow investigation of higher order interactions would be beyond that which participants could reasonably be expected to complete. Thus, it is possible that some higher order interactions could show particular sub-groups who are more or less likely to report concerns about aviation safety.

CHAPTER NINE

Conclusion

This thesis began with a problem identified by the CAA NZ (2006a) in the aftermath of an aviation accident in which nine people died, when it was asked, “How could this have happened?” The CAA NZ’s question arose from their subsequent investigation of the accident in which it was found that many people held concerns about the pilot which, had they been communicated to the regulatory authority, could quite possibly have been used proactively to avoid the accident occurring (i.e., the operating licence of the pilot responsible could have been withdrawn).

In total, six research questions were developed to address the research problem. However, it was the first research question which was *la raison d’être* of this thesis: “How could accidents such as Air adventures have happened?” Empirical evidence was presented to suggest that the answer to this question is threefold.

First, evidence was presented to suggest that there is significant variation in the degree to which any particular behaviour is perceived for be a problem to aviation safety. Specifically, for the same behaviour there was evidence of a range of responses regarding the extent to which it was perceived to be a problem by those who work or intend to work in the aviation industry. Thus, insofar as any particular behaviour in an aviation environment may truly be a problem to safety, not all people who become aware of it will perceive it is as a problem. When a problem is not perceived as such, the logical action is ‘do nothing’. Such disagreement clearly provides a pathway via

which the CAA NZ's question can be answered. Clearly many aviation workers will not be trained to identify all potential risks to aviation safety, although it is possible that some may be 'turning a blind eye' due to their not wanting to become involved. This has also been observed by NZALPA (2005) who submitted that despite reporting of incidents being a legal requirement, up to 80% of incidents are not reported. Indeed, NZALPA claimed that a survey conducted by the organisation found that only 6% of pilots routinely file incident reports. These aviation specific findings appear to be highly consistent with the findings in the wider area of business and management, for example, although KPMG (2008) maintained that more organisations are providing a means for employees to report their concerns, and that notification of fraud cases by external parties has significantly increased from 15% in 2006 to 23% in 2008, the findings of KPMG and NZALPA nevertheless indicate further improvement is necessary.

Second, of those who identify an issue which they perceive as a problem for aviation safety, some will nevertheless do nothing while others may act in a way that may not be consistent with a proactive, regulator led approach to improving aviation safety. That is, some will simply do nothing, whilst others may speak with the perpetrator of the act, but may not report the behaviour to the regulatory authority or to a person in a position to intervene in wrongdoing. Again, these findings clearly provide a pathway via which the CAA NZ's question can be answered.

Third, experimental evidence was found that suggests a number of specific factors may affect people's perception of whether a problem exists that may affect aviation safety, and what action would those becoming aware of the problem subsequently take.

In many countries, aviation “can play a key role in economic development and in supporting long term economic growth” and “facilitate a country’s integration into the global economy” (International Air Transport Association, 2007). Although many different aspects of the aviation industry are often studied outside of the context of the wider business world, particularly in the case of academic research conducted in universities, it is important that findings from theoretical research, and how it extends current knowledge in the general area, should be considered in the wider context of business and management.

Indeed, whilst the findings of this thesis can almost certainly be used to contribute and improve knowledge in the specific and specialised area of aviation, it is perhaps a cause for some reflection that many of the findings of this thesis have been investigated earlier in the wider business and management context. That the findings of previous research have until now not been applied and/or investigated in the context of aviation may even have led to unnecessary loss of life, as demonstrated in the investigation of Air Adventures accident.

For example, the importance of the nature of the working environment regarding the likelihood that people will report their concerns, whilst a new finding in the aviation industry, has previously been suggested in other areas, such as business (Combs, 1981) and management (Keenan, 2002).

Similarly, it has previously been reported (e.g., Dubinsky & Loken, 1989; Jones, 1991; Harrington, 1997) that social consensus has a significant influence on both the moral

judgment and the moral intent of the individual. However, this too appears to have been ignored in the specific aviation context.

Another example of factors that were investigated in this thesis relates to the relationship between those involved in a wrongdoing situation. This factor was believed to influence reporting intentions of individuals. According to literature in business and marketing (e.g., Harrington, 1997; Hunt & Vitell, 2006), individuals were more likely to respond in a way that is consistent with safety when wrongdoing was committed by people with whom they do not have a relationship. Anecdotal evidence (Family Business Institute, 2010) suggested that many aviation businesses, particularly smaller ones, are likely to be family owned. This thesis therefore makes a significant contribution in finding how these relationships may lead to underreporting in aviation.

The three examples above each indicate a potential pathway via which accidents like that of Air Adventures could occur; that is, there are some specific variables, between or within-subject, that affect the likelihood of any given behaviour being perceived as a problem for aviation safety, and what action will subsequently be taken. But point upon which the aviation regulatory authorities and aviation communities as a whole might pause to reflect, is that whilst the findings of this thesis are entirely new in the context of aviation, they have long been investigated and accepted in both the academic and the management and business worlds. Thus, it is argued that perhaps the most significant contribution of this thesis is to bridge the divide between the highly specialised part of the business world that is the aviation industry, and the research that has been carried out in business, management and psychology.

In conclusion, these three strands of experimental evidence provide a strong case that not all people who may have information that the regulatory authority might use to improve aviation safety, will act in a way that leads to that information being communicated to the authority. As such, the evidence presented here clearly suggests that a widespread proactive approach to dealing with safety concerns will be unattainable until all aviation workers (and perhaps even the families and friends, thereof) communicate their concerns to the regulatory authority or, at the very least, to a person in a senior position within the organisation.

Whilst at face-value the above suggestion may seem sensible, particularly when viewed in the context of accidents such as that of Air Adventures, were every aviation employee to communicate every safety concern that they may have, there may be such instances where these safety concerns would rather be of a 'trivial' nature, regulatory authorities may therefore see an increase in the rate of reporting of incidents and subsequently may be facing a 'non-trivial' task of filtering out the mass of reporting data. As a result, the processing of trivial concerns could detract from the time spent on non-trivial concerns. Nevertheless, one would argue that analysis by an expert in the field of aviation would be required before it can be decided whether an incident is of a 'trivial' nature.

It is suggested that training may be a route via which aviation employees learn the importance of communicating their concerns. This could be incorporated into a general aviation ethics training programme, as has been called for by other researchers (Oderman, 2002; Patankar, 2005). Incorporated in such training could be lessons on what sorts of information might be useful to a regulatory authority.

Whilst the scope of this thesis was limited to investigating how accidents could have happened and what factors are implicated in people's decision to report safety concerns, a brief discussion of the Space Shuttle Challenger accident shows that whilst problem identification and reporting may be necessary conditions for proactive improvements to aviation safety, they may not be sufficient.

In the absence of a better solution, or perhaps in the interim period before the benefits of ethics training could be explored, it is recommended that aviation employees should err on the side of caution if they have a concern about safety; that is, they should do something. As Sir Edmund Burke (1770) once stated, "All that is needed for evil to prosper is for people of good will to do nothing".

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Appendices

Appendix A – Study 3 Survey

Thank you for completing this Survey. The survey should take less than ten minutes of your time to complete. Click the "Submit" button to submit the survey.

Below, are some scenarios based on various real-life incidents. Please put yourself in each scenario and chose from the provided answers, the answer that represents the closest to your judgment of the situation at hand.

Gender

Pilots, what license are you currently holding

Scenario 1

You met someone who was applying for a medical certificate for their pilot's licence. Talking to this person you found out that in the past the recently suffered from chronic fatigue syndrome and were depressed. Talking to this person led you to believe that they have no intention of informing the medical examiner of their past condition.

Do you feel you have to do something about this situation?

- Yes
- No

Please choose one option that best describes why?

- Because I have a duty to Society
- Because doing something about it might get me into trouble
- Because that's what would carry the least risk of harm to myself
- Because if my friends or family know I did something about it they might be disappointed in me
- Because I would do what would cause the least amount of harm to myself and the persons involved
- Because I feel responsible to do what would cause the least amount of harm to the persons involved

Scenario 2

You were told by a student learning to fly that their flying instructor often lets their students try activities that are not part of their training. You feel this instructor ought to abide by the training programme as it was safely designed and approved by regulatory authorities for the particular flying training.

Do you feel you have to do something about this situation?

- Yes
- No

Please choose one option that best describes why?

Because I have a duty to Society

- Because doing something about it might get me into trouble
- Because that's what would carry the least risk of harm to myself
- Because if my friends or family know I did something about it they might be disappointed in me
- Because I would do what would cause the least amount of harm to myself and the persons involved
- Because I feel responsible to do what would cause the least amount of harm to the persons involved

Scenario 3

Management of the charter airline where you are working plan to make some ‘unofficial’ changes to the flight crew leave and flying roster. The original Flight & Duty scheme was approved by the CAA and was expected to run for at least a period of 12 months. You are concerned that the new leave and flying roster will create more workload and stress.

Do you feel you have to do something about this situation?

- Yes*
- No*

Please choose one option that best describes why?

- Either to avoid making trouble for my self or to get some reward (e.g., promotion)
- It’s what other people like me would do
- Because it’s the right thing to do
- To care for my own interests
- To care for the interests of those involved
- To care for everyone’s interest (including mine)

Scenario 4

A close member of your family is involved in commercial flying operations. They own 2 aircraft which take people on scenic flights. However, although both aircraft are involved in commercial operations, only one is declared as such. Your family member is not willing to declare the other aircraft.

Do you feel you have to do something about this situation?

- Yes*
- No*

Please choose one option that best describes why?

- Either to avoid making trouble for my self or to get some reward (e.g., promotion)
- It’s what other people like me would do
- Because it’s the right thing to do
- To care for my own interests
- To care for the interests of those involved
- To care for everyone’s interest (including mine)

Scenario 5

It has come to your attention that a colleague has had 2 recent (minor) accidents in their aircraft and has not reported any to the CAA.

Do you feel you have to do something about this situation?

- Yes*
- No*

Please choose one option that best describes why?

- Either to avoid making trouble for my self or to get some reward (e.g., promotion)
- It’s what other people like me would do
- Because it’s the right thing to do
- To care for my own interests
- To care for the interests of those involved
- To care for everyone’s interest (including mine)

Scenario 6

You have noticed that a captain at your workplace amended the arrival time on their flight log to enable them to depart on time the next morning. Apparently, this is not the first occasion and it appears that this practice is ignored by the local management.

Do you feel you have to do something about this situation?

- Yes*
- No*

Please choose one option that best describes why?

- Either to avoid making trouble for my self or to get some reward (e.g., promotion)
- It's what other people like me would do
- Because it's the right thing to do
- To care for my own interests
- To care for the interests of those involved
- To care for everyone's interest (including mine)

Scenario 7

You have heard that fuel gauges of some training aircraft at a local flying club read incorrectly. Apparently, they have been defective for a while and no action has been taken to rectify them.

Do you feel you have to do something about this situation?

- Yes*
- No*

Please choose one option that best describes why?

- Either to avoid making trouble for my self or to get some reward (e.g., promotion)
- It's what other people like me would do
- Because it's the right thing to do
- To care for my own interests
- To care for the interests of those involved
- To care for everyone's interest (including mine)

Scenario 8

Your family runs a flying club business where an aircraft needs repairing. Due to some financial difficulties your family can neither afford the required part, nor can your family afford leaving the aircraft on the ground for much longer. However, an ex-avionics technician has said he knows how to simply repair the part and will do so as a favour. Your family has decided to make use of this offer.

Do you feel you have to do something about this situation?

- Yes*
- No*

Please choose one option that best describes why?

- Either to avoid making trouble for my self or to get some reward (e.g., promotion)
 - It's what other people like me would do
 - Because it's the right thing to do
 - To care for my own interests
 - To care for the interests of those involved
 - To care for everyone's interest (including mine)
-

Scenario 9

You recently gained a PPL. On your birthday, your friend who is also a holder of a PPL (for a few years) suggested going for a flight together. On landing the aircraft, your friend lost control and the wing clipped a fence. The aircraft suffered minor wing damage. Your friend wants you to take the blame by saying you accidentally knocked the rudder when the aircraft touched down.

Do you feel you have to do something about this situation?

- Yes*
- No*

Please choose one option that best describes why?

- Either to avoid making trouble for my self or to get some reward (e.g., promotion)
- It's what other people like me would do
- Because it's the right thing to do
- To care for my own interests
- To care for the interests of those involved
- To care for everyone's interest (including mine)



Or submit to:

aviationsafety@aviationsafety.info

Home: www.aviationsafety.info

THANK YOU

Appendix B – Study 4 Symptoms used for Pilot Study

Symptom		Number of Times symptoms were chosen ¹¹	
		N	%
1	Substance abuse	9	19
2	Impaired Judgment	9	19
3	Slow and irregular hand-eye coordination	9	19
4	Decreased attention	9	19
5	Panic attacks	9	19
6	Trembling	9	19
7	Forgetfulness	8	17
8	Increased risk taking	8	17
9	Anxiety	7	15
10	Indecisiveness	7	15
11	Self-destructive behaviour	7	15
12	Increased heart rate (Complaining of)	6	13
13	Work mistakes and loss of productivity	6	13
14	Difficulty concentrating	5	10
15	Depression	5	10
16	Nervousness	5	10
17	Obsessions	5	10
18	Hostility	5	10
19	Decreased motivation	4	8
20	Social isolation (e.g., being a loner)	4	8
21	Mood swings	4	8
22	Difficulty sleeping	3	6
23	Carelessness	3	6
24	Low self esteem	3	6
25	Short temperedness	3	6
26	Tiredness	2	4
27	Shakiness	2	4
28	Stomachache, nausea, vomiting, diarrhoea or constipation	2	4
29	Fingernail-biting	1	2
30	Shortness of breath	1	2
31	Headache or backache	1	2
32	Excessive sweating	1	2
33	Irritability	1	2
34	Sweaty Palms	1	2
35	Feeling of helplessness	1	2
36	Tense muscles, especially in the neck and shoulders	1	2
37	Binge eating	0	0
38	Weight loss/weight gain	0	0
39	Clenched jaw or clenched teeth	0	0
40	Marital problems	0	0
41	Preoccupation	0	0
42	Decreased interest in sex	0	0
43	Boredom	0	0
44	Apathy	0	0
45	Sighing	0	0
46	Excessive worry	0	0
47	Decrease in creativity	0	0
48	Loss of sense of humour	0	0

¹¹The first 25 symptoms were used.

Appendix C – Study 4 Survey

Thank you for completing this Survey. The survey should take less than five minutes of your time to complete. Click the "Submit" button to submit the survey

Below, are some stress-related symptoms that if unmanaged, could potentially have a negative effect on aviation safety? Imagine you have observed, on a few occasions, someone in the aviation environment displaying one or more of these symptoms. Please indicate which ones in your opinion, call for intervention (use of internal or external channels of communication to raise concern) in order to prevent potential accidents from happening and maintain a safe flying environment.

Gender

Pilots, what license are you currently holding How long have you held your license

	Do you think this symptom would affect aviation safety?			What actions would you take if you observe this symptom?			
	Yes	No	Not sure	Do nothing	Talk to the Person	Report to Senior Staff	Report to the CAA
Decreased attention	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Substance abuse	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Self-destructive behaviour	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Depression	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty sleeping	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Indecisiveness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Slow and/or irregular hand-eye coordination	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Panic attacks	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Decreased motivation	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Impaired judgment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Anxiety	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Difficulty concentrating	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Work mistakes and loss of productivity	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased risk taking	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Carelessness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Short-temperedness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Nervousness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Trembling	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Increased heart rate (Complaining of)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Social isolation (e.g. being loner)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Low self-esteem	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Obsessions	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Hostility	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Mood swings	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Forgetfulness	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

What would you do if you learned about someone suffering from any of the above symptoms?

Do Nothing Talk to the Person Report to Management / Senior Staff Report to the CAA

Or submit to: aviationsafety@aviationsafety.info Home: www.aviationsafety.info

Submit Online

THANK YOU

Appendix D – Study 5 Questionnaires

You are invited to participate in a

Test of Safety Model Questionnaire

Researcher:

Kawtar Tari
Postgraduate candidate at the School of Aviation
Massey University, Palmerston North

Participant recruitment
Management students and Flight students of the School of Aviation.

Project procedures:
The information you supply will be anonymous and all statistical analyses will be on group data. Data will be stored securely at Massey University for 5 years, after which it will be destroyed.

Participant involvement
Approximately 15–20 minutes of your time will be required to complete this questionnaire.

Participant's rights
You are under no obligation to participate in this study. If you initially decide to participate, you have the right to:

- decline to answer any particular question;
- ask any questions about the study at any time before or during participation
- decide not to participate after all

Committee Approval Statement
This project has been evaluated by peer review and judged to be low risk. Consequently, it has not been reviewed by one of the University's Human Ethics Committees. The researcher named above is responsible for the ethical conduct of this research.

If you have any concerns about the conduct of this research that you wish to raise with someone other than the researcher(s), please contact Professor Sylvia Foubell, Assistant to the Vice-Chancellor (Ethics & Equity), telephone 06 350 5249, email humanethicspm@massey.ac.nz

Instructions

This questionnaire explores factors that could impact the decision making process of people working in aviation.

On the following pages you will find two imaginary 'scenarios' which you are asked to read carefully. Please try to imagine that you are in the situation described in each scenario.

For the purpose of this study, I'm interested in:

- The extent to which you agree or disagree with the behaviour or statements [as displayed in 'Agreement' Column], AND
- The action you would take following observation of the behaviour or statement [as displayed in 'What you would do' Column].

Example:

- I. Read the scenario.
- II. Indicate the extent to which you believe the behaviour is a problem for aviation safety. The options are:
 - 1= Not a problem
 - 2 = Little bit of a problem
 - 3 = Moderate problem
 - 4 = Important problem
 - 5 = Very important problem
- III. Indicate the **action you would take** following observation of the behaviour. The options are:
 1. Do nothing
 2. Talk to the person
 3. Talk to a friend or colleague
 4. Talk to management
 5. Inform an external agency

Scenario 1

Try to imagine that you are working at an airport. During the course of your work, not surprisingly, you get to know certain things about your colleagues.

For each of the statements below, describe how much of a problem you personally think the behaviour described on each statement is, and what you would do (in statement, the problem or statement).

	Problem?					Action?				
	1	2	3	4	5	1	2	3	4	5
Talk to a friend or colleague about the situation										
Talk to Management about the situation										
Talk to a friend or colleague about the situation										
Talk to Management about the situation										
Talk to a friend or colleague about the situation										
Talk to Management about the situation										

You need to specify the exact behaviour of a colleague but have listed that management are more concerned about how to make your best working about things that might happen.

You should not use a scale of 1-5 unless you have completed the 'What you would do' column. You have that you think and finally would manage you to do something.

You have listed the number of problem/doing something about of an event!

Please treat each behaviour separately.

If you're happy with the instructions so far, then please turn the page and begin. If you have any questions, please feel free to ask.

Thanks once again for your time.
Kawtar

Scenario 1										
<p>Try to imagine that you've just graduated with your degree from Massey University's School of Aviation and you are now working in your first aviation job at an airport. During the course of your employment, you get to learn about your workplace and its practices, and about the people you are working with.</p> <p>In each of the statements described below, indicate how much do you personally think the underlined behaviour is a problem for aviation safety, and what you would do?</p> <p>When answering all of the questions that follow, please try to imagine you are now employed at an airport.</p>										
	Problem?					Action?				
<p>You want to question a colleague who frequently doesn't follow safety procedure but have heard that management are more concerned about how to make profit than worrying about things that might happen</p>	Not a problem	Little bit	Moderate	Important	Very important	Do Nothing	Talk to the Person	Talk to a Friend or Colleague	Talk to Management	Inform an External Agency
<p>You want to question a colleague who frequently doesn't follow safety procedure and have heard that management encourage reporting of all concerns</p>	1	2	3	4	5	1	2	3	4	5
<p>You found out that one of the pilots has been caught <u>drink-driving</u>. You believe that your friends and family would encourage you to do something.</p>	1	2	3	4	5	1	2	3	4	5
<p>You found out that one of the pilots has been caught <u>drink-driving</u>. You believe that your friends and family would think you shouldn't get involved.</p>	1	2	3	4	5	1	2	3	4	5
<p>You have heard that a mechanic is <u>rushing on his maintenance check</u> of an aircraft</p>	1	2	3	4	5	1	2	3	4	5
<p>You personally saw a mechanic <u>rushing on his maintenance check</u> of an aircraft</p>	1	2	3	4	5	1	2	3	4	5
<p>A junior member of staff asked you to <u>cover up for an incident</u> they caused</p>	1	2	3	4	5	1	2	3	4	5
<p>Your manager asked you to <u>cover up for an incident</u> they caused</p>	1	2	3	4	5	1	2	3	4	5
<p>You noticed that a junior staff member's <u>breath sometimes smells of alcohol in the afternoon</u></p>	1	2	3	4	5	1	2	3	4	5
<p>You noticed that your senior manager's <u>breath sometimes smells of alcohol in the afternoon</u></p>	1	2	3	4	5	1	2	3	4	5
<p>You heard an aviation security officer talking and they admitted that they <u>often fall asleep when on duty</u>. This security officer is not someone that you know</p>	1	2	3	4	5	1	2	3	4	5
<p>You heard an aviation security officer talking and they admitted that they <u>often fall asleep when on duty</u>. This security officer is your colleague.</p>	1	2	3	4	5	1	2	3	4	5
<p>You heard an aviation security officer talking and they admitted that they <u>often fall asleep when on duty</u>. This security officer is a member of your family.</p>	1	2	3	4	5	1	2	3	4	5
<p>A pilot appears to be <u>claiming for overtime that they haven't worked</u></p>	1	2	3	4	5	1	2	3	4	5
<p>A pilot has not reported an accident they had to the CAA</p>	1	2	3	4	5	1	2	3	4	5
<p>You want to raise your <u>concerns about operating procedures</u> at the workplace but you think you will not be protected from retaliation</p>	1	2	3	4	5	1	2	3	4	5
<p>You want to raise your <u>concerns about operating procedures</u> at the workplace and you know you will be protected</p>	1	2	3	4	5	1	2	3	4	5
<p>A Pilot told you they <u>flew through bad weather (when the knew they should have diverted)</u> so that their passenger won't miss the evening's rugby match</p>	1	2	3	4	5	1	2	3	4	5
<p>A pilot told you they <u>flew through bad weather (when the knew they should have diverted)</u> so that they won't miss the evening's rugby match</p>	1	2	3	4	5	1	2	3	4	5
<p>You want to question a colleague who frequently doesn't follow safety procedure but have heard that management are more concerned about how to make profit than worrying about things that might happen</p>	1	2	3	4	5	1	2	3	4	5
<p>Overall, if/when you observe wrongdoing, what action would you take?</p>						1	2	3	4	5
<p>Which one of these 6 statements best explains how you would decide upon the action you would take?</p>						Tick one only				
To avoid getting into trouble										
Because my action would benefit me										
Because that's what most people would do										
To respect the law and regulations										
Because a lot of people would benefit from this action										
Because this action takes into consideration the interest of individuals regardless of what the consequences of this action may be										

Scenario 2										
Try to imagine that you are now in your first aviation job since you graduated from Massey, and it is at an aviation company. During the course of your employment, you get to learn about the company and its practices, and about the people you are working with.										
In each of the statements described below, indicate how much do you personally think the underlined behaviour is a problem for aviation safety, and what you would do?										
When answering all of the questions that follow, please try to imagine you are now employed at an aviation company.										
	Problem?					Action?				
	Not a problem	Little bit	Moderate	Important	Very important	Do Nothing	Talk to the Person	Talk to a Friend or Colleague	Talk to Management	Inform an External Agency
You don't have reporting procedures at your workplace; you want to discuss the introduction of new safety reporting procedures but management are not interested in investing time and money in this.	1	2	3	4	5	1	2	3	4	5
You don't have reporting procedures at your workplace; you want to discuss the introduction of new safety reporting procedures and management are keen to invest time and money in this.	1	2	3	4	5	1	2	3	4	5
You found out that one of the security officers often fails to check people's ID cards properly. Your friends and family would think that you should do something.	1	2	3	4	5	1	2	3	4	5
You found out that one of the security officers often fails to check people's ID cards properly. Your friends and family would think you shouldn't get involved.										
You were told that a pilot fail to conduct a before flight inspection.	1	2	3	4	5	1	2	3	4	5
You personally saw a pilot fail to conduct a before flight inspection.	1	2	3	4	5	1	2	3	4	5
You were writing a report about safety performance of the company aircraft and your colleague suggests you could manipulate the figures so that it looks better for the shareholders.	1	2	3	4	5	1	2	3	4	5
You were writing a report about financial performance of the company aircraft and the director of the company suggests you could manipulate the figures so that it looks better for the shareholders.	1	2	3	4	5	1	2	3	4	5
You are a new and fairly junior member in a department. You became aware that one of the pilots is self-medicating and often shows symptoms of fatigue.	1	2	3	4	5	1	2	3	4	5
You are a member of management. You became aware that one of the pilots is self-medicating and often shows symptoms of fatigue.	1	2	3	4	5	1	2	3	4	5
You are on a flight and the passenger next to you, who is a stranger, appears to be sending text messages.	1	2	3	4	5	1	2	3	4	5
You are on a flight and your friend in the seat next to you appears to be sending text messages.	1	2	3	4	5	1	2	3	4	5
You are on a flight and you parent in the seat next to you appears to be sending text messages.	1	2	3	4	5	1	2	3	4	5
Several employees appear to be leaving work before the end of their shift.	1	2	3	4	5	1	2	3	4	5
Two recent incidents have not been reported to the CAA.	1	2	3	4	5	1	2	3	4	5
You want to raise concerns about safety operating procedures at the workplace but you know that the current laws won't protect against organisational retaliation.	1	2	3	4	5	1	2	3	4	5
You want to raise concerns about safety operating procedures at the workplace and you are confident that the current laws will protect against organisational retaliation.	1	2	3	4	5	1	2	3	4	5
You witnessed an employee cause an accident at the workplace that will cost at least \$10,000 to put right. It occurred because he was trying to speed up luggage loading to avoid delays.	1	2	3	4	5	1	2	3	4	5
You witnessed an employee cause an accident at the workplace that will cost at least \$10,000 to put right. It occurred because he wanted to leave work before the Friday traffic jam got too bad.	1	2	3	4	5	1	2	3	4	5
Overall, if/when you observe wrongdoing, what action would you take?						1	2	3	4	5
Which one of these 6 statements best explains your action?	Tick one only									
To avoid getting into trouble										
Because my action would benefit me										
Because that's what most people would do										
To respect the law and regulations										
Because a lot of people would benefit from this action										
Because this action takes into consideration the interest of individuals regardless of what the consequences of this action may be										

Appendix E – Summary of Hypotheses and Questions for Study 5

Factor Number	Factor	Hypothesis / Questions
F1	Working environment	<p>H1a: Within a supportive environment, individuals will be more likely to report concerns that they may have in a way that is consistent with safety than within an unsupportive environment.</p> <p>H1b: There will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent in a supportive environment.</p> <p>H1c: There will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent in an unsupportive environment.</p>
F2	Social consensus	<p>H2a: Wrongdoing that is not condoned by the social group of the individual witnessing wrongdoing will be perceived as more of a problem to aviation safety than wrongdoing that is accepted by the individual's social group.</p> <p>H2b: An individual witnessing wrongdoing that is not condoned by their social group will be more likely to respond in a way that is safety consistent than individual witnessing wrongdoing that is accepted by their social group.</p> <p>H2c: For wrongdoing that is accepted by the social group of the individual witnessing wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.</p> <p>H2d: For wrongdoing that is not supported by the by the social group of the individual witnessing wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.</p>
F3	Direct or indirect involvement in the wrongdoing situation	<p>H3a: Individuals directly witnessing wrongdoing will perceive it as more of a problem to aviation safety than those indirectly witnessing wrongdoing.</p> <p>H3b: Individuals directly witnessing wrongdoing will be more likely to respond in a way that is consistent with safety than those indirectly witnessing wrongdoing.</p>

H3c: For indirect involvement in wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H3d: For direct involvement in wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

F4 Status of the wrongdoer

Question 2: Would the extent to which participants perceive wrongdoing to be a problem for aviation safety be affected by the seniority of the person responsible for the wrongdoing?

H4a: Individuals observing wrongdoing committed by a person of less seniority will be more likely to respond in a way that is consistent with safety than individuals observing wrongdoing committed by a senior person.

H4b For wrongdoing committed by an individual less senior to the observer, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H4c: For wrongdoing committed by an individual senior to the observer, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

F5 Status of the observer

Question 3: Do individuals in higher positions (e.g. manager) differ from individuals in lower positions (e.g. staff) in the extent to which they perceive wrongdoing as a problem to aviation safety?

Question 4: would individuals in higher positions differ from individuals in lower positions in the extent to which they make a safety consistent response upon becoming aware of wrongdoing?

H5a: For individuals in lower positions, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

H5b: For individuals in higher positions, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.

F6	Gender of the observer	<p>Question 5: Will there be a difference in the extent to which males and females perceive wrongdoing as problematic for safety?</p> <p>H6a: Females will be more likely to make safety consistent responses than males.</p> <p>H6b: There will be a significant (positive) association for females between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.</p> <p>H6c: There will be significant (positive) association for males between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.</p>
F7	Moral values	<p>H7a: Individuals with higher moral values (i.e., those with higher levels of moral development) will perceive wrongdoing to be more of a problem for aviation safety than individuals with lower moral values.</p> <p>H7b: Individuals with higher moral values will be more likely to respond in a way that is consistent with safety than individuals with lower moral values.</p>
F8	Relationship to the wrongdoer	<p>H8a: Individuals will perceive wrongdoing to be more of a problem to aviation safety when committed by people with whom they do not have a relationship.</p> <p>H8b: Individuals observing wrongdoing committed by a wrongdoer with whom they have a relationship will be less likely to respond in a way that is consistent with safety than individuals observing wrongdoing committed by wrongdoers with whom they do not have a relationship.</p> <p>H8c: For wrongdoers with whom observers do not have a close relationship, there will be a significant (positive) association between the extent to which wrongdoing is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.</p> <p>H8d: For wrongdoers with whom observers have a close relationship, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.</p>

		<p>H8e: For wrongdoers with whom observers have a very close relationship, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.</p>
F9	Perceived seriousness of act	<p>H9a: Individuals will perceive high seriousness wrongdoing as more of a problem to aviation safety than low seriousness wrongdoing.</p> <p>H9b: People who observe wrongdoing that they perceive as highly serious will be more likely to respond in way that is consistent with safety than those that observe wrongdoing they perceive to be less serious.</p> <p>H9c: For low seriousness wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.</p> <p>H9d: For high seriousness wrongdoing, there will be a significant (positive) association between the extent to which a problem is perceived to be serious and the degree to which the outcome is safety consistent.</p>
F10	Legal protection of the reporter	<p>Question 6: Would individuals who believe they have the protection of the law perceive wrongdoing to be more of a problem to aviation safety than individuals who are not aware of current protective laws and regulations?</p> <p>H10a: Individuals who believe they have the protection of the law will be more likely to respond in a way that is consistent with safety than individuals who do not believe they have such protection.</p> <p>H10b: For individuals who believe that they are not protected by the current laws and regulations, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.</p> <p>H10c: For individuals who believe that they are protected by the current laws and regulations, there will be a significant (positive) association between the extent to which a problem is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.</p>

F11	Motive of the wrongdoer	<p>H11a: Individuals will perceive wrongdoing to be more of a problem to aviation safety if they believe the wrongdoer's motive behind committing the wrongdoing was bad than individuals believing that the wrongdoer's motive was good.</p> <p>H11b: Individuals who believe that a wrongdoer's motive was bad will be more likely to respond in a way that is safety consistent than individuals believing that the wrongdoer's motive was good.</p> <p>H11c: For individuals believing that the wrongdoer's motive was good, there will be a significant (positive) association between the extent to which wrongdoing is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.</p> <p>H11d: for individuals believing that the wrongdoer's motive was bad, there will be a significant (positive) association between the extent to which wrongdoing is perceived to be a problem for aviation safety and the degree to which the outcome is safety consistent.</p>
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