

Mar 14th, 2:20 PM

2015 Pilot Source Study

Guy Smith

Associate Professor, Embry-Riddle Aeronautical University, smithabc@erau.edu

Follow this and additional works at: <https://commons.erau.edu/ntas>

Smith, Guy, "2015 Pilot Source Study" (2016). *National Training Aircraft Symposium (NTAS)*. 4.
<https://commons.erau.edu/ntas/2016/presentations/4>

This Event is brought to you for free and open access by the Conferences at Scholarly Commons. It has been accepted for inclusion in National Training Aircraft Symposium (NTAS) by an authorized administrator of Scholarly Commons. For more information, please contact commons@erau.edu.

2015 Pilot Source Study



Panel 3: Pilot Source Study 2015 & Discussion
March 14, 2016



Overview

Dr. Guy Smith – Embry-Riddle Aeronautical University

- Introduction
- Background
- Methodology

Dr. MaryJo Smith – Ypsilon Associates

- Results

Introduction

Background

Methodology

Dr. Guy M. Smith

Pilot Source Study – Background

COLGAN AIR 3407 – February 12, 2009

ANPRM ► **Pilot Source Study 2010**

- Fewer extra training events and non-completions: 501-1,000 total flight hours

NPRM ► **Pilot Source Study 2012**

- Fewer extra training events and non-completions: 1,001-1,500 total flight hours

Public Law 111-216 ► FOQ Rule (Aug 1, 2013)

2015 Pilot Supply Summit ► **Pilot Source Study 2015**

Convenience Samples – Pilots Hired Between 2005 and 2011

Pilot Source Study

2010 (2156 Records)

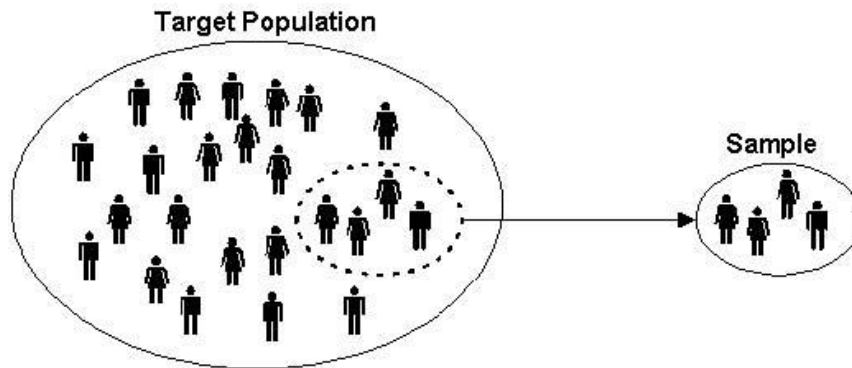
- American Eagle
- Atlantic Southeast
- Cape Air
- Horizon Air
- Mesa Airlines
- Trans State Airlines

Pilot Source Study

2012 (4024 Records)

- ExpressJet Airlines
- SkyWest Airlines
- Air Wisconsin Airlines
- Atlantic Southeast Airlines
- Shuttle America
- Chautauqua Airlines
- Republic Airways

- **Pre-Law (PSS 2010 & 2012)**
- **Post-Law (PSS 2015)**
 - Another **Sample study** of PSS 2010 and 2012



- **RAA Convention, Cleveland, May, 2015**
- **Result: A Population Study**
 - All US Regional Airlines

2015 PSS – a Population Study

ExpressJet Airlines	Great Lakes Aviation*	
Horizon Air	Republic Airlines	
CommutAir	Shuttle America	
Envoy	Empire Airlines	
Endeavor Air	Mesa Airlines	
Piedmont Airlines	Air Wisconsin Airlines Corp.	
GoJet Airlines	SkyWest Airlines	
Compass Airlines	Cape Air Airlines*	
Trans States Airlines	RAVN Alaska - Corvus	
Seaborne Airlines	RAVN Alaska - Hageland*	
PSA Airlines	Silver Airways	
2010/2012 PSS	New to 2015 PSS	* Part 135 Operators in 2015 PSS

Non-Disclosure Agreement (NDA)

Pilot Source Study, Phase IV (2015)
Principal Investigators: Dr. Guy M. Smith; Dr. Elizabeth Bjerke
Data Collectors: Jenna Ludwick, Nancy Shane

The undersigned is a data collector for the Pilot Source Study being conducted during the period ending December 31, 2015.

The undersigned understands and agrees to not, except as authorized by the airline, at any time during or after data collection for the Pilot Source Study, directly or indirectly, disclose to any other person or entity any proprietary or sensitive information of the airline or of others (collectively called "Proprietary Information"), which has come into the undersigned's possession, custody or knowledge in the course of data collection with the airline; nor shall the undersigned use any such Proprietary Information for personal use or advantage or make it available to others.

The undersigned, in consideration of the disclosure of Proprietary Information, with the consent of **Endeavor Air**, agrees: (a) not to use such information and data for any purpose other than that for which such information has been provided; (b) not to copy such information and data for the benefit of anyone other than the airline; and, (c) not to further disclose such information and data for the benefit of anyone other than the airline, to any other company, person, or entity without prior written consent of the airline.

Nothing herein shall expressly or by implication grant to the undersigned any right or license to such information and data. All rights to such information and data are reserved by the airline, and all documents and media containing such information and data shall remain in the airline's control, except de-identified data specifically released by the airline for the purposes of the Pilot Source Study.

_____ Signature <u>Dr. Guy M. Smith</u> Printed Name <u>May 28, 2015</u> Date	_____ Witness Signature _____ Printed Name <u>May 28, 2015</u> Date
_____ Signature <u>Dr. Elizabeth Bjerke</u> Printed Name <u>May 28, 2015</u> Date	
_____ Signature <u>Jenna Ludwick</u> Printed Name <u>May 28, 2015</u> Date	

- De-identified Data
- Name
- ID Number
- Age
- Gender
- Ethnicity
- No Other Purpose
- Non-disclosure

Data Collection Protocol

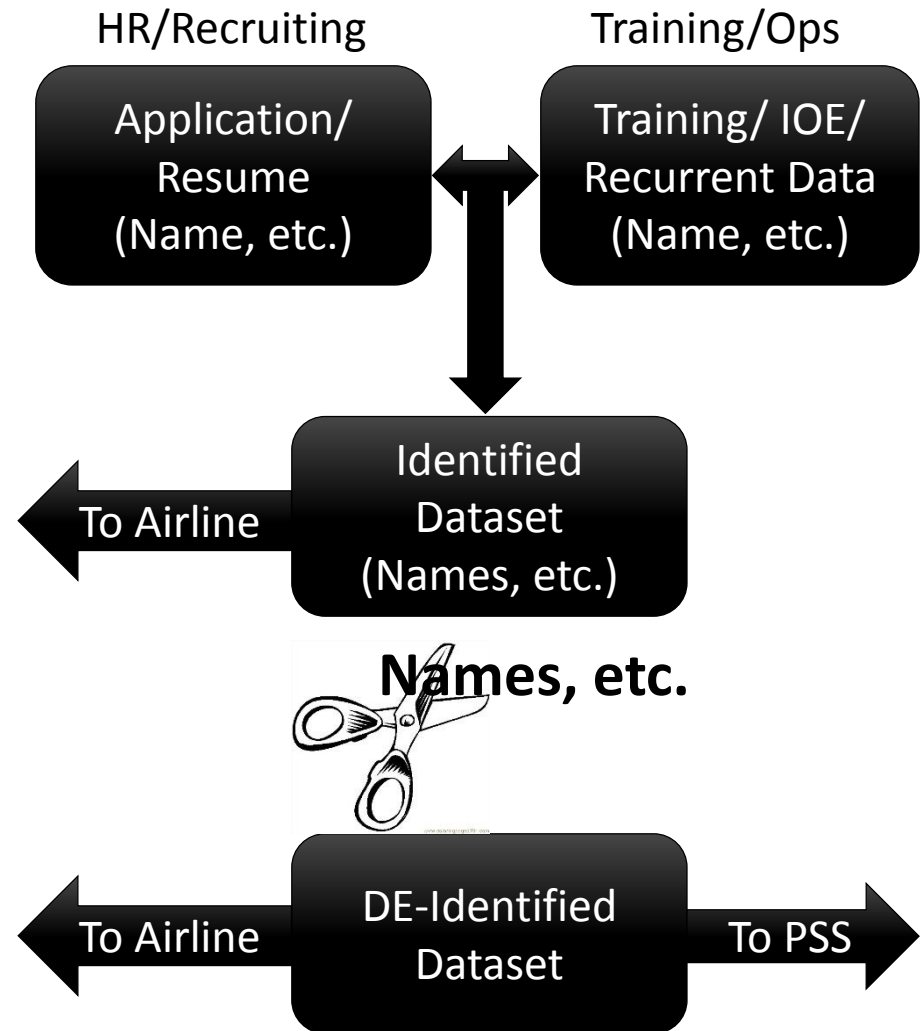
**Data Collection Protocol – Regional Airlines
Pilot Source Study 2015**

1. Establish **POPULATION** – Pilots hired after Aug 1, 2013 – Identify by Name, Company ID
 - a. This establishes scope for this airline
2. Collect **APPLICATION** Data – Identify by Name, Company ID
 - a. Data from Airline Apps or other data used to select pilots to hire
 - b. Write Code Book
3. Collect **TRAINING** Data – Identify by Name, Company ID
 - a. TRAINING data begins when pilot reports on the airline property until ready for IOE
 - b. May include AQP data – check with AQP manager
 - c. Write Code Book
4. Collect **IOE** Data – Identify by Name, Company ID
 - a. Primary data is IOE hours – may include other reports from IOE Instructors
 - b. May include AQP data – check with AQP manager
 - c. Write Code Book
5. Collect **FIRST YEAR** Data – Identify by Name, Company ID
 - a. May include probationary line checks, recurrent training, etc.
 - b. May include AQP data – check with AQP manager
 - c. Write Code Book
6. **SAVE Identified Data Set** – Identify by Name, Company ID
 - a. ADD Pilot Source Study ID – Airline Code and # (e.g., EV0001, EV0002, etc.)
 - b. Give a complete copy of the **Identified Data Set** to the AIRLINE representative
7. **DE-IDENTIFY** Data Set
 - a. Keep Pilot Source Study ID
 - b. DELETE Identifying information (e.g., Name, Company ID, Gender, Age, Ethnicity, etc.)
 - c. SAVE a copy of the De-Identified Data Set
 - d. Only this data set (the De-Identified Data Set) may leave the company property

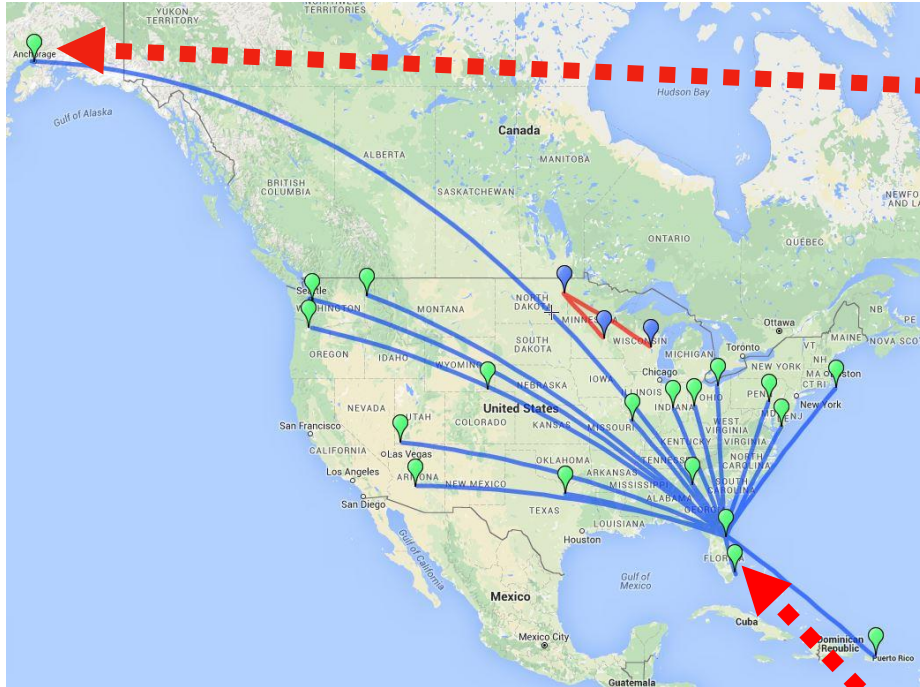
Pilot Source Study Contact information

CO- Principal Investigators
 Dr. Guy M. Smith – smithabc@erau.edu
 Dr. Elizabeth Bjerke – ebjerke@aero.und.edu

Data Collection Managers
 Jenna Ludwick – ludwickj@my.erau.edu
 Nancy Shane – Nancy.Shane@capeair.com; nrshane28@gmail.com



Data Collection



April-October 2015
22 Regional Airlines
7,073 Records

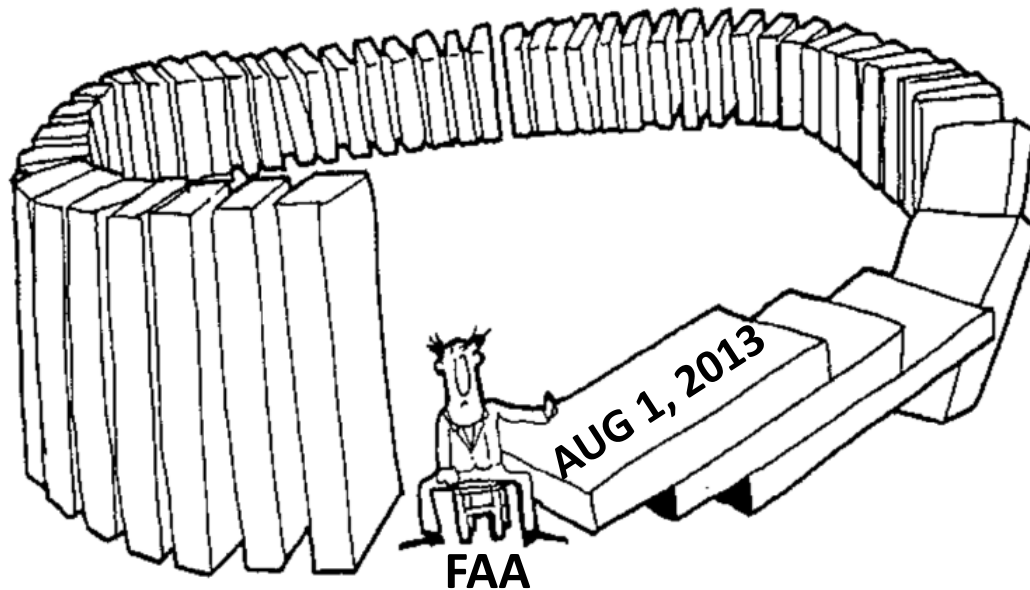


RESULTS

Dr. MaryJo Smith

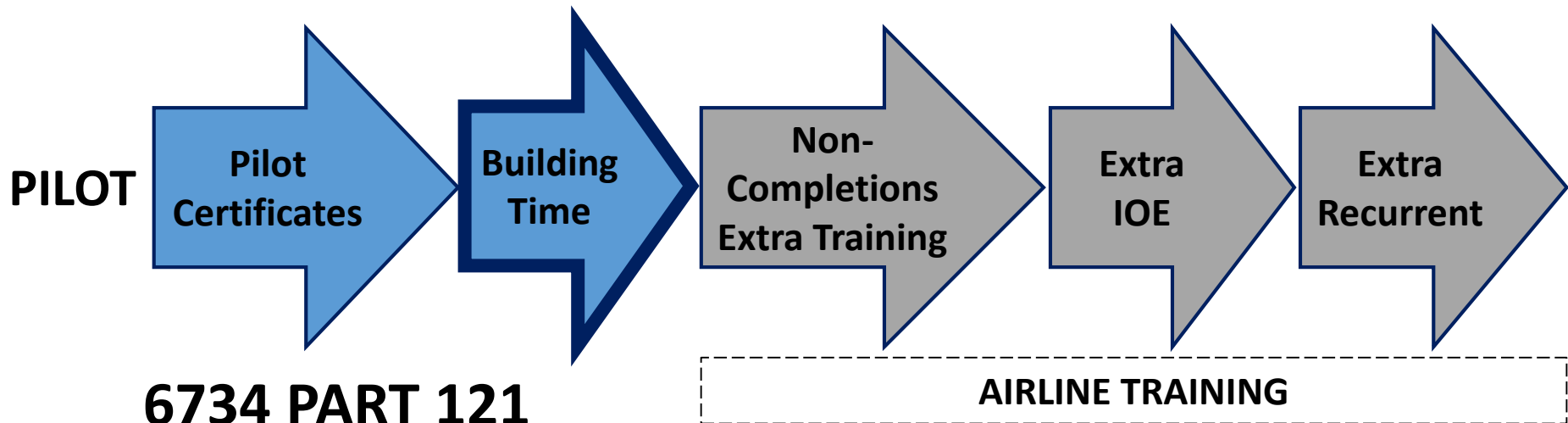
Pilot Source Study 2015 – Purpose:

What is the effect of PL 111-216 and the FOQ Rule on pilot hiring and pilot training in US regional airlines?



Background

Outcomes (Performance)



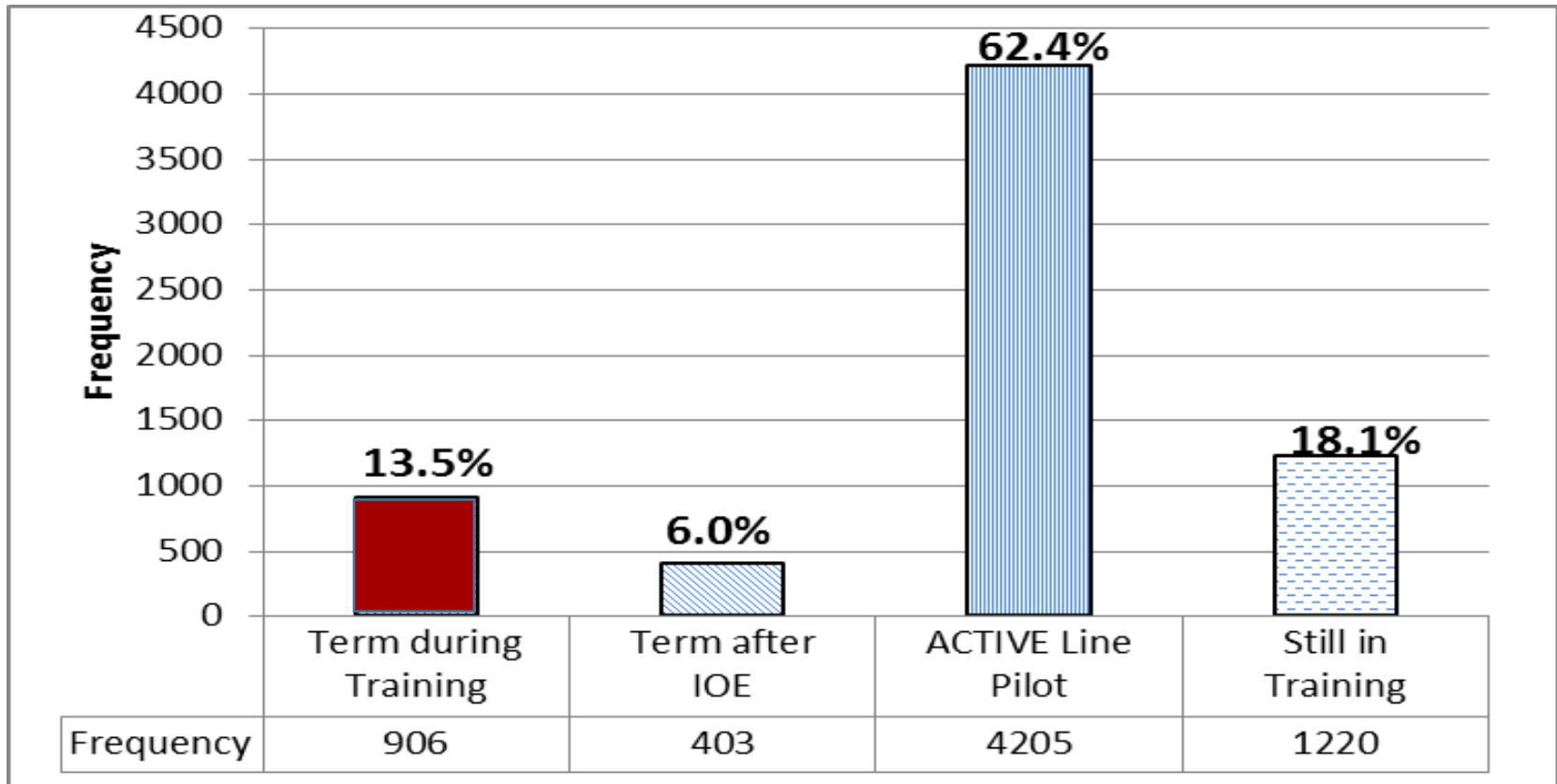
6734 PART 121

Regional Airline Pilots

Hired After

Aug 1, 2013

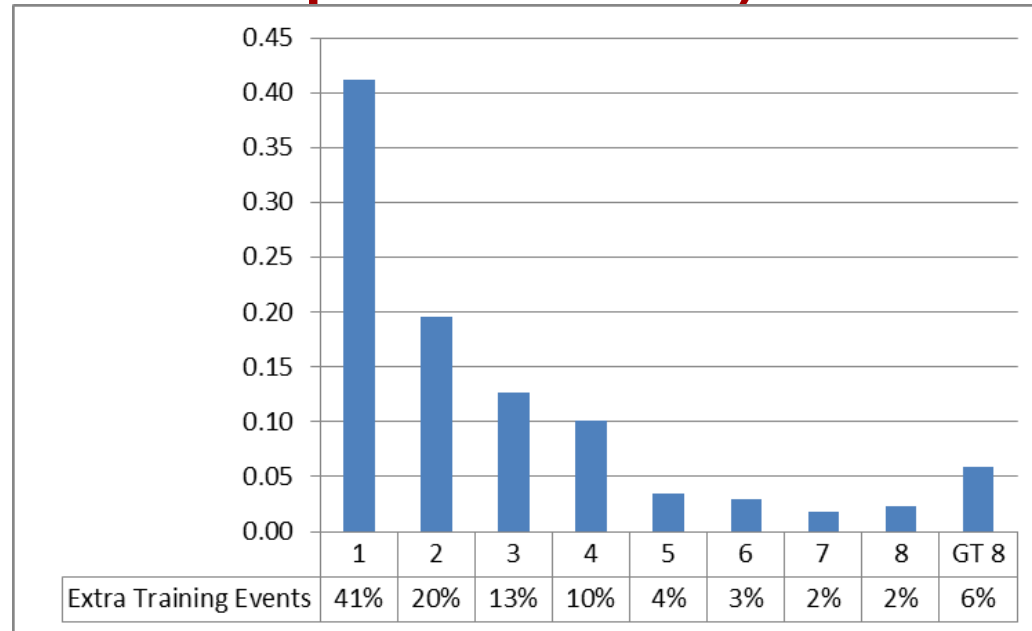
Non-Completions (13.5%) (No "Reason" Code)



Extra Training Events (29%) (Under – represented)

ZERO
EXTRA
TRAINING
EVENTS

71%

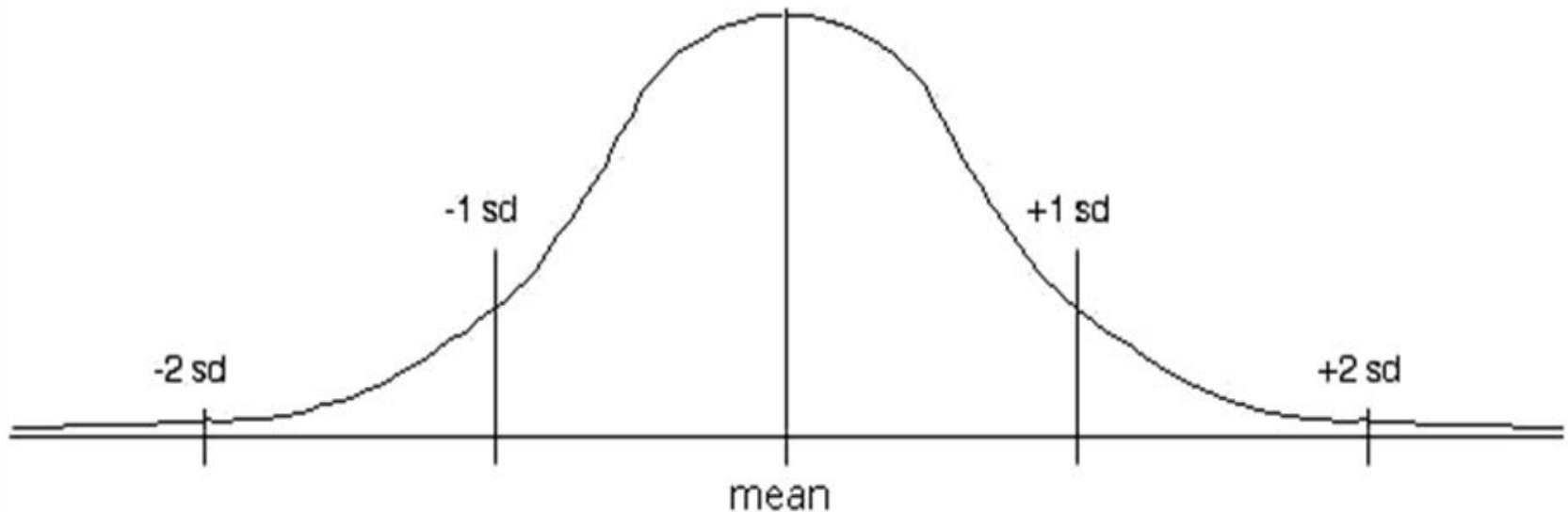


EXTRA
TRAINING
EVENTS

Extra IOE (12%) (Hours Debatable > z-Score)

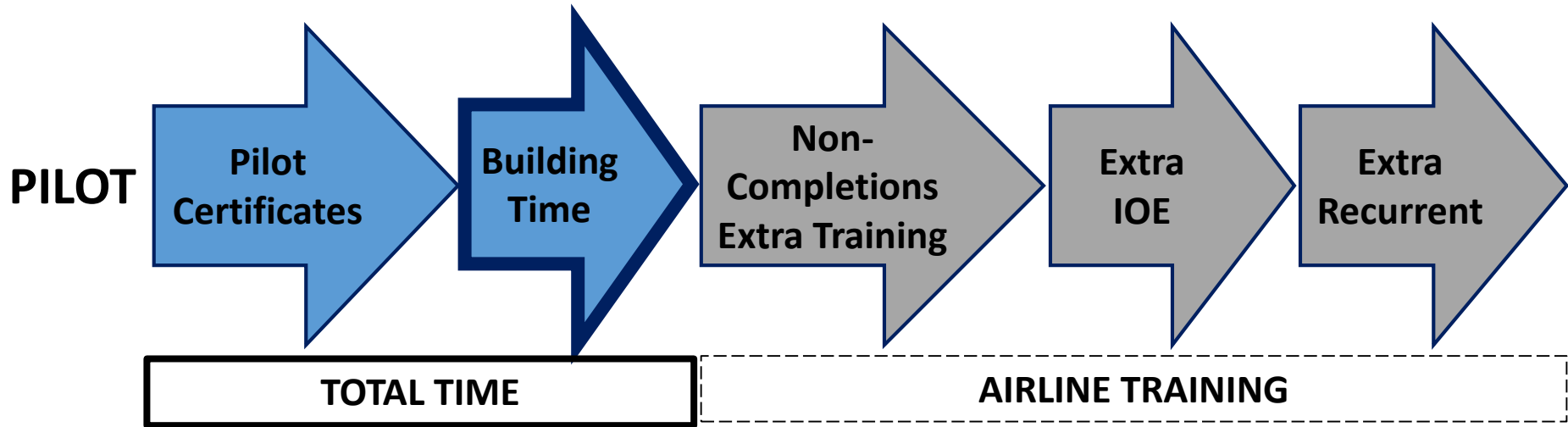
4,008 Normal IOE

564 Extra IOE



Extra Recurrent Training (8%) (Mostly AQP Airlines)

Number of Extra Recurrent Training Events	Count
One	215
Two	89
Three	37
Four	14
Greater than Four	12



College Degree
 AABI Flight
 Aviation Degree
 College GPA

Educational Background

Highest Degree (98%)

1214 High School

4223 Bachelor

625 Associate

539 Graduates

**Non
Completions**

Bachelor's:
FEWER

High School: MORE
Associate: MORE

**Extra
Training**

Bachelor's:
LESS

**Extra
IOE**

Associate:
MORE

**Extra
Recurrent**

AABI Flight Degree (23%)

**Non
Completions**

AABI:
FEWER

**Extra
Training**

**Extra
IOE**

**Extra
Recurrent**

AABI: LESS

Aviation Degree (Includes AABI) (48%)

**Non
Completions**

Aviation:
FEWER

Non-Aviation: MORE

**Extra
Training**

Aviation:
LESS

**Extra
IOE**

**Extra
Recurrent**

Aviation:
LESS

**Non-
Aviation:
MORE**

College GPA (38%)

**Non
Completions**

**Extra
Training**

**Extra
IOE**

**Extra
Recurrent**

< 3.0: MORE

Experience

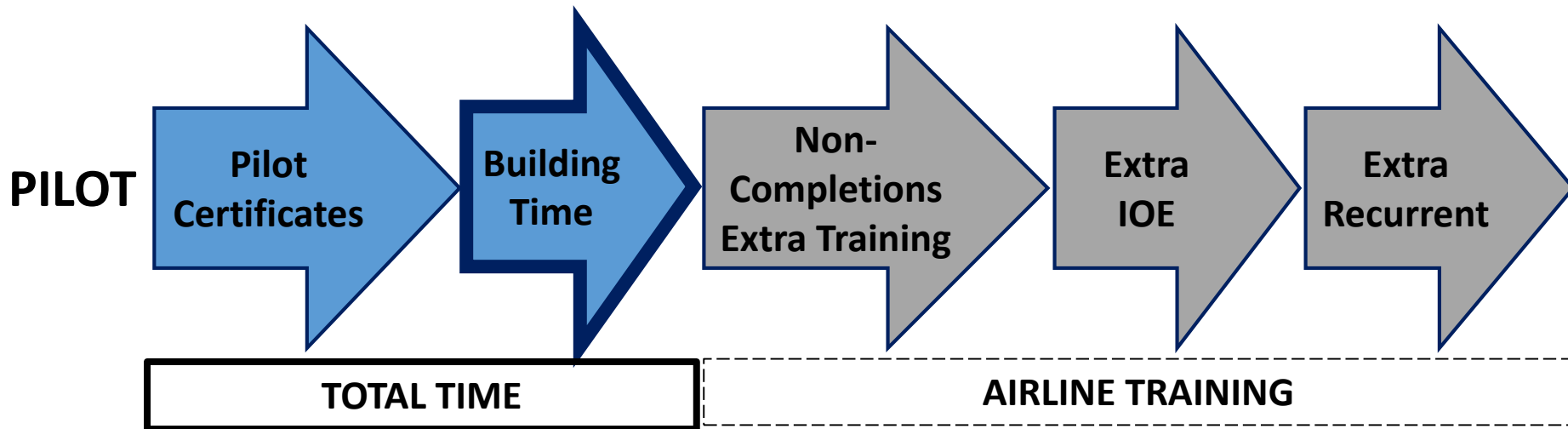
Years Since Graduation

Previous Employment

CFI Certificate

Military Pilot

ATP Certificate



Years Since Graduation (55%)

**Non
Completions**

≤ 4 Years:
FEWER

**Extra
Training**

≤ 4 Years:
LESS

**Extra
IOE**

**Extra
Recurrent**

≤ 4 Years:
LESS

> 10 Years: MORE

Pre-Employment (86%)

2406 Flt Instructor

1072 Part 135

1777 Part 121

507 Part 91

**Non
Completions**

**Extra
Training**

**Extra
IOE**

**Extra
Recurrent**

Flight
Instructor:
FEWER

Part 121: LESS

Part 91: MORE

**Flight Instructor:
MORE**

CFI Certificate (78%)

**Non
Completions**

**Extra
Training**

**Extra
IOE**

**Extra
Recurrent**

Non-CFI: MORE

Military Pilot (12%)

**Non
Completions**

**Extra
Training**

**Extra
IOE**

**Extra
Recurrent**

Military
Pilot: LESS

R-ATP Certificate (17%)

141 M R-ATP

1036 IA R-ATP

5557 Traditional ATP

**Non
Completions**

IA R-ATP:
FEWER

**Extra
Training**

IA R-ATP:
LESS

**Extra
IOE**

**Extra
Recurrent**

IA R-ATP:
LESS

Total Time - 1500 Hours

≤ 1500 (27%)

3001-4500 (14%)

1501-3000 (42%)

> 4500 (17%)

Non Completions

≤ 1500 HR:
FEWER

> 4500 HR:
MORE

Extra Training

≤ 1500 HR:
LESS

Extra IOE

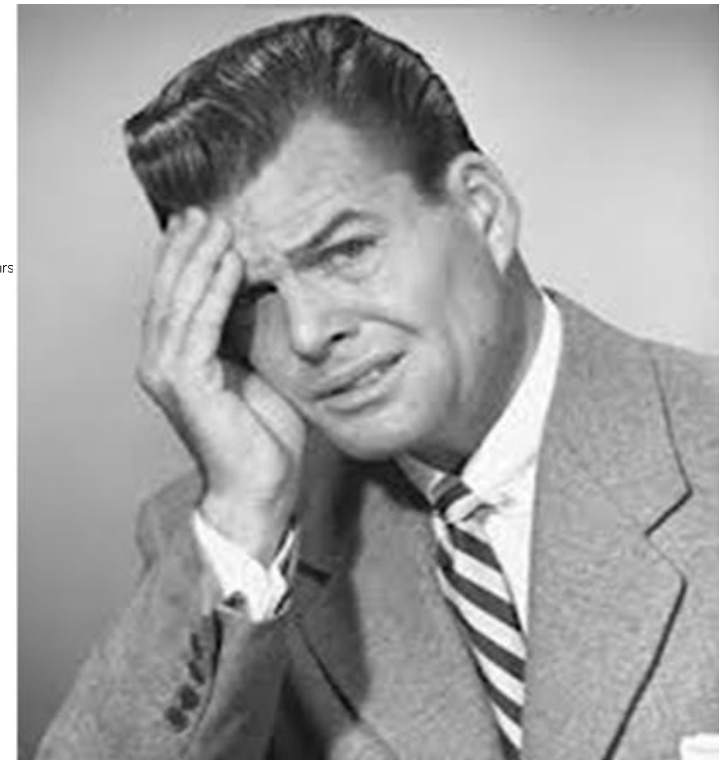
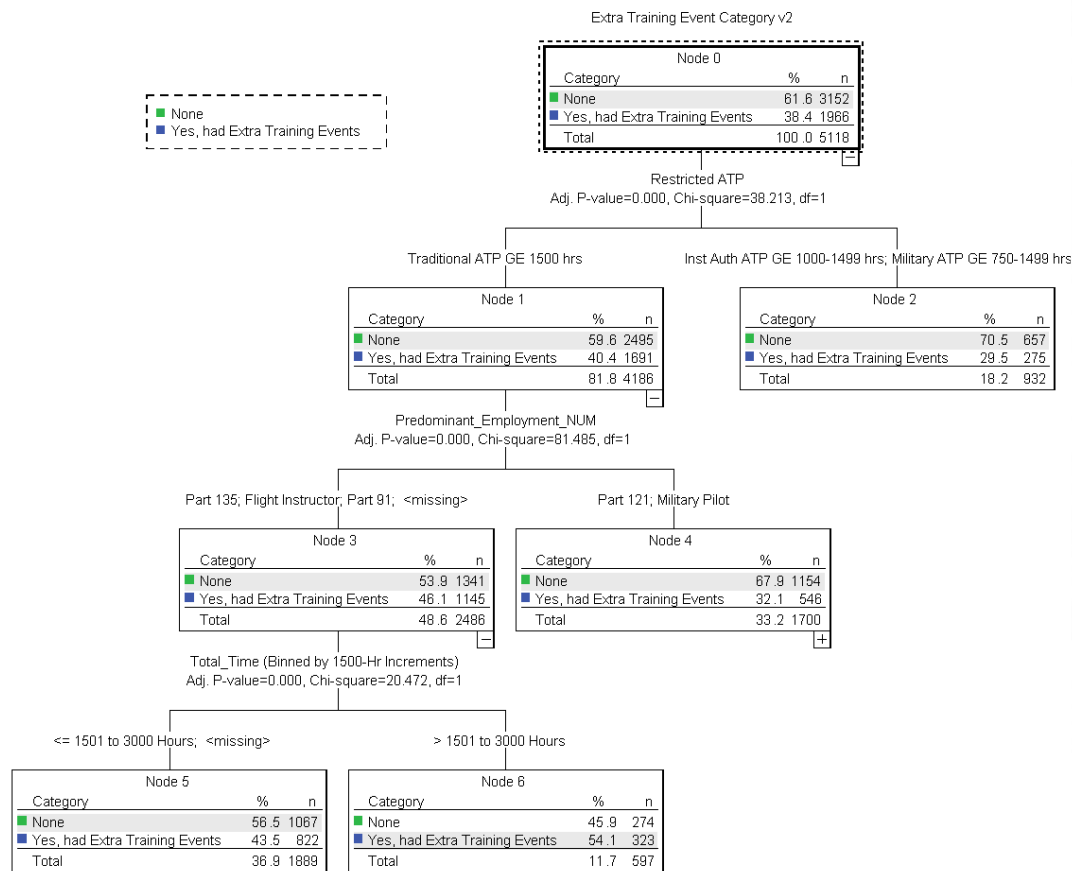
Extra Recurrent

≤ 1500 HR:
LESS

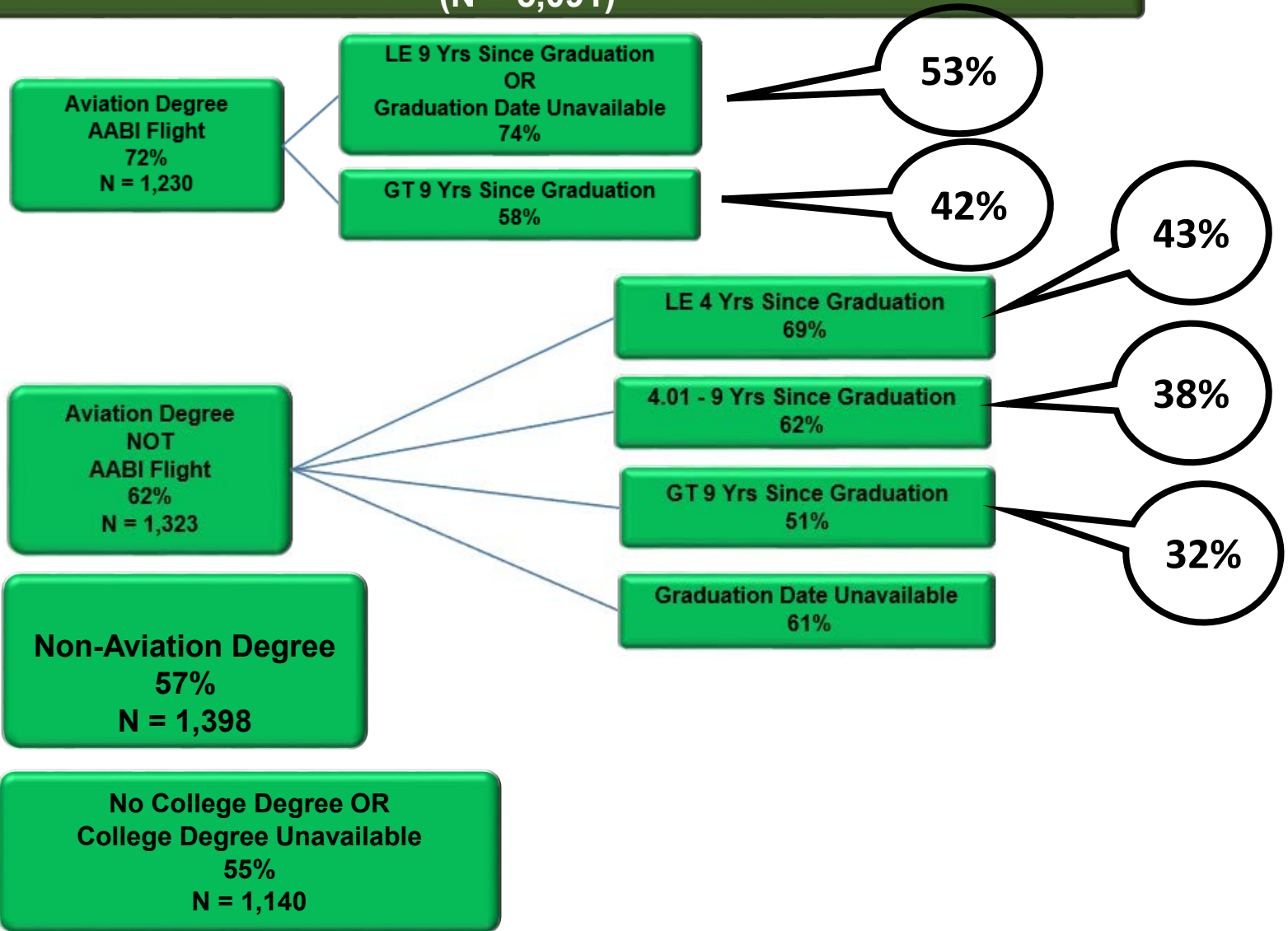
> 4500 HR:
LESS

1501 -
3000 HR:
MORE

Chi-square Automatic Interaction Detection (CHAID) Predictive Analytic Technique

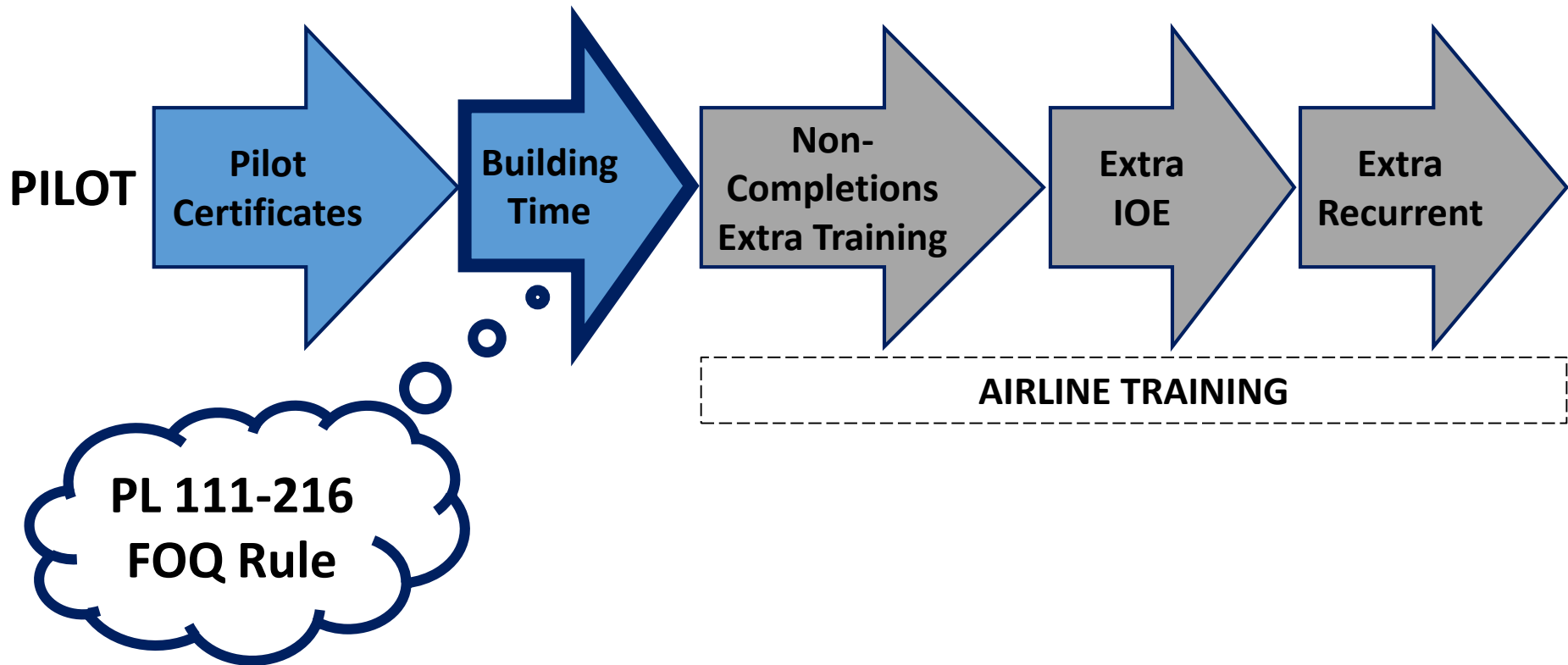


**NO Extra Training Events based on Educational Background – 62%
(N = 5,091)**



Effect size is the magnitude, or size, of an effect.

Effect Size



SUMMARY (Ranked by Effect Size)

Completions

No Extra Training

Effect Size

Years Since Graduation: ≤ 4 Yrs.	0.208
Total Time-1500 Hour: ≤ 1500 Hrs	0.122
AABI Flight: Yes	0.115
ATP Certificate: IA R-ATP	0.113
Aviation Degree: Yes	0.103
Highest Degree: Bachelor's	0.101
Previous Employment: Part 121	0.088
Military Pilot: Yes	0.032

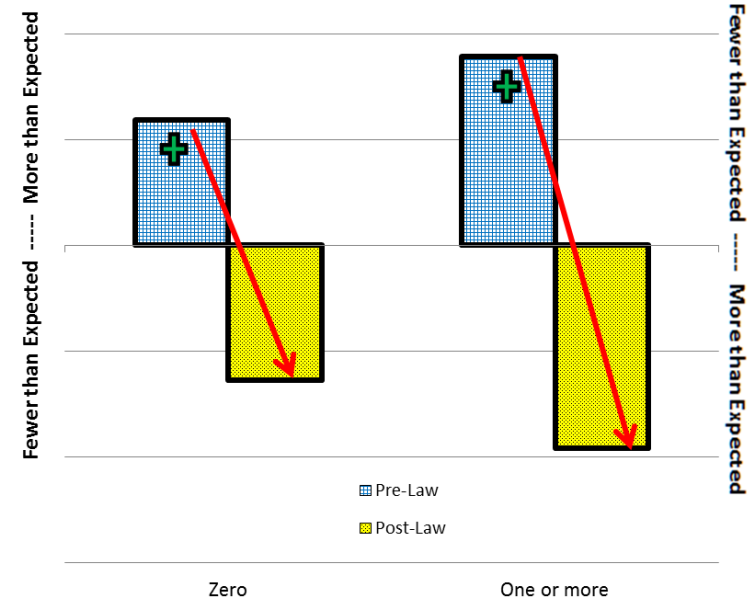
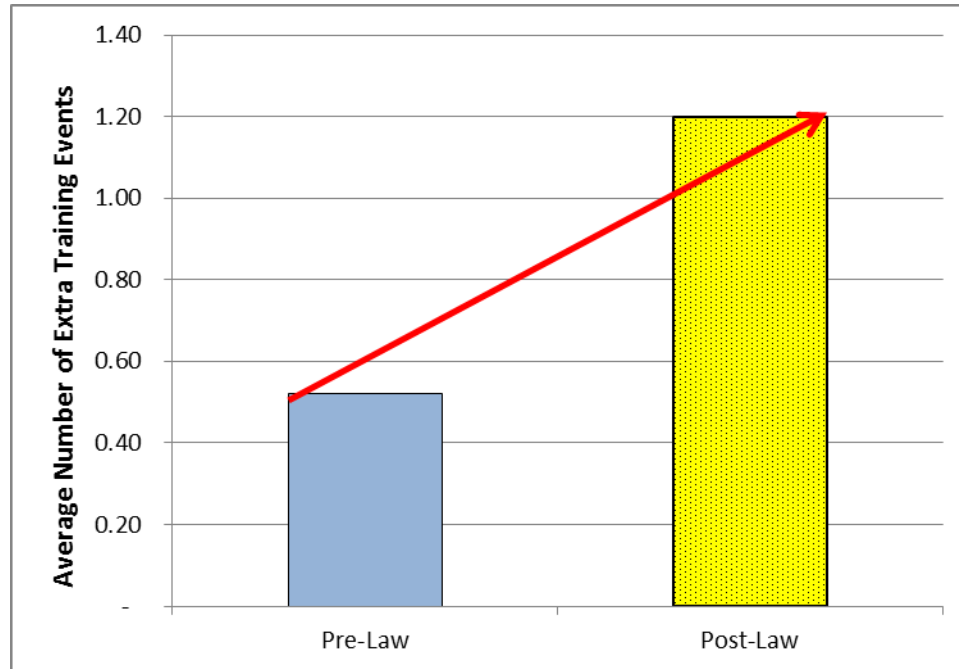
No Extra IOE

No Extra Recurrent

Effect Size

Previous Employment: Part 121	0.104
Years Since Graduation: ≤ 4 Yrs.	0.078
Total Time-1500 Hour: ≤ 1500 Hrs	0.061
Aviation Degree: Yes	0.060
AABI Flight: Yes	0.048
ATP Certificate: IA R-ATP	0.047

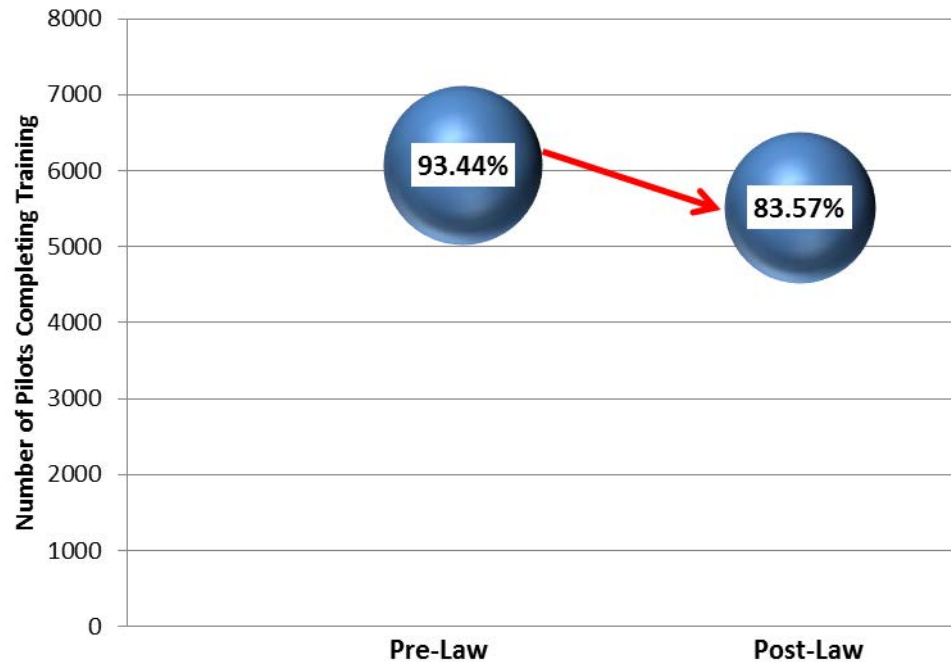
Outcome Variable: *Extra Training Events* Significant Differences



Extra Training: Post-Law pilots required **more** extra training.

Brown-Forsythe test for unequal variances: $F(1, 7,528) = 240.52, p < .001$

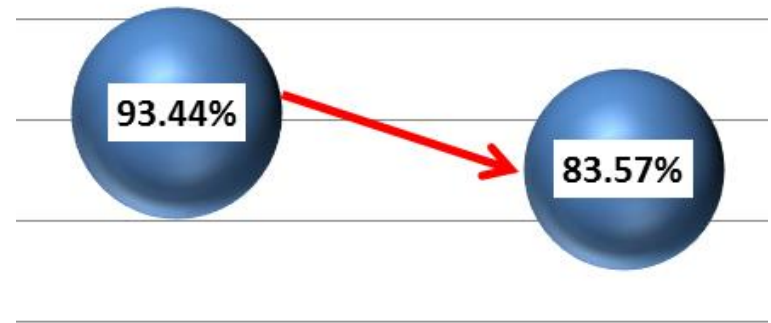
Pre-Law & Post-Law Completed Training



Completions: The Post-Law pilots had a **9.87% increase** in non-completions.

$N = 11,584$, $\chi^2(1) = 281.991$, $p < .001$, $\Phi = -.156$, $p < .001$

Cost for a 9.87% Decrease in Completions



Additional 9.87% of pilots in Post-Law data = 544 pilots

Average Salary and Benefits (from 7 airlines) → \$43,081.71

Average pilot terminates in 53 work days: Pro-rated salary for 2.65 months → \$9,514

Salary cost of the additional Non-Completers → → **\$5,179,888**

Training Accommodation Costs (\$106/day) → → **\$4,667,528**

Pro-rated airline costs per pilot = \$20,345 * 544 pilots → → → **\$11,077,100**

Total estimated cost of the additional non-completions = **\$20,924,516**

Approximate cost/pilot terminating training: \$38,464

Cost of the 3,071 Extra Training Events

Average cost of an additional training event: \$1,336

Total estimated cost of the additional **extra training events: \$3,960,745**





Total Additional Cost to Regional Airlines

Total estimated cost of additional **non-completions**

\$20,924,516

Total estimated cost of additional **extra training events**

\$ 3,960,745

Grand Total = \$24,885,263

Approximate cost per terminated pilot

\$45,745

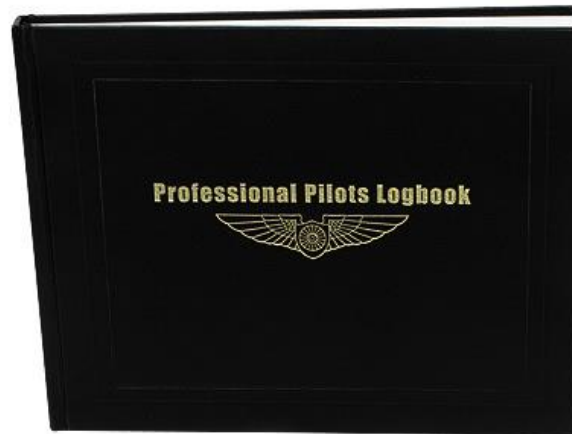
Conclusions

- Value of a degree
 - Bachelors → Aviation → AABI-Accredited Flight Program
 - GPA matters



Conclusions

- None of the three Pilot Source Studies has shown that "**HOURS**" is a reliable predictor of performance by pilots.

An open logbook is shown, displaying two pages of flight records. The left page has a header "Pilot Log Book" and a table with columns for "Date", "Registration", "PIC", "Altitude", "Time", "Type", "Fuel", "Wind", "Temp", "Humidity", "Pressure", "Altitude", "Time", "Fuel", "Wind", "Temp", "Humidity", "Pressure", "Altitude", "Time", "Fuel", "Wind", "Temp", "Humidity", "Pressure". The right page has a header "Pilot Log Book" and a table with columns for "Date", "Registration", "PIC", "Altitude", "Time", "Fuel", "Wind", "Temp", "Humidity", "Pressure", "Altitude", "Time", "Fuel", "Wind", "Temp", "Humidity", "Pressure".

Date	Registration	PIC	Altitude	Time	Fuel	Wind	Temp	Humidity	Pressure	Altitude	Time	Fuel	Wind	Temp	Humidity	Pressure
08-10-0-0000	U. S. 1000	0000	1000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
08-10-0-0000	U. S. 1000	0000	1000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
08-10-0-0000	U. S. 1000	0000	1000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000
08-10-0-0000	U. S. 1000	0000	1000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000	0000



2015 Pilot Source Study



<http://pilotsourcestudy.org>



PANEL 3

- **Panel Charge:** Update participants on the PSS 2015
- Engage airline reps in dialog about the Study, new pilot performance, past generation comparisons etc.
- **Desired Outcome:** NTAS & PS&DS participants gain new insights into trends in pilot performance, expectations for career performance, and explore Q&A with panelists and the Study researcher co-leader

PANEL: Dr. Guy M. Smith

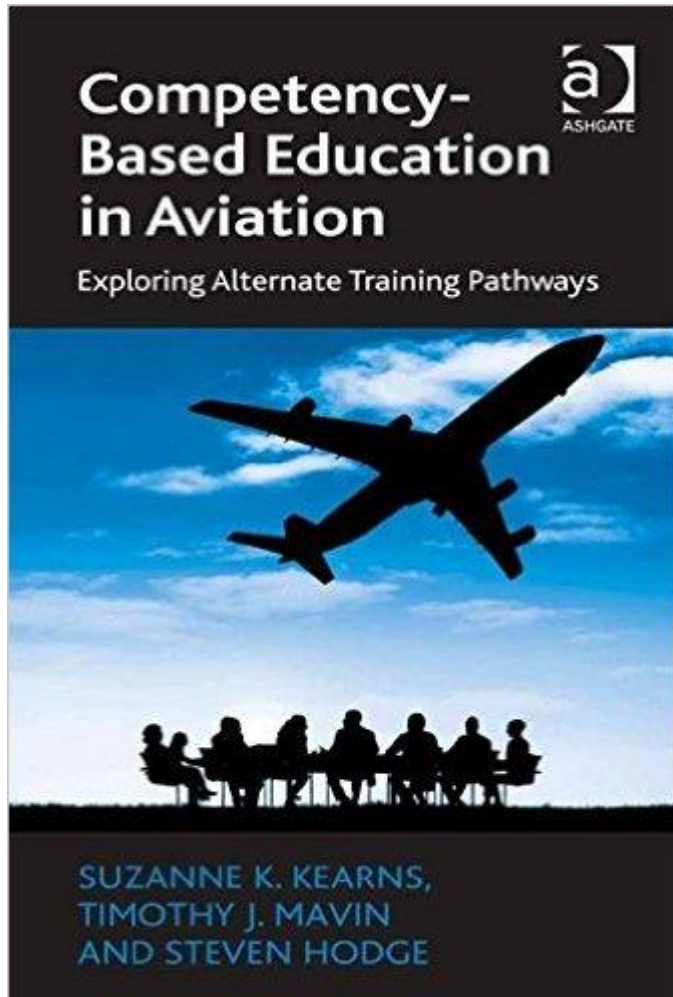
Captain Jeffrey Winter – JetBlue Airways

Captain Michael Dee – Republic Airways Holdings

Captain LaMar Haugaard – Horizon Air

Captain Darrin Greubel – ExpressJet Airlines

Captain Jeffrey Panhans – Allegiant Airlines



Competence: the ability to fully participate in a complex social practice, such as an aviation profession. Full participation requires **skills, knowledge, and attitudes** relevant to that practice.

From your experience, what are the “competencies” of an airline pilot that seem to be missing in current new-hire pilots?

PANEL: Dr. Guy M. Smith

Captain Jeffrey Winter – JetBlue Airways

Captain Michael Dee – Republic Airways Holdings

Captain LaMar Haugaard – Horizon Air

Captain Darrin Greubel – ExpressJet Airlines

Captain Jeffrey Panhans – Allegiant Airlines

Competencies ...

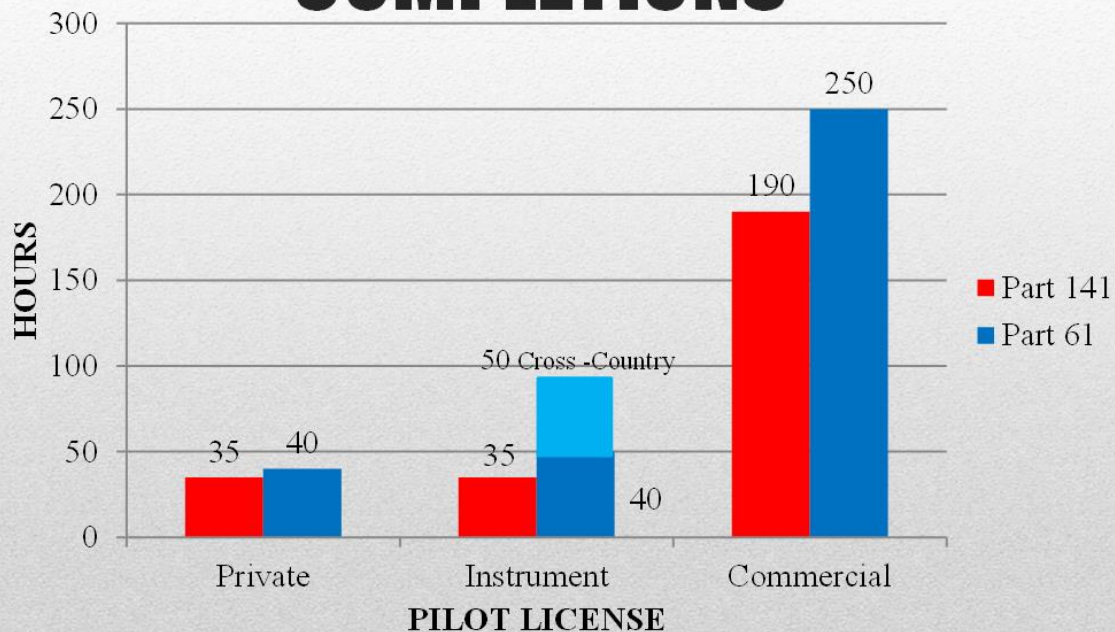
The way forward

- Air Carrier pilots require:
 - Knowledge of aerodynamics to understand AOA, stalls and upset recoveries and V-G diagrams
 - Practical experience in stalls and upsets beginning in early pilot training
 - Increased familiarity with flight guidance and autopilot systems
 - Opportunities to practice and maintain both autoflight and manual skills

Capt. Jon Tovani
Managing Director,
Flight Training
Delta Airlines
AABI Winter
Meeting
Feb 25, 2015

Structured Training ...

PART 141/PART 61 HOUR COMPLETIONS



THESE ARE MINIMUM HOUR COMPLETION REQUIREMENTS, NOT AVERAGES

Disciplined Flying...



So ... if HOURS is not an appropriate measure of a pilot's ability to perform as a first officer in a Part 121 operation; if we were to advise the FAA, **what measure should FAA use?**

Competencies ... Structured Training ... Disciplined Flying ...

PANEL: Dr. Guy M. Smith

Captain Jeffrey Winter – JetBlue Airways

Captain Michael Dee – Republic Airways Holdings

Captain LaMar Haugaard – Horizon Air

Captain Darrin Greubel – ExpressJet Airlines

Captain Jeffrey Panhans – Allegiant Airlines