

RISK PERCEPTIONS THAT EFFECT BEHAVIOR AND ATTITUDES IN SAFETY
PROGRAMS

By

MSgt Paul David Spillane

A Study submitted to University of West Florida in Partial Fulfillment of the
Requirements of the Education Doctorate Degree

University of West Florida
Extended Campus
Eglin AFB/Hurlburt Field Resident Center
2004

Report Documentation Page

Form Approved
OMB No. 0704-0188

Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

1. REPORT DATE SEP 2004		2. REPORT TYPE N/A		3. DATES COVERED -	
4. TITLE AND SUBTITLE Risk Perceptions That Effect Behavior and Attitudes in Safety Programs				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) University of Florida Extended Campus Eglin AFB/Hurlburt Field Resident Center 11000 University Pkwy., Pensacola, FL 32514				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release, distribution unlimited					
13. SUPPLEMENTARY NOTES Published in the Proceedings of the Forty Second Annual SAFE Association Symposium, Held in the Salt Lake City, Utah, September 27-28, 2004. SAFE Association, Post Office Box 130, Creswell, OR 97426-0130. http://www.safeassociation.org, The original document contains color images.					
14. ABSTRACT					
15. SUBJECT TERMS Safe					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT SAR	18. NUMBER OF PAGES 9	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

ABSTRACT

Researcher: Paul David Spillane

Title: Risk perceptions that effect behavior and attitudes in safety programs

Year: 2004

Purpose of this field study was to determine how perceptions of risk influence behavior and attitude in safety programs. In this study eleven undergraduate students enrolled in the aviation safety program at Embry Riddle University, were asked to assess and develop a safety program based on attitudes of risk. Students are fulltime U.S. Air Force employees, and are familiar with Air Force safety programs. Qualitative methodology was used to guide research toward discovery of factors, which contribute to perceptions of safety. Lived experiences were shared with students to derive responses and formulate a framework for data collection. Students were split into four groups and met one night a week for eight weeks. A humanistic and participatory teaching method was used to explore concepts of human behavior as it affects safety programs. Students were then tasked to make observations through informal interviews, photographs of work areas, data reviews and evaluations of their work areas. Results suggest the need for safety programs that provide constructs of behaviorisms and perceptions that can be used to develop more effective safety programs.

INTRODUCTION

The purpose of this study was to demonstrate how risk perception influences behavior and attitudes toward establishment of a safety program. In this study eleven undergraduate students enrolled in the aviation safety program at Embry Riddle University, were asked to assess and develop a safety program based on attitudes of risk. The students are fulltime U.S. Air Force employees, and are familiar with Air Force safety programs. The students were split into four groups and met one night a week for eight weeks. I used reflectivity and lived experiences as a means to explore human behavior as it affects safety programs. Students were tasked to perform informal interviews, photo-elicitations, data reviews and participatory evaluations of their work areas. My responsibility was to teach, interview, observe, and participate through the students' experiences and provide solutions to their discoveries. One question guided the study: (1) what factors determine a successful safety program?

METHOD

In my approach I used Phenomenological inquiry to guide research toward discovery of factors, which contribute, to perceptions of safety. In order to fully understand the inquiry, lived experiences were shared with students to derive responses and formulate a framework for data collection. The example provided was from personal experience

and was used to discuss perceptions of risk and attitudes that factor into a safety culture or program.

“The year was 1996 and the place- Al Karj Saudi Arabia. I was on my third rotation as a lead Dedicated Crew Chief for the 69th Fighter Squadron from Moody Air Force Base Georgia. I had eleven years experience as an all systems mechanic on the F-16 jet fighter. I was the ranking mechanic with the most experience and was more qualified than many of my peers in the same rank. Jobs that required extensive diagnosis were generally passed on to me.

My position in the squadron was equivalent to a mentor - I enjoyed being the “go to” guy when something needed to be fixed. I considered myself to be at the pinnacle of technical competence-“No one knew more than I did on the F-16”. I prided myself with a comprehensive knowledge of “the books” otherwise known as TO’S (Technical Order’s, fault tree analysis tools used to provide step by step procedures to accomplish maintenance tasks- and are legally required to use). Of Course the perception of “being” the go to guy also had its demands- but I accepted that role...It is what I was destined to be!

I worked the night shift- or the shift which the majority of the maintenance took place (since day time was dedicated to flying). The air had a grit taste to it, an almost invisible type chalk that penetrated every pore of skin. In time the environmental conditions became adaptable- after all... in Georgia the humidity was unbearable but in Al Karj, Saudi Arabia there was no humidity- just Heat! The one thing that did bother me was sunset; hence, when the sun

set, the accompaniment of heat set as well. The difference in temperature made it necessary to wear field jackets and undergarments. The thing about the wear of undergarments is how the beholder becomes cumbersome and uncoordinated. Everything becomes more difficult once more clothing is put on.”

As I looked across the room, the students appeared attentive and I knew each student could relate to the story. The Air Force implements program safety through regulations consistent among all disciplines. These students were apart of different job specialties within the Air Force but share common responsibilities with regards to safety. I continued with my “Desert Story”:

“Sometimes when you find yourself in a deployed location things are done which would not be done at home station”. However, to preclude safety based on such a statement certainly draws the potential for unwanted events. “And accommodation is the seed of habits’ grip that takes hold of one’s hand”. I completed work on an aircraft, which required an examination of the engine- in operation. This requirement necessitated a special location to perform such an examination or “engine run”. However, at this location the engine run pad was some two miles away from current location.”

I paused and opened the class up for open forum discussion. The students began to recognize themes or patterns to the story being told. Questions began to come forward as to the eventual outcome. I asked the students to think of the story being told and identify conditions

they felt were common to their own experiences. I then continued:

“To make matters worse, the Wing Commander implemented a policy, which restricted engine runs to ten p.m. What an absurd policy- I thought...we were at a deployed location and this particular aircraft was needed for the next day’s mission. Thus, seed number two had just been planted. I knew in order to make the mission; I had to meet a deadline.

I quickly gathered a tow team and briefed them of the necessity to complete this engine run for the next day’s mission. One of the members of the team informed me the chow hall would close before the job was complete. No, problem- I offered a reward for the sacrifice of a missed meal. I made a deal whereas for their help, I would give them time off the next day. Again, another seed planted. As I sat in the cockpit and the ten o’clock hour approached- I had a momentary thought...if something were to happen this would be the perfect time. I squelched into the Aircraft Radio “Tower Aircraft 220 request permission for ground run”. The next several steps were simultaneously accomplished- I had over fifty engine runs of this type under my belt.”

I finished the story and allowed the students to discuss what conditions they recognized similar to their own experiences. Lived experiences were given at each of the nine class meetings and major themes were documented. Thus, I acted as a participant observer; upon which, I guided open-ended inquiry and collected data to help formulate a framework to codify determinants of a safety culture.

The course content centered toward organizational management concepts and recognition of a “culture” within the organization. Class discussions were documented, and themes were coded and organized into data sets to be collected and compared with subsequent data collection techniques.

My goal throughout this study was to capture perceptions of the students without my influence. Therefore, I incorporated a combination of group and individual projects to collect data. The students were split into four groups and tasked to assess a squadron safety program under the pre-tense of a reputable aviation-consulting firm. The groups took over 250 photos, conducted 50 informal interviews and documented 50 observations of their own work centers. Also, each participant chose a topic of their choice and wrote a two-page opinion paper. Data collected from group assessments, individual papers, and my notes were then compiled.

FINDINGS

The research method employed tried to capture the “essence” of lived experiences, which may have an impact on aviation safety. In Max Van Manen’s book, *“Researching lived Experience: Human Science for an Action Sensitive Pedagogy”*, he states: “In the phenomenological approach there is an assumption that there is an essence or essences to a shared experience”. These essences are experienced through a common or shared phenomenon. Therefore, the phenomenological

approach is to look for what is the nature of an essence, and in this study the essence is the organizational culture. As the participant researcher in this study, I tried to document the experiences of the student body with relation to a “safety culture”.

The “Desert Story” attempted to demonstrate a type of essence or culture that had implications with regard to safety. The students were able to identify concepts and relate similar experiences. These shared experiences were then documented and bracketed into themes. These themes changed throughout the nine weeks as class discussions of informal interviews and observations took place.

A predominant theme discussed centered on adaptation to the essence or recognition of environmental conditions and human interactions with external and internal variables. One of the students relayed one such story, which captured this essence:

“I remember when I first arrived to the “Flight Line”, a term which described a place where airplanes slept and awoke to roar like rockets. When I placed my foot across that red painted stripe- (which delineated the flight line area from non-flight line areas) I immediately felt as if I landed on foreign soil. Every sound, every smell, every vibration resonated through my body; it was the best “rush” I ever experienced. At the same time, I can’t remember being more nervous than at other times in my life.

There were so many rules, “safety rules” which seemed impossible to remember all of them. A sudden shriek from a distance stopped me in my tracks... a huge man shouted

“hey you, where the hell are your EP’S?’ This term stood for ear protectors-, which looked like earmuffs and protected your eardrums from high decibel sounds. I soon discovered I couldn’t walk too far without being yelled at for something. I wondered when I would learn all the rules.

Away from the flight line and in the security of my squadron’s office I heard the initial rancor. The more experienced workers looked my way and under their breath I could hear them say: “hey did you see what so and so did” I wondered if they were talking about me! Slowly, and in time this new, foreign land became second hand nature. I was no longer scared, I was experienced, and I was invulnerable. It’s interesting though, how one becomes most vulnerable when one feels the most invulnerable.”

As observations and interviews progressed, a greater percentage of behaviorisms evolved. The interviews, observations and photo’s represented an initial construct of information; however, as data was collected causation theories of observed behavior emerged.

The “Desert” and “Flight line” story represented two of nine lived experiences that were discussed in class. Elements of these stories were discovered in a majority of informal interviews conducted by the students. In a collaborative manner I helped the students peel away exterior elements of each observation, photograph, interview, and story to uncover root elements of behavior.

Behavioral contributions to hazards have been well documented in aviation accidents and incidents. In the book *Aviation Psychology*

in Practice (Fuller, Johnston, McDonald, 1994), a number of studies by behaviorists indicate many disasters can be traced to social and organizational arrangements of the *Socio-technical systems* involved in hazards. Two prominent behaviorists are referenced for their work in *Risk Assessment and Accident Analysis, and Hazard Management and Emergency planning (Pidgeon, 1988, Pidgeon and Turner, 1992)*. They describe behavioral contributions to accidents as subtle and diverse in nature.

J. T. Reason in his book, *Human Error* (Reason, 1990) states; “Behavioral conditions range from simple human errors such as slips, lapses, mistakes and faulty decision making; to those associated with small-group social structure and dynamics, many involving failures of communication or collective decision making”. A well documented phenomenon known as “*Groupthink*” exposed failures in communication as a result of inadequate evaluation of available information due to pressure of the “group” (Janus, 1982). “Groupthink” is subtle and often not considered to those within the group; therefore, I provided a reflective experience of “groupthink” and had the students’ think of similar occurrences.

“It was a Friday night, and no one on the crew had received a decent nights rest in some time. We were short manned, night after night had been a twelve hour shift. This particular night started out with promise-- except for one Aircraft. I tried everything I knew in the “book” to start the engine but nothing worked. Then it was suggested; ‘why don’t we try a particular method which was not published in our technical manuals’. The crew knew full

well I was head strong and never strayed from the manuals. The crew looked up to me- I felt they thought if anyone or time warranted this action, I was the person and this was the time to digress from the book. I also felt a big pressure to concede; since, I might not be held in favorable esteem. After all, isn't the mark of a good troubleshooter someone who knows more than the book?"

A review of the observations and interviews revealed events that could be attributable to "Groupthink". An interesting phenomenon occurred from these discussions. Some of the students remarked how they had experienced this phenomenon; however, to be cognizant of a "groupthink" condition usually necessitated an unwanted event. In other words, the accepted norm is difficult to expose as unacceptable, unless an unwanted event occurs. Subsequently, students began to question and analyze some of the accepted norms.

The photo elicitation conducted by the students proved to help identify discrepancies that otherwise were overlooked or considered a "norm". Many interviewees were presented with photos that depicted errors to which they had previously not recognized. This recognition highlighted the latent effect of such behaviorisms accepted as norms. Since most incidents or accidents don't occur immediately, latent behaviorisms can go unnoticed until a final event or trigger event occurs (*Fuller, Johnston, McDonald, 1994*).

In his book *Man-Made Disasters* (*Turner, 1978*) B.A. Turner conducted a detailed sociological analysis of 84 major accidents over

a ten-year period and found; "that prior to any disaster it is typical to find a number of undesirable events accumulate, unnoticed, or not fully understood, often over a considerable number of years. Turner defined this development of preconditions as the *disaster incubation period*".

CONCLUSION

The results of the study provide insights into potential methodologies that could be used to implement a safety program. However, the results are not definitive and the author recognizes the need for further investigation. Data that has been collected should provide sufficient insight into the complexity of human behavior and the concept of Safety. Numerous perceptions of risk and behaviorisms were identified and considered necessary components to development of safety programs. All four groups offered recommendations that educate stakeholders to the complexities identified in this report. All participants agreed safety programs that identified hazards but did not address processes and conditions was not an effective tool to educate and reduce incidents.

The results of the student assessments implicate rudimentary approaches taken with regard to some safety programs. Reflective notes, surveys, observations, and photo elicitation provided data to suggest different approaches to safety programs should be considered. It is recommended that programs include more investigation into causation of events. Also, more research is needed to develop methodologies that provide a blueprint of

behaviorisms and perceptions that can be used to develop effective safety programs.

References

Janis, I. L. (1982), *Groupthink*, 2nd edn, Boston, MA, Houghton-Mifflin.

Johnston, Neil, McDonald, Nick, Fuller, Ray, (1994) Aviation Psychology in Practice, Ashgate Publishing Co. ISBN 0-291-39808-1

Pidgeon, N. F. (1988), "Risk assessment and accident analysis", *Acta Psychologica*, 68, 355-368

Pidgeon, N. F., Hood, Turner, B. A., Toft, B. and Blockley, D. I. (1992b), "Hazard management and safety culture", in D. J. Parker and J. Handmer (eds), "Hazard Management and Emergency Planning; Perspectives on Britain, London, James and James

Turner, B.A. (1978), *Man-made Disasters*. London, Wykeham.

Van Manen, Max. 1990. *Reasearching lived experience: Human Science for an Action Sensitive Pedagogy*. New York: State University of New York.