AN ANALYSIS OF READING PREFERENCES OF PILOTS TO DEVELOP A BOOK LIST FOR AVIATION EDUCATION

DISSERTATION

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This study proposed to develop a list of aviation books that experienced pilots consider inspirational and motivational which could be used in an aviation literature course in adult education. A trial test, or pilot study, accomplished by 25 highly experienced pilot judges (through a Q-sort of 33 hypothetical pilots) determined the attributes of experienced pilots. Through the multiple regression iterations of Judgment Analysis (JAN), two policies emerged from the judgments of the 25 judges. Attitude toward flying and flying experience, the weighted attributes of the policies (applied to the subject pilots) determined the most experienced pilots.

The 384 randomly chosen subject pilots (for 95% confidence with 0.05 error) completed the survey opinionnaire. All pilots, male and female, had commercial or airline transport certificates and were between the ages of 21 and 81. The opinionnaire, using a list of 30 sample books, determined the reading extent of the subject pilots and elicited demographics such as: flying experience,

gender, education, flying status, and flying time. An original semantic differential scale (r = .90) validated their attitude toward reading. An original Likert-type summated rating scale (r = .97) estimated their attitude toward flying.

The cross-tabulation chart divided the data into number of sample books read with groupings by age, education, gender, and status. Chi-square analysis with age yielded significance χ^2 (4, $\underline{N}$ = 393) = 33.18, $\underline{p} < .001$. There was no statistical significance in the groups education and gender. Chi-square analysis with status yielded significance χ^2(6, $\underline{N}$ = 393) = 17.35, $\underline{p} < .05$.

Survey results showed the subject pilots had a positive attitude toward reading and flying, but there was little correlation (r = .35) between the two. This suggests that something else influenced the reading of the sample books. The pilot respondents suggested 269 books for use in a course. This book list will need additional refining and syntopical sorting before use as a canon in an aviation education course.

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CHAPTER 1

INTRODUCTION TO THE STUDY

Like the great sea stories of the past, aviation stories being written today may someday be classics. Some experienced pilots are inspired and motivated by reading aviation literature. Indeed, some pilots grew up in aviation being rewarded with stories about heroes of the air like Lindbergh, Doolittle, and Yeager. This paper presents a list of books that could become the first collection of classic aviation books. Recommended by experienced pilots who have a positive attitude toward flying, these books could be used for study in an aviation literature course in adult education.

What are attitudes, and why are they relevant to this study? "An attitude," according to Kerlinger (1986), "is an organized predisposition to think, feel, perceive, and behave toward a referent or cognitive object. It is an enduring structure of beliefs that predisposes the individual to behave selectively toward attitude referents" (p. 453). Helmreich (1983) stated that attitudes "are learned dispositions regarding behaviors, objects or persons. Attitudes can be acquired at anytime during the

life span and are relatively open to modification through intellectual or emotional appeals" (p. 6). Alreck and Settle (1985) wrote that attitude, for people, "consists of three components: their knowledge or beliefs, their feelings or evaluations, and their tendency toward action or passivity" (p. 404). To determine if experienced pilots read and value certain books on aviation, the attitudes of pilots were researched in this study "because of their possible predictive value" (Borg and Gall, 1989, p. 311).

Pilots who have a high positive attitude toward flying and toward reading were identified to determine if any correlation exists between their having read aviation literature, or great books about aviation, and their success in flying. These questions were asked of the pilots: (a) Was the reading inspirational? (b) Was reading aviation books valuable? (c) Was reading aviation books rewarding? The responses to the opinionnaire came from pilots with varying degrees of experience.

Because some experienced pilots have been influenced by valuable and rewarding reading, it is assumed that novice pilots can also benefit from reading these same books. Of course, a pilot will not learn how to fly by reading these books, but a transfer of learning can take place. Bigge (1982), from the cognitive-field psychology viewpoint, stated that "transfer of learning occurs because of perceptual similarities between situations and...[occurs]

in the form of meanings, expectations, generalizations, concepts, or insights that are developed in one learning situation and are usable in others" (pp. 274-275). Carl Rogers (1969) wrote "that [the] only learning which significantly influences behavior is self-discovered, self-appropriated learning" (p. 277). Indeed, the level of learning from reading the listed aviation books is more than learning how to fly, it is learning that flying is spiritually and emotionally rewarding.

Adler and Van Doren (1972) illuminated this when they discussed what great books can do:

> A good book does reward you for trying to read it. The best books reward you most of all....a good book can teach you about the world and about yourself...you also learn more about life. You become wiser...in the sense that you are more deeply aware of the great and enduring truths of human life. (pp. 340-341

If the gist of aviation stories transfers, then this vicarious flying experience gained through reading aviation books is meaningful. Does a pilot carry these stories around in his head (Ryle, 1949, pp. 35-40) and rely on the vicariousness to be inspirational and useful when needed? This study is centered on the supposition that experienced pilots do read aviation books in a useful and meaningful manner. Having a positive attitude toward flying and more than a curious exposure to aviation literature may be two of the attributes of an experienced pilot. The degree of inspiration and significance was determined to some extent by this research.

The Problem

Can a list of aviation books that inspire and motivate experienced pilots be identified for possible use in an aviation literature course in adult education?

Purposes of the Study

The purposes of this study were:

1. To determine the main aviation attributes that can be used to identify experienced pilots.

2. To identify experienced pilots who have a positive attitude toward flying and toward reading certain aviation books.

3. To determine a first canon of aviation books read by the most experienced pilots.

Research Questions

To achieve the purposes of this study the following research questions were formulated:

1. To what extent have experienced pilots read aviation books?

2. What is the attitude of experienced pilots toward reading aviation books?

3. What is the attitude of experienced pilots toward flying?

4. Is there a correlation between attitude toward flying and attitude toward reading aviation books?

5. What are the books read by the most experienced pilots?

6. To what extent has the reading of aviation books been inspirational, valuable, and rewarding?

Significance of the Study

This study focused on the pilots' attitude toward flying and their attitude toward reading aviation books. By doing so, the research revealed that a relationship exists between pilots who have a positive attitude toward flying and pilots who have read extensively about aviation.

Definition of Terms

Aviation Books: This study included aviation books that reflected the basic insights of the pilot. The books discuss flying and the condition of man while flying. The books reflect the views of flying from the pilot's perspective. Biographies, autobiographies, and fictional works were used as examples in order to gain closure on the basic insights of the pilot and his flying. These books are classified by this researcher as syntopical, using the term from Adler and Van Doren (1972, pp. 309-336).

Experienced Pilot: Generally, one who has had an extensive amount of flying time. The average number of

hours an experienced pilot had was determined through the use of descriptive statistics calculated with use of SPSS (Norusis, 1988). The actual number of hours did not necessarily mean that a pilot was experienced. The panel of policy making judges made the determination of who was experienced by comparing the attributes of the pilots.

Judgment Analysis (JAN): "A simple but powerful technique for identifying and describing the rating policies that exist within a board or committee of judges. It can be used to help the members of such boards or committees reach a consensus and will express their final joint policy in a precise manner....The JAN technique starts with the assumption that each judge has an individual policy by which the profiles are evaluated....Through regression the judges' R^2s are combined with other judges on the basis of having the most homogeneous prediction equation....The grouping procedure continues reducing the number of policies by one at each stage until finally all of the judges have been clustered into a single group" (Brookshire, 1969). (See Appendix A for additional information about JAN.)

Literature: Books are termed classic "because the ideas in them are eloquently expressed and because humans have recognized in them basic insights about the human condition" (Stevens, Eaton, and Miller, 1977).

Opinionnaire: "A questionnaire designed to elicit views on matters of opinion from which generalizations may be abstracted" (Webster's Third New International Dictionary, 1969, p. 1582).

Pilot Judges: A panel of 25 experienced pilots chosen to do the pilot study for the survey opinionnaire. Some were chosen based upon high qualifications in many areas of flying while others were chosen based upon specific expertise in the aviation field. Their years of experience in the aviation business range from ten to forty plus years. Their careers varied: Some were crop dusters who became airline pilots, and some were airline pilots who became airshow pilots. The panel of judges had diverse aviation experiences, including: design, building, sales, management, and training. The judges came from different flying backgrounds; all branches of the military were represented.

Pilot study: Q-sort on 33 hypothetical pilots by the pilot judges, a panel of 25 experienced pilots who took the survey opinionnaire. This information was then used in the Judgment Analysis (JAN) program.

Powered flight: Began with the Wright brothers' first successful flight at Kitty Hawk, North Carolina, in 1903. For purposes of this study, the focus was on pilots and on the type of powered aircraft they had flown.

Pre-pilot study: A practice Q-sort by a panel of six experienced pilot judges took the survey opinionnaire to debug the measuring instruments. After they did the Q-sort, a trial run of JAN was accomplished. Some of the language was modified to clarify the directions in the survey, and six of the questions were reworded.

SPSS: Statistical package for the social sciences.

SPSS1: A computer program, written for this paper in SPSS, to determine the descriptive statistics, correlations, and reliability of policies of the pilot judges and pilot subjects. (See copy in Appendix B.)

SPSS2: A computer program, written for this paper in SPSS, to determine the regression equation for the research questions regarding the pilot judges. (See copy in Appendix B.)

SPSS3: A computer program, written for this paper in SPSS, to determine descriptive statistics for the pilot subjects (e.g., cross tabs and experience sort histograms). (See copy in Appendix B.)

Subject Pilots: Stratified random sample of pilot subjects (N = 394) who took the opinionnaire, commercial and airline transport rated pilots (ATP) living in the contiguous United States.

Syntopical reading: "The reading of two or more books on the same subject, which implies that the identification

of the subject matter occurs before the reading begins, it is in a sense true that the identification of the subject matter must follow the reading, not precede it" (Adler and Van Doren, 1972, p. 313).

Delimitations

Space flight, rockets, balloons, and sailplanes were considered outside the scope of this study. Technical manuals, magazines, and aircraft handbooks were not included. The list of aviation books, therefore, goes beyond the normal required reading for aviation education.

The sample of syntopical books used in this study are listed in Table 1. This aviation book list was initially chosen from the researcher's personal library. The list was modified to counteract what Borg and Gall (1989) call "experimental bias effect" (pp. 656-658). Six pilot judges were asked to submit their reading lists of 30 books. The sample of syntopical books used in the opinionnaire reflected the input of these judges.

It is possible that there are some pilots, and perhaps some aviation educators, who would disagree with this classification of aviation books. Perhaps they would also disagree with the idea of even suggesting a literature list for a course in aviation education. Some may say that the idea of aviation books as classic or great was premature, and that another 100 years will have to go by before we

will have a list of aviation books that can be classified as literature. This study, however, was a probe for the classic, a first sort of aviation books termed great.

Table 1

*Syntopical books used in the opinionnaire

Author	Year	Title
Bach, Richard	(1963)	Stranger to the ground
Bach, Richard	(1969)	Nothing by chance
Bach, Richard	(1977)	Illusions
Blesse, Fredrich	(1955)	"No guts no glory!"
Boyington, Gregory	(1958)	Baa baa black sheep
Broughton, Jack	(1969)	Thud ridge
Galland, Adolf	(1954)	The first and the last
Gann, Ernest	(1944)	Island in the sky
Gann, Ernest	(1953)	The high and the mighty
Gann, Ernest	(1961)	Fate is the hunter
Halliburton, Richard	(1932)	The flying carpet
Hunter, Jack	(1964)	The blue max
Langewiesche, Wolfgang	(1944)	Stick and rudder
Lawson, Ted	(1943)	Thirty seconds Over Tokyo
Lay, Beirne	(1948)	12 o'clock high!

Table continues

Table 1 continued)

Author	Year	Title
Lent, Henry	(1947)	Eight hours to solo
Lindbergh, Charles	(1927)	"We"
Lindbergh, Charles	(1953)	The Spirit of St. Louis
Morgan, Len	(1985)	View from the cockpit
Rickenbacker, Edward	(1967)	Rickenbacker
Saint-Exupéry	(1942)	Night flight
Saint-Exupéry	(1965)	Wind, sand and stars
Scott, Robert	(1943)	God is my co-pilot
Searls, Fred	(1960)	The crowded sky
Serling, Robert	(1962)	The probable cause
Serling, Robert	(1966)	The left seat
Serling, Robert	(1969)	Loud and clear
Tallman, Frank	(1973)	Flying the old planes
Williams, Neil	(1975)	Aerobatics
Yeager, Chuck	(1985)	Yeager

Note. Books listed in random order on the opinionnaire.

To arrive at this first classic sort, the researcher assumed that there exists a positive relationship between experienced pilots who have a positive attitude toward flying and those who have read classic aviation books,

thereby enhancing their flying experiences in a meaningful manner.

CHAPTER 2

SYNTHESIS OF RELATED LITERATURE

As of this writing, so far as this researcher knows, an aviation literature course taught like a great books course does not exist. The paucity of research on the subject probably stems from the fact that aviation is still in its infancy, or that such a course is not required by government regulation. As far as this researcher can tell, no combined study has been done on aviation literature, the attitudes of pilots toward flying, and the attitude of pilots toward reading aviation literature. When it comes to evaluating classic aviation literature, this research may have been a pioneer effort in the field of adult education.

Therefore, in raising the question, perhaps for the first time, about classic aviation books, it was appropriate to ask whether or not there was a parallel between the old sea stories and the new air stories. We do have sea stories. Who has not read the Melville, Conrad, and Hemingway classics: Moby Dick, Lord Jim, and The old man and the sea? Anecdotes about the sea have been around for years, and these stories have their established place in literature courses.

This study raised the issue of establishing a list of aviation books while some of the pilots who wrote them were still alive. It was also seeking to denote the existential questions asked in sea stories and to ask the same questions about flying stories: questions concerning the consciousness of aviators as the history of aviation was being made. The focus was on the pilot: his ideals and his flying.

This synthesis of literature included: (a) adult education, (b) aviation literature, and (c) sub aspects of research in aviation literature research.

Adult Education

An aviation literature course, taken by a person to enhance his knowledge, is ideally suited to what adult education does for people:

> Adult education is a process whereby persons whose major social roles are characteristic of adult status undertake systematic and sustained learning activities for the purpose of bringing about changes in knowledge, attitudes, values, or skills....Adult education is concerned not with preparing people for life, but rather with helping people live more successfully. (Darkenwald and Merriam, 1982, p. 9)

The question raised was: Why study classic aviation books? The answer was that success in flying can be enhanced by a positive change in knowledge, attitude, and values. Although the theory and lab classes in an aviation program will bring about some of these same changes, especially in the skills area, such classes are set up to

meet minimum standard qualifications. Rarely are students required to study the history, the philosophy, or the romance of flying. Indeed, some of the respondents to this research said that such reading was not necessary. An aviation literature course using the classic books denoted by this study would go beyond that which is currently required.

Like most adults taking education courses, the student becomes involved to improve knowledge, attitude, value, or skill. In order to gain closure on this section, these items have been briefly discussed: (a) definitions of classic, (b) why read the classics, and (c) how to read classics.

Definition of a Classic

Brockett (1987), book review editor of Adult Education, asked several educators to review classic books in adult education. Stubblefield (1987), reviewing Lindeman's The Meaning of Adult Education, wrote: "A classic illuminates abiding issues in such a way that succeeding generations discover light and direction" (p. 115). Merriam (1987), reviewing Brunner, Wilder, Kirchner, and Newberry's An Overview of Adult Education Research, defined a classic in adult education:

> Essentially a "classic" [sic] conceptualizes or illuminates in a significant way some aspect of the theory or practice of adult education. It endures over

> the years because it eloquently preserves a part of the field's development and/or its message is continually relevant. (p 118)

In the same article, Sisco (1987) reviewed Overstreet's The mature mind, giving yet another reason to look at classic aviation literature:

> In our rush to embrace the future, the heritage of the past is often overlooked. It is as if the only veritable knowledge and wisdom worth considering is that which remains to be discovered or invented. While this view has a certain degree of optimism, it too smacks of benign neglect for those important works in the past that give us so much to hope for in the future. [Total quote originally italicized.] (p. 117)

Sisco stated that Overstreet's book is still as relevant today as it was twenty-five years ago. "In some cases it is even more relevant" (p. 117). Using that criterion, which aviation books that will become classics sometime in the future are relevant today? The book list developed from this research was a start. Overstreet (1949) provided insight that promotes the maturity being sought: "Man is a creature capable of so transcending his own limitations of sense and of subjectivity as to gain ever more knowledge about his world and about himself in that world" [italics added] (p. 112).

Five standards were used by St. John's College (1991) to define a classic book: (a) has been read by the largest number of persons, (b) has the largest number of possible interpretations, (c) raises the persistent and, perhaps, unanswerable questions about the great themes in human

thought, (d) must be a work of fine art, and (e) must be a masterpiece of the liberal arts (p. 6).

Why Read the Classics

Calvino (1986) not only defined the classics, but also posed a pedagogical reason for reading them:

> The classics are books that exert a peculiar influence, both when they refuse to be eradicated from the mind and when they conceal themselves in the folds of memory, camouflaging themselves as the collective or individual unconscious.
>
> There should be a time in adult life devoted to revisiting the most important books of our youth. (p. 19)

The judges and some respondents discussed their vicarious learning experiences during the research. Although this learning theory may be a minority opinion about how important these books were to a pilot and his career, it is comforting to know that the classic books have been instrumental in some of the pilots' careers. The statistics tell us just how much.

From the opinionnaire about aviation books, the researcher was able to determine specifically what was being read by the pilots. A deeper question, and one particularly addressed by research question number 6, concerned the intrinsic value to be derived from reading these books.

According to Shea (1989), John Dewey performed "the most sustained and deepest thinking any American has ever done about education" (p. 293), suggesting that we turn the

education system away from rote and toward experience. Studying aviation literature does that.

Aviation literature is the spiritual child of sea stories, having a classic appeal to the basic needs of pilots and offering the insights of other pilots to those who fly airplanes while adhering to Shea's statement: "A classic appeals across intercultural barriers and breaks down cultural biases. It grips our common humanity" (Shea, 1989, p. 307). The classics help us to see what we have always seen, but in another way--a way we will never be able to see again.

Adler and Van Doren (1972) discussed books that are read once then put away:

> How do you know that you do not ever have to read such books again? You know it by your own mental reaction to the experience of reading them. Such a book stretches your mind and increases your understanding. But as your mind stretches and your understanding increases, you realize, by a process that is more or less mysterious, that you are not going to be changed any more in the future by this book. You realize that you have grasped the book in its entirety. You have milked it dry. You are grateful to it for what it has given you, but you know it has no more to give.

Then they compared them with books that cry to be read again and again:

> A smaller number [of books] cannot be exhausted by even the very best reading you can manage. How do you recognize this? Again, it is rather mysterious, but when you have closed the book after reading it analytically to the best of your ability, and place it back on the shelf, you have a sneaking suspicion that there is more there than you got....But if the book belongs to the highest class...you discover on returning that <u>the book seems to have grown with you</u>.

> You see new things in it...that you did not see before....Your impression of increased understanding on your previous reading was not false. The book truly lifted you then. But now, even though you have become wiser and more knowledgeable, it can lift you again. And it will go on doing this until you die. (pp. 342-343)

How to Read the Classics

These admonitions were applicable to the list in this survey. Discussing syntopical reading, Adler and Van Doren (1972) wrote: "Your aim is to find the passages in the books that are most germane to your needs" (p. 317). Of course, this is the heart of the matter of establishing a list of books to be read as aviation literature. In the survey opinionnaire, the experienced pilots were asked if the books they have read should be read by all pilots. What has been accomplished by this research is the saving of a vast amount of time and energy. A pilot, or an interested reader of aviation literature, does not have to read all of the books written about aviation. He could, using wisdom gained from the survey, be selective in his choice of aviation literature.

Hutchins and Adler (1963) suggested that some books "written by professors for professors, and in the jargon of the trade" are difficult for a first time reader, and that to solve the problem of difficult subject matter a reader can "make some headway in understanding if he will only follow the rule of cracking a tough nut by applying pressure at the softest spot. That, in other words, is the

rule of paying maximum attention to what you do understand" (p. 32-33).

How does this apply to pilots? An example of how to read aviation literature is to compare the first solo flight across the Atlantic by Lindbergh in 1927 with the flight of Beryl Markham in 1936. In her book, West with the night, Markham (1983) wrote of the first east to west solo flight across the Atlantic, which reached shore but short of her destination: "I ought to thank God--and I do, though indirectly. I thank Geoffrey De Havilland who designed the indomitable Gipsy, and who, after all, must have been designed by God in the first place" (p. 287).

Wegener (1991) reported on the flight: "The first successful solo flight from east to west was carried out by a woman, Beryl Markham. In September 1936, she took off from England and, running short of fuel, crashlanded [sic] in Nova Scotia over twenty-one hours later" (p. 33).

In an aviation literature course, the obvious comparison would be to evaluate her trip with that made by other pilots or to compare her flight with modern commercial flights that take only a few hours. This approach will retain an appreciation of the past, for "the heritage of the past is often overlooked" (Sisco, 1987, p. 117).

Aviation Literature

One does not need to be a pilot, experienced or otherwise, to appreciate the literary significance of Beryl

Markham's (1983) poetic, and perhaps prophetic comment:

> After this era of great pilots is gone, as the era of great sea captains has gone--each nudged aside by the march of inventive genius, by steel cogs and copper discs and hair-thin wires on white faces that are dumb, but speak--it will be found, I think, that all the science of flying has been captured in the breadth of the instrument board, but not the religion of it.
>
> One day the stars will be as familiar to each man as the landmarks, the curves, and the hills on the road that leads to his door, and one day this will be an airborne life. But by then men will have forgotten how to fly; they will be passengers on machines whose conductors are carefully promoted to a familiarity with labeled buttons, and in whose minds knowledge of the sky and the wind and the way of weather will be extraneous as passing friction. And the days of the clipper ships will be recalled again--and people will wonder if clipper means ancients of the sea or ancients of the air. (p. 166)

Gann (1961) provided an example of being able to lift the level of understanding of pilots. His writings have a way of taking the myopic, gun barrel vision of some pilots and widening their horizons. Some pilots mature in their minds as their experience grows. Gann's insight is worthy of comment for the argument in this study. Gann, concerning his flight over the same water as Lindbergh and Markham, wrote:

> Venus rose to signal me from the eastern horizon, so brilliant and inconsistent in color, changing at once from yellow to green to purple and then reversing the show, that I thought for a time it was another aircraft equipped with special lighting devices. But Venus steadied in time, proving its identity. Tagging along behind it like an errant child, a small star arose, and I watched it being chased upward by the dawn.
>
> There was now a pause in everything. The night heavens appeared indecisive and reluctant to accept the invasion of foreign light. I changed fuel tanks and carefully reset my gyrocompass with its magnetic brother. And when I looked out at the sky again only

> moments later, I found the conquest well under way. My fatigue left me, subsiding in direct proportion to the gradual lightening of the sky. My eyes continued to burn, I touched often at the prickly stubble of my beard, and my legs were stiffened from so little burden. Yet I was otherwise comfortable and could not believe when I reckoned by the clock that I had been held in my seat for three hours. Staring ahead, I thought that if such beauty could prevail I might willingly fly on forever. (p. 172)

Gann and Markham's spiritual vision can be compared to: "This, the peak of the internalization process,...those objectives which concern one's view of the universe, one's philosophy of life, one's Weltanschauung--a value system having as its object the whole of what is known or knowable" (Krathwohl, Bloom, and Masia, 1964, p. 185).

A formidable inspiration in this researcher's youth is a book listed in the sample of books: Eight hours to solo, by Henry B. Lent (1947). Read sometime before high school, this simple story about a boy taking flying lessons made such an impression on me that I knew I would have no problem flying an airplane. The experience of reading about how to start the engine, taxi to the runway, and make the take off was so believable that it was as if I had already done it. After reading Lent's description of flying straight and level, it was like second nature when a few years later it came my time to take lessons. It was like singing the same song, second verse. The only thing I did not remember, however, was the noxious smell of the gasoline. That was not in the book.

Sub Aspects of Research in Aviation Literature

Attitude, used as one of the qualifying changes in the definition of adult education, was a measurable attribute of pilots used in this research. As pointed out, little has been written on the attitude of pilots toward flying and toward reading aviation literature. The survey of the literature found the emphasis was on cockpit resource management (CRM) studies (Helmreich, 1983; Helmreich, 1984; Gregorich, Helmreich, and Wilhelm, 1990; Sarter and Woods, 1991). A sub aspect of this research has been aerospace studies in pilot training in the Air Force (Flanagan, 1954; Kantor, Noble, Leisey, and McFarlane, 1979; Eddowes and King, 1975).

The attitude scales (Crites, 1978) were used to elicit "the feelings, the subjective reactions, the dispositions that the [pilots] have" (p. 3) toward flying and toward reading aviation books. If the pilots demonstrated a high positive attitude, a formative and unique book list could be compiled.

An inquiry into aviation instruction at the Air University and the United States Air Force (USAF) Academy revealed that training emphasis was on leadership, not on literature. A. Sue Goodman, USAF Air University Library Bibliographer, (personal communication 23 July 1991) stated that soldiers, airmen, and authors are listed as leadership

examples in war (e.g., Boyd, C.G. Air University suggested professional reading guide, 1990). The Curriculum Handbook (1991-1992) of the USAF Academy lists humanity, history, and geography courses, but includes no aviation literature courses.

There were a number of colleges and universities, such as St. John's College, Columbia University, and the University of Chicago (Elias and Merriam, 1980, p. 35), that offered a Great Books Program. The Great Books Foundation and the Encyclopedia Britannica, both in Chicago, have programs for reading great books. Some of the leading aviation education universities with degree plans in aviation related areas are: Oklahoma State University, North Dakota University, and Ohio State University (Oklahoma State University Catalog, 1989-90; Collegiate Aviation Directory, 1989; Bell, 1991; Neilson, 1990). There are presently, as far as this researcher has been able to determine, no schools that offer an aviation literature course.

The list of aviation literature, supported by this research, has the possibility of enriching aviation education. This aviation literature course could be the core course for advanced adult education in community colleges or universities. Other collateral education courses that could be offered are aviation history, aviation careers, aviation safety, and human factors in

aviation. The study of aviation literature would be a step beyond the normal reading of aeronautics, regulations, and aircraft technical manuals. Reading aviation literature would give pilots a broader in-depth perspective of flying: of how flying deals with the human condition in the 21st century.

CHAPTER 3

RESEARCH DESIGN

The survey opinionnaire was designed to determine the attributes of experienced pilots and the correlation between their attitude toward reading aviation books and their attitude toward flying. The survey queried pilots on a sample of aviation literature to determine the extent of their reading in the field and to develop a reading list suitable for use in an adult education course. The opinionnaire was designed to gain information to answer the research questions.

The research design setting was a sample survey as characterized by Miller (1991, p. 22). The design was non experimental because it did not "include the highly controlled aspects which allow the researcher to assume cause and effect" (Sproull, 1988, p. 149). Because no attempt was made to determine causality in this design, descriptive statistics (Borg and Gall, 1989, p. 331) were used to determine the attitudes of pilots as well as to determine the number of books they had read.

Procedure

The survey opinionnaire (Nunnally, 1967, pp. 588-626) was first given the scrutiny of a pre-pilot test where a group of six experienced pilots informally tested the items for clarity. A group of 25 experienced pilot judges were then chosen for the pilot test. The researcher followed Balian's (1982) advice to "make time for a formal pilot test. If the instrument is original, a pilot testing should be mandatory. The pilot test allows the researcher to review instruments, subjects,...and actual test administration, all in one operation, and simultaneously" (p. 78-90). The second administration of the opinionnaire was sent to the panel of 25 judges during the last week of October 1991.

The opinionnaire was designed to collect variable information and elicit demographic factors (Wiener, 1989, pp. 189-216). These factors included experience level, number of FAA ratings, number of flying schools attended, years of formal education, and present flying status. (See copy of opinionnaire in Appendix B)

The opinionnaire was administered to 25 pilot judges and 384 subject pilots. Because this study used an original instrument, found in the Attitude Toward Books scale and the Attitude Toward Flying scale, both validity and reliability were tested. The SPSS1 program checked for Cronbach's coefficient Alpha. The Likert-type scale used in the

attitude toward flying survey, is a modified scale from Miller (1934, pp. 68-76). The validity and reliability for both scales were tested using the panel of pilot judges and the pilot subjects.

Subjects

The population of subject pilots was determined from U. S. Civil Statistics (Carter, 1990, pp. 4-5) where they were broken down into commercial and airline transport pilots. Because this study was based on attitudes of experienced pilots, the opinionnaire subject sampling did not include private pilots, who generally are the least experienced. Commercial and air line transport pilots have more experience; therefore, surveying private pilots was not within the scope of this research.

Aerodata, of Boulder, Colorado, randomly selected the pilot subjects (N = 767) who were sent their opinionnaire during the last week of December 1991. Aerodata randomly chose the subject pilots from the eight FAA regions in the same ratio as from the states in these regions by using a zip-code sort. Refusals were replaced with additional randomly selected names. The data were stored in the researcher's office and in the statistics lab at the University of North Texas.

According to McCall (1980, pp. 209-212), the formula to determine sample size is:

$$n = \hat{\pi} \ (1 - \hat{\pi}) \ Z^2 / \epsilon^2$$

Where:

n = S_s pilots necessary.

$\hat{\pi}$ = estimation of population (.50) since nothing is known *a priori*.

Z = 1.96 (two-tail deviate for 95% confidence).

ϵ = 0.05 (the acceptable level).

therefore: N = 384 (or the sample).

Hence, a sample of 384 pilots provided a maximum error of 0.05, with 95% confidence. The estimation of the population equaling 0.50 is the worst case scenario. This means the proportion of the pilot population opposed to this initiative according to McCall (1980) "when no prior information is available for the value of $\hat{\pi}$, a safe assumption is $\hat{\pi}$ = 0.50. If on the other hand, a smaller, or larger, value for $\hat{\pi}$ can be safely assumed, the sample size will be reduced accordingly....[this study] is interested in having the sample proportion (p) be within 0.05 of the true proportion, with the associated confidence of 0.95" (p. 209-210).

Borg and Gall (1989) wrote, "Although random assignment is not a perfect method for assuring treatment group equivalence, it is the best method available" (p. 665). Sproull (1988) noted, "The best chance for a sample to be representative is to use random sampling methods" (p. 110). The sample, from eight FAA regions, was selected using the stratified random sampling method. This method controlled for "stratification variables" (Sproull, 1988, P. 111).

The opinionnaire survey mailings to the subject pilots began on the 26th of December of 1991. The last of five separate mailings was made on 24 January 1992. The cut off date for the returns was 10 February 1992. Table 2 shows the distribution of the three groups that were utilized. Due to a lower than expected rate of return with the Aerodata/FAA mailing list, a random selection of pilots from two aero clubs was sent the survey. Further, in order to attain the 384 pilots needed for this research, 105 pilots were given the survey at two of the local airports and in seven different airline and commercial training locations.

Pre-pilot Study

A group of six experienced pilots were first chosen to informally test the items in the opinionnaire for clarity (Balian, 1982, p. 78). Slight changes were made in the directions, six questions were modified in the two scales, and the SPSS1 and SPSS2 programs were tested.

Table 2

Survey mailing results

Group	Mailings	Responses	Rate
Aerodata	767	226	29.5
Aero Club	114	62	54.0
Airline	105	105	100.0
Total	986	393	40.0

Pilot Study

Twenty-five experienced pilots, including both genders, were chosen as a panel of judges to perform the pilot study of the opinionnaire and the Q-sort for the Judgment Analysis procedure. This panel of twenty-five highly qualified pilots was chosen because of its experience in aviation. They represented the complete spectrum of flying: from barnstorming, cropdusting, and airshow pilots to corporate, airline, and fighter pilots. Moreover, most of the panel of judges had had military flying experience.

The ages of the pilot judges varied from 30 to 69. The group was divided between civilian, military, airline,

retired, and others; but some pilots fell into more than one category.

The judges were contacted and briefed on the opinionnaire so the results could be returned within ten (10) days. The time needed to complete the opinionnaire was approximately 25 minutes. About ten minutes were spent on the telephone with each judge discussing the opinionnaire and Q-sort.

This panel served as subjects for the pilot study for the opinionnaire and then were used in the JAN procedure (Christal, 1968b). [The SPSS1 regression program was written to determine the significance of the correlation between the variables in the opinionnaire (Norusis, 1988).] Judgment Analysis was chosen as the method for determining the policie(s) of the judges because the procedure can be completed in one administration. Selected from a number of options, this statistical program seemed more appropriate than the Delphi Method or a panel discussion. (See Appendix A for a more detailed discussion of Judgment Analysis.)

Instrumentation

Reliability of Instrument

Because the two instruments used in this survey are original, although the attitude toward flying follows

Miller's (1934) general outline, the instruments were tested for internal consistency. A reliability statement written into the SPSS program is called Cronbach's coefficient Alpha. Table 3 shows the comparison of both the judges and the subjects. Morris, Fitz-Gibbon, and Lindheim (1987) report, "Reliability coefficients of .70 or above are usually considered respectable, regardless of the

Table 3

Alpha for instruments

	Attitude Toward Books	Attitude Toward Flying
Judges	.97	.90
Subjects	.93	.91

type of reliability calculated or the method of calculation used" (p. 118). Hence, each instrument, using different items, "elicit[s] the same ability or attitude from any given respondent on a single administration of the instrument" (p. 111).

Therefore, it can be reported for this group of pilot judges and pilot subjects that the homogeneity,

scalability, or internal consistency is the same for each test. Although they measure different attitudes toward different subjects, the Attitude Toward Flying and Attitude Toward Reading Books scales are amazingly similar, having essentially the same internal consistency. The pilots have the same positive attitude toward flying as they have toward reading books.

Aviation Book List

A Likert-type scale (Likert, 1932), using Balian's (1982, p. 85) response width of five, was designed to satisfy the number of books read for both subjects and judges. The potential responses for each value were: (a) strongly agree = 5, (b) agree = 4, (c) undecided = 3, (d) disagree = 2, and (e) strongly disagree = 1. The books read were scored to help determine the reading list. Descriptive statistics were determined for each book. The number of books was used as the criterion variable, and the rest of the attributes listed on the 3 x 5 cards was used as the predictor variables in the regression analysis.

Attitude Toward Reading Aviation Books

The semantic differential (Osgood, Suci, and Tannenbaum, 1957, p. 20) was used to determine the pilots' Attitude Toward Reading Aviation Books scale. "The semantic differential (SD) is a method of observing and

measuring the psychological meaning of concepts" (Kerlinger, 1973, p. 566). Using a response width of nine, the score yielded the pilots' image, or picture, of reading books (Jenkins and Russell, 1958; Snider and Osgood, 1969, Alreck and Settle, 1985). The scale contains 17 bipolar adjectives placed at opposite ends of a nine point continuum (McCallon and Brown, 1973) with five in reverse order "to counteract response bias tendencies" (Kerlinger, 1973, p. 572). "The semantic differential is generally regarded as a good tool for measuring affect--people's positive and negative feelings toward an attitude object. Its score represents the respondent's general impression about the attitude object" (Henerson, Morris, and Fitz-Gibbon, 1987, p. 89).

Attitude Toward Flying

A Likert-type scale, the method of summated ratings suggested by Edwards (1957, pp. 149-171) using a response width of eleven to give more range in variability (Schumacker, 1991), was designed to measure the pilots' Attitude Toward Flying. An earlier test on attitude (Shaw and Wright, 1967, pp. 130-132) was used as a model for this scale. The construction of this pilot scale was modeled further after Miller (1934, pp. 98-76), who used two forms in his experiment. Where Miller used the term job, the term flying has been inserted. The scale consists of 20

items to which pilots were instructed to respond by placing a value ranging from +5 to -5. The scale contains seven negative statements and thirteen positive statements. The SPSS3 computer program was written to reverse the scores of negative statements and to report the mean between 11 and 1.0. A score of 11.0 would represent the most positive attitude score, and a score of 1.0 would represent the most negative attitude.

Validity

The validity for both the Attitude Toward Reading Books and Attitude Toward Flying scales was tested in the pilot study with the panel of judges. To test the content validity and to see that the questions represent attitudes of pilots, each question was weighed by the panel of judges for its presumed relevance to pilots (Kerlinger, 1986, p. 417). As to construct validity, it can be said that the test is valid if "it efficiently distinguishes individuals high and low in" the trait of attitude toward flying (Kerlinger, 1986, 417).

Reliability

Because the items in the semantic differential are not scored dichotomously, a general form that can be used is Cronbach's coefficient Alpha (Borg and Gall, 1989). This method of calculating reliability was used to estimate the

internal consistency from a single form of the test. Cronbach (1951) refers the general property of internal consistency as "homogeneity or scalability....In a homogeneous test, the items measure the same things. If a test has substantial internal consistency, it is psychologically interpretable" (p. 320). The internal consistency of the semantic differential, therefore, was determined by applying Cronbach's coefficient Alpha to 25 pilot judges and 384 subject pilots.

Summary

In order to determine the attitudes of pilots toward reading aviation books, the number of books they actually read, and their attitudes toward flying, a survey opinionnaire was designed. After informal pre-pilot testing by six experienced pilot judges, the opinionnaire was given a pilot test with 25 judges, who also did a Q-sort. This information, along with Judgment Analysis (JAN), determined the policies of the judges and the attributes of experienced pilots. The information from the most experienced pilot subjects, statistically compiled from the opinionnaire, answered the research questions.

CHAPTER 4

FINDINGS

This study of 384 experienced pilots in the contiguous United States was undertaken to determine the extent of their reading aviation literature, their attitude toward reading, their attitude toward flying, and the extent of their flying experience. Designed to determine if there was any relationship between attitude toward reading and attitude toward flying, the survey answered to what extent these pilots felt aviation literature was inspirational, valuable, and rewarding.

The opinionnaire was first administered to 25 experienced pilot judges and then to 384 subject pilots; Chronbach's Alpha was then run on the Attitude Toward Reading Books and Attitude Toward Flying scales to determine reliability. The pilot judges also performed a Q-sort which was used in the Judgment Analysis (JAN) procedure. The scores of the 384 subject pilots were analyzed and, using JAN, the books from the top 25% were chosen.

Pilot Judges

Because the pilot judges answered the survey first, their results will be given first. Table 4 displays the reading extent of the pilot judges, and Table 8 displays the reading extent of the subject pilots. No statistically significant difference was noted between the groups.

TABLE 4

Reading extent and grading by the pilot judges

Title	SA 5	A 4	U 3	D 2	SD 1	- 0	Mean[a]
Fate is the hunter	8	9	0	1	0	7	3.1
The probable cause	2	7	1	0	0	15	1.6
Stranger to the ground	4	7	2	1	0	11	2.2
Wind, sand and stars	2	5	3	1	0	14	1.6
"We"	5	6	1	1	0	12	2.2
The crowded sky	2	4	3	2	0	14	1.6
God is my co-pilot	4	8	5	2	0	6	2.8
The blue max	2	9	1	3	0	10	2.2
12 o'clock high!	7	7	2	1	0	8	2.8
Baa baa black sheep	3	7	5	2	0	8	2.5
The flying carpet	1	0	3	1	0	20	0.6
View from the cockpit	2	5	4	0	0	14	1.7
The first and the last	4	6	1	0	0	14	1.9

Table continues

Table 4 continued

Title	SA 5	A 4	U 3	D 2	SD 1	- 0	Mean[a]
Flying the old planes	2	8	1	0	0	14	1.8
Thud ridge	6	4	2	1	0	12	2.2
The left seat	5	3	1	0	0	16	1.6
Eight hours to solo	2	1	1	0	0	21	0.7
The high and the mighty	7	7	6	0	0	5	3.2
"No guts no glory!"	6	3	1	0	0	15	1.8
Yeager	3	11	4	2	0	5	3.0
Illusions	1	7	6	1	1	9	2.2
Aerobatics	7	6	1	0	0	11	2.5
Island in the sky	3	7	4	0	0	11	2.2
The Spirit of St. Louis	5	8	3	0	0	9	2.6
Nothing by chance	5	5	3	1	0	11	2.2
Loud and clear	3	2	1	1	0	18	1.1
Rickenbacker	3	4	1	3	0	14	1.6
Night flight	5	2	2	1	0	15	1.6
Stick and rudder	6	2	1	0	0	16	1.6
Thirty seconds over Tokyo	4	7	4	1	0	9	2.5

Note. N = 25.

[a]Scoring: (5) strongly agree, (4) agree, (3) undecided, (2) disagree, (1) strongly disagree, (0) book not read.

The sample of reading by the pilot judges reflects that 40% of them had read the books, as compared to 20% of the subject pilots. Of the 25 pilot judges, one had only read one book (Yeager), one had read them all, and nine pilot judges had read 25 or more books. Six of these same judges contributed their list of 30 books prior to having seen the sample list. Only 8 books from the sample list had not been read while 14 books had been read by two or more judges. Twenty-two books had been read by one or more of the judges. From these results it is felt that the sample was adequate for the survey of aviation books.

The Cross Tab

Table 5 is a descriptive cross-tabulation of the pilot judges using four categories. It is not surprising that the older pilots appear to have read more of the books. The distribution is more or less even in education and flying status. The gender match (male to female) of pilot judges used in the study equals that of the population of commercial and airline transport rated pilots. Only 3.4 percent of the rated pilots in the United States are female (Carter, 1990, p. 8).

Attitude Toward Reading Books

In Table 6 the results of the Attitude Toward Reading Books scale is shown. The range in the 17 answers is from

Table 5

Cross-tabulation of pilot judges [a]

	Number of books read				
Age	0-10	11-20	21-30	TOT.	Comb.
under 35	100.0	0.0	0.0	100.0	4.0
36 to 50	100.0	0.0	0.0	100.0	12.0
51 to 60	20.0	53.0	17.0	100.0	60.0
61 and over	33.0	17.0	50.0	100.0	24.0
combined	36.0	36.0	28.0	100.0	100.0
Education					
no college	0.0	100.0	0.0	100.0	4.0
some college	50.0	0.0	50.0	100.0	8.0
college grad	44.0	33.3	22.0	100.0	36.0
post graduate	23.0	46.0	31.0	100.0	52.0
combined	32.0	40.0	28.0	100.0	100.0
Gender					
males	29.0	42.0	29.0	100.0	96.0
females	100.0	0.0	0.0	100.0	4.0
combined	32.0	40.0	28.0	100.0	100.0

Table continues

Table 5 continued

Age	Number of books read 0-10	11-20	21-30	TOT.	Comb.
Status					
civilian	80.0	20.0	0.0	100.0	20.0
military	50.0	0.0	50.0	100.0	8.0
airline	14.0	43.0	43.0	100.0	28.0
retired	20.0	40.0	40.0	100.0	20.0
other	50.0	0.0	50.0	100.0	24.0
combined	40.0	24.0	36.0	100.0	100.0

Note. N = 25

[a] Row percentages are listed.

6.4 to 8.3, with a mean of 7.4 for the group. The results of this bipolar adjective scale suggested that there was a high positive attitude among the pilot judges toward reading aviation books. The question was whether, among the judges, reading aviation literature was inspirational, valuable, or rewarding. The scores were 7.4 for inspirational, 7.8 for valuable, and 7.8 for rewarding, with a mean of 7.7. According to Cronbach's coefficient Alpha, the reliability of this scale given to these 25 judges is 0.97.

Table 6

Judges' attitude toward reading aviation books

Positive	Mean	Negative
Inspirational	7.4	Uninspirational
Enjoyable	8.3	Unenjoyable
Good[a]	6.9	Bad
Pleasant[a]	7.2	Unpleasant
Valuable	7.8	Worthless
Effective	7.3	Ineffective
Relevant	7.4	Irrelevant
Interesting[a]	7.2	Boring
Important[a]	6.4	Unimportant
Informative	7.8	Uninformative
Educational	7.6	Not educational
Timely	7.0	Untimely
Wise[a]	6.6	Foolish
Useful[a]	6.8	Useless
Responsible	7.4	Irresponsible
Rewarding	7.8	Not rewarding
Literate	8.0	Illiterate

Note. N = 25. The higher the score, the more positive the attitude.

[a]Order corrected for reverse scoring.

Attitude Toward Flying

In Table 7, the results of the Likert-type summated rating scale is shown. The range is from 1.8 to 4.8, with a mean of 4.4. For these 25 judges, this reflects a high positive attitude toward flying. According to Cronbach's coefficient Alpha, the reliability is 0.90.

Subject Pilots

Sample of Aviation Books

The lack of reading by the subject pilots was no surprise. Table 8 shows the number and grades of the books

Table 7

Attitude toward flying by pilot judges

Mean	Questions
9.1	I would rather fly than eat.
10.7	I love flying.
10.0	I don't care if I ever get back in an airplane again.[a]
10.4	Flying has an irresistible attraction for me.
10.0	I hate airplanes.[a]
9.3	Flying is a business and I don't fly just for fun[a]

Table continues

Table 7 continued

Mean	Questions
9.7	If they paid me the same money to stay home, I wouldn't miss the flying.[a]
7.7	I'd give my left you know what to be in the left seat of a 767.
9.2	I would be devastated if I couldn't fly.
9.8	Sometimes flying is so good that I could fly forever.
9.5	If I just get my four hours a month I'm happy.[a]
9.6	Flying is getting so bad that I am going to retire early.[a]
10.0	Flying is one of the most important things in my life.
9.7	There are few things I'd rather do than fly.
8.7	Flying for a living is more enjoyable than play.
10.5	Flying still fascinates me.
8.6	Flying for a living is my favorite pastime.
10.4	Flying gives me a great deal of pleasure.
9.1	I can take it or leave it.[a]
8.7	I could fly everyday of the week.

Note. n = 25.

[a]Scores corrected for reverse scoring.

on the sample list. Only about 23% of the pilots appear to have read the books on the sample list. Of interest 50 pilots (12.6%) reported zero books read. Only one pilot had read all of the sample books.

Cross Tabulation of Sample Books

The frequencies of books read were subdivided into three categories while four demographic categories were picked for a comparison. Table 9 makes it possible to see the percentage of books read by columns and the demographics listed in rows. By examining the percentages in Table 9, one can see that it appears that people the same age read the same number of books as other people within the same education group. This is not the case, and there is no relationship. The chi-square analysis of age is significant, χ^2 (6, $\underline{N}$ = 387) = 33.18, $\underline{p} < .001$. For a sample like this, there is less than 1% chance that the distribution of books would differ as much as they do among age groups if they actually did not differ in the whole population of pilots. To a lesser degree, we can also assume significance in the status group using chi-square analysis, χ^2(8, $\underline{N}$ = 391) 17.35 $\underline{p} < .05$. The differences between the education and gender groups in this sample are not large enough to assume they exist in the pilot subject population as well.

Attitude Toward Aviation Books

The scores of the subject pilots reflect a strong attitude toward reading aviation books. Table 10 shows the scores with the mean range of 5.7 (timely) to 7.3 (pleasant).

TABLE 8

Reading extent and grading by the subject pilots

Title	SA 5	A 4	U 3	D 2	SD 1	- [a] 0	Mean
Fate is the hunter	85	82	39	4	2	181	2.2
The probable cause	29	31	16	2	0	315	0.8
Stranger to The ground	21	19	27	6	1	319	0.7
Wind, sand and stars	23	17	13	6	2	332	0.6
"We"	20	30	17	4	0	322	0.7
The crowded sky	13	37	29	9	3	302	0.8
God is my co-pilot	28	68	62	9	5	221	1.6
The blue max	15	46	45	7	5	275	0.1
12 o'clock high!	29	62	40	8	4	250	1.4
Baa baa black sheep	26	56	49	10	4	248	1.3
The flying carpet	1	3	7	2	1	379	0.1
View from the cockpit	13	30	14	3	2	331	0.6

Table continues

Table 8 continued

Title	SA 5	A 4	U 3	D 2	SD 1	- [a] 0	Mean
The first and the last	10	22	10	4	0	347	0.5
Flying the old planes	5	30	10	8	1	339	0.5
Thud ridge	15	28	31	7	5	307	0.8
The left seat	26	27	13	3	1	323	0.7
Eight hours to solo	2	9	7	1	1	373	0.2
The high and the mighty	48	68	39	7	1	230	1.7
"No guts no glory!"	11	16	11	2	4	349	0.4
Yeager	47	81	61	26	20	158	2.1
Illusions	18	26	21	9	6	313	0.7
Aerobatics	10	22	9	2	0	350	0.4
Island in the sky	24	31	20	4	0	314	0.8
The Spirit of St. Louis	53	51	23	4	3	259	1.4
Nothing by chance	14	30	19	1	3	326	0.6
Loud and clear	13	21	10	2	0	347	0.5
Rickenbacker	17	32	11	4	4	325	0.7
Night flight	26	22	18	5	1	321	0.7
Stick and rudder	66	40	13	2	0	272	1.4
Thirty seconds over Tokyo	22	62	50	10	2	247	1.4

Note. n = 393.

[a]Question asked: "Out of my flying experience, I feel every pilot should read this book."

Table 9

Cross-tabulation of subject pilots [a]

	Number of books read				
Age Group*	0-10	11-20	21-30	TOT.	Comb.
under 35	88.7	10.3	1.0	100.0	25.1
36 to 50	75.6	21.6	2.8	100.0	45.5
51 to 60	55.6	38.3	6.2	100.0	20.9
61 and over	57.6	30.3	12.1	100.0	8.5
combined	73.1	23.0	3.9	100.0	100.0
Education					
no college	65.9	31.0	3.4	100.0	7.4
some college	68.1	26.6	5.3	100.0	24.0
college grad	76.9	21.2	1.9	100.0	39.0
post graduate	72.3	21.4	6.3	100.0	28.6
combined	72.6	23.3	4.1	100.0	100.0
Gender					
males	71.9	24.2	3.9	100.0	91.8
females	81.3	12.5	6.3	100.0	8.2
combined	72.6	23.3	4.1	100.0	100.0

Table continues

Table 9 continued

Age Group*	Number of books read 0-10	11-20	21-30	TOT.	Comb.
Status*					
civilian	73.2	21.3	5.5	100.0	32.4
military	93.3	0.0	6.7	100.0	3.8
airline	73.7	24.2	2.1	100.0	49.5
retired	52.9	35.3	11.8	100.0	8.7
other	77.3	22.7	0.0	100.0	5.6
combined	72.7	23.2	4.1	100.0	100.0

Note. N = 25

[a] Row percentages are listed.

*Differences by age and status are statistically significant.

Reading Books: Inspirational, Valuable, and Rewarding

Table 11 shows a relatively strong attitude in these three areas, with rewarding carrying a little more weight than valuable or inspirational. Over 50% in all three categories gave a six or higher as a grade.

The List of Aviation Books

The list of aviation books from independent recommendation made by the subject pilots can be found in Appendix B. The books were alphabetized by author (where given) and no distinction was made in the list as to whether subject pilot or pilot judge recommended the book. To sort the books by any other category was beyond the scope of this study, however, a wide range of books was recommended.

The number recommended by the 100 more experienced pilots was eleven books. Seventy-seven came from the remaining subject pilots, and the remainder came from the pilot judges. The time spent on researching experienced pilots to determine aviation books to be read could have been better spent on a systematic sort or categorization of books. Experienced pilots do not necessarily read aviation literature.

A list was compiled which could be the beginning of a canon to be used in an aviation literature course. To report these findings of how inspirational, valuable, and rewarding reading has been to pilots during their careers, as far as transfer of learning was concerned, was not possible from the results of this opinionnaire. One could speculate, as the scores reflected, that the movement was in a positive direction. However, other tests, perhaps a detailed ethnographic method, would be better suited.

Table 10

Subjects' attitude toward reading aviation books

Positive	Mean	Negative
Inspirational	6.1	Uninspirational
Enjoyable	7.1	Unenjoyable
Good[a]	7.1	Bad
Pleasant[a]	7.3	Unpleasant
Valuable	6.6	Worthless
Effective	6.1	Ineffective
Relevant	6.3	Irrelevant
Interesting[a]	7.2	Boring
Important[a]	6.6	Unimportant
Informative	6.6	Uninformative
Educational	6.6	Not educational
Timely	5.7	Untimely
Wise[a]	6.7	Foolish
Useful[a]	6.7	Useless
Responsible	6.4	Irresponsible
Rewarding	6.8	Not rewarding
Literate	6.6	Illiterate

Note. The higher the score, the more positive the attitude. n = 393.

[a] order corrected for reverse scoring.

Table 11

Inspirational, valuable, rewarding attitudes

Label	Value	Frequency Inspire.	Frequency Value	Frequency Reward
(Missing)	0	12	9	10
strongly disagree	1	6	6	2
moderately disagree	2	8	4	1
disagree	3	16	7	5
mildly disagree	4	15	18	5
undecided	5	89	55	58
mildly agree	6	62	52	63
agree	7	93	103	96
moderately agree	8	46	68	102
strongly agree	9	46	71	51
Total		393	393	393
Mean		6.056	7.000	7.000
Median		6.000	7.000	7.000

Again the descriptive ordinal data from the survey items in both condensed Likert-type scale reports was not definitive.

Attitude Toward Flying

The attitude toward flying scale reflected a high positive attitude of the pilots toward flying. The scores shown in Table 12 reflected that the lowest mean score was 6.5 in the last question: "I could fly everyday of the week." The highest score of 10.5 (reversed) was for: "I hate airplanes." Only 2.8% gave this statement a low grade; four pilots reported they hated airplanes.

As high as the scores were, the first statement was most surprising in its finding. "I would rather fly than eat," having the highest scale value in H. E. Miller's list of statements, ended up with one of the lowest scores on the attitude toward flying scale. Table 13 shows the scores with a mean of 6.6. The median interval was 7.00.

During informal interviews, the pilots were asked why they chose a low score on this first attitude statement. Most took it as literally as the statement probably sounds. Several qualified their verbal answers with: "Well, it depends on what kind of airplane you're talking about," while another said: "One has to eat to live." After having discussed this statement and compared the results in the survey, it can be said that when given the opportunity to eat or fly, 54% will fly, 35% will eat, and the other 11% remain undecided.

Attitude Toward Reading and Flying

Although the two groups of pilots showed a high measure of internal consistency regarding attitude toward reading and attitude toward flying, the correlation between the two scales was another matter. According to SPSS3, the correlation was r = .35. As low as this is, it can be subjectively stated: The pilots probably were influenced to read aviation literature by something else besides attitude toward flying.

Incidental Findings

Of interest to this researcher, and perhaps to others, were some findings that were relevant to the problem but played no part in the lines of evidence.

The comments written by respondents were helpful in making subjective evaluations of the survey. Words of encouragement such as: "Glad to help," "Good luck," "Hope this doesn't skew your curve too bad" were countered by comments such as: "Bad question," "Too sexist for the 90s," and "Your term 'freight dog' is demeaning."

One pilot wrote all the way around a page stating that the survey was an exploitation for the purpose of gathering a list of books to sell nationally. Another pilot (Stewart, Code No. 347, personal communication 29 January 1992) wrote a two page letter offering suggestions

Table 12

Attitude toward flying by subject pilots

Score	Questions
6.6	I would rather fly than eat.
10.0	I love flying.
10.0	I don't care if I ever get back in an airplane again.[a]
9.4	Flying has an irresistible attraction for me.
10.6	I hate airplanes.[a]
7.8	Flying is a business and I don't fly just for fun[a]
9.7	If they paid me the same money to stay home, I wouldn't miss the flying.[a]
7.0	I'd give my left you know what to be in the left seat of a 767.
7.7	I would be devastated if I couldn't fly.
8.0	Sometimes flying is so good that I could fly forever.
8.8	If I just get my four hours a month I'm happy.[a]
8.6	Flying is getting so bad that I am going to retire early.[a]
8.5	Flying is one of the most important things in my life.
8.0	There are few things I'd rather do than fly.
7.5	Flying for a living is more enjoyable than play.

Table 12 continues

9.7	Flying still fascinates me.
7.7	Flying for a living is my favorite pastime.
9.9	Flying gives me a great deal of pleasure.
8.8	I can take it or leave it.[a]
6.5	I could fly everyday of the week.

Note. Scores: Strongly agree (+5), strongly disagree (-5). n = 392.

[a]Scores corrected for reverse scoring.

on how attitudes change with pilots and stated that a specific period of a pilot's flying career should have been included in the Attitude Toward Flying scale. He also contributed a list of books. (See letter in Appendix B.)

His letter prompted a telephone call to check the authenticity of his remarks. Stewart, whose identity had been protected until his letter, made two worthy comments. He suggested that the attitude toward flying scale be broken down into two scales: one for commercial flying, and one for pleasure flying. This would help explain the ambiguity of pilots, who like Stewart, would rather fly their own airplanes than eat but do not care that much about other (airline) flying. Stewart's second comment is similar. Like the choice of flying different airplanes, he stated that it depended on when he flew. He wrote, "Attitudes change....What is interesting to a pilot depends on age and where he is at in his career."

Table 13

"I would rather fly than eat."

	Value	Frequency	Percentage
(missing)	0	2	2.0
severely disagree	1	29	7.4
strongly disagree	2	15	4.1
moderately disagree	2	16	13.3
disagree	4	52	13.3
mildly disagree	5	25	10.7
undecided	6	42	10.7
mildly agree	7	36	9.2
agree	8	50	12.8
moderately agree	9	46	11.8
strongly agree	10	37	9.5
severely agree	11	37	9.5
	Total	393	100.0

During telephone conversations with 32 of the respondents, (personal communications 9-14 January 1992) seeking to find out why the return rate was so low, it was discovered that four felt the survey was too long, three stated its purpose was not clear, ten pilots were too busy, and five were not interested enough to fill out the

opinionnaire. There were indications three pilots thought the survey was an angle to sell something. "It was so professionally done and it looked so good, I thought it was more of that stuff that we get bombarded with all the time," one pilot responded, stating that he "didn't want to get on another computer list to be sold something."

The last area of concern was a general comment of the respondent's being too embarrassed to return the opinionnaire because of not having read many of the books. These comments confirm the descriptive statistics. Most pilots do not appear to read the kind of books used in this survey. Those who do, like Stewart, certainly do have opinions and suggestions about them.

Another incidental finding in this survey is a collateral list of other books the pilots have been reading. Although some of the suggested books were technical manuals and airplane handbooks, pilots also discussed their reading of flying magazines, National Transportation Safety Board publications, and how to fly books. Two pilots commented on these books as educational while labeling the survey sample books as entertainment.

Discussion

This study was undertaken to determine if a list of aviation books could be determined from a sampling of experienced pilots. The survey of the top 25% of the

subject pilots yielded only 11 books that could be considered. The rest of the pilots only suggested 77 books.

The survey list of books, to be considered in an aviation literature course, also came from the input of the pilot judges. Total input from the combined sources was 269 books.

Although the attitude of pilots toward reading aviation books and toward flying was high, little relationship ($r = .35$) was apparent between them. Three specific aspects of the Attitude Toward Reading Books scale that research question six addressed were found to be positive. Those aspects dealt with whether the books were inspirational, valuable, and rewarding. However, it was not determined whether reading these books was helpful to the pilots' careers.

It can be concluded that only a small percent of the pilots read the type aviation books used in this survey. The survey yielded a large list of books that could be considered a beginning for a book list to be used in an aviation literature course in adult education.

CHAPTER 5

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Where are the air stories that match the sea stories? Is there a Moby Dick of the skies waiting to be discovered and brought to the attention of aviators while they are still in flight training? Can experienced pilots help identify aviation literature through a scientifically designed study? These were the nebulous questions waiting to be answered when this study began. Now there are answers. Yes, there are air stories with literary value. Yes, experienced pilots can help find them. Yes, a scientific study can identify a basic book list worthy of study in adult education.

As Saint-Exupéry (1965) so aptly wrote in Wind, sand and stars: "the machine [airplane] does not isolate man from the great problems of nature but plunges him more deeply into them" (p. 42).

Summary

To determine the attributes of experienced pilots, to identify these pilots, and to determine from the books they had read a list of books to be used in a literature course was the purpose of this study. To make these

determinations, a survey opinionnaire with two attitude scales was designed. The results of the scales showed respondents had a positive attitude toward both reading and flying. The opinionnaire also incorporated a sample listing of aviation books to determine the extent of reading by the pilots.

Using this sample of 30 aviation books, the survey findings revealed that the extent of books read by the 394 pilots ranged from zero to 30. About 73% read from zero to 10 books, while only 4% read between 21 and 30. From the pilots' Attitude Toward Reading Books scale, the average score was 6.6 on a scale of 1 to 9. From the Attitude Toward Flying scale, the average score was 8.5, using a response width of 11. In addition to the sample, the 394 pilots named 88 books that they thought every pilot should read.

Twenty-five experienced aviators were chosen as judges to determine the attributes of experienced pilots. A Q-sort of 33 hypothetical pilots, each having ten attributes, was accomplished by each judge. The Q-sort data were entered into in a computer, utilizing a program called Judgment Analysis (see Appendix A). Using multiple linear regression, the correlation coefficient (R) of each judge was combined in such a manner that the homogeneity or scalability was staged until the policy (R^2) of each pilot judge formed one policy, or consensus. Thus, the

profile items, or attributes, for each judge were an expression of that judge's policy and were combined into a joint policy. The JAN procedure enabled the researcher to capture the joint policy of the judges in a clear and methodical manner. The weighted results of JAN were then applied to the 393 subject pilots, and 25% of the more experienced pilots were identified. The books that this group recommended have become the initial list for the canon of books to be the basis of an aviation literature course in adult education.

It can be concluded that there are few books in the list that stand out by themselves. This is surprising, even with a currently popular book like Yeager or those that have been around 20 years like Fate is the hunter. Both were high on the subject pilots' list of books read: Yeager was read by 60%, and Fate is the hunter by 54%. The 25 pilot judges had read: 72% for Yeager and 80% for Fate is the hunter. The rest of the books in the sample averaged being read by only 23%, indicating that only about one out of four pilots had read any specific book.

Conclusions

The list of aviation literature came from a combination of sources: (a) the top 25% of the subject pilots, (b) the rest of the subject pilots, and (c) the 25 pilot judges. Responses from the top 25% of the pilots, for which this

survey was designed and to whom it was targeted, did not yield the books needed to construct the basis of an aviation literature course in adult education. The survey of all the pilots used in this study has yielded 269 books that have the potential of being used in such a course. To arrive at a definitive list for a course, these books will have to undergo a sort. The methodical selection of a workable quantity of books will have to follow this research.

The extent of reading by all the pilots in this survey appears to be: (a) books like those used in the sample, (b) technical books and magazines, or (c) few books at all. It is concluded, by particularly observing the survey comments, that reading aviation literature is not necessary to the art and success of flying airplanes. By aviation literature is meant the syntopical books used in the survey sample. Whether they read aviation literature or not, the pilots' comments reflected a respectable professional awareness of reading material on regulations, safety, and technical skills.

Recommendations

As a result of the findings of this study, it is recommended that further research be done in the area of aviation literature. The fact that no single list of books emerged from this research suggests a need for more focused study. Three aspects of further research are suggested:

(a) the literature, (b) the panel of experts to help determine the literature, and (c) the methods of selecting the literature.

Having amassed, through this study, 269 aviation books recommended by experienced pilots, a systematic sort becomes necessary. Having obtained at least a beginning list from aviators, study could now be directed to a panel with literary expertise and expanded to include, among others, about 25 professional people. Perhaps this panel of judges could include: writers, professors, adult educators, readers, librarians, literary critics, students, and pilots. It is suggested that a list of the attributes of aviation literature be compiled by the panel and Q-sorted. Judgment Analysis (JAN) could then be accomplished, and the policy or policies of this panel of judges could be applied to the list of books to determine, in a very strict sense, the definitive reading list.

Toward Adult Education

This survey has statistically made clear that the syntopical books suggested in the list are not necessary to the skill of flying airplanes and, at the insistence of some pilots, not worth the time to read. There are a few, however, who find their lives enriched by the literary input of these inspirational, valuable, and rewarding stories about flying. Indeed, the high positive scores,

especially among the judges, suggested that this type of reading was beneficial to their flying.

Just as Brockett (1987) asked his six educators to review classic books in adult education, this survey has been used as a pathfinder for the first canon of aviation books that will someday be taught somewhere in a literature class. Just as engines have been designed and then enriched, pumped up, turbo charged, augmented, or afterburned, so pilots add to their skills and attitudes to prepare themselves for a richer and fuller life. Some read classic aviation books. Some see the validity of learning from experience in life through the written word. Perhaps, vicarious as the experience may be, the books are inspirational, valuable, and rewarding. Perhaps the stories can improve a person's prospects for living more successfully. This survey was designed to get at the heart of classic aviation literature. The intent was to use the most experienced pilots to achieve this goal because they would be the only ones who could put a stamp of authenticity on the flying stories. The results of this survey show that this hypothesis was not necessarily true.

While experience in flying accounts for realism, to a certain degree, the appreciation of expression is a literary matter. While few people may have, for instance, flown through a thunderstorm, the details of a flight through one can be appreciated by anyone. It doesn't take

a 20,000 hour pilot to make a judgment about how awful a flight can be in bad weather, or to appreciate writing that recreates the experience. Hence, the literary quality of judgment is more important than the experimental skill in relaying the message. This survey, while touting a sample of pilots and writers, has pointed to a few like Morgan, Bach, and Gann who both fly and write. This research has rediscovered a relatively unknown pilot author who, because of her skills has turned out to be a giant. Her name is Beryl Markham; her fame is to have been the woman who first flew the Atlantic solo from east to west. Her book, West with the night, turned up on six survey recommendations. Without doubt, one can learn by reading the book; it is a classic by any definition of the term.

As a pilot and writer, Markham (1983) defined flying in one sentence: "Flight is but momentary escape from the eternal custody of the earth" (p. 253). By changing only the first word, literature can also be defined. What better escape from the eternal custody of the earth than to lose oneself in reading a great book?

One of the survey respondents (I. D. No. 522), perhaps more insightful than the rest of us, pointed out another giant whose, "Wind, sand and stars should be read by every human being." A short passage shows the flavor of the author:

> When Joseph Conrad described a typhoon he said very little about towering waves, or darkness, or the

> whistling of the wind in the shrouds. He knew better. Instead, he took his reader down into the hold of the vessel, packed with emigrant coolies, where the rolling and the pitching of the ship had ripped up and scattered their bags and bundles, burst open their boxes, and flung their humble belongings into a crazy heap....It was this human drama that Conrad described when he painted a typhoon.
>
> Every airline pilot has flown through tornadoes, has returned out of them to the fold--to the little restaurant in Toulouse where we sat in peace under the watchful eye of the waitress--and there, recognizing his powerlessness to convey what he has been through, has given up the idea of describing hell. (Saint-Exupéry, 1965, p. 47)

Could there be a better opening to a course in aviation literature than to take the advice of this confidential survey respondent and begin with the study of Wind, sand, and stars?

APPENDIX A

JUDGMENT ANALYSIS (JAN): AN EVALUATION INSTRUMENT

JUDGMENT ANALYSIS

Twenty-five experienced pilots were used in the pilot study and in the second validity check of the survey opinionnaire. They did the Q-sort on thirty-three hypothetical pilots. "Q technique uses a rank-order procedure of piles or groups of objects...a set of objects is given to an individual to sort into a set of piles...according to the individuals 'most approve' to 'least approve' [sic]" (Kerlinger, 1986, pp. 508-509). Edwards (1957, p. 105) uses the terms most favorable and most unfavorable. The rank order of the 33 pilots, ranked by Q-sort using 3 x 5 cards, was from high to low in seven (7) piles, or seven sorts:

2-4-6-9-6-4-2

The judges placed the top two pilots on the left and the bottom two on the right (Williams, Gab, and Lindem, 1969).

"The Judgment Analysis technique (JAN), devised by Christal, is useful for identifying the rating policies existing in a board or committee of judges. Using JAN, the group would be able to ascertain the number of clusters that exist (if greater than one) for that group" (Williams, Gab, and Lindem, 1969, p. 92). The items listed in Table A-1 were used in this study to indicate variables.

Table A-1

List of variables and abbreviations

Variable	Abbreviation
Gender--male or female	Gender
Age--years of age in 1991	Age
Number of books read from the sample	bksread
Attitude toward books--from semantic differential	attbks
Attitude toward flying--from Likert-type scale	attfly
Number of flying experiences for list of 37	flyexp
Years of formal education	educ
Number of FAA ratings	Ratings
Number of flying schools attended	Schools
Total hours of flying time	flytime

Lasher (1990) stated that the JAN model:

> uses a hierarchical grouping technique that clusters judges according to the homogeneity of their prediction equations. Starting with the assumption that each judge has an individual policy, the JAN technique gives a squared multiple correlation coefficient (R^2) for each judge and an overall R^2 for the entire group of judges....An a priori minimum drop of 0.05 in R^2 from one stage to the next stage was used to determine if any significant change in policy took place....The consistency of each judge's use was measured by the R^2. The R^2 thus becomes an indicator of the degree to which the judges' decision-making behavior was predictable. Standard score regression weights (betas) of the policy equations were used to measure the importance of each variable. (pp. 88-89)

This a priori drop of 0.05 is also referred to in Houston, Duff, and Roy (1972), Ward and Hook (1963); Holmes and Zedeck (1973); Leonard, Gruetzemacher, Maddox, and Stewart (1982); and Leonard, Gruetzemacher, Wegner, and Whittington (1980).

The attributes, typed individually on 3 x 5 cards, also had an ID number. The judges used these cards in the Q-sort with 33 profiles, or hypothetical pilot profiles. The attributes on each profile were weighed by the pilot judges, then each pilot profile was assigned rank order in the Q-sort. The regression program SPSS1 was written to determine the multiple correlation coefficients (R^2) of the panel of judges in the Q-sort. This R^2 was used in JAN to determine the rating policies of the panel of judges (Houston, 1968; Christal, 1968a; Ward, 1962; Lasher, 1990). A program, written in FORTRAN, called STO39 on the mainframe at the University of North Texas performed JAN for this study.

An analysis of the Q-sort by each of the 25 pilot judges yielded a squared multiple correlation coefficient (R^2). This R^2 is actually the judges individual policy by which the profiles are evaluated. These R^2s were compared by using Judgment Analysis (JAN) to determine the policies for the group of judges. The policies were actually a consensus of the judges. This consensus is shown in Table A-7 under the stages for JAN procedure. The policies, where the stage drops exceeds 0.05, stopped the iteration. The iterative process was also stopped when the overall R^2 exceeded 0.70. The stage where the iteration was stopped, therefore, determined the weighted correlations to be applied to the scores of the subjects obtained from the opinionnaire. The top 25% of the subject pilots were chosen, and their responses were used to determine the answers to the research questions.

After the Q-sort was accomplished, the results were run in the Judgment Analysis program. The full model R^2 was 0.85 with the iteration stopped at stage four. The attributes the judges appeared to be using in making their judgment were attitude toward flying, flying experience, and flying time. For the results of the pre-pilot study, refer to Table A-2: Correlation between judges and attributes, Table A-3: Intercorrelations among the predictor items, and Table A-4: Stages of the JAN procedure.

Table A-2

Correlations between six judges and attributes

Attribute		Judge					
		1	2	3	4	5	6
1	gender	.18	.06	.14	.24	.54	.28
2	age	-.18	-.02	-.11	.40	-.06	-.33
3	books	-.80	-.68	-.81	-.58	-.26	-.19
4	attbks	-.68	-.62	-.71	-.45	-.17	-.12
5	attfly	-.80	-.84	-.86	-.41	-.25	.01
6	flyexp	-.67	-.44	-.51	-.92	-.40	-.61
7	educ	-.27	-.19	-.35	-.01	.08	.27
8	ratings	-.45	-.45	-.52	-.62	-.24	-.57
9	schools	-.43	-.46	-.48	-.68	-.40	-.66
10	flytime	-.31	-.14	-.20	-.59	-.62	-.93
	R	.9458	.8954	.9353	.9439	.8359	.9589
	R^2	.8946	.8017	.8747	.8909	.6988	.9194

Note. N = 33.

JAN was used to determine the policies of the judges. Table A-3 shows intercorrelations among the predictor items. The range is from -0.35 to 0.84. The strongest correlation occurred between number of books read and

Table A-3

Intercorrelations among the predictor items

Variable	1	2	3	4	5	6	7	8	9	10
1 Gender	-									
2 Age	-.33	-								
3 bksread	-.19	.25	-							
4 attbks	-.11	.13	.84	-						
5 attfly	-.08	-.05	.74	.75	-					
6 flyexp	-.21	.48	.56	.35	.28	-				
7 educ	-.04	-.12	.31	.27	.28	-.09	-			
8 Ratings	.03	.23	.40	.34	.27	.65	.10	-		
9 Schools	-.24	.26	.45	.32	.22	.72	.01	.82	-	
10 flytime	-.35	.51	.23	.12	-.05	.67	-.23	.50	.60	-

Note. N = 25. Refer to Table A-1 for variable description. Intercorrelation is the same for both sets of judges because same profiles were used.

attitude toward reading books (r = 0.82). Attitude toward flying was about the same high correlation as reading books and as attitude toward reading books (r = 0.74). The other high items show a high correlation between attitude toward flying, flying experience, and flying time. Mean and standard deviations for the ten variables used in JAN appear in Table A-5.

Table A-4

Stages for judgment analysis procedure (6 judges)

Stage	Judges	R^2	Dif R^2
1	1,2,3,4,5,6	-	.8474
2	(2,3)1,4,5,6	.0053	.8420
3	(2,3,1)4,5,6	.0147	.8274
4	(2,3,1)(5,6)4	.0344	.7930
5	(2,3,1,4)(5,6)	.0605	.7324
6	(one system)	.1809	.5516

Note. Total system loss: 0.2958. System loss from two systems: 0.1809. Total number of cases: 198.

Table A-6 shows the correlation between judges and attributes (Q-sort rating). The high absolute values provide us with some intuitive notions from each judge. For example, Judges 8 and 16 seem to be using flying experience and flying time as their basis for judgment. Judges 5 and 6 also seem to be using the same attributes. The correlations of judges in Table A-6 can be compared to the JAN results or stages in Table A-7. Table A-8 is an aid to the interpretation of the results, indicating the hierarchical grouping of the pilot judges into clusters at significant stages of the process. The policies are shown, again, in Table A-7.

Table A-5

For pilot judges: Mean and standard deviation

Variable		Mean	Standard Deviation
1	Gender	1.121	0.331
2	Age	48.485	12.682
3	bksread	9.333	5.688
4	attbks	5.519	1.850
5	attfly	6.474	1.677
6	flyexp	12.606	6.154
7	educ	15.727	2.051
8	Ratings	4.849	1.716
9	Schools	2.879	1.387
10	flytime	14.034	8.893

Using the a priori minimum drop of 0.05 in R^2 from one state to the next, we see that between stage 24 and 25 there is a loss of 0.1475. This reflects a significant change from the two groups in stage 24. Hence, we can say that two policies exist in the group of 25 judges. By comparing the beta weights (Table A-6) of these two groups we can see that JAN suggests (Table A-7, stage 24) that judges in group (1, 14, 2...20) relied on attitude toward

Table A-6

Correlations between 25 judges and attributes

Judge	Attribute									
	gender	age	bks	attbks	attfly	flyexp	educ	ratings	schools	flytime
1	.06	.07	-.54**	-.62**	(-.66**)	(-.27)	-.17	(-.46*)	-.39	(-.34)
2	.24	-.30	-.79**	-.68**	(-.77**)	(-.70**)	-.25	-.55**	-.59**	(-.46*)
3	.18	-.16	-.78**	(-.80**)	(-.79**)	-.60**	-.15	(-.46*)	-.53**	(-.43**)
4	.24	-.30	-.65**	(-.57**)	-.50**	(-.77**)	-.09	-.61**	(-.70**)	-.51*
5	.24	-.53**	-.49*	-.30	-.25	(-.92**)	.17	-.69**	-.70**	(-.81**)
6	.24	-.40*	-.45*	-.30	-.22	(.94**)	.15	-.70**	-.74**	(-.77**)
7	.12	-.25	-.54**	-.46*	-.39	(-.74**)	-.15	-.74**	(-.76**)	-.48*
8	.24	-.47*	-.38	-.24	-.11	(-.84**)	.18	-.68**	-.76**	(-.90**)
9	.36	-.52**	-.48*	-.37	-.25	-.75**	.15	-.55**	-.64**	-.91**
10	.30	-.27	(-.41*)	(-.35)	-.27	(-.73**)	.12	(-.43**)	(-.63**)	(-.73**)
11	.42	-.37	-.45*	-.36	(-.30)	-.71**	.09	-.59**	(-.73**)	(-.86**)
12	.18	-.06	-.84**	-.84**	(-.93**)	-.41*	-.24	-.33	-.30	-.12
13	.24	-.13	-.70**	-.63**	(-.68**)	-.59**	-.19	-.58**	(-.70**)	(-.44**)
14	(.42)	(-.14)	-.58**	-.52**	-.49*	-.56*	-.07	(-.50*)	-.56**	(-.55**)
15	.18	-.06	-.71**	-.69**	(-.84**)	-.50*	-.19	-.55**	(-.59**)	-.27
16	.30	-.44*	-.37	-.22	-.12	(-.82**)	.20	-.69**	-.73**	(-.89**)
17	.30	-.40	-.34	-.24	(-.17)	-.68**	.20	-.59**	-.66**	(-.93**)
18	(-.18)	.09	-.77**	(-.81**)	(-.86**)	(-.36)	-.37	-.39	-.29	.07
19	.24	-.45*	-.28	-.19	-.01	-.65**	.16	-.54**	-.63**	(-.94**)
20	.12	-.13	-.87	(-.86**)	(-.79**)	-.49**	-.42*	-.48*	(-.50*)	-.19
21	.30	-.45*	(-.62**)	(-.57**)	(-.46*)	(-.86**)	.06	-.71**	-.78**	(-.73**)
22	.00	.04	-.76**	-.79**	(-.92**)	-.28	-.29	-.35	-.27	-.01
23	.06	.09	-.73**	-.74**	(-.92**)	-.36	-.21	-.29	-.28	-.07
24	.24	-.49*	-.37**	-.22	-.15	(-.85)	.15	-.61**	-.70**	(-.86**)
25	.06	-.25	(-.36)	-.34	-.27	-.68**	-.09	(-.93**)	-.81**	-.59**

n = 33

Note: Due to the uniqueness of the standard (Beta) weight used in JAN, parentheses are used to signify attributes used by the judges as basis for their judgment.

one-tailed signif: *.01 **.001

Table A-7

Stages for Judgment Analysis procedure (25 judges)

Stage	Judges	R^2	dif R^2
1	1,2,3,4,5,6,7,8,9,10,11,12,13,14,15,16,17,18,19,20,21,22,23,24,25	-	.8781
2	(8,16) 1,2,3,4,5,6,7,9,10,11,12,13,14,15,17,18,19,20,21,22,23,24,25	.0003	.8778
3	(8,16,24) 1,2,3,4,5,6,7,9,10,11,12,13,14,15,17,18,19,20,21,22,23,25	.0008	.8770
4	(5,6) (8,16,24) 1,2,3,4,7,9,10,11,12,13,14,15,17,18,19,20,21,22,23,25	.0009	.8761
5	(5,6) (8,16,24) (17,19) 1,2,3,4,7,9,10,11,12,13,14,15,18,20,21,22,23,25	.0011	.8750
6	(5,6) (8,16,24) (17,19) (22,23) 1,2,3,4,7,9,10,11,12,13,14,15,18,20,21,25	.0011	.8739
7	(5,6) (8,16,24) (12,22,23) (17,19) 1,2,3,4,7,9,10,11,13,14,15,18,20,21,25	.0012	.8727
8	(5,6) (8,16,24) (9,11) (12,22,23) (17,19) 1,2,3,4,7,10,13,14,15,18,20,21,25	.0012	.8715
9	(4,7) (5,6) (8,16,24,) (9,11) (12,22,23) (17,19) 1,2,3,10,13,14,15,18,20,21,25	.0015	.8700
10	(4,7) (5,6) (8,16,24) (9,11) (12,22,23) (13,15) (17,19) 1,2,3,10,14,18,20,21,25	.0016	.8684
11	(2,3) (4,7) (5,6) (8,16,24) (9,11) (12,22,23) (13,15) (17,19) 1,10,14,18,20,21,25	.0022	.8662
12	(2,3) (4,7) (5,6) (8,16,24) (9,11,17,19) (12,22,23) (13,15) 1,10,14,18,20,21,25	.0024	.8638
13	(2,3) (4,7,21) (5,6) (8,16,24) (9,11,17,19) (12,22,23) (13,15) 1,10,14,18,20,25	.0027	.8611
14	(2,3) (4,7,21) (5,6,8,16,24) (9,11,17,19) (12,22,23) (13,15) 1,10,14,18,20,25	.0029	.8582
15	(2,3) (4,7,21) (5,6,8,16,24) (9,11,17,19) (12,22,23) (13,15) (18,20) 1,10,14,25	.0033	.8550
16	(2,3,13,15) (4,7,21) (5,6,8,16,24) (9,11,17,19) (12,22,23) (18,20) 1,10,14,25	.0035	.8514
17	(2,3,13,15) (4,7,21) (5,6,8,16,24) (9,11,17,19) (12,22,23,18,20) 1,10,14,25	.0053	.8461
18	(2,3,13,15) (4,7,21) (5,6,8,16,24,10) (9,11,17,19) (12,22,23,18,20) 1,14,25	.0055	.8406
19	(1,14) (2,3,13,15) (4,7,21) (5,6,8,16,24,10 (9,11,17,19) (12,22,23,18,20) 25	.0060	.8346
20	(1,14) (2,3,13,15) (4,7,21,25) (5,6,8,16,24,10) (9,11,17,19) (12,22,23,18,20)	.0078	.8268
21	(1,14,2,3,13,15) (4,7,21,25) (5,6,8,16,24,10) (9,11,17,19) (12,22,23,18,20)	.0084	.8183
22	(1,14,2,3,13,15) (4,7,21,25) (5,6,8,16,24,10,11,17,19) (12,22,23,18,20)	.0103	.8080
23	(1,14,2,3,13,15,12,22,23,18,20) (4,7,21,23) (5,6,8,16,24,10,9,11,17,19)	.0205	.7875
24	(1,14,2,3,13,15,12,22,23,18,20) (4,7,21,25,5,6,8,16,24,10,9,11,17,19)	.0256	.7619
25	(one system)	.1474	.6144

Table A-8

Hierarchical stages of the JAN procedure

Stage	Number of Policies	R^2	Successive R^2	Accumulated R^2 Drop
1	25	.8781	-	-
2	24	.8778	.0003	.0003
3	23	.8770	.0008	.0011
4	22	.8761	.0009	.0020
5	21	.8750	.0011	.0031
6	20	.8739	.0011	.0042
7	19	.8727	.0012	.0054
8	18	.8715	.0012	.0066
9	17	.8700	.0015	.0081
10	16	.8684	.0016	.0097
11	15	.8662	.0022	.0119
12	14	.8638	.0024	.0143
13	13	.8611	.0027	.0170
14	12	.8582	.0029	.0198
15	11	.8550	.0033	.0231
16	10	.8514	.0035	.0267
17	9	.8461	.0053	.0320
18	8	.8406	.0055	.0375

table continues

Table A-8 continued

Stage	Number of Policies	R^2	Successive R^2	Accumulated R^2 Drop
19	7	.8346	.0060	.0435
20	6	.8268	.0078	.0513
21	5	.8183	.0084	.0598
22	4	.8080	.0103	.0701
23	3	.7875	.0205	.0906
24	2	.7619	.0256	.1162
25	1	.6144	.1475	.2637

flying to make their judgments, while judges in group (4, 7, 21...19) relied on flying experience. Both groups used flying time as the other main variable.

Table A-9 shows the Beta weights used by the judges as a basis for their judgment in choosing the attributes of experienced pilots. Intuitively, it can be seen by the absolute values in parenthesis that the three aspects most relied on were attitude toward flying, flying experience, and flying time.

The task of this panel of judges in the Q-sort was to identify the attributes of highly qualified and experienced so that the top 25 percent of the pilot subjects could be

Table A-9

Standard (Beta) weights

Judge	Attribute									
	gender	age	bks	attbks	attfly	flyexp	educ	ratings	schools	flytime
1	-.07	.21	.03	-.21	(-.61)	(.45)	-.02	(-.28)	.05	(-.69)
2	-.04	-.09	-.00	.02	(-.68)	(-.27)	-.18	.07	-.12	(-.29)
3	-.10	.06	.19	(-.42)	(-.60)	-.19	-.05	(.26)	-.23	(-.40)
4	.03	.01	.11	(-.24)	-.20	(-.51)	-.06	.07	(-.29)	-.05
5	-.00	-.06	-.03	.10	-.16	(-.59)	.07	-.17	.12	(-.37)
6	.04	.11	.19	-.10	-.04	(-.81)	.02	-.09	.01	(-.27)
7	-.03	.03	.18	-.20	-.10	(-.44)	.15	-.17	(-.31)	-.00
8	-.06	.02	.02	-.02	-.02	(-.32)	.03	-.08	-.11	(-.61)
9	.01	-.06	-.04	-.07	-.20	-.07	.03	-.01	.00	(-.80)
10	-.05	.17	(.40)	(-.30)	-.24	(-.55)	-.06	(.50)	(-.39)	(-.57)
11	.09	.07	.10	-.04	(-.33)	-.00	-.01	.05	(-.25)	(-.77)
12	.10	.06	-.21	-.20	(-.63)	-.06	.05	-.11	.17	-.07
13	-.04	.07	-.01	-.05	(-.56)	.03	-.09	.19	(-.59)	(-.29)
14	(.33)	(.30)	-.14	-.15	-.20	-.07	.04	(-.25)	.12	(-.44)
15	.01	.02	.09	-.05	(-.81)	-.08	.01	-.09	(-.38)	-.13
16	.07	.08	.01	.03	-.05	(-.32)	.07	-.22	.04	(-.60)
17	-.02	.06	-.01	.08	(-.27)	.08	.07	-.12	-.03	(-.95)
18	(-.25)	.08	.01	(-.36)	(-.50)	(-.26)	-.13	-.01	-.02	.11
19	-.13	.00	.01	-.07	-.01	.06	-.04	.03	-.11	(-.98)
20	-.07	-.01	-.15	(-.39)	(-.28)	-.08	-.22	.08	(-.25)	-.03
21	.04	-.07	(.32)	(-.38)	(-.26)	(-.42)	.03	-.05	-.21	(-.28)
22	-.09	.02	-.14	-.16	(-.72)	.15	.00	-.10	-.00	-.09
23	-.05	.17	.01	-.14	(-.82)	-.15	-.02	.09	.01	-.14
24	-.09	-.05	.19	.02	-.19	(-.48)	-.05	.08	-.13	(-.57)
25	.01	.02	(.36)	-.16	-.15	-.14	-.09	(-.74)	-.08	-.18

n = 33

Note: Parenthesis signify the most important attributes used by the judge as the basis for their judgment.

selected with the JAN procedure. This unique, elite group provided the answer to the last two research questions: (a) What books have the pilots read? (See book list in Appendix B.) and (b) To what extend has the reading been inspirational, valuable, and rewarding? (See Table 11.)

Discussion

The decision-making policies used in this study demonstrates the use of information in a consistent and predictable fashion when making decisions about experienced pilots. The homogeneity between the two groups is almost striking. The drop in predictability in each successive stage of the JAN clustering process was small. Only about 12 percent of the predictability was lost with the two groups while 26 percent was lost when combined into one group. The weighted results of the attitude toward flying and flying experience will be added to the flying time of the subject pilots to determine the most experienced pilots.

The task of this panel of judges in the Q-sort was to identify the attributes of highly qualified and experienced so that the top 25% of the 384 pilot subjects could be selected from the use of the JAN procedure. This unique and elite group of pilots was used to provide data to answer the last two research questions.

APPENDIX B

SURVEY INSTRUMENT AND ATTENDANT MATERIAL

FIVE STATES ENERGY COMPANY
1220 ONE ENERGY SQUARE · 4925 GREENVILLE AVENUE · DALLAS, TX 75206

December 1991

Dear Pilot,

This quality pilot survey "opinionnaire" is designed to help pilots. The information is being collected, as part of a **Five States Energy Company** grant, to investigate the attitudes of pilots toward reading certain aviation books. Your professional and experienced input could lead to the development of an aviation education great books course.

Please take a few minutes to complete these five sections and return them in the postage paid reply envelope. Your opinion is very important to this research. Your response will be kept confidential.

If you would like the results of this study please request a copy of our findings in writing. Data analysis begins January 15, 1992. Thank you for your time in completing and returning the pilot opinionnaire.

Have a good flight!

Gary Heartsill

Gary Heartsill
Project Director
(817)497-6132 [fone/fax]

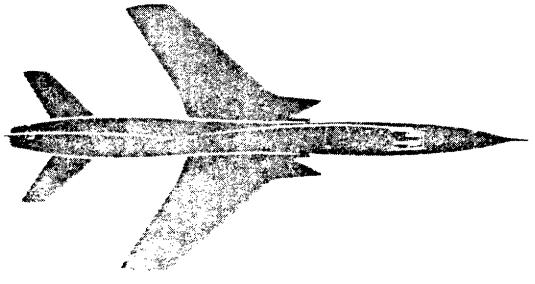
For results send requests to:
Gary Heartsill
#1 Hidden Valley Airpark
Denton, TX 76205

AVIATION BOOK LIST

Listed below is a sample of aviation books. Please mark the ones you have read by making a judgment about it by asking: *"Out of my flying experience, I feel every pilot should read this book."* Use this five point scale: Strongly agree (5), agree (4), undecided (3), disagree (2), strongly disagree (1). If you have not read the book mark the zero (0). [disregard the small data entry numbers on the right]

Fate Is The Hunter	Ernest Gann	5 4 3 2 1 0	(09)
The Probable Cause	Robert Serling	5 4 3 2 1 0	(10)
Stranger To The Ground	Richard Bach	5 4 3 2 1 0	(11)
Wind, Sand And Stars	Saint-Exupéry	5 4 3 2 1 0	(12)
"WE"	Charles Lindbergh	5 4 3 2 1 0	(13)
The Crowded Sky	Fred Searls	5 4 3 2 1 0	(14)
God Is My Co-pilot	Robert Scott	5 4 3 2 1 0	(15)
The Blue Max	Jack Hunter	5 4 3 2 1 0	(16)
12 O'Clock High!	Beirne Lay	5 4 3 2 1 0	(17)
Baa Baa Black Sheep	Gregory Boyington	5 4 3 2 1 0	(18)
The Flying Carpet	Richard Halliburton	5 4 3 2 1 0	(19)
View From The Cockpit	Len Morgan	5 4 3 2 1 0	(20)
The First And The Last	Adolf Galland	5 4 3 2 1 0	(21)
Flying The Old Planes	Frank Tallman	5 4 3 2 1 0	(22)
Thud Ridge	Jack Broughton	5 4 3 2 1 0	(23)
The Left Seat	Robert Serling	5 4 3 2 1 0	(24)
Eight Hours To Solo	Henry Lent	5 4 3 2 1 0	(25)
The High And The Mighty	Ernest Gann	5 4 3 2 1 0	(26)
"No Guts No Glory!"	Fredrich Blesse	5 4 3 2 1 0	(27)
Yeager	Chuck Yeager	5 4 3 2 1 0	(28)
Illusions	Richard Bach	5 4 3 2 1 0	(29)
Aerobatics	Neil Williams	5 4 3 2 1 0	(30)
Island In The Sky	Ernest Gann	5 4 3 2 1 0	(31)
The Spirit Of St. Louis	Charles Lindbergh	5 4 3 2 1 0	(32)
Nothing By Chance	Richard Bach	5 4 3 2 1 0	(33)
Loud And Clear	Robert Serling	5 4 3 2 1 0	(34)
Rickenbacker	Edward Rickenbacker	5 4 3 2 1 0	(35)
Night Flight	Saint Exupéry	5 4 3 2 1 0	(36)
Stick And Rudder	Wolfgang Langewiesche	5 4 3 2 1 0	(37)
Thirty Seconds Over Tokyo	Ted Lawson	5 4 3 2 1 0	(38)

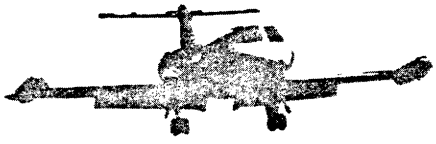
What are some other books *every pilot* should read?



ATTITUDE TOWARD READING AVIATION BOOKS

Directions: Please circle the number between the words on each line below to show your opinion of reading aviation books. (Disregard the data entry numbers to the right).

INSPIRATIONAL__9__8__7__6__5__4__3__2__1__UNINSPIRATIONAL	40
ENJOYABLE__9__8__7__6__5__4__3__2__1__UNENJOYABLE	41
BAD__9__8__7__6__5__4__3__2__1__GOOD	42
UNPLEASANT__9__8__7__6__5__4__3__2__1__PLEASANT	43
VALUABLE__9__8__7__6__5__4__3__2__1__WORTHLESS	44
EFFECTIVE__9__8__7__6__5__4__3__2__1__INEFFECTIVE	45
RELEVANT__9__8__7__6__5__4__3__2__1__IRRELEVANT	46
BORING__9__8__7__6__5__4__3__2__1__INTERESTING	47
UNIMPORTANT__9__8__7__6__5__4__3__2__1__IMPORTANT	48
INFORMATIVE__9__8__7__6__5__4__3__2__1__UNINFORMATIVE	49
EDUCATIONAL__9__8__7__6__5__4__3__2__1__NOT EDUCATIONAL	50
TIMELY__9__8__7__6__5__4__3__2__1__UNTIMELY	51
FOOLISH__9__8__7__6__5__4__3__2__1__WISE	52
USELESS__9__8__7__6__5__4__3__2__1__USEFUL	53
RESPONSIBLE__9__8__7__6__5__4__3__2__1__IRRESPONSIBLE	54
REWARDING__9__8__7__6__5__4__3__2__1__NOT REWARDING	55
LITERATE__9__8__7__6__5__4__3__2__1__ILLITERATE	56



ATTITUDE TOWARD FLYING

Directions: Below is a list of statements about flying (you may have heard some of them). Please answer by placing the number that best reflects your personal attitude toward each statement. Use the scale below. (Disregard data numbers to the right).

+5 +4 +3 +2 +1 0 -1 -2 -3 -4 -5
Strongly agree agree undecided disagree strongly disagree

___I would rather fly than eat. 1-2

___I love flying. 3-4

___I don't care if I ever get back in an airplane again. 5-6

___Flying has an irresistible attraction for me. 7-8

___I hate airplanes. 9-10

___Flying is a business and I don't fly just for fun. 11-12

___If they paid me the same money to stay home, I wouldn't miss the flying. 13-14

___I'd give my left you know what to be in the left seat of a 767. 15-16

___I would be devastated if I couldn't fly. 17-18

___Sometimes flying is so good that I could fly forever. 19-20

___If I just get my four hours a month I'm happy. 21-22

___Flying is getting so bad that I am going to retire early. 23-24

___Flying is one of the most important things in my life. 25-26

___There are few things I'd rather do than fly. 27-28

___Flying for a living is more enjoyable than play. 29-30

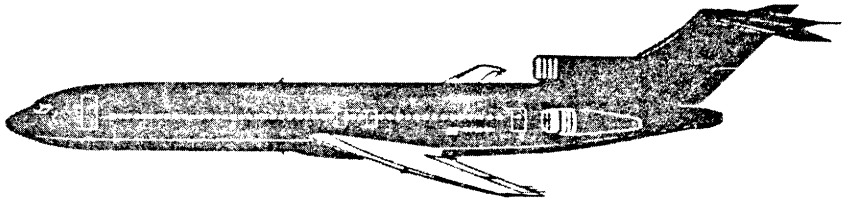
___Flying still fascinates me. 31-32

___Flying for a living is my favorite pastime. 33-34

___Flying gives me a great deal of pleasure. 35-36

___I can take it or leave it. 37-38

___I could fly everyday of the week. 39-40



Flying Experience

Please checkmark all the areas where you have at least **100 hours** experience.

42____single engine land

43____multi-engine land

44____single engine sea

45____multi-engine sea

46____tail dragger (SEL)

47____tail dragger (MEL)

48____acrobatics (military)

49____aerobatics (light plane)

50____helicopter

51____glider/sailplane

52____dusting/spraying

53____banner towing

54____pipeline patrol

55____freight dog

56____fire fighting

57____combat

58____single engine jet (single seat)

59____single engine jet

60____12,500-50,000# aircraft

61____50,000-100,000# aircraft

62____100,000-200,000# aircraft

63____200,000-400,000# aircraft

64____400,000+ # aircraft

65____simulator

66____simulator instructor

67____check airman

68____ground school instructor

69____test pilot

70____homebuilts

71____homebuilt (one you built)

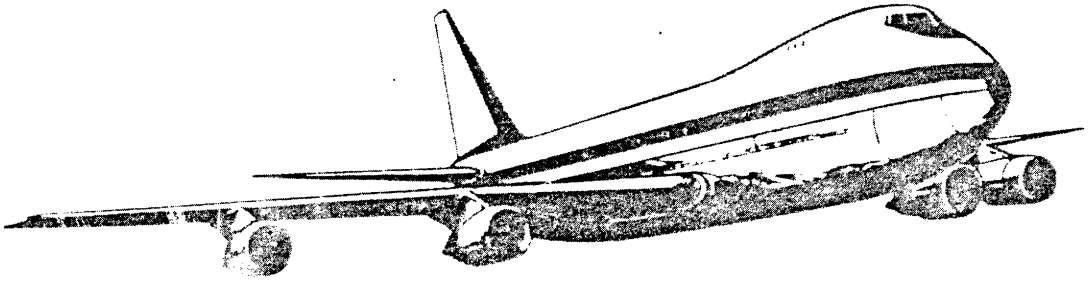
72____ratings (DC-9, B737, BAC type a/c)

73____ratings (727, B707, DC-8)

74____ratings (B747, DC-10, MD-11/12)

75____ratings (L188, Convair, etc.)

76____ratings (other)



Background (please disregard the fine print data entry numbers)

Last four digits of your social security number ___ ___ ___ ___ 1,2,3,4

Gender (circle) Male Female 5

What is the year of your birth? 1 9 ___ ___ 6,7

Formal Education
(years of formal education)
_____in High School (12 if grad)
_____in College
_____in Masters
_____in PhD
_____**TOTAL** (all the above) 1-2

Current Status
(present flying status)
___Civilian
___Military
___Airline
___Retired (from_____) 15
___Other 16

Ratings
(check each one that you have)
___Commercial 3
___Instrument 4
___MEL 5
___CFI 6
___ATP 7
___Glider 8
___Rotocraft 9
___A & P 10
___Flight Engineer 11

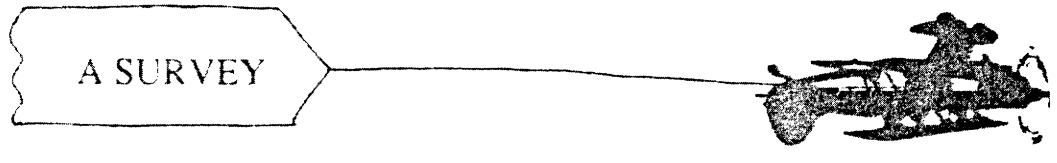
Flight Training Schools
(Check all schools where you were trained)
___College 17
___Commercial school 18
___Air Taxi trained 19
___Airline trained 20
___Corp.or private company 21
___US Air Force 22
___US Army 23
___US Navy (Marines) 24
___Other(s)_____ 25

Flying Time
Add up logged airplane time. Please use these examples:

315 hours = .3 2420 hours = 2.4 9,910 = 9.9 16,500 = 16.5

Subtotal airplane time, add it to FE for **Total.**

	airplane		flight engineer
civilian	_____	27,28,29,30	_____
military	_____	31,32,33,34	_____
airline	_____	35,36,37,38	_____
other	_____	39,40,41,42	_____
subtot	_____ 43,44,45,46	plus	_____ 47,48,49,50 = **Total** _____ 51,52,53,54



January 17, 1991

Five States Energy Company
1220 One Energy Square
Dallas, Texas 75206

Dear Pilot,

Within the past few weeks we mailed a very important pilot survey form to your address. As part of our follow-up program, and due to much needed information, we have mailed another form. Please take the time to fill this out.

We have enclosed a postage paid reply envelope. We appreciate your time and input. Your opinions are important to us.

Thank you again. We'll keep this confidential. Please advise us if you would like to have a copy of the results.

Have a good trip!

Gary Heartsill
Project Director

DIRECTIONS FOR Q-SORT

This evaluation will rank order a group of pilots, using your personal background, to choose the most qualified and experienced aviators. The method is called a Q-sort. You will rate the pilots according to how their experience matches your judgement. Ask the question: *" Which pilots, in their careers, have distinguished themselves as "most experienced?"* Sort from high to low.

The profiles of the thirty-three pilots are listed on the 1 by 3½ cards. The variables are the same as in the pilot opinionnaire you just completed. For reference they are listed here:

1.	pilot	id number
2.	gender	male or female
3.	age	0-99
4.	# books read	0-30
5.	Att to books	0-9.00
6.	Att to flying	0-10.00
7.	Flying experiences	0-37+
8.	Education	12-21+
9.	FAA ratings	0-9
10.	Current status	Civilian, Military, Airline, Retired, Other
11.	Flying schools	0-9
12.	Flying time	0-30,000+

Arrange the thirty-three pilot profiles into <u>seven different piles</u> using this distribution:

2 - 4 - 6 - 9 - 6 - 4 - 2

that is, the two highest on the left, the next four pilots, then six, and so on, until the lowest sort of two is on the right. Feel free to move the cards around as much as you like to determine the order. Note that there is no order in <u>each</u> pile. For example, all the pilots in the first group of six are all rated as equal. Perhaps the ones you are unsure of can be placed in the middle until the highs and lows are determined.

When you have completed your sort, mark the pilot ID numbers and staple the cards in the marked spaces below.

To assure that we can measure the responses accurately, use the edge of this paper to staple the distributions from left to right in the sorts:

2 - 4 - 6 - 9 - 6 - 4 - 2

Place this "stapled" sheet and the opinionnaire in the mailing envelope and mail as soon as you can.

Thank you for taking the time to do this!

SORT

1.....2.....3.....4.....5.....6.....7

XX	XX	XX	XX	XX	XX	XX
	XX	XX	XX	XX	XX	
		XX	XX	XX		
			XX			
			X			

MARK (IN PEN OR PENCIL) THE PILOT NUMBERS UNDER EACH PILE BELOW:

1.....2.....3.....4.....5.....6.....7

STAPLE THE PILOT CARDS IN THE SAME ORDER HERE: (another data check)

1.....2.....3.....4.....5.....6.....7

THE 33 PILOT CARDS FOR THE Q-SORT. PLEASE CUT OUT, RANK ORDER, NUMBER AND STAPLE IN THE APPROPRIATE PILE AND RETURN IN THE ENVELOPE.

PILOT	01	FLYEXP	25
GENDER	M	EDUC	12
AGE	65	RATINGS	8
BKSREAD	3	STATUS	R
ATTBKS	3.33	SCHOOLS	5
ATTFLY	3.05	FLYTIME	28.2

PILOT	02	FLYEXP	12
GENDER	M	EDUC	14
AGE	56	RATINGS	5
BKSREAD	6	STATUS	O
ATTBKS	6.22	SCHOOLS	4
ATTFLY	6.82	FLYTIME	21.2

PILOT	03	FLYEXP	21
GENDER	M	EDUC	16
AGE	61	RATINGS	6
BKSREAD	18	STATUS	R
ATTBKS	7.53	SCHOOLS	5
ATTFLY	7.33	FLYTIME	26.0

PILOT	04	FLYEXP	6
GENDER	M	EDUC	14
AGE	51	RATINGS	3
BKSREAD	2	STATUS	C
ATTBKS	3.81	SCHOOLS	2
ATTFLY	4.13	FLYTIME	28.0

PILOT	05	FLYEXP	5
GENDER	M	EDUC	16
AGE	59	RATINGS	4
BKSREAD	1	STATUS	R
ATTBKS	2.10	SCHOOLS	2
ATTFLY	3.22	FLYTIME	14.2

PILOT	06	FLYEXP	6
GENDER	M	EDUC	16
AGE	48	RATINGS	5
BKSREAD	10	STATUS	M
ATTBKS	6.70	SCHOOLS	3
ATTFLY	6.50	FLYTIME	8.2

PILOT	13	FLYEXP	13
GENDER	M	EDUC	16
AGE	42	RATINGS	5
BKSREAD	12	STATUS	A
ATTBKS	7.00	SCHOOLS	4
ATTFLY	8.54	FLYTIME	11.0

PILOT	07	FLYEXP	5
GENDER	M	EDUC	18
AGE	42	RATINGS	3
BKSREAD	4	STATUS	M
ATTBKS	4.11	SCHOOLS	1
ATTFLY	3.92	FLYTIME	2.9

PILOT	08	FLYEXP	12
GENDER	M	EDUC	16
AGE	31	RATINGS	5
BKSREAD	11	STATUS	M
ATTBKS	6.91	SCHOOLS	2
ATTFLY	6.99	FLYTIME	6.7

PILOT	09	FLYEXP	5
GENDER	F	EDUC	16
AGE	31	RATINGS	3
BKSREAD	3	STATUS	M
ATTBKS	3.25	SCHOOLS	1
ATTFLY	4.08	FLYTIME	2.2

PILOT	10	FLYEXP	21
GENDER	M	EDUC	18
AGE	52	RATINGS	8
BKSREAD	17	STATUS	R
ATTBKS	7.50	SCHOOL	6
ATTFLY	7.59	FLYTIME	22.3

PILOT	11	FLYEXP	23
GENDER	M	EDUC	22
AGE	53	RATINGS	7
BKSREAD	19	STATUS	O
ATTBKS	8.33	SCHOOL	5
ATTFLY	8.53	FLYTIME	19.0

PILOT	12	FLYEXP	6
GENDER	M	EDUC	16
AGE	54	RATINGS	3
BKSREAD	12	STATUS	C
ATTBKS	6.50	SCHOOL	1
ATTFLY	8.12	FLYTIME	2.4

PILOT	19	FLYEXP	7
GENDER	M	EDUC	15
AGE	28	RATINGS	3
BKSREAD	4	STATUS	A
ATTBKS	2.91	SCHOOL	3
ATTFLY	3.88	FLYTIME	6.8

PILOT	14	FLYEXP	14	PILOT	20	FLYEXP	23
GENDER	M	EDUC	16	GENDER	M	EDUC	10
AGE	63	RATINGS	4	AGE	70	RATINGS	2
BKSREAD	7	STATUS	R	BKSREAD	12	STATUS	R
ATTBKS	5.51	SCHOOLS	2	ATTBKS	5.18	SCHOOL	2
ATTFLY	5.74	FLYTIME	29.9	ATTFLY	6.21	FLYTIME	16.3
PILOT	15	FLYEXP	13	PILOT	21	FLYEXP	16
GENDER	M	EDUC	18	GENDER	M	EDUC	14
AGE	57	RATINGS	4	AGE	45	RATINGS	6
BKSREAD	10	STATUS	O	BKSREAD	9	STATUS	A
ATTBKS	6.33	SCHOOLS	1	ATTBKS	4.21	SCHOOL	3
ATTFLY	8.42	FLYTIME	6.1	ATTFLY	7.33	FLYTIME	26.3
PILOT	16	FLYEXP	11	PILOT	22	FLYEXP	8
GENDER	F	EDUC	16	GENDER	M	EDUC	18
AGE	53	RATINGS	8	AGE	49	RATINGS	2
BKSREAD	9	STATUS	O	BKSREAD	15	STATUS	C
ATTBKS	6.11	SCHOOLS	3	ATTBKS	6.94	SCHOOL	1
ATTFLY	7.13	FLYTIME	9.0	ATTFLY	7.67	FLYTIME	3.6
PILOT	17	FLYEXP	26	PILOT	23	FLYEXP	18
GENDER	M	EDUC	14	GENDER	M	EDUC	18
AGE	54	RATINGS	9	AGE	63	RATINGS	6
BKSREAD	23	STATUS	A	BKSREAD	11	STATUS	O
ATTBKS	8.35	SCHOOLS	6	ATTBKS	3.32	SCHOOL	4
ATTFLY	9.00	FLYTIME	28.5	ATTFLY	5.41	FLYTIME	16.0
PILOT	18	FLYEXP	8	PILOT	24	FLYEXP	11
GENDER	M	EDUC	16	GENDER	M	EDUC	16
AGE	29	RATINGS	4	AGE	56	RATINGS	4
BKSREAD	13	STATUS	A	BKSREAD	7	STATUS	O
ATTBKS	6.95	SCHOOLS	2	ATTBKS	4.12	SCHOOL	3
ATTFLY	8.10	FLYTIME	6.3	ATTFLY	4.62	FLYTIME	17.2
PILOT	25	FLYEXP	12	PILOT	31	FLYEXP	12
GENDER	M	EDUC	16	GENDER	F	EDUC	16
AGE	56	RATINGS	5	AGE	39	RATINGS	5
BKSREAD	21	STATUS	R	BKSREAD	10	STATUS	A
ATTBKS	9.00	SCHOOLS	3	ATTBKS	6.33	SCHOOL	2
ATTFLY	8.33	FLYTIME	18.1	ATTFLY	7.10	FLYTIME	7.4
PILOT	26	FLYEXP	13	PILOT	32	FLYEXP	10
GENDER	M	EDUC	6	GENDER	M	EDUC	14
AGE	50	RATINGS	5	AGE	35	RATINGS	5
BKSREAD	6	STATUS	C	BKSREAD	6	STATUS	A
ATTBKS	3.12	SCHOOLS	2	ATTBKS	5.81	SCHOOL	3
ATTFLY	5.91	FLYTIME	17.5	ATTFLY	6.20	FLYTIME	16.1

PILOT	27
GENDER	M
AGE	53
BKSREAD	10
ATTBKS	6.44
ATTFLY	7.33
FLYEXP	18
EDUC	16
RATINGS	5
STATUS	C
SCHOOLS	3
FLYTIME	21.3

PILOT	28
GENDER	M
AGE	26
BKSREAD	3
ATTBKS	2.34
ATTFLY	8.33
FLYEXP	8
EDUC	16
RATINGS	4
STATUS	M
SCHOOLS	3
FLYTIME	4.5

PILOT	29
GENDER	F
AGE	27
BKSREAD	4
ATTBKS	4.33
ATTFLY	6.10
FLYEXP	9
EDUC	14
RATINGS	4
STATUS	C
SCHOOLS	2
FLYTIME	4.4

PILOT	33
GENDER	M
AGE	34
BKSREAD	5
ATTBKS	6.23
ATTFLY	6.20
FLYEXP	11
EDUC	16
RATINGS	5
STATUS	A
SCHOOL	3
FLYTIME	12.2

PILOT	30
GENDER	M
AGE	68
BKSREAD	5
ATTBKS	5.31
ATTFLY	6.10
FLYEXP	8
EDUC	14
RATINGS	5
STATUS	C
SCHOOL	3
FLYTIME	4.3

SPSS1 Statistical Program for Aviation Literature

```
data list file='a:heartsur.dat' fixed / id 1-4 gender 5 age
 6-7 books1 to books30 9-38 attbks1 to attbks17 40-56
/ attfly1 to attfly20 1-40 flyexp1 to flyexp35 42-76
/ educ 1-2 ratings1 to ratings9 3-11 status1 to status5 12-16
schools1 to schools9 17-25 flytime1 to flytime7 27-54.

missing values id gender ratings1 to ratings9 status1 to status5
(0)/
flyexp1 to flyexp35 schools1 to schools9 flytime1 to flytime7(9)/
age books1 to books30 attfly1 to attfly20 educ (99).

variables labels   gender      'gender of respondent'
                   age         'age'
                   books1      'FATE IS THE HUNTER'
                   books2      'THE PROBABLE CAUSE'
                   books3      'STRANGER TO THE GROUND'
                   books4      'WIND, SAND AND STARS'
                   books5      'WE'
                   books6      'THE CROWDED SKY'
                   books7      'GOD IS MY COPILOT'
                   books8      'THE BLUE MAX'
                   books9      '12OCLOCK HIGH'
                   books10     'BAA BAA BLACK SHEEP'
                   books11     'THE FLYING CARPET'
                   books12     'VIEW FROM THE COCKPIT'
                   books13     'THE FIRST AND THE LAST'
                   books14     'FLYING THE OLD PLANES'
                   books15     'THUD RIDGE'
                   books16     'THE LEFT SEAT'
                   books17     'EIGHT HOURS TO SOLO'
                   books18     'THE HIGH AND THE MIGHTY'
                   books19     'NO GUTS NO GLORY'
                   books20     'YEAGER'
                   books21     'ILLUSIONS'
                   books22     'AEROBATICS'
                   books23     'ISLAND IN THE SKY'
                   books24     'THE SPIRIT OF ST. LOUIS'
                   books25     'NOTHING BY CHANCE'
                   books26     'LOUD AND CLEAR'
                   books27     'RICKENBACKER'
                   books28     'NIGHT FLIGHT'
                   books29     'STICK AND RUDDER'
                   books30     'THIRTY SECONDS OVER TOKYO'
```

```
                attbks1 to attbks17    'attitude to books-sd'
                attfly1 to attfly20    'attitude to flying'
                flyexp1 to flyexp35    'flying experience'
                educ                   'years formal education'
                ratings1 to ratings9   'FAA ratings'
                status1 to status5     'flying status'
                schools1 to schools9   'pilot training schools'
                flytime1 to flytime7   'flying time in hours'.

value labels      gender       1 'male'  2 'female'/ books1 to
                               books30
                  5 'strongly agree' 4 'agree' 3 'undecided' 2
                  'disagree' 1 'strongly disagree'
                  0 'not read' /
                               attbks1 to attbks17
          9  'strongly agree'
          8  'moderately agree'
          7  'agree'
          6  'mildly agree'
          5  'undecided'
          4  'mildly disagree'
          3  'disagree'
          2  'moderately disagree'
          1  'strongly disagree' /
attfly1 to attfly20
          5 'severly agree'
          4 'strongly agree'
          3 'agree'
          2 'mildly agree'
          1 'slightly agree'
          0 'undecided'
         -1 'slight disagree'
         -2 'mildly disagree'
         -3 'disagree'
         -4 'strongly disagree'
         -5 'severly disagree' /
flyexp1 to flyexp35    1 'yes' 0 'no' /
ratings1 to ratings9   1 'yes' 0 'no' /
status1 to status5     1 'yes' 0 'no' /
schools1 to schools9   1 'yes' 0 'no' .

title 'Flying Opinionnaire: Attitude and Reading'.

frequencies variables =gender books1 to books30 ratings1 to ratings9
 status1 to status5 schools1 to schools9 flyexp1 to flyexp35.
```

```
descriptives variables= attbks1 to attbks17
attfly1 to attfly20  educ flytime1 to flytime7.

means books1 to books30 by gender.

compute books31=books1+books2+books3+books4+books5+books6+books7.

compute books32=books31+books8+books9+books10+books11+books12.

compute books33=books32+books13+books14+books15+books16+books17.

compute books34=books33+books18+books19+books20+books21+books22.

compute books35=books34+books23+books24+books25+books26+books27.
compute books=books35+books28+books29+books30.

com attbks1=10-attbks1.
com attbks2=10-attbks2.
com attbks5=10-attbks5.
com attbks6=10-attbks6.
com attbks7=10-attbks7.
com attbks10=10-attbks10.
com attbks11=10-attbks11.
com attbks12=10-attbks12.
com attbks15=10-attbks15.
com attbks16=10-attbks16.
com attbks17=10-attbks17.
com attbks18=attbks1+attbks2+attbks3+attbks4+attbks5+attbks6+attbks7+
attbks8.
com
attbks19=attbks18+attbks9+attbks10+attbks11+attbks12+attbks13+
attbks14.
com attbks=attbks19+attbks15+attbks16+attbks17.

com attfly1=6-attfly1.
com attfly2=6-attfly2.
com attfly3=6+attfly3.
com attfly4=6-attfly4.
com attfly5=6+attfly5.
com attfly6=6+attfly6.
com attfly7=6+attfly7.
com attfly8=6-attfly8.
com attfly9=6-attfly9.
com attfly10=6-attfly10.
com attfly11=6+attfly11.
com attfly12=6+attfly12.
```

```
com attfly13=6-attfly13.
com attfly14=6-attfly14.
com attfly15=6-attfly15.
com attfly16=6-attfly16.
com attfly17=6-attfly17.
com attfly18=6-attfly18.
com attfly19=6+attfly19.
com attfly20=6-attfly20.

com
attfly21=attfly1+attfly2+attfly3+attfly4+attfly5+attfly6+attfly7+
attfly8.
com
attfly22=attfly21+attfly9+attfly10+attfly11+attfly12+attfly13+
attfly14.
com
attfly=attfly22+attfly15+attfly16+attfly17+attfly18+attfly19+
attfly20.

com
flyexp36=flyexp1+flyexp2+flyexp3+flyexp4+flyexp5+flyexp6+flyexp7+
flyexp8.
com
flyexp37=flyexp36+flyexp9+flyexp10+flyexp11+flyexp12+flyexp13+
flyexp14.
com
flyexp38=flyexp37+flyexp15+flyexp16+flyexp17+flyexp18+flyexp19+
flyexp20.
com
flyexp39=flyexp38+flyexp21+flyexp22+flyexp23+flyexp24+flyexp25+
flyexp26.
com
flyexp40=flyexp39+flyexp27+flyexp28+flyexp29+flyexp30+flyexp31+
flyexp32.
com flyexp=flyexp40+flyexp33+flyexp34+flyexp35.

regression variables gender age books attbks attfly flyexp educ
flytime7/dependent=books/method=backwards.

correlations variables=age attbks1 to attbks17
attfly1 to attfly20 educ flytime1 to flytime7.
set listing='a:hart.out'.
reliability /VARIABLES attfly1 to attfly20 .

reliability / VARIABLES attbks1 to attbks17.
```

```
SPSS2 Statistical Program for Aviation Literature
[Used for the 25 judges regression and Q-sort]
data list file = 'a:\jan.dat' / id 1-2 gender 3 age 4-5 bksread 6-7
     attbks 8-11 attfly 12-15 flyexp 17-18 educ 19-20 ratings 21
     schools 22 flytime 23-26 judge 27-28 qsort 29.
variable labels id 'identification number'
                gender ' sex of respondent'
                books 'number of books read'
                attbks 'attitude towards books'
                attfly 'attitude towards flying'
                flyexp 'flying experience'
                educ   'years of formal education'
                ratings 'FAA ratings'
                schools 'number of flying schools'
                flytime 'flying time in hours'
                judge   'judge for panel of pilots'
                qsort   'Q sort grade assigned by judge'.
value labels
                gender 1 'male' 2 'female'.
set more = off.
set length = 59.
set listing = 'g:\home\gary\temp\jan.lis'.
sort cases by judge.
process if judge = 1.
regression variables gender to flytime  qsort/
          dependent=qsort/
          method=backwards.
process if judge = 1.
correlations variables =gender to flytime qsort.
process if judge = 2.
regression variables gender to flytime  qsort/
          dependent=qsort/
          method=backwards.
REM This iteration continued through judge 25
process if judge = 25.
regression variables gender to flytime  qsort/
          dependent=qsort/
          method=backwards.
process if judge = 25.
correlations variables =gender to flytime qsort.
```

```
SPSS3 Statistical Program for Aviation Literature
get file = 'a:sysfile.sub'.
count books = books1 to books30 (0).
compute books = 30 - books.
if (books <= 10) bksread = 1.
if (books > 10 and books <= 20) bksread = 2.
if (books > 20) bksread = 3.
if (age <= 35) agegroup = 1.
if (age > 35 and age <= 50) agegroup = 2.
if (age > 50 and age <= 60) agegroup = 3.
if (age > 60) agegroup = 4.
if (educ <= 12) college = 1.
if (educ > 12 and educ <= 15) college = 2.
if (educ = 16) college = 3.
if (educ > 16) college = 4.
if (status1 = 1) status = 1.
if (status2 = 1) status = 2.
if (status3 = 1) status = 3.
if (status4 = 1) status = 4.
if (status5 = 1) status = 5.
variable labels books 'number of books read'
                bksread 'Level of Book Reading'
                agegroup 'Age Group'
                college 'College Level'
                status 'Status'.
value labels bksread 1 '0 to 10' 2 '11 to 20' 3 '21 to 30'
             /agegroup 1 'Less than 35' 2 '36 to 50' 3 '51 to 60' 4 '60+'
             /college 1 'none' 2 'some' 3 'grad' 4 'post'
             /status 1 'civilian' 2 'military' 3 'airline' 4 'retired'
              5 'other'.
set listing = 'g:\home\gary\temp\subj.lis'.
crosstabs tables = agegroup by bksread
                 /cells = count row column total
                 /statistics = chisq.
crosstabs tables = college by bksread
                 /cells = count row column total
                 /statistics = chisq.
crosstabs tables = gender by bksread
                 /cells = count row column total
                 /statistics = chisq.
crosstabs tables = status by bksread
```

```
                /cells = count row column total
                /statistics = chisq.
compute attbks = attbks1 + attbks2 + attbks3 + attbks4 + attbks5 + attbks6
              + attbks7 + attbks8 + attbks9 + attbks10 + attbks11
              + attbks12 + attbks13 + attbks14 + attbks15 + attbks16
              + attbks17.
compute attfly = attfly1 + attfly2 + attfly3 + attfly4 + attfly5
              + attfly6 + attfly7 + attfly8 + attfly9 + attfly10
              + attfly11 + attfly12 + attfly13 + attfly14 + attfly15
              + attfly16 + attfly17 + attfly18 + attfly19 + attfly20.
variable labels  attbks 'attitude toward books' attfly 'attitude toward flying'
corr var = attbks attfly.
reliability /var attfly1 to attfly20.
reliability /var attbks1 to attbks17.
frequencies var = attbks1 to attbks17
              /format = notable
              /statistics = median mean.
frequencies var = attfly1 to attfly20
              /format = notable
              /statistics = median mean.
sort cases by flytime7 (d).
compute flyexp = flyexp1 + flyexp2 + flyexp3 + flyexp4 + flyexp5
              + flyexp6 + flyexp7 + flyexp8 + flyexp9 + flyexp10
              + flyexp11 + flyexp12 + flyexp13 + flyexp14 + flyexp15
              + flyexp16 + flyexp17 + flyexp18 + flyexp19 + flyexp20
              + flyexp21 + flyexp22 + flyexp23 + flyexp24 + flyexp25
              + flyexp26 + flyexp27 + flyexp28 + flyexp29 + flyexp30
              + flyexp31 + flyexp32 + flyexp33 + flyexp34 + flyexp35.
variable labels flyexp 'flying experience'.
compute attbks = attbks/17.
compute attfly = attfly/20.
list var = id code attbks attfly flyexp flytime7.
frequencies variables = attbks1 to attbks17
  /histogram.
frequencies variables = attfly1 to attfly20
  /histogram.
```

Letter from Respondent No. 347

DEAR GARY,

Hope you get the info you need. I had a very difficult time answering the "ATTITUDE TOWARD FLYING" portion. THIS SHOULD HAVE BEEN BROKE IN HALF BETWEEN FLYING COMMERCIALLY & FLYING-PLEASURE.

AS A 15,000 HOUR COMMERCIAL PILOT for a major airline, do I care if I go fly a 727 tomorrow? HELL NO.

I am a war bird owner and homebuilder also. Would I be devestated if I couldn't continue flying and tinkering with these? Hell yes.

See what I mean. Also 20 years ago I would have answered all of the questions differently. Yet you don't ask age or total time. Attitudes change.

Also 20 years ago I hadn't read Bach or St. Ex. But I had read Beck, Morgan and a few others. I think now that ST. EX., BACH, & LINDBERGH ARE THE GREAT AVIATION WRITERS AND BACH IS AN ABSOLUTE FLAKE. HIS EARLY 3 books O.K. but his later attempts an

Letter continued

absolute exploitation of flying as an attempt to recover financially and push new age type garbage under the guise of flying. Who needs Yeager blowing his own horn for money? I'd bet money that Yeager never read BANK or St. Ex. I'm not sure Robert Scott was even there.

Lea Morgan has withstood my test of time. Gordon BAXTER HAS NOT. Probably a good writer and guy but rarely goes flying.

What are some other books every pilot should read? Every what kind of pilot? pleasure, airline? Every airline pilot should read High Horizons by Frank Taylor. Tells all the beginnings of [redacted] Airline History in America.

Every military pilot should read Flight to Arras by St. Ex. Tells about the futility of war and some missions. Every freight dog should read Southern Mail & Night Flight by St. Ex. How about Faulkner's "Pylon" for air race pilots. Early 20's lit. I guess I thought your questionaire was a little to general. What is interesting to a pilot depends on age and where he is at in his career. Stick with the time-tested would be my advice.

Sincerely

Ryan Stewart

THE LIST OF AVIATION BOOKS[a]

The airline pride almost bought

Allen, Revolution in the sky

Anvil of the gods

Aymar, Men in the air

Babington, Testing time

Bach, Biplane

Bach, A gift of wings

Bach, Johnathan Livingston Seagull

Bauer, The flying mystique

Beaty, The human factor

Beaty, The water jump

Berent, Rolling thunder

Berent, Steel tiger

Bernstein, Grounded

Blesse, Check six

Blount, We band of brothers

Bond, The love and fear of flying

Boyd, The Soviet Air Force

Boyne, Trophy for eagles

Boyne, The wild blue

Brickhill, Reach for the sky

Broughton, Going downtown

Brown, Day of the cheeta

Brown, Flight of the old dog

Bryan, Aircraft carrier

Buck, The art of flying

Buck, Flying know how

Buck, Instrument flying

Buck, Weather flying

Burgess, Jungmeister junket

Cactus air force

Caiden, Ragwings and heavy iron

Carpenter, The steel albatross

Christy, Summon the stars

Clancy, First flight

Closterman, The big show

The clouds remember

Coffey, Decision over Schweinfurt

Coffey, Iron eagle

Cole, Conquest of lines and symmetry

Cole, Roll around a point

Collins, Takeoffs and landings

Collins, Thunderstroms and airplanes

Collins, Carrying the fire

Collins, Instrument flying

Collins, Tips to fly by

Combs, Kill Devil Hill

Confessions of Captain X

Conway, The joy of soaring

Coonts, Flight of the avenger

Coonts, Flight of the intruder

Corrigan, That's my story

Crane, The pilot's brain, mind and memory

Crouch, The Bishop's boys

Cunningham, Fox two

Dailey, Silverwings

Dassault, The talisman

Davies, Handling the big jets

Dawn patrol

Deleeuw, Lindbergh: lone eagle

Divine thunder

Douglas, Combat and command

Durham, Strawman

Dwiggins, The barnstormers

Eagle squadron

Eschman, Linebacker

Faulkner, Pylon

Feet wet

Ferguson, Random track to Peking

Flying the line

Flying the wing

Forbes, Goodbye to some

Forrester, Fly for you life

Forseyth, Biafra story

Forseyth, The sheppard

Freeman, The mighty eighth

Frede, The pilots

Fry, Escort to Berlin

Fuller, The ghost of flight 401

Gann, The aviator

Gann, Band of brothers

Gann, Benjamin Lawless

Gann, The blackwatch

Gann, Blaze of noon

Gann, Gentlemen of adventure

Gann, Hostage to fortune

Gann, Soldier of fortune

Getting off the ground

Gibbons, The Red Knight of Germany

Gibbs, The invention of the airplane

Gibson, Enemy coast ahead

Gill, Lindbergh alone

Glen Curtiss: Pioneer of flight

Glines, Jimmy Doolittle

Godfrey, The look of eagles

Golding, Magic marathon man

Golley, Whittle

Goodbye Mickey Mouse

Goodson, Tumult in the clouds

GPO, Airman's information manual

GPO, Aviaton weather

GPO, F-16 dash one

GPO, Federal aviation regulations

GPO, Flight training handbook

Grinnell, Wind in the wire

Grosser, Gossamer odyssey

Gurney, Flying aces of World War I

Haines, Command decision

Hall, 1000 destroyed

Halvorsen, Steeds in the sky

Harker, The engines were Rolls Royce

Harrison, A lonely kind of war

Harrison, Storming intrepid

Haviland, The eagle war

Healy, Cutting edge

Heilman, I fought you from the sky

Heinmuller, Man's fight to fly

Heller, Catch-22

Henjhaw, High for a Merlin

Henjhaw, New gull

Herman, Warbirds

Hess, Battle hymn

Holden, Lady birds

Holden, Lady birds II

The Holy Bible

Hood, The sky racers

Hopkins, Flying the line

Houston, Going higher

Howard, Wilbur and Orville

Huey

Hurley, Billy Mitchell

Hurt, Aerodynamics for naval aviators

Ingellis, The Lockheed story

Irwin, To rule the night

Jackson, The Red Falcons

Jaynes, Eagles must fly

Johnson, Full circle

Johnson, Thunderbolt

Johnson, Wing leader

Kamikaze

Kaplan, One last look

Kershner, Student manuals

Key, The red eagle

Kurt, Water flying

The lady who tamed Pegasus

Lanchbery, The saga of flight

Larson, To fly the Concorde

Lasley, Turn the tigers loose

The last enemy

Lay, I wanted wings

Leading edge

Lee, No parachute

Leib, Fire arrow

LeMay, Mission with LeMay

LeVier, Pilot

Lewis, Sagittarius rising

Lincke, Jenny was no lady

Lindbergh, A., North to the orient

Lindbergh, Of flight and life

Lindbergh, Autobiography of values

Lindbergh, A., Listen, the wind

Loomis, Amelia Earhart

Lorenzo, Grounded

Lovell, Straight on till morning

Lucas, Wings of war

Manningham, Systems controls

Markham, West with the night

Mason, Chickenhawk

Mason, Stalls, spins and safety

Maverick

Mayer, Climb for the evening star

McCullough, Thorn birds

McDonald, Youth must fly

McMurtry, Lonesome dove

Merek, Target stealth

Michener, Bridges at Toko-ri

Michener, Space

Monks, Squadron up

Montague, Oceans, poles and airmen

Morgan, Reflections of a pilot

Morris, Alpha bug

Moseley, Lindbergh: A biography

Mosquito

Murchie, Song of the sky

Nance, Blind trust

Nance, Splash of colors

Newton, Severe weather flying

Noah, Wings God gave my soul

Nordoff, Falcons of France

Old Soggy #1

Over the beach

Over the earth

Peters, In search of excellence

Pilot error

The pilot maker

Pistole, Flying Tigers

Powers ,Operation overflight

Reichmann, Cross-country soaring

Reichman, Flying sailplanes

Reeves, Glacier pilot

Reitch, Flying is my life

Reynolds, They fought for the sky

Rickenbacker, Fighting the flying circus

Rickenbacker, I thought I heard the angels sing

Risner, The passing of the night

Robbins, Air America

Robbins, The ravens

Robinson, Piece 'o cake

Robinson, Flying the world's greatest aircraft

Ross, The last hero: Charles A. Lindbergh

Rudel, Stuka pilot

Saint-Exupéry, Airman's odessy

Saint-Exupéry, Flight to Arras

Saint-Exupéry, The little prince

Saint-Exupéry, Southern mail

Sakai, Sumarai

Schiff, The proficient pilot

Serling, Wings

Serling, She'll never get off the ground

Shannon, The predatory female

Short, Of men and mustangs

Shute, Steven Morris sky struck

Solberg, Conquest of the skys

Smith, Flights of fancy

Smith, Weekend pilot

Steinhoff, The final hours

Stewart, Aviation: The creative ideas

Stiller, Serenade to the big bird

Swick, The Luscombe story

Taylor, Command decisions series

Taylor, Fair-weather flying

Taylor, High horizons

Taylor, Instrument flying

Taylor, Positive flying

Taylor, The war lover

Thomas, Aircraft engine operating guide

Thomas, Doolittle: A biography

Thomas, Firefox

Thomas, Snow falcon

Thomas, Wildcat

Thomas, Winterhawk

Thurston, Design for safety

Thurston, Design for flying

Tiburizi, Take off

Tolliver, Horrido

Townsend, Duel of eagles

Trammel, Cause and circumstance

Trevor, Squadron airborne

Vader, Spitfire

Vasko, I'd rather be flying

Von Kármán, Aerodynamics

Von Kármán, The wind and beyond

Wager with the wind

Walsh, One day at Kitty Hawk

Welch, Accidents happen

Whittle, Jet

Who really shot the Red Baron?

Wiley, Airplance performance, stability and control

Willock, The fighters

Willows, Damn serious business

Wilson, The airman's world

Wolfe, The right stuff

Woodward, The battle for Leyte Gulf

Wyle, The homestead grays

Yeager, Breaking the sound barrier

Zweng, Airplane manual

Note. Pilot write-in recommendations: 100 most experienced pilots = 11 books, other pilot subjects = 77, pilot judges = the remainder of the books.

[a]No bibliographic data provided.

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