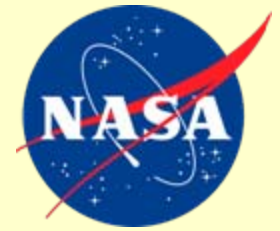


Field Trial

Quantitative Findings:
Sample Representatives,
Mode, Bias, Accuracy

Jon Krosnick, Ph.D.
Ohio State University



Users of Survey Research

- **Federal, State, and Local Government**
- **Academia**
- **Federal and State Courts**
- **Consumer Research**



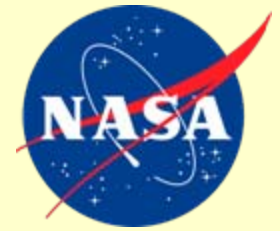
The Survey Approach to Data Gathering

- Human-centered
- Quantitative
- Flexible (versatile, topical)
- Comprehensive
- Well developed methods
- Statistically accurate
- Stable



Examples of Continuing Surveys

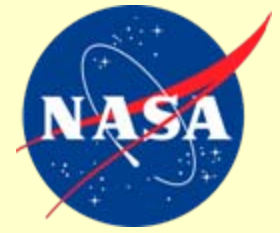
- **Survey of Income and Program Participation (Census Bureau) 1984 -**
- **Consumer Expenditure Surveys (Census Bureau) 1968 -**
- **Annual Housing Surveys (Census Bureau) 1973 -**
- **Consumer Attitudes and Behavior (SRC) 1953 -**
- **Health and Nutrition Examination Surveys (NCHS) 1959 -**
- **National Health Interview Surveys (NCHS) 1970 -**
- **American National Election Studies (NSF) 1948 -**
- **Panel Study of Income Dynamics (NSF) 1968 -**



You Can Measure:

- Attitudes
- Preferences
- Beliefs about the state of the world
- Predictions about the future
- Past behavioral experiences or events

NAOMS will be almost exclusively concerned with measuring events



You Can Learn:

- **Frequency of occurrences**
- **Changes over time**
- **Similarities and differences among groups**



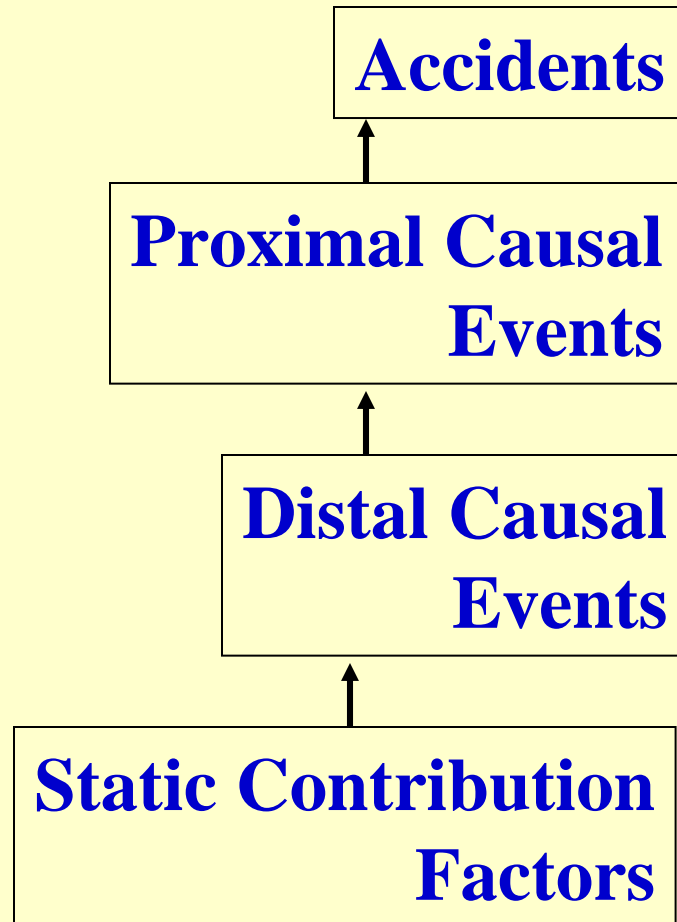
Trade-offs Among Data Collection Methods

	Mail	Telephone	In-Person
Response Rate	○	●	●
Following Instructions	○	●	●
Sense of Confidentiality	●	○	●
Honesty	●	○	●
Satisficing	○	●	●
Costs	●	●	○

Key: ● Excellent ● Good ○ Fair



Types of Events

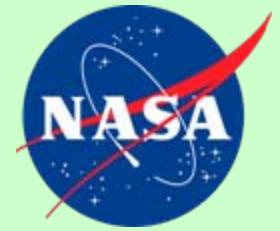


Mid-air collision

Incorrect altitude

Altitude clearance misunderstood by pilot

Microphone, earphones, radios, pilot's hearing, noise, etc



Recall Period

- **Memories Fade Over Time**
 - Important memories fade more slowly
- **Understanding recall is critical to survey design**
 - Participants should not be asked to recall things from too far in the past
- **Study of routine events recall**
- **We are less confident about how long more serious events can be remembered**
 - We know that more serious events will be remembered longer
 - We hope this will be a subject of further investigation



Survey Benefits

- Surveys have been used to shape national policy for many decades
- This use is extensive in areas such as public health policy and economics
- Aviation safety is a natural topic for survey data collection
- Survey methods are mature and well understood
- Best results are achieved with careful design and high response rates, but design must be tailored to the purpose of the study.
- The NAOMS field trial was designed to optimize design

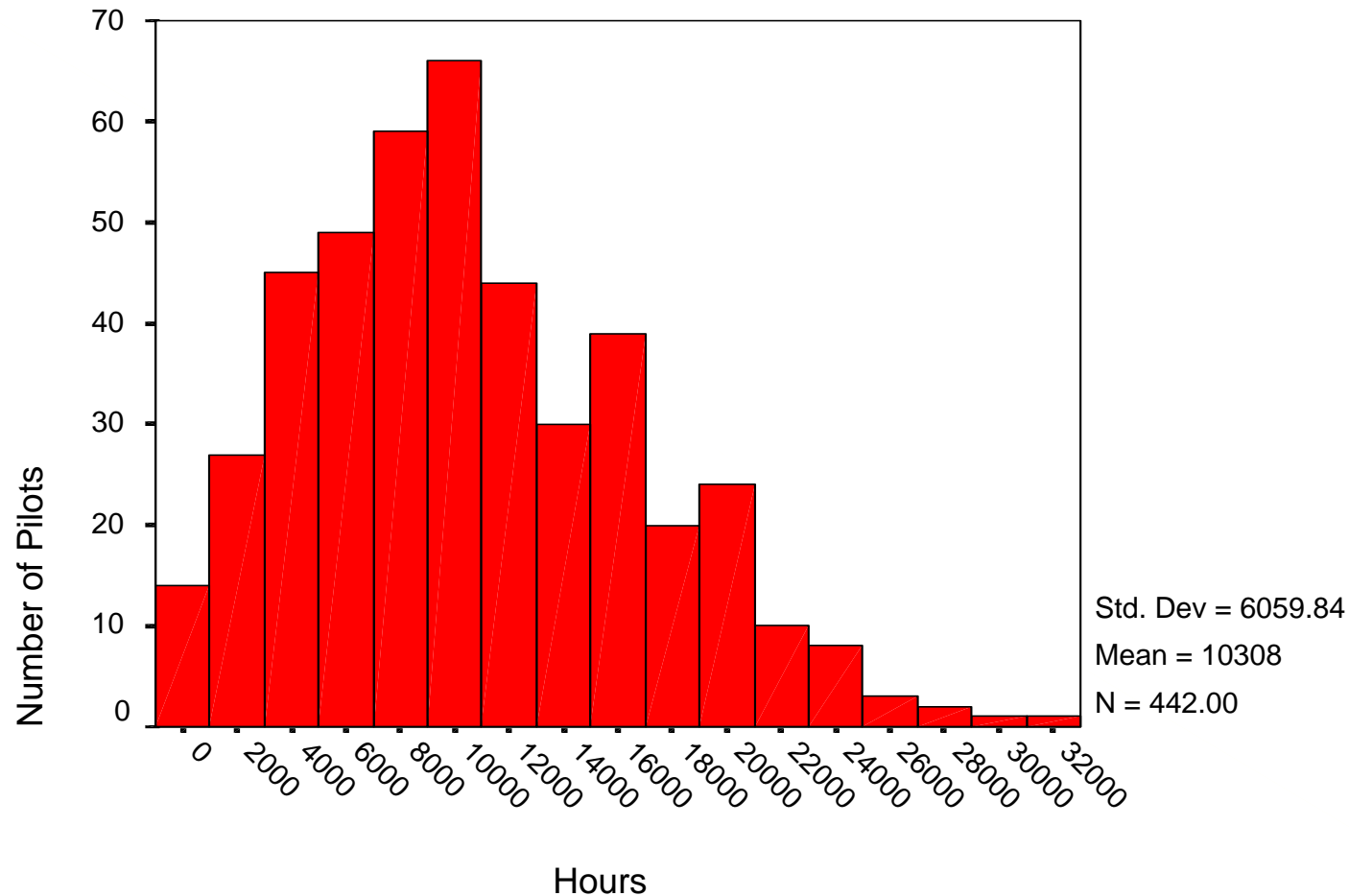


Findings

- **The field trial was very successful**
- **Information was gathered that allowed us to evaluate**
 - Response rates
 - The best mode for application
 - The best recall period
 - Pilot accuracy in responding
 - Pilot willingness to report events in meaningful numbers
 - Cost of applying the surveys



Total Pilot Career Flying Hours



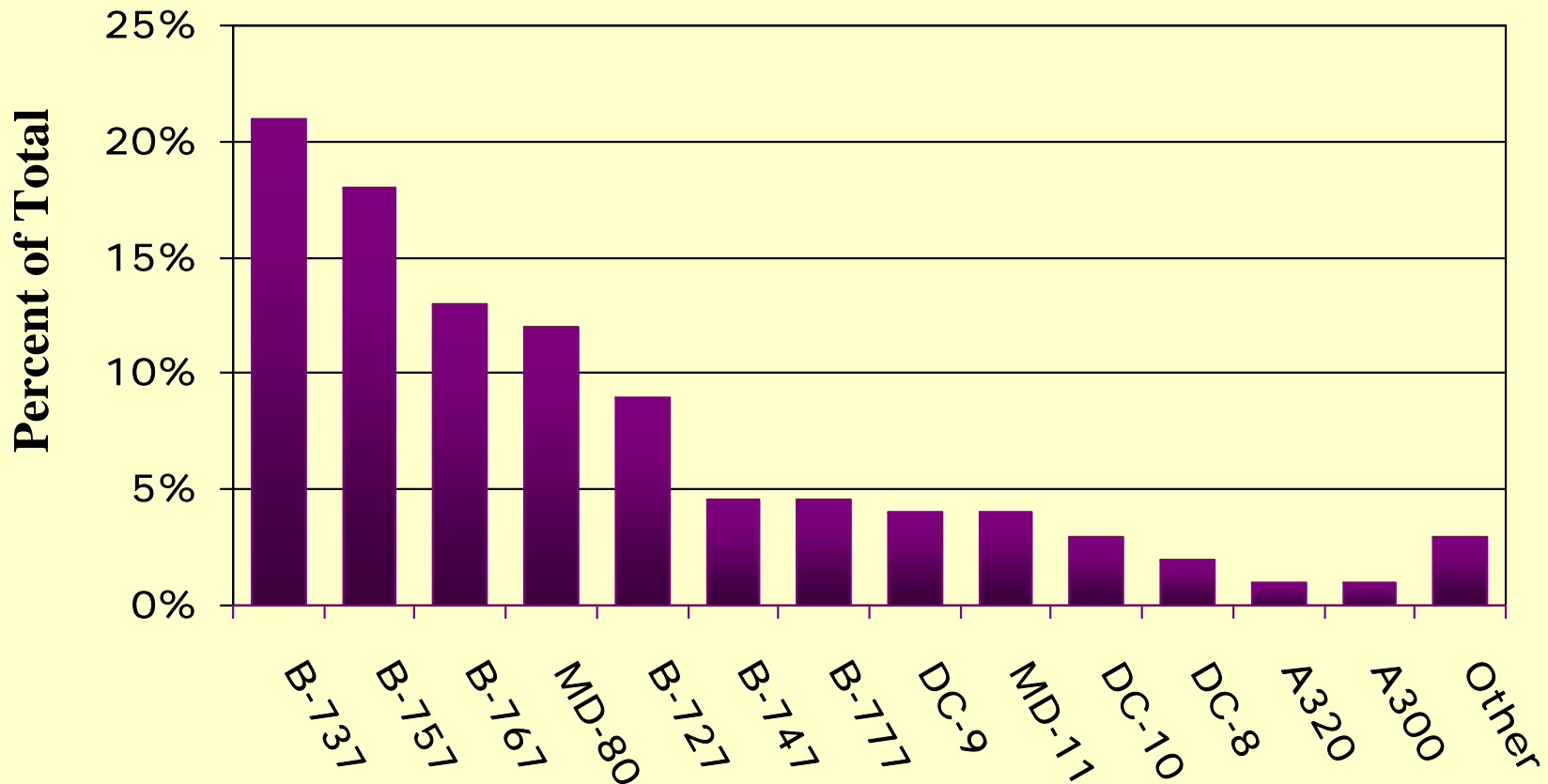


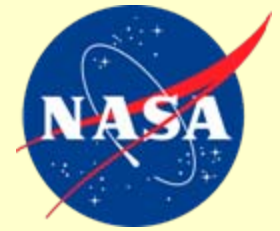
Sample Selection and Pilot Distribution

- **Majority of pilots flew major air carrier aircraft**
- **3% of the sample were commercial pilots who did not fly air carrier airplanes**
 - Pilatus Porter
 - Cessna Citation
 - Cessna 210
 - Others
- **These individuals flew professionally but did not meet the intent of the sampling frame.**



Aircraft Flown Distribution





Pilot Flight Crew Position

Position	Percentage
Captain	62%
First Officer	40%
Flight Engineer	4%
Relief Pilot	10%

Uneven distribution of captain and first officers due to sampling procedures since the sample was limited to individuals with first class medical certificates.

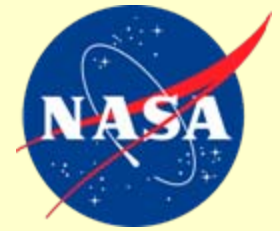
Percentages exceed 100% since some pilots served in two positions during the reference period

Average Pilot Flight Hours by Mode



Mode	Average Total Flying Hours
Self-administered	10,695
Telephone	9,825

These results indicate there are no significant differences between these two modes.



Average Pilot Flight Hours by Recall Period

Recall Period	Average Flight Hours
1 Week	10,048
2 Weeks	10,738
4 Weeks	10,249
2 Months	9,942
4 Months	9,698
6 Months	10,742

These results indicate there are no significant differences between these recall periods.



Average Flight Hours Flown During Recall Period

Recall Period	Mean Hours Flown During Recall Period
1 Week	20
2 Weeks	30
4 Weeks	58
2 Months	111
4 Months	231
6 Months	341

Except for week one, the average hours flown increase as expected.



Percent of Pilots with at Least One Missing Response

Mode	Missing Responses, %
Self-Administered	4.8%
Telephone	0.0%



Time to Complete Questionnaire

Mode	Minutes
Self-Administered	17
Telephone	29

Target time for survey was 30 minutes or less.



Pilot Confidence in Reporting Accuracy

Confidence					
Mode	Extremely	Very	Rather	Moderately	None
Mail	41%	39%	10%	9%	0%
Telephone	46%	45%	8%	2%	0%



Pilot Confidence in Reporting Accuracy

Recall Period	Percent Extremely Confident
1 Week	68%
2 Weeks	64%
4 Weeks	54%
2 Months	40%
4 Months	37%
6 Months	31%



Pilot Questionnaire Completion Time

Recall Period	Minutes to Complete
1 Week	20
2 Weeks	29
4 Weeks	27
2 Months	31
4 Months	33
6 Months	29



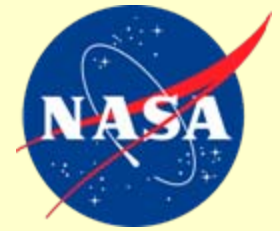
Recall Period

- More hours flown should be associated with more events witnessed
- More days in the recall period should be associated with more events witnessed
- Stronger relationships indicate more accurate reporting
- Strongest relationships for one month and two months
- No relationships for four and six months.



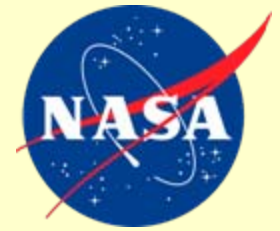
Question Order

- **Two instrument variations**
 - One variant had Event questions placed towards the beginning of the questionnaire
 - The other variant placed Event questions late in the instrument
- **Questions asked later often receive a less accurate response**
 - Because attention may decrease during the interview
- **Question order did not appear to affect the NAOMS response accuracy**



Quality of Data: Bias Concerns

- **Possible biases**
 - Unwillingness to report some types of events
 - Tendency to exaggerate other types of events
- **Changing data collection modes will often reveal biases**
 - If they are present
- **But NAOMS reporting rates did not show a mode effect**
- **This suggests that there was no detectable bias**



Required Sample Size

- **Sensitivity criteria set by NAOMS**
 - Recognize a 10% change in the rate
 - Of events that occur very infrequently
 - With 95% certainty
- **Required sample size:**
8,000 to 9,000 respondents per year



Conclusions

Quantitative Analysis

- **Telephone is the optimal method**
 - Better accuracy
 - Better completion rates
 - Better response rates
 - Avoids under-reporting and over-reporting
- **One month to two months is the ideal recall period**
- **Question order not relevant to quality**
- **Sample size of approximately 8000 to 9000 respondents per year will provide sufficient sensitivity**