

BY ROBERT BARON

# Speaking of Errors

A survey of regional airline employees reveals attitudes toward error.

Today there appears to be a paradigmatic shift in organizations' handling of errors, with the understanding that human error is both universal and inevitable.<sup>1</sup> Organizations are beginning to accept the fact that errors can and will happen and that more productive mitigation strategies are required.

Attitudes about errors can, in themselves, be a line of defense in error-provoking situations and environments. In fact, in one of the better-known error models known as the Human Factors Analysis and Classification System (HFACS), *attitudes* are explicitly referenced. The taxonomy states that "adverse mental states of operators may be due to personality traits and pernicious attitudes such as overconfidence, complacency and misplaced motivation."<sup>2</sup> These types of attitudes can clearly influence, and actually exacerbate, error-provoking behavior. However, numerous other error-related attitudinal constructs have, to date, been grossly ignored. These include employee attitudes toward errors themselves.

## Questionnaire Reveals Attitudes

The study described here investigated error attitudes of employees at a regional airline using the Error Orientation Questionnaire (EOQ).<sup>3</sup> What the EOQ labels *orientation* has been used interchangeably with *attitude* in this

study. Attitude was defined as "the way an individual feels about something or someone, which in turn affects an individual's responses and actions."

The EOQ is a 37-item, non-industry-specific survey questionnaire with demonstrated validity and reliability. The EOQ uses eight scales to measure attitudes toward, and coping with, errors at work. The eight-factor model includes six scales — error competence, learning from errors, error risk taking, error strain, error anticipation and covering up errors — and two additional scales, measuring error communication and thinking about errors.

**Error competence** is defined as "active knowledge for immediate recovery from errors and reduction in error consequences." **Learning from errors** is defined as "the ability to prevent errors in the long term by learning from them, planning and changing work processes." **Error risk taking** is defined as "the result of an achievement-oriented attitude which requires flexibility and taking responsibility." **Error strain** is defined as "a generalized fear of committing errors and by negative emotional reactions." **Error anticipation** is defined as "a general expectancy that errors will happen, because one has a realistic view that even in one's field of expertise, errors will occur."

**Covering up errors** is mainly "the strategy of a non-self-assured person

and may also be an adaptation to error-sensitive conditions at work." A definition of **error communication** was not provided for the EOQ. For this study, it was defined as "the ability to communicate one's errors to the proper channel or to rely on co-workers to rectify any errors that occur." Nor was a definition of **thinking about errors** provided. For this study, thinking about errors was defined as "the reactive thought process that occurs after one commits an error in order to prevent the error from happening again."

Distribution of the EOQ was coordinated and conducted through the airline's management, and participation was voluntary. The EOQ was distributed via e-mail to approximately 400 employees.

## Safety-Sensitive Positions

A total of 65 EOQs were returned for a response rate of 16 percent. Although not an impressive response rate, for descriptive purposes this sample was adequate. The respondents consisted of 47 males, or 72 percent, and 18 females, 28 percent. Age ranged from a categorical low of 18–22 years with a categorical high of 63+ years, with 18–22 the largest age category, providing 22 percent of responses.

Years of experience in aviation ranged from a categorical low of 1–5 years to a categorical high of 31+ years, with 1–5 years the largest experience category, providing 42 percent of responses.

Reported employment departments included, in descending order of participation in the survey, ramp operations, flight crew, other, flight operations, maintenance, dispatch and safety (Figure 1). Forty-seven, or 72 percent, indicated they were in non-management positions and the rest indicated they were in management positions. The majority of participants, 97 percent, indicated they worked in a safety-sensitive position.

The scales were organized by theme (Tables 1–6, pp. 50–52). Many questions within a scale were similar to one

another. This was to test for consistency, an indicator of validity for the scales.

### Orientation Toward Goals

The mean scores overall did not show any major variation between the non-management and management groups. However, some content items had noticeable differences between the means or standard deviations. For instance, in the Error Competence scale (Table 1), item 19, *I don't let go of the goal, although I may make mistakes*, showed a moderate difference in means between

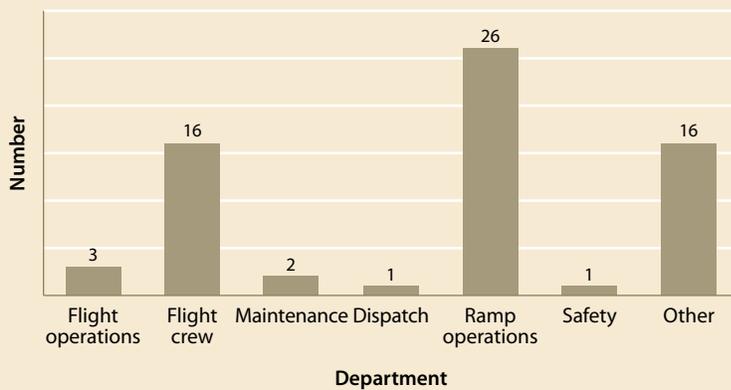
non-management and management. This indicates that those employees in non-management positions have a stronger orientation toward completing a goal, knowing that mistakes may happen.

In the Risk Taking scale (Table 3), Item 13, *If one wants to achieve at work, one has to risk making mistakes*, showed a moderate difference in means between non-management and management. This indicates that those employees in management positions have a stronger orientation toward work achievement at the risk of making mistakes. Also, there was less variation, or standard deviation, in the management group.

A qualitative component was also included in this study, consisting of participants' perceptions of why they committed an error on the job, as well as why they believed someone they knew committed an error. These questions were added to the EOQ. The errors were categorized based on their subjective root causes. Some errors were difficult to assign to a specific category, in which case the category that most closely fit was chosen. Twelve root-cause categories emerged (Figure 2, p. 52). The qualitative portion of the study uncovered additional information that was useful in supporting the results of the EOQ. The top three categories combined — pressure, situation awareness and complacency — accounted for well over 50 percent of perceived root causes of errors.

Pressure is exerted by the daily demands of tight flight schedules and affects all personnel including pilots, maintenance technicians, dispatchers and, in fact, anyone directly or indirectly involved with the completion of a flight. Among other things, pressure can lead to shortcutting procedures, irrational decision making and loss of focus. While pressure is not something that can be readily eliminated in the aviation

Regional Airline Survey Respondents, by Department



Note: The responses included 65 returned surveys of about 400 distributed to study error attitudes.

Source: Robert Baron

Figure 1

Error Competence

Item No.	Description	Non-Mgmt (N=47)		Mgmt (N=18)	
		M	SD	M	SD
8	When I have made a mistake, I know immediately how to rectify it.	3.46	(0.776)	3.55	(0.704)
15	When I do something wrong at work, I correct it immediately.	4.36	(0.605)	4.16	(0.707)
16	If it is at all possible to correct a mistake, then I usually know how to go about it.	3.80	(0.741)	4.11	(0.832)
19	I don't let go of the goal, although I may make mistakes.	4.00	(1.000)	3.38	(0.916)

Agree 1: Not at all, 2: A bit, 3: Neither a bit nor a lot, 4: A lot, 5: Completely

M = mean; Mgmt = management; N = number; SD = standard deviation

Note: The responses included 65 returned surveys of about 400 distributed to study error attitudes.

Source: Robert Baron

Table 1

environment, it can be mitigated. Countermeasures include an awareness of the effects of pressure as well as the ability to understand when and where a line needs to be drawn between “everyday pressure” and the type of pressure that can lead to consequential errors. Situation awareness (SA) is knowing where you have been, where you are currently and where you are projected to be in the future. Mostly related to cockpit operations, SA can also be applied to maintenance and other activities. A common word, *attention*, was used in many of the SA qualitative reports. Countermeasures for inadequate SA include creating an awareness of the reasons why SA may be compromised at a given time. For instance, high-workload situations, ineffective workload management, lack of delegation and complacency may all lead to a loss of SA. In multicrew flight operations, it is critically important that one pilot monitor the other pilot, or in cases where the autoflight system is engaged, monitor the autopilot. Maintaining good SA is required for the entire duration of a flight, but it is critically important during the approach phase, especially in areas of mountainous terrain.

Complacency is a feeling of contentment and self-satisfaction that tends to put employees in an “autopilot mode.” People may feel that because they have done the job a hundred times previously with no problems, there will be no problems this time. Repetitive tasks may be met with less conscious attention and awareness by the employee. This has become a major issue in maintenance-related accidents, where complacency has been cited as a contributing factor in airframe or powerplant inspections.

Countermeasures for complacency include increasing awareness of complacency’s potential consequences; understanding that just because a task or

Learning from Errors					
Item No.	Description	Non-Mgmt (N=47)		Mgmt (N=18)	
		M	SD	M	SD
4	Mistakes assist me to improve my work.	3.97	(1.073)	4.00	(0.970)
14	Mistakes provide useful information for me to carry out my work.	3.25	(1.259)	3.50	(0.857)
17	My mistakes help me to improve my work.	3.87	(0.991)	4.05	(0.872)
29	My mistakes have helped me to improve my work.	3.72	(1.036)	4.05	(0.937)

Agree 1: Not at all, 2: A bit, 3: Neither a bit nor a lot, 4: A lot, 5: Completely  
M = mean; Mgmt = management; N = number; SD = standard deviation  
Note: The responses included 65 returned surveys of about 400 distributed to study error attitudes.  
Source: Robert Baron

Table 2

Risk Taking					
Item No.	Description	Non-Mgmt (N=47)		Mgmt (N=18)	
		M	SD	M	SD
13	If one wants to achieve at work, one has to risk making mistakes.	2.74	(1.241)	3.33	(0.840)
26	It is better to take the risk of making mistakes than to “sit on one’s behind.”	3.27	(1.346)	2.88	(1.022)
27	To get on with my work, I gladly put up with things that can go wrong.	3.02	(1.343)	2.66	(0.970)
31	I’d prefer to err, than to do nothing at all.	2.80	(1.469)	2.72	(1.178)

Agree 1: Not at all, 2: A bit, 3: Neither a bit nor a lot, 4: A lot, 5: Completely  
M = mean; Mgmt = management; N = number; SD = standard deviation  
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Table 3

Error Strain					
Item No.	Description	Non-Mgmt (N=47)		Mgmt (N=18)	
		M	SD	M	SD
6	I find it stressful when I err.	3.55	(1.119)	3.88	(0.963)
25	I am often afraid of making mistakes.	2.61	(1.207)	3.11	(1.131)
32	I feel embarrassed when I make an error.	3.10	(1.303)	2.94	(0.998)
36	If I make a mistake at work, I “lose my cool” and become angry.	1.39	(0.613)	1.33	(0.766)
37	While working I am concerned that I could do something wrong.	2.93	(1.143)	2.33	(1.028)

Agree 1: Not at all, 2: A bit, 3: Neither a bit nor a lot, 4: A lot, 5: Completely  
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Table 4

### Error Anticipation

Item No.	Description	Non-Mgmt (N=47)		Mgmt (N=18)	
		M	SD	M	SD
20	In carrying out my task, the likelihood of errors is high.	2.14	(0.955)	2.61	(1.195)
24	Whenever I start some piece of work, I am aware that mistakes occur.	3.02	(1.259)	3.11	(1.231)
28	Most of the time I am not astonished about my mistakes because I expected them.	2.04	(1.284)	2.50	(0.923)
30	I anticipate mistakes happening in my work.	2.74	(1.169)	2.94	(1.055)
35	I expect that something will go wrong from time to time	3.13	(1.258)	3.16	(1.294)

Agree 1: Not at all, 2: A bit, 3: Neither a bit nor a lot, 4: A lot, 5: Completely  
M = mean; Mgmt = management; N = number; SD = standard deviation  
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Table 5

### Covering up Errors

Item No.	Description	Non-Mgmt (N=47)		Mgmt (N=18)	
		M	SD	M	SD
11	Why mention a mistake when isn't obvious?	2.19	(1.244)	2.50	(1.098)
21	It is disadvantageous to make one's mistakes public.	2.19	(1.191)	2.22	(0.942)
22	I do not find it useful to discuss my mistakes.	1.91	(1.039)	1.83	(0.923)
23	It can be useful to cover up mistakes.	1.57	(0.800)	1.66	(0.907)
33	I rather keep my mistakes to myself.	2.02	(1.021)	2.00	(0.970)
34	Employees who admit to their errors make a big mistake.	1.41	(0.717)	1.33	(0.766)

Agree 1: Not at all, 2: A bit, 3: Neither a bit nor a lot, 4: A lot, 5: Completely  
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Table 6

### Root Causes of Errors

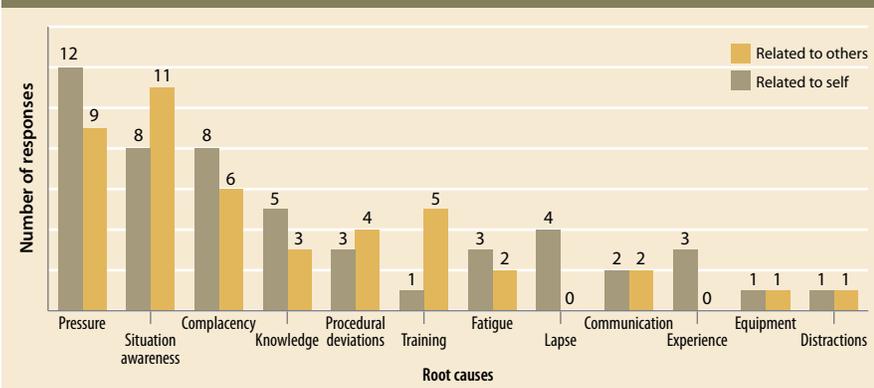


Figure 2

inspection has been completed successfully a hundred times before, it does not guarantee that the outcome will be successful this time; not letting down your guard; assuming that something may have been missed; and always double-checking your own work, especially if an additional set of eyes is *not* required for a particular task (such as completing a task and signing it off yourself).

### Additional Research

Understanding the psychology of errors is critically important to the successful implementation of an error-reporting system. This study showed, at least on a self-reporting level, that there were differences between non-management and management in terms of error attitudes. It would be highly desirable to conduct additional research in this area. Building a rich database will allow meta-analyses to be conducted. Hypotheses can then be posited and tested for statistical significance. ➔

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### Notes

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