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Aviation Disaster Primer: Psychologies of Error

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Abstract. This article describes common psychological phenomena that often mitigate against accurate induction and deduction of the causes of aviation disasters.

There are two main logical approaches to identifying the causes of aviation disasters. The inductive approach entails classifying a specific disaster as similar in relevant characteristics to that of other disasters whose cause has been identified. Once the classification is made, the cause automatically follows--leaping from the specific to the general. The deductive approach entails following a trail of associations from specific details to specific causes--each association based on faith in a hypothesis supported by yet other data. (A third approach is a mixture of the inductive and the deductive.)

But there are problems with the inductive approach. A disaster may be similar in all relevant respects to a class of past disasters but may be subject to a different cause. This may be because another aspect of the disaster in question has not before been implicated in a causal chain. Thus, this aspect is not deemed relevant and a misclassification of the disaster at hand with the class of previous disasters occurs. Another problem with the inductive approach is that a class of past disasters may be such that more than one cause may be responsible--but only one cause has so far has been identified. Here, the disaster in question is correctly characterized as a member of a class of past disasters but has occurred through the cause that has not yet been identified.

In addition, there are problems with the deductive approach. As was stated above, the associations linking specific details with specific causes are based on faith in hypotheses supported by data. Unfortunately, there are just too many pathways to faith-based associations--e.g., majority consensus, reason-based rules, intuition-based hunches. These and other pathways do not necessarily occupy a privileged status of causal semiotic.

There are yet other psychological phenomena mitigating against the accurate identification of the causes of aviation disasters. Professional and lay investigators--as well as other speculators--tend to more easily discern and construct patterns and related series of events as opposed to a series of random events. This tendency biases towards some classes of causal factors and against another classes. Yet another psychological tendency is to allocate unwarranted casual significance to events that can be easily imagined as opposed to those that cannot be--with respective biases towards and against respective classes of causal factors.

All the above suggests that an investigative rush to judgment is a recipe for disaster in the identification of the causes of aviation disasters. (See Blumberg, S.J., & Silvera, D.H. (1998). Attributional complexity and cognitive development: A look at the motivational and cognitive requirements for attribution. Social Cognition, 16, 253-266; Calvo, M.G., & Eysenck, M. W. (1998). Cognitive bias to internal sources of information in anxiety. International Journal of Psychology, 33, 287-299; Durst, M. (1998). Beyond mathematics, logic, and psychoanalysis towards philosophy. Journal of Melanie Klein and Object Relations, 16, 87-114; Fiedler, K. (1996). Explaining and simulating judgment biases as an aggregation phenomenon on probabilistic, multiple-cue environments. Psychological Review, 103, 193-214; Paulos,

J.A. (November 2, 1999). After a crash, fear overtakes logic. The New York Times, p. A31; Shappell, S.A., & Wiegmann, D.A. (1997). A human error approach to accident investigation: The Taxonomy of Unsafe Operations. International Journal of Aviation Psychology, 7, 269-291.) (Keywords: Aviation Disaster, Bias, Cognitive Psychology, Investigation.)