Aviation Weather and Decision Making: A Human Factors Perspective

Beth Blickensderfer
*Embry-Riddle Aeronautical University*, blick488@erau.edu

Jessica Cruit
*Embry-Riddle Aeronautical University*

Michael Vincent
*Embry-Riddle Aeronautical University*

Follow this and additional works at: [https://commons.erau.edu/ga-wx-training-research](https://commons.erau.edu/ga-wx-training-research)

Part of the Aviation Commons, Cognitive Psychology Commons, Human Factors Psychology Commons, and the Meteorology Commons

Scholarly Commons Citation

This Article is brought to you for free and open access by the General Aviation Weather at Scholarly Commons. It has been accepted for inclusion in Aviation Weather Training Research by an authorized administrator of Scholarly Commons. For more information, please contact commons@erau.edu.
Overview

• A History of Decision Making Research

• Pilot Decision Making

• Future Research Directions
History of Decision Making Research

- Simon & Chase (1973)
- Tversky & Kahneman (1974)
- Klein (1993)
History of Decision Making Research

• Simon & Chase (1973)
  – Experts recall more domain specific knowledge than novices.
  – Expert pilots may not be expert decision-makers.
History of Decision Making

Research

- Klein (1993)
  - How experts make decisions under time pressure.
- Studied Expert Firefighters
- Recognitional decision making over analytical
History of Decision Making Research

- Tversky & Kahneman
  - Framing Effect
  - Anchoring Effect
  - Better understanding of biases and heuristics can help with decision making.
Pilot Decision-Making

Anchoring Bias
Motivational influences/pressures
Usability of Weather Information
Anchoring Example

- You plan to attend a reunion in Burlington, Iowa and TAF’s indicate cloudy but VFR weather at the scheduled ETA.
Anchoring (cont.)

- 2 Hours into the flight, data link NEXRAD indicates a line of thunderstorms just outside of Burlington
Anchoring (cont.)

TAFs
KFSD XX1830Z XX19/XX19 33005KT P6SM BKN090
   FMXX2000 33006KT P6SM SCT090
   FMXX2200 33008KT P6SM SKC
   FMXX0000 35010KT P6SM SKC
   TEMPO XX03/XX06 SCT070
   FMXX0800 02006KT P6SM SKC=
KBRL XX1835Z XX19/XX19 22006KT P6SM SCT100 SCT250
   FMXX2300 25008KT P6SM SCT035
   FMXX0200 29006KT 6SM HZ VCTS
BKN040CB
   TEMPO XX02/XX06 4SM SHRA BR OVC030
   FMXX0600 32008KT P6SM BKN050=
Motivational Pressures

- Possible External Pressures:
  - Passenger pressure to make the reunion on time.
  - Management pressure to return

- Possible Internal Pressures:
  - Not wanting to admit defeat
  - Wanting to live up to own reputation
Weather Information: Usability

- Where is the information?
  - Users can't find the information.

- Information Comprehension
  - Difficulty understanding the information with confusing displays
  - Display design doesn't mesh with decision making process.

- Information Availability
  - Information users want is not readily available.

- Information overload
Where to go from here...

- Multidisciplinary approach
- The role of Human Factors
- Research needs
Multidisciplinary Approach

- Working together, meteorologists, domain experts, and human factors professionals can develop research driven solutions.
Human Factors: Methods and Tools

- Vast literature on human performance
- Established methods for behavioral research
- User analysis
  - Cognitive Task Analysis (CTA)
  - User interviews
  - Observation based user analysis
Research Needs

• Display Design (what & how)

• Training
  – Scenario-based training practice
  – Tools and technology enabling pilots to practice and receive feedback.

• Measuring/Assessing effectiveness of aviation weather products

⭐ human-machine system
References


Beth Blickensderfer
blick488@erau.edu

Jessica Cruit
cruitj@erau.edu

Michael Vincent
vincenm3@my.erau.edu