THE EFFECT OF MANAGEMENT INSTABILITY ON AIR LINE PILOTS AND THEIR FAMILIES: AN OVERVIEW OF SOURCES, MEDIATORS, AND SYMPTOMS OF STRESS

by

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(ABSTRACT)

This study was based on a portion of data collected in the first half of a proposed two-part survey examining the effects of unstable airline working conditions on pilots and their families. The survey was a descriptive, exploratory investigation of two pilot groups (N = 425). Data were drawn from a random sample of those pilots (n = 205) employed by an airline with chronic unstable working conditions, and those pilots (n = 220) employed by airlines with stable conditions. Several major variables from a multi-dimensional systems model of stress were selected to evaluate differences in stress symptoms, life event strains, family resources, and perceptions of control between pilot groups and between spouse groups. A major hypothesis tested by this report was that increases in pilot stress symptomology would be related to unstable airline working conditions. When differences between pilot groups and spouse groups were analyzed on the Family Inventory of Life Events (FILE), a self report symptoms of stress scale (SOS), the Family Adaptability and Cohesion Evaluation Scales (FACES III), and the Attribution Questionnaire, pilots and spouses found to have the highest stress symptoms and total family strains were those from the unstable airline. In addition, a large subtotal of pilot families across carriers were found to be low functioning families. The results of the study document the importance of

unstable airline working conditions as an explanatory variable in examining pilot stress. It is suggested that understanding the pilot stress process depends on the recognition of work/family/ individual systems interdependence. Implications of findings and directions for future research were presented.

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This thesis was developed from information gathered on the Pilot Stress Project. It is the end result of a year of research on airline pilots and their families. The author was part of a team: student, psychologist, and statistical analyst.

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THE EFFECT OF MANAGEMENT INSTABILITY ON AIR LINE PILOTS AND THEIR FAMILIES: AN OVERVIEW OF SOURCES, MEDIATORS, AND SYMPTOMS OF STRESS

Accidents have been called the ultimate symptom of stress (Voydanoff, 1980). There may be upward of 500 passengers, 15 crew members, and countless numbers of ground casualties involved in each airline accident. With up to 80% of all aviation mishaps attributed to pilot error, research has begun to focus on the human factors element as an important variable in civilian and military accident investigations (Chopping, 1976; Haakonson, 1980; Sanders & Hoffman, 1975). Recent research has found that pilot performance deteriorates with accumulated stress (Berkowitz & Perkins, 1984). Several studies have now linked pilot career strain, financial setbacks, and interpersonal problems to aircraft mishaps, underscoring the importance of the relationship between contextual stress factors and pilot performance (Alkov & Borowsky, 1980; Alkov, Borowsky, & Gaynor, 1982; Alkov, Gaynor, & Borowsky, 1985; Sloan & Cooper, 1985).

One of the major tenets of systems theory is the interconnectedness of system parts and of whole systems. The systemic paradigm implies that pilot stress is a reciprocal process that can only be understood in terms of interactions among interfacing work, family, and individual systems. Although over forty years of research has documented the relationship between work stress and family disruption, economic hardship, and individual symptomology (Angell, 1936; Bakke, 1940; Briar, 1978; Figley & McCubbin, 1983), to date this

multi-systemic perspective has not been applied to the study of pilot stress.

Since the 1978 deregulation of the nation's airline system, the impact upon airline pilots and their families of more than eight years of unprecedented numbers of airline bankruptcies, mergers, sales and takeovers, of extensive price wars, intense competition for passengers and assets, and of major corporate losses, has remained unknown (see Table 1). Also unknown are the effects upon pilots and their families of the industry-wide focus on profitability, cost reductions, and increased productivity. Escalating management/labor confrontations, contract concessions, paycuts, and the ongoing anticipation of furloughs and job loss, are also undocumented.

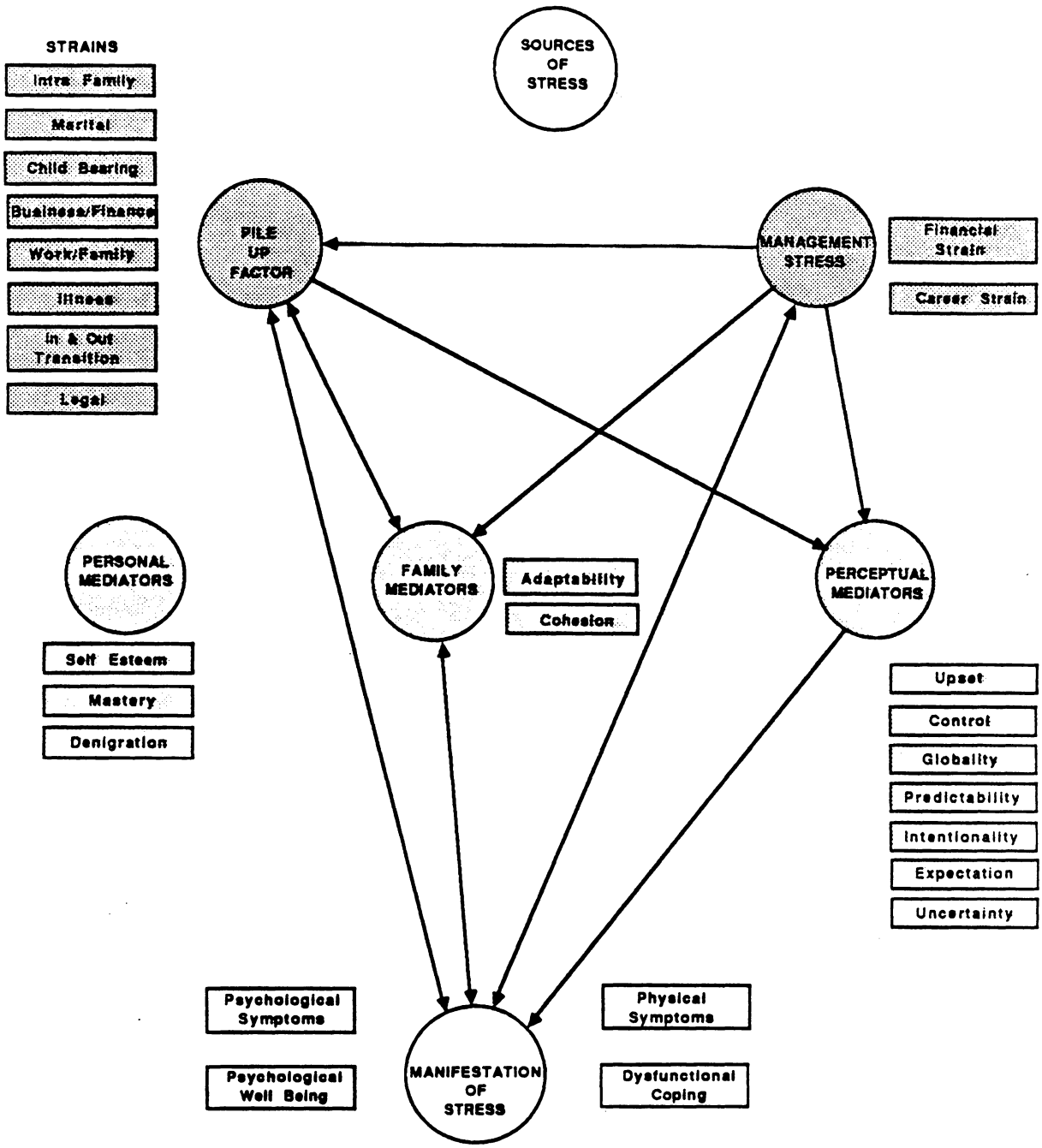
Because little attention has been given to the contribution of unstable airline working conditions to the risk of pilot stress, it is the purpose of this research project to examine the linkage between airline instability and symptoms of stress in pilots and their families. In addition, a second goal is to measure the scope of these effects.

Efforts made to explain stress in theoretical and empirical studies have traditionally focused on the relations among sources, mediators, and manifestations of stress. In an attempt to clarify the complex interconnections among work/individual/family systems in the investigation of pilot stress, the following model (see Figure 1) was constructed based on current stress and family systems literature (Hammen & Mayol, 1982; McCubbin & Patterson, 1981; Olson & Portner,

Table 1

Chronology of 1986 Airline Industry Consolidation

1986:	January	- Republic Airlines merged with Northwest Airlines.
		- Piedmont Aviation purchased Empire Airlines.
	February	- People Express took over Providence-Boston Airlines.
		- United Airlines purchased the Pacific Division of Pan American World Airways.
		- Trans World Airline bought Ozark Air.
		- Texas Air Corporation agreed to purchase Eastern Air Lines.
	April	- Pan American World Airways bought Ransome Airlines.
	May	- Southwest Airlines merged with Meese Air.
	July	- United Airlines announced it would buy Frontier Airlines.
		- Northwest Airlines bought a half interest in TWA's $400 million computer reservation system.
		- Presidential Airways agreed to purchase Key Airlines.
	August	- Presidential Airways bought Colgan Airways.
	September	- Delta Airlines bought Western Airlines.
		- Texas Air bought People Express.
		- US Air announced it would acquire Pacific Southwest Airlines.



1. Circles denote latent variables or constructs.
2. Rectangles denote measured variables.
3. Arrows denote several proposed directional relationships.

Figure 1. Model of multi-dimensional stress process.

1983; Pearlin, Lieberman, Mengghan, & Mullan, 1981). It is intended to serve as a framework for identifying and explaining the many interacting factors that may be involved in the pilot stress process.

Sources of Stress

Holmes and Rahe (1967) considered job loss eighth in their list of stressful life events, and, indeed, it has been found that even anticipation of job loss can result in severe personal and family stress. Studies of plant closings have shown that the period of prolonged anticipation of job loss, wage cuts, and bankruptcy can be as detrimental to the worker as the event itself (Kasl, Gore, & Cobb, 1975).

Job disruptions have been found to impact the family chiefly through loss of income. The effects of economic strains can be reflected in both the marital system and the family system. Numerous studies have linked job disruption to increased marital strain, disturbed sexual relations, loss of authority, family violence, behavioral problems in children, and divorce (Briar, 1978; Cavan, 1959; Pearlin et al., 1981; Voydanoff, 1980).

Life Events

In addition to the major stressor of career instability, pilots and their families must also cope with new and ongoing life events that may be stressful and require adaptation. Research has shown that stressful life events and changes (e.g., divorce, illness, increased alcohol use, legal difficulties) will tend to cluster near the occurrence of a major stressor such as job disruption, a tendency

McCubbin and Patterson (1981) have termed "pile up of demand." As the pile up factor increases, individuals and families can lose their ability to cope and adapt, feeling overwhelmed and becoming susceptible to psychological and physical symptoms of stress (Holmes & Rahe, 1967). A growing number of studies has reported a positive relationship between depression, suicide, schizophrenia, anxiety, and other psychiatric symptoms and increased numbers of recent life events (Grant, Sweetwood, Yager, & Gerst, 1981; Monroe, 1982; Tennant & Andrews, 1978). Rahe and Lind (1976) have reported a correlation between accumulated stressful life events and sudden cardiac death, accidents, injuries, tuberculosis, leukemia, multiple sclerosis, and diabetes.

Mediators of Stress

Exposure to stressors alone is not sufficient to explain the onset of stress symptoms. Stress is not only a function of the duration or intensity of its sources; other factors called mediators influence their impact. Two such mediators, individual perception of events and the quality and availability of family resources, have been shown to be related to the course of adaptation to stress. Therefore, the nature of these mediators must be considered in evaluating the pilot stress response (Hammen, Krantz, & Cochran, 1981; Olson, Sprenkle, & Russell, 1979).

Figley and McCubbin (1983) call families "critical" to the survival of victims of crisis. Their vast resources and strengths can limit the impact of stress. Many studies have found that support from

the family can reduce the impact of unemployment (Billings & Moos, 1982; Jackson & Maslach, 1982; Voydanoff, 1980). Bakke (1940) determined that the primary factors involved in successful adjustment to unemployment were the family's adaptability and cohesion resources. But severe external stressors can alter the family's ability to provide support. Rabkin and Struening (1976) found that the more severe the stressor, the less significant the role of family support in buffering its effect. If conditions are sufficiently stressful, individual and family stress symptoms are certain.

The degree of disorganization experienced following a stressor event depends not only on availability of family resources but on individual perception of the events as well (O'Toole, 1974). Many researchers have hypothesized that it is the appraisal of events, rather than their occurrence, that shapes the intensity of response. In particular, studies have pointed to the perception of the controllability of an event as the crucial mediator of event impact (Dohrenwend, 1977; Dohrenwend & Martin, 1979). Numerous studies are in agreement that individuals who experience high levels of stressful events, and who perceive themselves to be helpless to control those events, are most susceptible to symptoms of stress (Dohrenwend & Martin, 1979; Johnson & Sarason, 1978; Schmale, 1972).

Manifestations of Stress

Unemployment, job instability, job strain, and job dissatisfaction have all been linked to a wide range of mental and physical disorders. Slote's (1977) study of a plant closing found

that over half the employees suffered from ulcers, arthritis, hypertension, and alcoholism. House (1974) linked job pressure, work overload, responsibility and role conflict to greater risk of heart disease. Margolis and Kroes (1974) implicated low job satisfaction with increased rates of coronary heart disease.

In addition to physical illness, work stress has been strongly linked to a variety of psychological disorders. Among these, depression has emerged consistently as a global indicator of stress. Paykel (1978) found that work stress and marital problems were most frequently reported by patients suffering from depression. In life event research, it has been found that events perceived as undesirable, uncontrollable, threatening, or those involving loss, are most likely to precede depression (Hammen et al., 1981; Hammen & Mayol, 1982; Johnson & Sarason, 1972; Lloyd, 1980; Sarason, Johnson, & Siegel, 1978).

The present research goes beyond previous efforts to understand pilot stress (Alkov et al., 1985; Fry & Reinhardt, 1969; Prelooker, 1985; Shuckburg, 1975) by extending the analysis beyond individual assessment to include both work system and family system functioning as key variables. These variables were selected because of their consistent identification in research literature with stress symptomology. Their inclusion should enable the researcher to better understand their role in influencing the pilot's vulnerability to stress symptoms.

Based on previous research linking job disruption with individual and family stress symptoms, it was predicted that pilots employed by an unstable carrier would report significantly more individual and family symptomology than pilots employed by stable airlines. This prediction was based on the assumption that stress is a contextual phenomenon, a direct consequence of the relationship between individual and environment (Haley, 1981; Watzlawick, Weakland, & Fisch, 1974).

Methodology

Subjects

In each of three airlines, a simple random sample was taken from the total population of Air Line Pilot Association (ALPA) members. Approximately 96% of all the pilots employed by the three airlines involved were union members. Based on a percentage of total pilots from each carrier, a sample of 401 pilots was drawn from a major, unstable carrier, and samples of 215 and 223 pilots, respectively, were taken from each of two major stable carriers. Of the total 839 airline pilots, 425 pilots returned usable questionnaires, 205 pilots from the unstable airline and 220 pilots from the stable airlines. In addition, 391 spouse questionnaires were returned.

Airlines were chosen for this study by the researcher and ALPA based on three criteria: sale, merger, or takeover of the company within the previous 12 months; airline net loss reported for the last two earning periods; and employee wage/work rules concessions in the last contract.

The carrier selected as unstable was sold within the last year. After more than eight consecutive years of losses (except 1985), it reported net losses in 1986 of 110.6 million dollars for the first quarter and 44 million dollars for the second quarter earning periods (Jet A Fuel, 1986). It had a total debt of 4.0 billion dollars, the largest in the airline industry ("To the Vanquished," 1986). And in the last contract (1986), management negotiated with employees for 90 million dollars in wage/work rule concessions. (See Table 2 for complete history of contract concessions.)

The two carriers selected as stable each declared net second quarter profits for 1986 of 26.7 and 36.7 million dollars respectively (Jet A Fuel, 1986); remained free of merger, sale, takeover or bankruptcy; and employees received increases in wages in the last contract (L. Schulte, personal communication, September 1986). The purpose of using stable airlines was to establish a baseline of airline pilot stress which was operationally defined as "normal pilot stress." Two stable airlines were chosen to control for possible idiosyncratic (i.e., geographic) differences.

Instruments

A multidimensional stress model was tested in the questionnaire via the use of ten stress instruments. This research study focused on four of those dimensions, and thus four measures of stress were used for the data analysis.

Family life events were measured by The Family Inventory of Life Event and Changes (McCubbin, Patterson, & Wilson, 1981). FILE is a 71

Table 2

Total Value of Employee Net Concessions of Unstable Airline*

Year	All Employees As A Group	Employees Excluding Pilots	Pilots' Concessions	
1976	32.0	24.3	7.7	Wages for warrants or profit-sharing
1977	12.0	9.0	3.0	Variable Earning Program
	(6.0)	(4.5)	(1.5)	Return of profit-sharing
1978	(9.6)	(7.3)	(2.3)	Return for profit-sharing
	(9.8)	(7.4)	(2.4)	Variable Earning Program payout
1979	22.8	17.3	5.5	Variable Earning Program
	(7.4)	(5.6)	(1.8)	Return of profit-sharing
1980	37.3	28.3	9.0	Variable Earning Program
1981	40.6	30.9	9.7	Variable Earning Program
	17.8	0.8	17.0	Productivity & wage freeze
1982	37.7	28.7	9.0	Variable Earning Program
	75.0	54.0	21.0	Wage freeze
1983	206.6	86.6	120.0	Prod. & debentures
1984	295.0	217.0	78.0	Wages for stock (net)
1985	90.0	45.0	45.0	1985 wage plans (net)
TOTAL NET	$ 834	$ 517	$ 317	million

*All figures are in millions.

*L. Schulte, personal communication, August 27, 1986.

self-report instrument which assesses the normative and nonnormative life events a family may experience within year. A subset of 34 items includes events which occurred prior to the past year. The 71 items are grouped into nine subscales: intra-family strains; marital strains; pregnancy and childbearing strains; finance and business strains; work-family transitions and strains; illness and family care strains; family losses; family transitions in and out; family legal strains; total family pile up of demand.

Several tests of validity are reported for FILE (McCubbin & Patterson, 1981; Patterson & McCubbin, 1983). Test-retest reliability estimates have been established and reveal relatively stable responses across all subscales after 5 weeks ranging from .64 for business strains to .84 for pregnancy and childbearing strain. The estimate for overall Family Pile Up reliability was .80 (Olson, McCubbin, Barnes, Larsen, Muxen, & Wilson, 1982).

The respondent was asked to check "yes" or "no" to record the life event that happened to any family member during the past year. The "yes" responses were summed and then the mean number of "yes" responses for each subscale and for the total pile up scale were compared for each pilot group.

Family functioning was measured by the Family Adaptability and Cohesion Evaluation Scales (Olson, Portner, & Levee, 1985). FACES is a 20-item self-report scale constructed to measure the two major dimensions in the Circumplex model. This model theorizes a curvilinear relationship between cohesion and adaptability, which have

been found to be the two most important dimensions of family functioning across the life cycle. Balanced families falling into the center of this model are hypothesized as functioning better than those that are extreme on both dimensions (i.e., rigid and disengaged or chaotic and enmeshed).

FACES contains 10 cohesion items and 10 adaptability items. The responses range from "almost never" to "almost always" on a 5-point Likert Scale. The scores for adaptability and for cohesion were compared with established norm ranges to classify a pilot family as belonging to one of four adaptability or cohesion group types. Then the number of pilots from each airline in each of the group types was compared.

FACES construct validity was assessed by factor analysis of data from a sample of 2,412 individuals. Pearson correlations between the two factors was r = .03, clearly showing the dimensions as independent. To assess the internal consistency of the scale, Cronbach's alpha was computed separately for the two halves of the sample, and again with total sample of family members. The reliability estimate for the total sample was .77 for cohesion, .62 for adaptability, and .68 for the total scale. Test-retest reliability after 4-5 weeks was .83 for cohesion, and .80 for adaptability (Olson & Portner, 1983).

Individual manifestations of stress were assessed by a scale designed to measure the severity and scope of symptoms. Symptoms of Stress is an 18-item, self-report check list of emotional and physical

problems the individual may have struggled with during the past few weeks. The 18 items included on this list were those that commonly appear in stress literature and were taken from several sources including standard stress literature (Lecker, 1978; Nuernberger, 1981; Selye, 1978); DSM III's criteria for depressive neurosis; Pearlin and Schooler's (1978) Depression Model; and the FAA (1983) stress symptom check list for pilot training. Subjects were asked to circle the appropriate response, indicating about how often they had experienced each symptom. Responses were on a 5-point Likert Scale ranging from "almost never" to "almost always." This instrument was scored by summing the number of pilots who reported experiencing a symptom either "sometime," "frequently," or "almost always" in each airline and then comparing pilot groups.

Event characteristics were assessed by using the Attribution Questionnaire (Hammen & Mayol, 1982). Seven items were selected from a 10-item scale developed to capture the relevant dimensions of stressful life events that are currently associated with onset of depression and to discriminate the properties of those events.

There were seven single item cognitive-appraisal dimensions on which individual life stress events were evaluated: perceived control, locus of causality, stability, globality, intentionality, expectation or anticipation, degree of uncertainty caused by the event, and likelihood of its reocurrence. The subject circled the appropriate response to each statement on a 4-point Likert Scale ranging from "not at all" to "very much." The sums of responses in

each category were compared among airline groups on each appraisal item. Studies supporting the reliability and construct validity of this instrument were reported by Gonz-Guy and Hammon (1981) and Hammen et al. (1981).

Procedure

Support for this study, including the mailing lists, and postage, printing, stationery, and data entry costs, was obtained from ALPA. The questionnaire was constructed using eight instruments from stress literature that were judged best able to encompass the various dimensions of stress. Two additional measures were constructed to reflect strains specific to airline pilots.

A pretest of the stress instrument was given to a small number of airline pilots and their wives to assess the format, design, length, and clarity of the questionnaire. Some modifications and improvements were made, and suggestions incorporated. Because the family system has previously been ignored in studies of pilot stress, separate pilot and spouse questionnaire forms were developed.

Questionnaires were coded to identify respondents by airline and pilot/spouse status. A letter from the chairman of each airline union supporting the project and insuring confidentiality was included with the stress questionnaire. Each survey packet was mailed with a pilot and spouse questionnaire, a union letter, and a cover letter (the letters explained the significance of the project and asked for participation in this first phase and in a follow-up second phase of the project). Return, stamped envelopes were also enclosed.

Following the Dillman (1978) method of survey research, follow-up post cards were mailed and at least two attempts by telephone were made to non-respondents to secure an adequate response rate. Second questionnaires were mailed to 24 pilots who requested them.

Results

Data were obtained for 425 of the pilots originally contacted, 205 pilots from the unstable airline and 220 pilots from the stable airlines, about 51% of the sample.

An initial analysis of the data revealed no significant group differences for the following six demographic variables: gender (X^2 = 1.10; df = 1; p <.30); present marital status (X^2 = 6.34; df = 5; p <.28); number of times married (X^2 = 9.03; df = 9; p <.11); number of dependents (X^2 = 5.17; df = 5; p <.82); age of youngest child (X^2 = 6.34; df = 5; p <.28); percent family income from pilot job (X^2 = 7.22; df = 4, p <.13). Pilot groups differed, however, in the following demographic variables: age (X^2 = 18.43; df = 4; p <.001), significantly more older pilots responded from the unstable airline; education (X^2 = 23.92; df = 5; p <.002), significantly more pilots from the unstable airline had more years of education; years married to present spouse (X^2 = 16.09; df = 7; p <.02), pilots from the unstable airline were married longer than pilots from the stable airlines; age of oldest child (X^2 = 14.32, df = 7; p <.05), pilots from the unstable airline had older children than pilots from the stable airlines; flight crew status (X^2 = 32.20; df = 2; p <.0000), significantly more higher rank pilots responded from the stable

airlines; years with present employer (X^2 = 84.39; df = 7; p <.0000), pilots from the unstable airline had more years with their present employer; years to retirement (X^2 = 43.29; df = 7; p <.0000), the stable airlines' pilots had more years until retirement; year in present rank (X^2 = 27.22; df = 6; p <.0003), unstable airlines' pilots remained more years within rank.

To examine the relationship between corporate airline instability and pilot stress, the data for the FILE, Stress Symptoms, and Event Attribution measures were analyzed by a one-way analysis of variance (ANOVA), with airline affiliation as the independent variable and each stress measure treated as a separate dependent variable. Separate analyses were conducted for pilots and for spouses. The objective was to compare groups on mean scores. For the FACES III, which postulates a curvilinear relationship for each subscale, data were analyzed by Chi-Square, a non-parametric statistic (Olson, 1985).

Airline Instability and Family Functioning

It was hypothesized that pilots employed by the stable airlines would report higher family functioning than pilots employed by the unstable airline. However, the findings demonstrated no significant differences between pilot groups on either the cohesion dimension (X^2 = 2.28; df = 3; p <.52) or the adaptability dimension (X^2 = 4.27; df = 3; p <.23) of FACES III. Therefore, the prediction was not supported. Although it was expected that pilots from the unstable airline would report a higher percentage of low functioning families, contrary to expectation, the FACES III data revealed that for both pilot groups

there were almost twice as many low functioning families as would be expected from the established norms (Olson, 1985).

Airline Instability and Family Pile Up of Demand

It was hypothesized that pilots employed by the unstable airline would report a higher pile up of demand than pilots employed by the stable airlines. As hypothesized, the findings demonstrated significant differences between pilot groups on total pile up of demand scores, F (1,423) = 43.66, p <.0000. To determine which areas of family life were most affected by work stress, a separate ANOVA was performed on each subscale. Consistent with stress literature, four of nine family strain subscales scores were significant: intra family strain, F (1,423) = 27.19; p <.0000; marital strain, F (1,423) = 8.32; p <.004; finance/ business strains, F (1,423) = 37.54, p <.0000; work/family strain, F (1,423) = 47.33, p <.0000. These findings document a strong and significant relationship between corporate airline instability and increasing strains within families of pilot employees.

This study was unique in assessing stress in families of airline pilots; therefore, to provide a more detailed view of pilot families across nine areas of family life, all subscale data were reported (see Table 3). In all subscales, with one exception, the nonsignificant means were in the hypothesized direction, with more strains reported for the families of pilots of the unstable airline. The one exception, pregnancy strains, may be age related. However, as noted, none of these relationships reached the .05 probability level.

Table 3

Total Pile Up of Demand and Subscale Strain Scores

Instrument FILE	Group Means Unstable	Stable	Group Error Unstable SS	Stable SS	F	Significance
Total Pile Up of Demand	12.59	8.55	1736	16822	43.66	.0000
Subscales:						
1. Intra-Family Strains	4.35	2.93	213.79	3334.69	27.12	.0000
2. Marital Strains	.459	.286	3.15	159.86	8.324	.0041
3. Pregnancy Strains	.088	.132	.21	73.60	1.18	.277 (NS)
4. Finance-Business Strains	3.24	2.10	137.76	1552.40	37.54	.0000
5. Work-Family Strains	2.54	1.48	118.13	1055.86	47.33	.0000
6. Illness Strains	.73	.60	1.83	417.70	1.85	.174 (NS)
7. Loss Strains	.46	.42	.22	196.50	.47	.494 (NS)
8. Transitions Strains	.57	.49	.68	291.20	.98	.322 (NS)
9. Legal Strains	.15	.10	.23	73.41	1.31	.253 (NS)

Cognitive Mediators and Family Functioning, Stress Symptoms and Pile Up of Demand

A one-way analysis of variance was used to test whether the pilots' perception of stressful work events as controllable had a significant mediating effect on the development of stress symptoms in pilots and on the pile up of demand in their families. Within the unstable airlines, contrary to expectation, there were no significant differences between pilots who perceived stressful work events as uncontrollable and pilots who perceived stressful work events as partly within their control.

Using Chi-Square analysis to determine whether perception of stressful work events as uncontrollable or controllable had a mediating effect on level of family functioning, only the adaptability dimension of FACES III was significant ($X^2 = 60.90$; $df = 6$, $p < .0000$). Based on this finding, it appears that the extreme adaptability scores of pilot families were related to the pilots' perceptions of work events as uncontrollable. Looking at the scores of the two subscales of family functioning, it is apparent that support for the prediction of the study was only partially consistent. The subscale that confirmed the prediction of the study was adaptability.

Airline Instability and Pilot Stress Symptoms

A one-way analysis of variance was performed to determine whether airline instability had a significant impact on pilot stress symptoms. The findings demonstrated significant differences between pilot groups, F (1,423) = 23.54, $p < .0000$. These results indicate the

relationship between corporate airline instability and pilot stress symptoms is strong and significant.

Airline Instability and Spousal Stress Symptoms

To test the relationship between airline instability and stress symptoms of spouses, a one-way analysis of variance was used. Stress symptom scores were compared between pilots' spouses of the unstable airline and pilots' spouses of the stable airlines. The findings demonstrated significant differences between spouse groups on this scale, F (1,378) = 10.16, p <.002. Based on these results, there appears to be a strong relationship between airline work events and spousal stress symptoms, that is, between the work system and family system, supporting the multi-systemic stress model's proposition of work/family systems interaction.

Discussion

The empirical findings of this study indicate a consistent pattern of significant differences between pilot groups on multiple stress measures, confirming the hypothesis that pilot stress symptomology is positively associated with unstable working conditions. Pilots employed by the unstable airline reported more total pile up of family demand than pilots employed by the stable airlines. Furthermore, they reported more marital strains, more family conflict, more financial strains, and more work-family transition strains than other pilots. Additionally, pilots from the unstable airline reported more individual stress symptoms than pilots from the stable airlines. Also, spouses of pilots from the unstable

airline reported more stress symptoms than spouses of pilots from the stable airlines. These results provide strong evidence that corporate airline instability has negative consequences for pilot stress and underscore the importance of management actions as a variable critically tied to the mental and physical health of pilots and, therefore, to their job performance and productivity.

Airline Instability and Pilot Symptomology

It was suggested from the work of House (1974), Rabkin and Struening (1976), and others that threats to employment, as well as job loss, can have devastating effects upon employees' physical and mental health. In support of these findings, data from the ALPA Aeromedical Advisor (see Table 4) indicate that more pilots from the unstable airline than the stable airlines contacted the aeromedical office during the last four years because of potentially disqualifying medical disabilities discovered during required physical examinations (R. Masters, personal communication, December 23, 1986). Furthermore, as shown in Table 5, the Federal Aviation Administration found that more pilots from the unstable airline than from the stable airlines were denied medical certification during 1983 and 1984 (Dark, 1986). These data are consistent with the findings of the present investigation. Pilots found to have the most stress symptoms were those employed by the unstable airlines. It seems clear that too much work stress (e.g., repeated threats to job security, anticipation of further reduced pay rates, and escalating management-union conflict)

Table 4

Number (rate per hundred) of Pilots Contacting Aeromedical Staff for Medical Consultations (Source, Richard Masters, M.D.)

Airline	Year 1983	1984	1985*	1986	Average Rate
**Unstable	110 (2.5)	139 (3.2)	89 (2.0)	75 (1.7)	2.35
Stable (1)	14 (1.25)	17 (1.5)	18 (1.6)	35 (3.1)	1.86
Stable (2)	25 (1.4)	41 (2.2)	22 (1.2)	25 (1.4)	1.55

*In 1985, a charge of $100 was initiated for each consultation by ALPA. Dr. Masters believes this fee affected the numbers of calls received by his staff.

**The unstable airline has approximately 4,400 pilots, stable airline (1) has 1,120, and stable airline (2), about 1,830 pilots.

Table 5

Productivity Losses by Carrier*

Airline	FAA Medical Certification Denial**
Unstable	5.6
Stable (1)	2.4
Stable (2)	3.2

*Rate per 1000 pilots.

**1983, 1984 figures, Shirley Dark, FAA

over too long a time could eventually lead to the onset of physical and/or mental symptoms.

Airline Instability and Spouse Symptomology

This report found that spouses of pilots employed by the unstable airline had more stress symptoms than spouses of pilots employed by the stable airlines. These results coincide with earlier stress research (Brown, Rawlinson, & Harden, 1982; Dohrenwend & Dohrenwend, 1981; Figley & McCubbin, 1983) that has shown that family members are inextricably linked together. Because of an intricate and complex web of emotional, legal, and financial bonds, each family member is adversely affected by any threat, loss, or crisis experienced by another family member. It is suggested, therefore, that in addition to the direct effect of stressful airline work events on the level of stress for spouses, there may also be the interactional effect of stressful work events and the deteriorating physical and mental health of the pilot that contribute to spousal stress.

Airline Instability and the Family

This combination of persistent work stress and deteriorating health status of pilots and of their spouses may explain the increased marital strain and increased family conflict reported by pilots employed by the unstable airline. There is a strong relationship recognized in research literature between the physical and mental health of family members and the disruption of the family system (Brown et al., 1982). Additionally, over forty years of research literature has linked high levels of work stress to family instability

and disintegration (Thomas, McCabe, & Berry, 1980). The data in this report support these findings and suggest that as the pilot family struggles with persistent threats to job security, in addition to increasing physical and mental stress symptoms of the pilot and the spouse, both personal and family resources are depleted and the level of family strains may increase to intolerable levels. With diminished resources left with which to cope, unresolved past strains and additional change or stress mount and the family and its members are increasingly vulnerable to crisis.

Airline Instability, Financial Strain and the Family

One index of a family's well being is its income adequacy. Income adequacy is not only a measure of actual earnings but, also, the subjective perception of: family income versus family needs; probable future income gains or further income loss; income inequity, or the comparison of present earnings to earnings of a reference group; and negative comparisons of past earnings to present earnings (Moen, 1980).

A second index of family well-being is the actual drop in income. Severe negative changes in a family's economic resources have been associated with illness onset and with family disintegration since the depression era studies (Angell, 1936; Bakke, 1940; Briar, 1978; Furstenberg, 1974; Pearlin et al., 1981). Therefore, it is suggested that the extent of financial hardship a family suffers is both a measure of actual and perceived income adequacy as well as the change in economic resources.

After years of repeated wage freezes, pay cuts, and contract concessions, pilots in the unstable airline are among the lowest paid pilots of any major U.S. carrier (Bavis, personal communication, January 1987). (See Table 6.) Since the sale of the unstable airline (February 1986), the new management has repeatedly publicly announced pilot furloughs, pay cuts, and drastic changes in work rules (D. Breeding, personal communication, August 1986; "Some Jobs at EAL," December 23, 1986). On the basis of the findings of this study, it seems clear that the reported increase in financial strains in families of pilots employed by the unstable airline is related to stressful work events.

Airline Instability and Family Functioning

The finding of no significant difference in family functioning between pilot groups was not expected. Based on extensive stress literature (Anderson, 1986; Angell, 1936; Beavers & Voeller, 1983; Figley & McCubbin, 1983; Russell, 1979), it was assumed that chronic and severe work stress would negatively impact the adaptability and cohesion of families of pilots employed by the unstable airline and that these families would, therefore, report significantly lower family functioning than the families of pilots employed by the stable airlines. The question naturally arises, however, as to why the present study failed to find a significant difference between families of pilot groups, when past research efforts have found that families with low family functioning who experience stressful events become even more disorganized (Olson et al., 1983; Voydanoff, 1980). One

Table 6

Comparison of Pay Rates, January 1987

		Hourly Rate (average Captain)
AAA	American	$141
DAL	Delta	143
EAL	Eastern	91
NWA	Northwest	139
PAA	Pan American	108
TWA	Trans World	91
UAL	United	128
All Industry Average		116

possibility in explaining this discrepancy may be in the difference between samples employed. Both Olson and Voydanoff used clinic families in their sample designs, while the current study used a random sample of pilot couples. It may be that studies using clinic populations are restricted in their ability to generalize results to different or unique populations.

Stress is a complex process, one with variables and relationships still not fully explained. Another possibility in explaining these results is that the finding of no difference between pilot groups is spurious. There may be some variable or some interaction between variables not accounted for in this analysis that has affected the outcome.

The finding that about 40% of all pilot families scored either very high or very low on adaptability and/or cohesion scales, indicating a significant number of low functioning pilot families across carriers, was surprising. On the basis of this finding, the conclusion must be considered that the many inherent "normal" stressors of working as a commercial pilot (e.g., irregular hours, long trips away from home, inability to schedule holidays, vacations, or leisure time) eventually affect all pilot families, making family communication and emotional bonding difficult and promoting a "disengaged" life style. Another possible explanation is in the type of personality attracted to the career of flying. Pilots have been widely studied and found to be a rather homogeneous group with similarities in personality characteristics. Studies (Fry &

Reinhardt, 1969; Ursano, 1980) have found the flyer to be more self sufficient, controlled, dominant, achievement oriented, and emotionally avoidant than the average adult male, as well as less introspective, nurturant, supportive, or emotionally reactive. It appears, therefore, that the findings in this report of low family functioning for a large number of all pilot families could be a result of the interaction of several variables (e.g., the demands of the profession and the type of personality attracted to this profession). It may be less a causal model than one of "fit" or coherence.

Pilots exposed to the same stressful work events can differ considerably in their responses due in part to the family resources they can mobilize to help minimize distress. Successful family functioning seems to reflect moderate rather than extreme levels of family cohesion and adaptability (Olson, 1986). This balance appears to be a primary key to effective stress coping, giving families a larger repertoire of behavioral options to aid them in dealing effectively with change and in successfully adapting to stress. Therefore, it is important to consider the implication of low family functioning for pilots coping with chronic, stressful working conditions. The finding in this report that many pilot families are low functioning families suggests that when job stress escalates, these families cannot serve as a resource for the pilot, cushioning the effects of work events. Rather, the compounding of job stress and low family functioning places the pilot in a doubly vulnerable position, one that may be predicted to result in physical illness

(e.g., cardiovascular disease), mental health symptoms (e.g., depression), or behavioral dysfunction (e.g., accidents) (Fairbank & Hough, 1979; Holmes & Rahe, 1967; Hurst, Jenkins, & Rose, 1976).

Airline Instability and Perception of Control of Work Events

The finding of no difference in stress symptoms, family strains, or family cohesion between high control and low control pilot groups, was also unexpected. These results run counter to a growing body of research linking perception of high control of stressful events to increased depression symptoms (Hammen, Krantz, & Cochran, 1981), as well as to research linking perception of low control of events to increased symptomology (Dohrenwend & Martin, 1979; Paykel, McGuiness, & Gomez, 1976; Seligman, 1975). At least one other study (Averill, 1973) supports the finding in this study that under certain conditions perception of control of stressful events may have no effect at all as a stress mediator. There are several possible explanations for the present findings. It may be that certain highly stressful events (death, war, job loss) will inevitably result in stress symptoms regardless of individual perceptions of control. The severity of the event may be more important than perception of event characteristics in determining event outcome. Another possibility is that control is only one type of perceptual mediator. Other perceptual mediators may be associated with stressful work events.

An additional finding of this study was that there was a significant difference in family adaptability patterns between high and low control pilot groups. Both high and low perception of control

were associated with extreme adaptability scores and, therefore, low family functioning. These results were congruent with the research of Hammen and Cochran (1980), suggesting that there is not a single model of the stress process. The data for this study indicate that there may be at least two interactive and reciprocal subtypes of the pilot stress process (see Figure 2). These findings suggest a need for development of differentiated models of stress where event and contextual parameters interact with different perceptions to yield different symptom clusters, depending on the population sampled and the level of family resources.

Another competing explanation for the failure of this study to find a difference in symptoms between high control and low control pilot groups is that these results are in error and that differences do in fact exist. The fault may lie with the instrument. The one control question of the attribution questionnaire may not have completely or adequately captured the scope of the construct. A more sensitive or refined instrument may yield different data.

Summary

The results of this study give strong support for the theory of "spill over" or "cross environmental effect" between interfacing working and family systems (Billings & Moos, 1982; Jackson & Maslach, 1982; Voydanoff, 1980). Apparently, the greater the work crisis, the greater the family strain, the greater the probability of physical, psychological and relationship problems. These findings are consistent with family and individual research literature on job loss

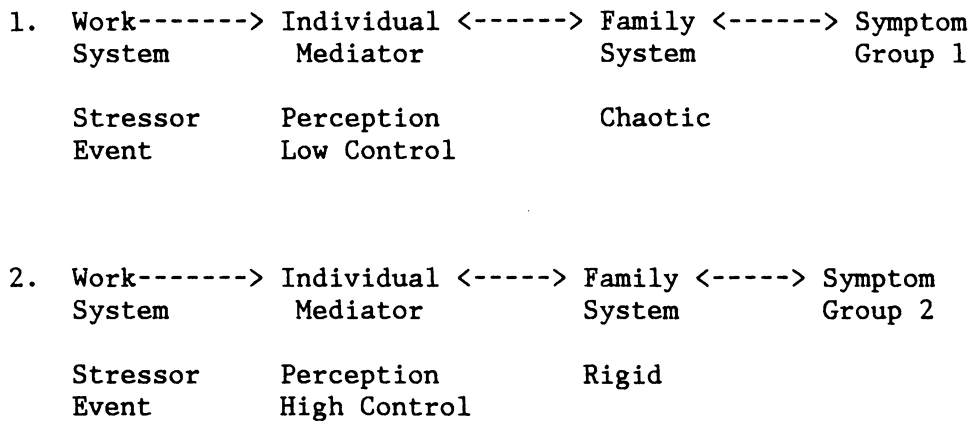


Figure 2. Subtypes of pilot stress processes: Interactive models.

(Jackson & Maslach, 1982), life events (Holmes & Rahe, 1967; Lloyd, 1980), and illness onset (Hurst et al., 1976).

Numerous studies have hypothesized relations between pairs of variables (e.g., job loss and illness [Kasl et al., 1975], life events and depression [Tennant & Andrews, 1975], stress and depression [Hammen & Mayol, 1982]). This model examined the link between work stress and a broad range of stress indicators in an effort to expand the framework underlying the investigation of pilot stress as well as to underscore the importance of a multi-systemic perspective. It seems clear that only a dynamic interactive model can begin to capture the complexity of the stress process.

Conclusions and Recommendations

As the airline industry continues to consolidate, high levels of work stress for many airline pilots can be predicted to continue. With work stress consistently linked to increased employee absenteeism, illness, and accidents, airline managements have a public responsibility to take heed of the results of this study documenting the deteriorating well being of their pilots and to use the data as a clear mandate to begin a comprehensive pilot stress and coping assistance program.

The data presented, although collected from a broad range of established stress measures, is, of necessity, a partial view of a complex and dynamic process at one point in time. Therefore, it is only an indication of the full extent of the effects of past airline events. Although the consistency and magnitude of these results

indicate that stress exists and is already serious for a substantial subtotal of airline pilots, their spouses, and their families, the impact of the sale of a major airline upon its pilot employees is probably only beginning to emerge.

Although there are many types of stress management and coping programs already in existence that are routinely available through the yellow page directory of stress consultants, community mental health agencies, university counseling, psychology, and education programs everywhere, pilots are a unique population with specialized problems and concerns; it is, therefore, recommended that the following programs be implemented:

(1) Develop a brief, informative pilot awareness and assistance packet giving pilots and families information on: individual and family stress symptoms; the range of normal physical, psychological, and interpersonal stress responses that can be expected given highly stressful working conditions; how to find help locally.

(2) Develop and implement remedial stress programs in hub cities for family and pilot support groups. During periods of airline industry crisis or management upheaval, stress consultants would be made available to help with stress management, development of coping skills, problem solving, conflict resolution and improved family communication.

(3) Develop a predictive model of a pilot stress syndrome to help educate pilots, management, public and the government about the effects and scope of stressful airline work events.

(4) Develop a prototype preventive stress program tailored for the entire pilot population, for pilot groups currently bearing the brunt of an unstable industry with highly stressful conditions and for those who may be similarly affected in the future.

Implications for Future Research

Based on the findings of this study the following implications for future research include:

(1) initiation of the second phase of this research project, a one year follow-up, in order to gather data as pilots and their families adjust and cope with further changes in their working conditions.

(2) supplementing the present survey approach with other means of data collection including interview and telephone surveys.

(3) investigation of pilots and their families from other unstable airlines to examine the generalizability of the present findings to any corporate airline upheaval.

(4) long term follow-up of the subjects of this report (e.g., two year, five year follow up) to determine the long term effects of stressful work events as well as pilot vulnerability to increased risk for illness, death, and accidents.

(5) further investigation of the role of management stability. Potential interaction effects among airline affiliation, life cycle, crew status, age, etc. should be explored.

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Appendix A

Review of Related Literature

REVIEW OF RELATED LITERATURE

Efforts to understand and explain the stress response have traditionally focused on the relations among three broad conceptual areas: the sources of stress, the manifestations of stress, and the mediating factors between the two. Using this framework, the following review of theoretical and empirical stress literature will focus on those studies with a multi-systemic perspective.

Sources of Stress: Work Events

Many authors agree that job loss is a dynamic process, a continuum of corporate situational events and employee emotional and behavioral reactions that occur in stages that alternate over time (Figley & McCubbin, 1983). This process has its beginning in corporate instability, as workers anticipate paycuts, wage freezes, and layoffs, and includes the corporate closing, actual job loss, job searches, and, the end point of the continuum, reemployment. Studies of plant closings, extended layoffs, severe manpower reductions, and dislocated workers indicate that each of these stages of perceived joblessness, from anticipation through reemployment, can have long lasting effects on workers and their families and can be as devastating as the termination itself (Kasl, Gore, & Cobb, 1975).

Hurst and Shepard (1986) have noted that as a company becomes unstable, workers experience an "emotional roller coaster," similar to a prolonged grieving process or to emotional burnout. The first phase of this process can include denial, anger, bargaining, and depression. The second phase is usually characterized by acceptance and

enthusiasm. The third phase is one of burnout: apathy, hopelessness, and frustration. Similarly, Zawadski and Lazarfield (cited in Briar, 1978) have described six emotional stages that can accompany job disruption: fear, hatred, apathy, hope for improved conditions, hopelessness, and depression. According to Lopez's (1983) description, the termination process and its emotional toll begin when managerial decisions such as cost reductions, seniority bumping, and layoffs occur. Workers of the failing company, who have generally demonstrated reliability, corporate loyalty, and high productivity then experience the first phase of emotional reactions. Initially, a survival reaction begins accompanied by a denial of ongoing work events as workers accept paycuts or wage freezes to enable the company to survive (Hurst & Shepard, 1986). If this period is protracted, denial may persist, preventing workers from completing needed emotional tasks and moving on to a stage of acceptance. Younger workers leave the company, securing new jobs, and older employees retire, leaving behind those whose age, seniority, or specialized skills limit their job options. Bakke (1980) found that workers with highly specialized skills were more severely affected by threats to employment than less skilled workers. In addition, highly skilled workers maintained their belief in a return to former working conditions for longer periods, denying the prospect of oncoming joblessness. With no possibility of company recovery and no power left with which to bargain, remaining employees become bound more closely to the company both financially and emotionally. As corporate

instability continues to increase, shock and disbelief follow, and the third emotional job loss stage begins. Workers who continue to remain with the company see job opportunities in other companies wither away, going to workers who already left. Hopes for finding reemployment with similar wages and status fade. Denial alternates with demoralization, and personal and family concerns accumulate. Feelings of grief, sadness, anger, and loss intensify as the company and a way of life end.

The loss of a major role is especially devastating for workers whose self worth is tied to their professional identity. The realization of the loss of this valued role can result in ongoing depression (Figley & McCubbin, 1983). Cavan (1959) found that joblessness leads to loss of status, loss of self esteem, and loss of an accustomed standard of living for the worker. Kalish (1966) suggests that the high levels of stress that workers experience as a company fails are due to an accumulated sense of losses: loss of identity; loss of control; loss of ability to plan; loss of goals; loss of feelings of competence. The employee of the unstable company is in a helpless and hopeless position. Not knowing what will occur, the future appears uncertain. Functional coping and adaptation are forestalled.

Increasing the stress producing nature of job disruption is the fact that no norms exist on established techniques for coping with the process of job loss. Previous experience with the demands of job loss appear to be the only means of information and education available to

the worker in the unstable company (Bakke, 1940; Figley & McCubbin, 1983).

When threats to unemployment are chronic and there is no hope of relief, the sense of losses increases and as stress becomes continuous, emotional resources are depleted. The effect on the worker is reflected in other family members and a continuous cycle begins in which work events lead to employee anxiety and fear which then result in family disruption and dysfunction (Jackson & Maslach, 1982). There is a high degree of consensus linking job loss to family disorganization (Little, 1976; O'Toole, 1974). Thomas, McCabe, and Berry (1980) found that unemployment has a severe impact on families, resulting in high levels of stress.

Cavan (1959) found that joblessness often leads to alienation of family members, family violence, separation and divorce. Gore (1978) linked long term physical illness and depression with lack of support from families of unemployed workers. Sawhill, Peabody, Jones, and Caldwell (1975) found a strong correlation between job loss and marital separation. In a study of 41 unemployed and 40 employed males and their spouses, Larson (1984) found unemployed husbands and their wives reported significantly lower marital adjustment, quality of communication, and consensus than the employed group. In addition, family harmony and family satisfaction were significantly lower. Larson hypothesized that it may be the combination of significant emotional losses as well as poor communication between spouses that results in lower marital adjustment and lower family functioning. In

addition, he suggested that when the husband's major family role is that of provider and when the family derives most of its financial resources from the husband's employment, the economic strains resulting from job disruption are likely to produce hostility and withdrawal in family members. Other researchers agree that job disruptions impact the family chiefly through loss of income. And, indeed, the resulting economic uncertainty has been cited as the prinicipal reason why families fall apart (Furstenberg, 1974; Larson, 1984). Numerous studies have found effects of economic pressure reflected both in the marital system and in the family system. If threats to job security are ongoing and if economic strains are chronic, families and individuals experience mounting strain and increased levels of symptomology (Briar, 1978; Cavan, 1959; Pearlin, Lieberman, Mengghan, & Mullan, 1981; Voydanoff, 1980).

Sources of Stress: Life Events

As pilots and their families attempt to deal with the major stressor of career instability, new and ongoing life events continue to require coping and adaptation. Life events include: (1) typical family life cycle stressors (e.g., marriage, graduation); (2) those events reflecting the coping efforts of family members which may add to the family burden of stress (e.g., father's taking a second job, adolescent drug/alcohol use); and (3) events which flow directly from the major stressor event that result in additional hardships (e.g., restricted recreation, vacations, entertainment) (McCubbin & Patterson, 1981).

By 1949, research and clinical findings had clearly linked stressful life events to disorders of nearly every major organ and body part (Dohrenwend & Martin, 1979). Over the last twenty five years a growing body of research has correlated stressful life events and a broad range of physical and mental illness in a wide variety of populations (Dohrenwend & Dohrenwend, 1977; Rabkin & Struening, 1976; Sarason, Johnson & Siegel, 1978; Tennant & Andrews, 1978). The idea that contextual stress is causally related to illness onset has been investigated chiefly through the use of life event inventories designed to assess the cumulative stress of life events. The original model proposed by Holmes and Rahe (1967) and supported by Alkov and Borowsky (1980) and Dohrenwend and Dohrenwend (1981) assumed that change of any kind causes disequilibrium and requires adaptation. As the adaptive demand increases, the organism is less able to adjust adequately. Prolonged or repeated demands can lead to permanent changes and damage to major organ systems and hence to symptom formation. Numerous reports have repeatedly found statistically significant associations between recent stressful life events and subsequent illness symptomology such as: heart disease, asthma, tuberculosis, athletic injuries, childhood leukemia, fractures,, pregnancy difficulties, and other major and minor somatic problems (Dohrenwend & Dohrenwend, 1977; Dohrenwend & Dohrenwend, 1981; McCarron & Haakonson, 1982; Rahe, 1974; Sarason et al., 1978).

In addition to physical symptoms, many studies have reported a positive relationship between stressful life events and psychological

symptoms (Monroe, 1982; Tennant & Andrews, 1978). Paykel (1974) linked schizophrenia, depression, neurosis, and suicide attempts to increasing experience with stressful life events. Others have demonstrated the relationship between recent life events and depression, anxiety, and tension (Thomas et al., 1980).

Not only have stressful life events been correlated to numerous physical and mental dysfunctions, research has also linked accumulated life stress to deficits in task performance and to accidents (Dohrenwend & Martin, 1979; McGuire, 1976; Rabkin & Struening, 1976; Vinokur & Selzer, 1975). In fact, Finch and Smith (cited in McGuire, 1976) found that 80% of drivers killed in car accidents had experienced major stressful life events within the 24 hours preceding the crash. The most significant events related to fatal crashes where job difficulties, financial problems and interpersonal stress.

Because stress coping is an integral part of the life of the professional airline pilot, life events research has been applied to the investigation of aviation mishaps. Haakonson (1980) found that pilot performance decreased according to the number of stressors to which the pilot was exposed and that the effect of multiple stressors on pilot performance was additive. He suggested that an "accident zone" exists in which lowered ability to perform due to accumulated contextual stressors (marital difficulties, financial worries) interfaces with increasing flight demands (low fuel, bad weather, night flying). Therefore, accident proneness in pilots may be due in part to the accumulation of major life stressors. Alkov, Gaynor, and

Borowsky (1985) reported that aviators who contributed to aircraft mishaps had recently experienced major stressful life events. Moore (1977) argued that life event factors such as job difficulties or relationship problems contributed to accidents. Using life event scores in an attempt to identify, before the event, aviators who might become involved in an aircraft mishap, Alkov et al. (1985) found that those aviators who were experiencing difficulties with peers or superiors were more likely to be involved in mishaps and be responsible for accidents. Alkov, Borowsky, and Gaynor (1982) described the accident process as a symptom of too many stressors and inadequate coping strategies. These authors have specifically linked financial difficulties, career decisions, and marital problems to aircraft accidents.

Research has shown that stressful life events and changes will cluster near the occurrence of a major stressor such as job disruption. As the pile up factor increases, individuals and families may lose their ability to cope and adapt, feeling overwhelmed and becoming susceptible to psychological and physical symptoms of stress (Holmes & Rahe, 1967). High scores on checklists of life events have consistently been associated with psychiatric symptoms (Borowsky & Wall, 1983). It appears that the greater the number of life changes, the greater the probability of disease onset (Dohrenwend, Krasnoff, Askenasy, & Dohrenwend, 1978), psychological symptoms, accident liability (McCarron & Haakonson, 1982), and increased severity of symptomology (Haakonson, 1980). Dohrenwend and Dohrenwend (1977)

found that when a number of events occur closely together, crisis or severe consequences are likely to result. Both number and intensity of life events have been related to the probability of illness in the near future. Alkov and Borowsky (1980) found life changes for the prior two years correlated with negative health changes. McCarron and Haakonson (1982) reported major life events preceded health changes by one year. Myers, Lindenthal, and Pepper (1974) showed a relationship between number of life events over a one year period and changes in mental health: increases in numbers of stressful life events were followed by a worsening of psychiatric symptoms, decreases in stressful events by improvement in symptoms.

Although Holmes and Rahe (1967) and others support the theory that all life event change is associated with symptom formation, a second model supported by Dohrenwend and Dohrenwend (1981), Paykel (1974), Tennant and Andrews (1978), and Vinokur and Selzer (1975), proposes that life events have their debilitating effects not because of increasing requirements for adaptation but because of their undesirable, threatening, or distressing qualities. Vinokur and Selzer (1975) found that undesirable events are the major contributor to the relationship between life events and psychological dysfunction. Myers et al. (1974) and Paykel (1974) reported undesirable events were more highly correlated with psychological symptoms than all life events.

Several major controversies exist concerning the design and scoring of instruments intended to be used as checklists of major life

events. For example, Dohrenwend et al. (1978) have argued for the use of standardized weights for items on life event lists that could be determined by independent judges. Other authors argue for weights to be decided by individuals in the same occupation, status, etc., as those to be sampled, or to have subjects themselves rate items in terms of subjective distress. Vinokur and Selzer (1975) proposed that weighted techniques have little impact on results. Weighted scores may skew results toward individual perception, predisposition and previous experience.

Other problems with the individualization of life events measures include list items that result in the confounding of event and outcome (e.g., the stressful quality of graduation may increase if unemployment is the anticipated outcome), the confusion of event with consequences (e.g., divorce may be a life event or the result of other life events), and events on certain life event lists may be irrelevant to certain populations (Rabkin & Struening, 1976). Finally, researchers often do not consider the impact of multiple events, different combinations of events, or events that occur repeatedly (Dohrenwend & Dohrenwend, 1977).

Mediators of Stress

Examination of sources of stress alone is not sufficient to explain the onset or variety of stress symptoms. Other factors, called mediators, influence their impact. Rabkin and Struening (1976) grouped mediators that might serve as a buffer against the effects of stress into three types: characteristics of the stressor event (e.g.,

its threatening quality), of the individual (e.g., internal vs. external locus of control), or of the social support system (e.g., family system resources). What follows is a discussion of the reciprocal relationship between severe stressors and two important stress mediators, family resources and individual perception of events.

The Family. Payne (1980) has defined the many roles the family assumes to help mediate the effect of stress: a support system; a storehouse of information; a guidance system, a source of values and problem-solving; a source of material and emotional support. Many studies have found that support from the family can reduce the impact of unemployment (Billings & Moos, 1982; Jackson & Maslach, 1982; Voydanoff, 1980). In a study of pilots' coping and stress symptoms, Sloan and Cooper (1986) identified stability of home life, marital satisfaction, and wives' involvement and interest in their husbands' careers as the most important factors in successful coping with work stress. Voydanoff (1980) suggests that marital satisfaction and support could serve to attenuate the effects of work stress on the mental and physical well being of the worker. There is agreement in family stress research that some families faced with external stressors can utilize their strengths, pull together, and gather needed outside support to confront severe stressors and survive. Numerous studies have concluded that the family characteristics that most determine its ability to withstand stress are its resources of adaptability and cohesion (Anderson, 1986; Olson, Russell, & Sprenkle,

1983). Angell (1936) identified family adaptability as an important factor in successful coping with prolonged unemployment. Billings and Moos (1981) found that the consequences of job disruption on marital and family relations depended on the degree of family unity and its level of adaptability. Unadaptable families regardless of other factors consistently experienced disorganization. Russell (1979) linked low family cohesion and adaptability to low family functioning. Bakke (1940) determined that the primary factors involved in successful adaptation to unemployment were the willingness of the family to work together to readapt their standard of living, devise new ways to solve problems, and to adjust their activities to new realities. Larson (1984) found that unemployed men who perceived a lack of family support during unemployment were more depressed and had more physical symptoms than unemployed men who felt supported. Evidently, it is not only the family's ability to shift course but its bonds of unity that predict the vulnerability of its members (McCubbin & Patterson, 1981). In a study of concentration camp survivors, Dohrenwend and Dohrenwend (1981) reported that those prisoners who were able to retain their family ties survived more often and adjusted better to freedom than those without family support.

The family system can serve to protect members from the impact of a stressor or can exacerbate it. External stressors affect the family as well as the individual, altering its internal structure and its ability to provide support. Cavan (1959) found that unemployment

often leads to family disorganization with resulting deterioration in marital relations and family communication.

Because of the strong bonds between members, the family does not escape the consequences of the stressor event. There are immediate and long term effects for the individual and the family system. Olson, Sprenkle, and Russell (1979) linked highly stressed families with chemically dependent children and families with juvenile offenders to extreme scores on measures of adaptability and cohesion, indicating low family resources. It appears that membership in a family leaves one vulnerable to the difficulties and crises experienced by other family members. This simultaneous family experience of emotional upset is a process called "secondary catastrophic stress reaction" (Figley & McCubbin, 1981). Gore (1981) has developed a model of family stress which illustrates the interactive relationship between stressor, family resources, and symptoms. Gore explained that stressors deplete the family's availability of resources, which in turn affect the individual's liability for symptom development. Figley and McCubbin (1981) have suggested that when stressors are severe, prolonged, or repeated, the protective role of family support becomes less significant. Families that may have adapted to lesser difficulties eventually fall apart. Coping becomes dysfunctional and recovery appears bleak. When conditions are sufficiently stressful, individual and family breakdown are certain (Rabkin & Struening, 1976).

Perception. There is a consensus in stress literature that individual perception, appraisal, and interpretation of stressful events ar crucial to the degree of symptomology subsequently experienced (Hammen, Krantz, & Cochran, 1981; Hammen & Mayol, 1982). One of the most important mediators of stressful events that has been identified is that of perception of control. Control may be defined as the availability of behavioral responses that might modify event outcome, the ability to generate various interpretations of the event, or the opportunity to have alternatives or options, open to the individual (Averill, 1973; Johnson & Sarason, 1978). Whether an event and its outcome are believed to be within or outside a person's ability to establish any of these types of control has been found to be significantly related to symptomology (Seligman, 1975).

One body of research supports the position that it is the individual's sense of helplessness to influence events that are responsible for severity of stress reactions, and that events perceived as uncontrollable are most destructive (Figley & McCubbin, 1983; Seligman, 1975). Glass and Singer (1972) reported that the damaging effects of negative events were reduced when subjects perceived themselves in control events. Schmale's study (cited in Dohrenwend, 1977) reported that people who felt helpless to control stressful events were more likely to suffer illness or death than those who felt events were within their control. Three different models of stress reported by Dohrenwend and Martin (1979) are in agreement that perception of lack of control over the environment and

feelings of helplessness explain variability in the stress response. Johnson and Sarason (1978) and Lefcourt (1981) report that stress symptoms were significantly correlated with negative events only for subjects who perceived events beyond their control.

Studies by Sarason, Johnson, and Siegel (1978) and Seligman (1975) are in agreement that an individual's perception that a stressor event is beyond his control can be the result of repeated prior experience with having no control over noxious events, resulting in the expectation of being helpless. This learned helplessness results in low motivation, inability to initiate appropriate responses, increased emotion, fear and depression.

In contrast to the assumption that perception of uncontrollability of noxious events and symptomology are closely linked, is the research of Hammen and Mayol (1982) and others. These authors have found that contrary to expectation, events perceived as uncontrollable were least associated with depression. Events that may have been partially within the individual's control were found to result in the greatest distress.

Manifestations of Stress

The relationship between stressful events and illness onset has been extensively studied and documented. Stress has been found to be a factor in a broad spectrum of physical and psychological disorders. Among the most common stress related illnesses are: cancer, heart disease, cirrhosis of the liver, hypertension, and stomach ulcer (Pilisuk & Park, 1983). In fact, Rabkin and Struening (1976) suggest

that while stress can be a contributing factor to any disease, excessive stress is a causal factor in chronic illness. Rahe and Lind (1971) studied the recent life stressors of 67 persons who had died a sudden cardiac death. Using the Schedule of Recent Experiences, completed by next of kin, a comparison was made of stressful life events at two years, one year, and six months before death. It was found that in all cases, statistically significant increases in life stress were found in the final six months prior to death.

There is increasing evidence that job pressure, work overload, interpersonal tension, increased responsibilities and conflict are associated with both physical disease and mortality (House, 1974). Brenner (1977) reported that changes in the national economy and a rise in unemployment figures directly affects seven statistical indices of stress in the general population: mortality; homicide; suicide; cardiovascular-renal disease mortality; cirrhosis of the liver mortality; mental hospital admissions; and state imprisonments. In fact, a rise of 1.4% in the national unemployment rate in 1970 was correlated with a 2.7% increase in cardiovascular and renal disease deaths in 1975. Other studies support the link between job stress and physical illness. In a comparison of 100 coronary patients and 100 control patients, House (1974) reported that 91% of the coronary patients has experienced job stress prior to hospitalization, while only 20% of the control group reported prior work problems. House also found that men who were dissatisfied with their jobs were more likely to have higher blood pressure, higher blood sugar, higher

cholesterol and were more likely to be overweight. Low job satisfaction, intense competition, long hours, and multiple jobs have also been associated with higher levels of serum cholesterol and increased risk of heart disease (Margolis & Kroes, 1974).

In addition to physical illness, work stress has been linked to a variety of psychological disorders. Job disruption can have pervasive and long lasting effects on workers including depression, anxiety, lowered morale (Thomas et al., 1980). Strong support for the relationship between job dissatisfaction and psychiatric symptomology was found in a study of 416 Air Traffic Controllers (Kavanagh, Hurst, & Rose, 1981). Job dissatisfaction was significantly related to subjective distress, behavioral disturbances, impulse control disturbances alcohol abuse, and wage-earner role disturbance.

Depression has been well established as a common symptom of stress. Research has repeatedly found stressful life events including job events, to be a precipitating factor in depression onset. Events characterized as threatening, undesirable, or those that involve loss or exit are particularly likely to have occurred prior to depression. Paykel, Meyers, and Dienelt (1970) studied a group of 185 depressed patients and a group of 185 community persons. Using a list of 33 stressor items, it was found that the depressed group had experience three times the number of stressful life events as the control group, with exit events most commonly reported. Using a 43 item event list, Thompson and Hendrie (1972) compared a group of 45 manic depressives, psychotics, and depressives to a control group of 37 staff members.

These authors found that the patient group had significantly more life changes occurrences in the year prior to illness onset and interview than the control group. Paykel and Tanner's 1976 study found that depressed patients who had not attempted suicide had experienced three times as many stressful life events in the six months before hospitalization than had the control group. Patients who had attempted suicide had about four times as many stressful life events as the control group, with a significant increase in events occurring in the month prior to the attempt. Grant, Sweetwood, Yager, and Gerst (1981) used this Schedule of Recent Experiences and a symptom checklist bimonthly for 18 months to compare 196 male psychiatric outpatients with 194 male hospital workers. They found that increased symptoms related directly to the occurrence of undesirable and uncontrollable events. At all intervals, there was a high correlation between symptoms and events.

Appendix B

Additional Results

Additional Results

This study was a descriptive survey of two groups of airline pilots and their spouses; 401 pilots and their spouses from a major unstable airline and 438 pilots and their spouses from two major stable airlines.

All data for this study were analyzed by computer using SPSS, the Statistical Package for Social Sciences. One-way analysis of variance (ANOVA) and Chi-Square were used to test hypotheses. The level of significance employed in this study was the .05 alpha level.

Demographic data were analyzed to determine differences between the two pilot groups on variables not addressed by the hypotheses. Fourteen comparisons were made to assess similarity of sample groups. The results of comparisons are listed in Tables 7-21, and include: (a) age, (b) gender, (c) level of education, (d) marital status, (e) times married, (f) years married, (g) number of dependents, (h) age of oldest child, (i) age of youngest child, (j) crew status, (k) years with present airline, (l) years to retirement, (m) years in present crew status, (n) percent of total family income from flying. Independent sample Chi-Square analysis revealed:

a) No significant difference when groups were compared by gender. The gender percentages of the two pilot groups were roughly the same as seen in Table 7, indicating very similar composition of both airline groups by gender.

b) Table 8 shows a comparison of pilot groups by age. The highly significant Chi-Square results ($p < .001$) show that there was a

Table 7

Pilot Gender Comparison

Airline	Male	Female	Total
Unstable	201	4	205
Stable	212	8	220
Total	413	12	425

Chi-Square = 1.098, df = 1, Significance = .295 (NS)

Table 8

Comparison of Pilots by Age

Airline	30 or less	31-40	41-50	51-60	Over 60	Total
Unstable	6	49	105	44	1	205
Stable	17	84	86	33	0	220
Total	23	133	191	77	1	425

Chi-Square = 18.426, df = 4, Significance = .0010

difference between the age structure of the unstable airline and the stable airlines. The unstable airline's pilots' age distribution was skewed toward older pilots (i.e., 150 out of 205 pilots were over 40 years old [73.2%] for unstable airline, and 55 pilots [26.8%] were under 40; and 119 out of 220 pilots were over 40 years old [54%] for stable airlines, while 101 [45.9%] were under 40).

c) This difference in ages of pilot groups probably had a partial effect on the other demographic comparisons illustrated in Table 9 through 17, six of which are significant beyond .05 alpha level: highest level of education completed, present marital status, number of years married to present spouse, number of dependents, age of oldest child, age of youngest child, number of years with present employer, number of years to retirement, and number of years in present flight crew status. Table 9 shows a comparison of pilot groups by highest level of education. The highly significant Chi-Square result ($p < .0002$) shows that there was a difference in the education levels of pilot groups. The unstable airline's pilots' education level was skewed toward more education. Fifty-seven out of 205 pilots of the unstable airline (27.8%) had post graduate credits, and 62 (30.3%) had less than a bachelor's degree; while 24 pilots (10.9%) from the stable airlines had post graduate credits, and 98 (44.6%) had less than a bachelor's degree.

d) Table 10 indicates no significant differences when groups were compared by present marital status. This comparison shows that for

Table 9

Comparison of Pilots by Education

Airline	High School	1-3 yrs College	Bachelor's Degree	Post Grad Credits	Master's Degree	Post Master's	Total
Unstable	11	51	86	35	16	6	205
Stable	27	71	98	16	6	2	220
Total	28	122	184	51	22	8	425

Chi-Square = 23.922, df = 5, Significance = .002

Table 10

Comparison of Pilots by Present Marital Status

Airline	Never Married	First Married	Remarried	Living Together	Separated	Divorced	Total
Unstable	2	131	55	5	2	10	205
Stable	9	146	50	2	2	10	219
Total	11	277	105	7	4	20	424

Chi-Square = 6.335, df = 5, Significance = .275 (NS)

both pilot groups about 62% of respondents were in a first marriage and about 22% in a second marriage.

e) Table 11 indicates no significant difference between groups when compared by number of times married.

f) In Table 12 the significant Chi-Square result ($p < .02$) indicates that pilots in the unstable airline had been married longer to their present spouse than pilots from the stable airlines. The unstable airline's pilots' distribution was skewed toward more years married. For the unstable airline's pilots, 68 out of 205 (33%) had been married more than 20 years; while for stable airlines' pilots, 58 out of 220 (25.9%) had been married more than 20 years. From the unstable airline, 53 pilots (25.9%) compared to 77 from the stable airlines (35%) had been married 5 or fewer years.

g) Table 13 indicates that the number of dependents for airline pilot groups was about the same. The nonsignificant Chi-Square result shows that the two groups were similar. Over 50% of the pilots in each group had 2 or 3 dependents.

h) In Table 14 the significant Chi-Square result ($p < .046$) shows that there was a difference in age of oldest child between pilot groups. The distribution was skewed toward older children for pilots in the unstable airline. For the unstable airline 76 pilots (39%) had an oldest child over 21 years old, compared to 62 (28.1%) from the stable airlines. From the stable airlines, 74 pilots (33.6%) had an oldest child less than 5 years old, compared to 39 (19%) from the unstable airline.

Table 11

Comparison of Pilots by Number of Times Married

Airline	0	1	2	3	4	5	Total
Unstable	4	11	36	12	2	1	66
Stable	9	12	41	3	1		66
Total	13	23	77	15	3	1	132

Chi-Square = 9.025, df = 5, Significance = .108 (NS)

Table 12

Comparison of Pilots by Number of Years Married to Present Spouse

Airline	0-5 Years	6-10 Years	11-15 Years	16-20 Years	21-25 Years	26-30 Years	31-35 Years	36-40 Years	Total
Unstable	53	23	29	32	44	14	7	3	205
Stable	77	32	26	28	26	24	7		220
Total	130	55	55	60	70	38	14	3	425

Chi-Square = 16.085, df = 7, Significance = .0244

Table 13

Comparison of Pilots by Number of Dependents

Airline	0	1	2	3	4	5	6	7	10	16	Total
Unstable	33	30	63	41	21	10	2		1	1	202
Stable	39	31	68	46	20	8	1	2			215
Total	72	61	131	87	41	18	3	2	1	1	417

Chi-Square = 5.174, df = 9, Significance = .819 (NS)

Table 14

Comparison of Pilots by Age of Oldest Child

Airline	0-5 Years	6-10 Years	11-15 Years	16-20 Years	21-25 Years	26-30 Years	31-35 Years	More than 40	Total
Unstable	39	20	29	37	50	24	5	1	205
Stable	74	20	25	39	39	17	6		220
Total	113	40	54	76	89	41	11	1	425

Chi-Square = 14.324, df = 7, Significance = .0457

i) Table 15 indicates that there was no significant difference between pilot groups when age of youngest child was compared. For both groups, over 50% of pilots had a youngest child less than 10 years old.

j) Table 16 shows a comparison of pilots by flight crew status. The highly significant Chi-Square result ($p < .0000$) indicates that there was a difference between crew status structure of the unstable and stable airlines. The stable airlines' distribution was skewed toward captain status while the unstable airline distribution was skewed toward junior rank. For the unstable airline, 120 pilots (58.5%) were from junior ranks, while 82 (37%) from stable airlines were from junior ranks.

k) Table 17 shows a comparison of pilots' number of years with present employer. The highly significant Chi-Square result ($p < .0000$) shows that there was a difference between number of years with present employer between groups. The difference was accounted for by the unstable airline's pilots' distribution being skewed toward longer service. Summing pilots with more than 10 years for both airlines, there were 148 pilots (72.7%) from the unstable airline compared to 84 pilots (38.1%) from stable airlines. Similarly, there were 100 pilots (45.5%) from stable airlines, compared to 18 pilots (8.8%), from unstable airline with less than 5 years with their present employer.

l) In Table 18 the highly significant Chi-Square ($p < .00$) indicates that there was a difference in years to retirement between

Table 15

Comparison of Pilots by Age of Youngest Child

Airline	0-5 Years	6-10 Years	11-15 Years	16-20 Years	21-25 Years	26-30 Years	Total Years
Unstable	69	39	31	38	24	4	205
Stable	97	31	35	35	18	4	220
Total	166	70	66	73	42	8	425

Chi-Square = 6.339, df = 5, Significance = .275 (NS)

Table 16

Pilot Flight Crew Status Comparison

Airline	Second Officer	First Officer	Captain	Total
Unstable	24	96	85	205
Stable	2	80	138	220
Total	26	176	223	425

Chi-Square = 32.177, df = 2, Significance = .0000

Table 17

Comparison of Pilots by Number of Years with Present Employer

Airline	0-5 Years	6-10 Years	11-15 Years	16-20 Years	21-25 Years	26-30 Years	31-35 Years	36-40 Years	Total
Unstable	18	39	24	71	28	19	6		205
Stable	100	36	4	39	21	17	2	1	220
Total	118	75	28	110	49	36	8	1	425

Chi-Square = 84.385, df = 7, Significance = .0000

Table 18

Comparison of Pilots by Number of Years to Retirement

Airline	0-5 Years	6-10 Years	11-15 Years	16-20 Years	21-25 Years	26-30 Years	31-35 Years	More Than 40	Total
Unstable	17	39	45	61	29	8	4	2	205
Stable	18	38	45	28	35	44	12		220
Total	35	77	90	89	64	52	16	2	425

Chi-Square = 43.288, df = 7, Significance .0000

pilot groups. The difference is accounted for by the unstable airline's pilots' distribution being skewed toward fewer years to retirement, and the distribution for stable airline pilots being skewed toward more years to retirement. For the unstable airline, 14 pilots (6.9%), compared to 56 pilots (25.5%) for the stable airlines had 26 or more years before retirement.

m) In Table 19 the highly significant Chi-Square result ($p < .0003$) indicates that there was a difference between pilot groups in years at present rank or promotion rate. For the unstable airline, 101 pilots (49.3%), compared to 72 (33.2%) from stable airlines, had more than 6 years at present rank.

n) The percent of family income from flying was about the same for each pilot group as seen in Table 20. The nonsignificant Chi-Square result shows that more than 85% of both pilots groups derived over 75% of family income from their job as pilot.

Hypothesis 1

Hypothesis 1 stated that pilots employed by the stable airline would demonstrate higher family functioning than those employed by the unstable airline, as measured by adaptability and cohesion subscales on FACES III.

Items on FACES III were divided into two subscales: (a) adaptability and (b) cohesion. The contingency table for grouped FACES III scores is shown in Table 21. For the cohesion subscale, the Chi-Square value of 2.28 with 3 degrees of freedom and for the adaptability subscale, the Chi-Square value of 4.27 with 3 degrees of

Table 19

Comparison of Pilots by Number of Years at Present Rank

Airline	0-5 Years	6-10 Years	11-15 Years	16-20 Years	21-25 Years	26-30 Years	31-35 Years	Total
Unstable	104	51	22	24	2	1	1	205
Stable	147	32	11	13	13	3	1	220
Total	251	83	33	37	15	4	2	425

Chi-Square = 27.224, df = 6, Significance = .0001

Table 20

Comparison of Pilots by Percentage of Total Family Income From Flying

Airline	Under 25%	25%-40%	50%-74%	75%-99%	100%	Total
Unstable		3	25	106	71	205
Stable	1	1	19	99	99	219
Total	1	4	44	205	170	424

Chi-Square = 7.215, df = 4, Significance = .1250 (NS)

Table 21

Chi-Square Results for Hypothesis 1

a) cohesion

Airline Category	Disengaged	Separated	Connected	Enmeshed	Total
Unstable	56	71	47	16	190
Stable	64	63	57	22	206
Total	120	134	104	38	396

Chi-Square = 2.28, df = 3, Significance = .52 (NS)

b) adaptability

Airline Category	Rigid	Structured	Flexible	Chaotic	Total
Unstable	56	47	31	31	165
Stable	50	55	41	21	167
Total	106	102	72	52	332

Chi-Square = 4.27, df = 3, Significance = .23 (NS)

freedom were not statistically significant at the alpha .05 level, therefore, the hypothesis of a difference between airline pilot groups in level of family functioning was rejected. It was, concluded that the stable airlines' pilots did not have higher family functioning than the unstable airline's pilots.

Inspection of the contingency table for cohesion indicates that the distribution of scores for both pilot groups is skewed toward "disengaged and separated" categories. And, in fact, the percentage of pilots from both pilot groups in the disengaged category is about 30%, which is much larger than the national norm of 16.3% for the disengaged category. This suggests that many more pilot families are low functioning families than are non-pilot families.

Hypothesis 2

Hypothesis 2 stated that pilots employed by the unstable airline would demonstrate a higher "pile up of demand" factor than pilots employed by the stable airlines, as measured by total life event scores and subscale scores on the FILE.

Items on the FILE were divided into nine subscales: (a) intra-family strain, (b) marital strains, (c) childbearing strains, (d) business/finance strains, (e) work/family strains, (f) illness strains, (g) loss strains, (h) in and out transition strains, and (i) legal strains. Means and standard deviations on the FILE for the two pilot groups are presented in Table 22. The results of the one-way analysis of variance are shown in Table 2 (see article).

Table 22

Means and Standard Deviation on FILE by Group

Subscales	Unstable Airline		Stable Airlines	
	Mean	SD	Mean	SD
1. Intra-Family Strains	4.35	3.01	2.93	2.60
2. Marital Strains (coded)	.459	.617	.286	.56
3. Pregnancy Strains (coded)	.088	.422	.132	.412
4. Finance/Business Strains	3.24	2.18	2.10	1.64
5. Work-Family Strains	2.54	1.69	1.419	1.47
6. Illness Strains (coded)	.727	1.090	.596	.894
7. Loss Strains (coded)	.463	.697	.418	.667
8. Transitions Strain (coded)	.571	.852	.491	.808
9. Legal Strains (coded)	.146	.441	.100	.393
Total FILE	12.590	7.054	8.55	5.519

The F ratio for total life event scores on FILE was found to be significant, F (1,423) = 43.66, p <.0000, and hypothesis 2 was accepted. The F ratios of pilots on the intra-family strains, F (1,423) = 27.12, p <.0000, marital strains F (1,423) = 8.32, p <.0041, finance/ business strains F (1,423) = 37.54, p <.0000, and work-family strains F (1,423) = 47.33, p <.0000 subscales were also significant.

Hypothesis 3

Hypothesis 3 stated that pilots within the unstable airline who perceived events to be uncontrollable would show more severe stress symptoms than pilots who perceived events to be under their control. This would be reflected in higher total life event scores on the FILE, more extreme adaptability and cohesion scores on the FACES III, and more stress symptoms.

The results of the one-way analysis of variance for hypothesis 3 are presented in Table 23. The F ratios for FILE subscales and for total life events, as well as for stress symptoms, were found to be not significant at the .05 level of confidence. Presented in Table 24, the results of the Chi-Square analysis for FACES III indicate the subscale adaptability (X^2 = 60.90; df = 6, p <.01) to be significant. Therefore, there is only partial support for this hypothesis.

Hypothesis 4

Hypothesis 4 stated that pilots employed by the unstable airline would exhibit higher mean levels of stress symptoms than pilots of the stable airlines. The Stress Symptoms instrument consisted of 18 items. The F ratio was found to be significant (F [1,423] = 23.54, p

Table 23

Results for One-Way Analysis of Variance for Hypothesis 3

Instrument FILE	Group Means		Group SS	SS	F	Significance
	No Control	Control				
1. Intra-Family Strains	4.75	3.65	23.90	1530.22	2.58	.11 (NS)
2. Marital Strains	.49	.48	.001	77.71	.003	.95 (NS)
3. Pregnancy Strains	.09	.04	.043	30.78	.233	.63 (NS)
4. Finance-Business Strains	1.84	1.86	.017	97.94	.0287	.866 (NS)
5. Work-Family Strains	1.56	1.48	.141	69.18	.336	.56 (NS)
6. Illness Strains	.76	.74	.006	214.93	.005	.944 (NS)
7. Loss Strains	.46	.43	.011	85.40	.021	.88 (NS)
8. Transition Strains	.69	.43	1.26	132.59	1.58	.21 (NS)
9. Legal Strains	.15	.17	.009	35.94	.04	.84 (NS)
Total FILE	13.51	11.87	53.62	8332.58	1.06	.30 (NS)
Stress Symptoms:	5.44	4.69	11.11	3192.42	.57	.45 (NS)

Table 24

Chi-Square Results for Hypothesis 3

Control x Cohesion, Unstable Airline

Group	Disengaged	Separated	Connected	Enmeshed	Total
No Control	18	32	20	2	72
Some Control	22	28	15	7	72
Very Much Control	10	6	5	2	23
Total	50	66	40	11	167

Chi-Square = 7.09, df = 6, Significance = .311 (NS)

Control x Adaptability, Unstable Airline

Group	Rigid	Structured	Flexible	Chaotic	Total
No Control	6	16	23	26	71
Some Control	33	26	7	4	70
Very Much Control	15	5	1	1	22
Total	54	47	31	31	163

Chi-Square = 60.89, df = 6, Significance .0000

<.0000) and hypothesis 4 was accepted. Table 25 presents the result of the one-way analysis of variance.

Hypothesis 5

Hypothesis 5 stated that spouses of pilots employed by the unstable airline would exhibit higher levels of stress symptoms than spouses of pilots employed by the stable airlines. The results of the ANOVA for FILE and Stress Symptoms are presented in Table 26.

The F ratios for the total FILE were found to be significant (F [2,377] = 8.89, p <.002) as well as for Stress Symptoms (F [1,378] = 10.16, p <.002). Therefore, the data supported hypothesis 5 and it was accepted.

Table 25

One-Way Analysis of Variance Result of Hypothesis 4

Instrument	Group Means		Group Error		F	Significance
	Unstable	Stable	SS	SS		
Stress Symptom	5.22	3.39	354.83	6377.50	23.54	.0000

Table 26

One-Way Analysis of Variance of Results of Hypothesis 5

Instrument	Group Means Unstable	Group Means Stable	Group Error SS	Group Error SS	F	Significance
FILE Total	11.83	9.23	730.28	15469.55	8.89	.0002
Stress Symptom	1.75	1.48	7.12	264.79	10.16	.0016

Appendix C

Instruments

AIRLINE PILOTS AND THEIR FAMILIES

Please have the __X__ Pilot _____ Spouse in your household answer this questionnaire.

AIRLINE PILOTS AND THEIR FAMILIES

Please have the _____ Pilot __X__ Spouse in your household answer this questionnaire.

GENERAL INSTRUCTIONS

AIRLINE PILOT FAMILIES

The purpose of this questionnaire is to gain information about airline pilots and their families. The information we are asking of you is not available from any other source. It is only through your cooperation that we can gain the information needed to better understand how the changes occuring in the airline industry are affecting airline pilots and their families.

It is important that you and your spouse (if married) each answer the following questions. We ask that you and your spouse fill out your questionnaires separately and return them in the enclosed self-addressed envelope.

DO NOT PUT YOUR NAME ON THE QUESTIONNAIRE. ALL ANSWERS WILL BE KEPT CONFIDENTIAL. YOUR NAME WILL NEVER BE ASSOCIATED WITH INDIVIDUAL ANSWERS.

PILOT FORM

Please answer the following demographic questions. When answering a multiple choice question, please enter the corresponding number which is shown in parenthesis next to the answer.

SAMPLE QUESTION

For example, if you are 42 years old, your answer to the following sample question should look like this:

_2_ 4. What is your Age:

Under 30(0)
31 - 40 (1)
41 - 50 (2)
51 - 60 (3)
Over 60 (4)

__ 1. What is your sex?

Male (0)
Female (1)

__ 2. What is your age?

Under 30 (0)
31-40 (1)
41-50 (2)
51-60 (3)
Over 60 (4)

__ 3. Highest level of academic education completed:

High school (0)
1-3 years college (1)
Bachelors degree (4 years) (2)
Post graduate credits (3)
Masters degree (4)
Post masters degree (5)

__ 4. What is your present marital status:

Single, never married (0)
First marriage (1)
Remarried (2)
Cohabiting as husband and wife but not married (3)
Separated (4)
Divorced (5)

__ 5. If remarried, please enter the number of times married.

__ 6. If married, please enter the number of years you have been married to your present spouse?

__ 7. Please enter the number of dependents.

__ 8. Please enter the age of your oldest child.

__ 9. Please enter the age of your youngest child.

__10. Please enter your present status:

2nd Officer (0)
1st Officer (1)
Captain (2)
Other (3)

__11. Please enter the number which corresponds to the name of your present employer:

Eastern (0)
Piedmont (1)
USAir (2)

__12. Enter the number of years you have worked for your present employer.

13. What is your current airline domicile: _____

14. What is the state in which your family resides: _____

__15. Please enter the number of years you have remaining before retirement.

__16. Please enter the number of years you have flown in your present flight crew status.

__17. What is the percent of total family income derived from your airline job:

less than 25% (0)
25% - 49% (1)
50% - 74% (2)
75% - 99% (3)
100% (4)

SPOUSE FORM

Please answer the following demographic questions. When answering a multiple choice question please enter the corresponding number which is shown in parenthesis next to the answer.

SAMPLE QUESTION

For example, if you are 42 years old, your answer to the following sample question should look like this:

2 4. What is your Age:
Under 30(0)
31 - 40 (1)
41 - 50 (2)
51 - 60 (3)
Over 60 (4)

__ 1. What is your sex?
Male (0)
Female (1)

__ 2. What is your age:
Under 30 (0)
31-40 (1)
41-50 (2)
51-60 (3)
Over 60 (4)

__ 3. Highest level of academic education completed:

High school (0)
1-3 years college (1)
Bachelors degree (4 years) (2)
Post graduate credits (4)
Masters degree (5)
Post masters degree (6)

__ 4. What is your present marital status?

First marriage (0)
Remarried (1)
Cohabiting as husband and wife but not married (2)
Separated (3)
Divorced (4)

__ 5. Please enter the number of times you have been married.

__ 6. If married, please enter the number of years you have been married to your present spouse.

__ 7. Please enter the age of your oldest child.

__ 8. Please enter the age of your youngest child.

__ 9. Are you employed: Yes (0) No (1)

10. If yes, occupation:_____

__ 11. Please enter the percentage of the total family income derived from your employment?

less than 25% (0)
25% - 49% (1)
50% - 74% (2)
75% - 99% (3)
100% (4)

12. Please indicate spouse's current airline domicile: _____

13. In what state does your family reside? _____

I. The following list of family life changes can happen in a family at any time. "FAMILY" means a group of two or more people living together who are related by blood, marriage or adoption. This includes persons who live with you and to whom you have a long term committment.

DIRECTIONS

Please read each family life change and decide whether it happened to any member of your family -- including you.

First, decide if it happened any time during the last 12 months and check YES or NO. (If No change, or the statement doesn't apply to your family, check No.)

Second, for some family changes decide if it happened any time before the last 12 months and check YES or NO. It is okay to check YES twice if it happened both times -- before last year and during the past years.

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY? During last 12 Months YES	NO	Before last 12 Months YES	NO
101. Increase of husband/father's time away from family	(a)____	(b)____	(c)____	(d)____
102. Increase of wife/mother's time away from family	(a)____	(b)____	(c)____	(d)____
103. A member appears to have emotional problems	(a)____	(b)____	(c)____	(d)____
104. A member appears to depend on alcohol or drugs	(a)____	(b)____	(c)____	(d)____
105. Increase in conflicts between husband and wife	(a)____	(b)____		
106. Increase in arguments between parent(s) and child(ren)	(a)____	(b)____		
107. Increase in conflict among children in the family	(a)____	(b)____		
108. Increased difficulty in managing teenage children	(a)____	(b)____		

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY? During last 12 Months YES	NO	Before last 12 Months YES	NO
109. Increased difficulty in managing school age child(ren) (6-12 yrs.)	(a)____	(b)____		
110. Increased difficulty in managing preschool age child(ren) (2-1/2-6 yrs.)	(a)____	(b)____		
111. Increased difficulty in managing toddler(s) (1-2-1/2 yrs.)	(a)____	(b)____		
112. Increased difficulty in managing infant(s) (0-1 yrs.)	(a)____	(b)____		
113. Increase in the amount of "outside activities" which the child(ren) are involved in	(a)____	(b)____		
114. Increased disagreement about a member's friends or activities	(a)____	(b)____		
115. Increase in the number of problems or issues which don't get resolved	(a)____	(b)____		
116. Increase in the number of tasks or chores which don't get done	(a)____	(b)____		
117. Increased conflict with in-laws or relatives	(a)____	(b)____		
118. Spouse/parent was separated or divorced	(a)____	(b)____	(c)____	(d)____
119. Spouse/parent has an "affair"	(a)____	(b)____	(c)____	(d)____
120. Increased difficulty in resolving issues with a "former" or separated spouse	(a)____	(b)____		
121. Increased difficulty with sexual relationship between husband and wife	(a)____	(b)____		

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY? During last 12 Months YES	NO	Before last 12 Months YES	NO
122. Spouse had unwanted or difficult pregnancy	(a)____	(b)____	(c)____	(d)____
123. An unmarried family member became pregnant	(a)____	(b)____	(c)____	(d)____
124. A family member had an abortion	(a)____	(b)____	(c)____	(d)____
125. A family member gave birth to or adopted a child	(a)____	(b)____	(c)____	(d)____
126. Took out a loan or re-financed a loan to cover increased expenses	(a)____	(b)____	(c)____	(d)____
127. Went on welfare	(a)____	(b)____	(c)____	(d)____
128. Change in conditions (economic, political, weather) which hurts family business	(a)____	(b)____	(c)____	(d)____
129. Change in Agriculture Market, Stock Market, or Land Values which hurts family investments and/or income	(a)____	(b)____	(c)____	(d)____
130. A member started a new business	(a)____	(b)____	(c)____	(d)____
131. Purchased or built a home	(a)____	(b)____	(c)____	(d)____
132. A member purchased a car or other major item	(a)____	(b)____		
133. Increasing financial debts due to over-use of credit cards	(a)____	(b)____		
134. Increased strain on family "money" for medical/dental expenses	(a)____	(b)____		
135. Increased strain on family "money" for food, clothing, energy, home care	(a)____	(b)____		

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY? During last 12 Months YES	NO	Before last 12 Months YES	NO
136. Increased strain on family "money" for child(ren)'s education	(a)____	(b)____		
137. Delay in receiving child support or alimony payments	(a)____	(b)____		
138. A member changed to a new job/career	(a)____	(b)____	(c)____	(d)____
139. A member lost or quit a job	(a)____	(b)____	(c)____	(d)____
140. A member retired from work	(a)____	(b)____	(c)____	(d)____
141. A member started or returned to work	(a)____	(b)____	(c)____	(d)____
142. A member stopped working for extended period (e.g., laid off, leave of absence, strike)	(a)____	(b)____		
143. Decrease in satisfaction with job/career	(a)____	(b)____		
144. A member had increased difficulty with people at work	(a)____	(b)____		
145. A member was promoted at work or given more responsibilities	(a)____	(b)____		
146. Family moved to a new home/ apartment	(a)____	(b)____		
147. A child/adolescent member changed to a new school	(a)____	(b)____		
148. Parent/spouse became seriously ill or injured	(a)____	(b)____	(c)____	(d)____
149. Child became seriously ill or injured	(a)____	(b)____	(c)____	(d)____
150. Close relative or friend of family became seriously ill	(a)____	(b)____	(c)____	(d)____

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY? During last 12 Months YES	NO	Before last 12 Months YES	NO
151. A member became physically disabled or chronically ill	(a)____	(b)____	(c)____	(d)____
152. Increased difficulty in managing a chronically ill or disabled member	(a)____	(b)____	(c)____	(d)____
153. Member or close relative was committed to an institution or nursing home	(a)____	(b)____	(c)____	(d)____
154. Increased responsibility to provide direct care or financial help to husband's and/or wife's parent(s)	(a)____	(b)____		
155. Experienced difficulty in arranging for satisfactory child care	(a)____	(b)____		
156. A parent/spouse died	(a)____	(b)____	(c)____	(d)____
157. A child member died	(a)____	(b)____	(c)____	(d)____
158. Death of husband's or wife's parent or close relative	(a)____	(b)____	(c)____	(d)____
159. Close friend of family died	(a)____	(b)____	(c)____	(d)____
160. Married son or daughter was separated or divorced	(a)____	(b)____	(c)____	(d)____
161. A member "broke up" a relationship with a close friend	(a)____	(b)____		
162. A member was married	(a)____	(b)____		
163. Young adult member left home	(a)____	(b)____		
164. A young adult member began college (or post high school training)	(a)____	(b)____		
165. A member moved back home or a new person moved into household	(a)____	(b)____		

FAMILY LIFE CHANGES	DID THE CHANGE HAPPEN IN YOUR FAMILY? During last 12 Months YES	NO	Before last 12 Months YES	NO
166. A parent/spouse started school (or training program) after being away from school for a long time	(a)____	(b)____		
167. A member went to jail or juvenile detention	(a)____	(b)____	(c)____	(d)____
168. A member was picked up by police or arrested	(a)____	(b)____	(c)____	(d)____
169. Physical or sexual abuse or violence in the home	(a)____	(b)____	(c)____	(d)____
170. A member ran away from home	(a)____	(b)____	(c)____	(d)____
171. A member dropped out of school or was suspended from school	(a)____	(b)____		

II. We would like to ask a few questions regarding how you feel about economic pressures. Please circle 1 or 2, for either Yes or No.

	YES	NO
201. Do you find yourself worrying a lot about how you're going to make ends meet?	1	2
202. Do you find yourself easily irritated these days?	1	2
203. Because of the financial pressures do you find yourself frequently depressed?	1	2
204. Do the financial pressures ever make you want to scream and shout in anger?	1	2
205. Because of financial pressures, do you ever find yourself so mad that you're almost ready to hit somebody?	1	2

Compared with how you used to feel, during the past few weeks have you frequently felt:

206. Pleased about having accomplished something	1	2
207. Nervous and tense	1	2
208. Proud because someone complimented you on something	1	2
209. Bored	1	2
210. Headachy	1	2
211. Particularly excited or interested in something	1	2
212. Upset because someone criticized you	1	2
213. On top of the world	1	2
214. Lonely and remote	1	2
215. That things were going your way	1	2

III. Next, please indicate about how often, in the past few weeks, you have experienced the following. Please circle number below answer.

	Almost Never	Once in Awhile	Some-times	Fre-quently	Almost Always
301. Feeling hope-less about the future	0	1	2	3	4
302. Irritability	0	1	2	3	4
303. Excessive anger	0	1	2	3	4
304. Inability to concentrate	0	1	2	3	4
305. Decreased attention	0	1	2	3	4
306. Accident proneness	0	1	2	3	4
307. Fatigue, low energy,loss of "joie de vivre"	0	1	2	3	4
308. Trouble getting to sleep or staying asleep	0	1	2	3	4
309. Migraine headaches	0	1	2	3	4
310. Feeling like a pressure cooker about to explode	0	1	2	3	4
311. Having "no feeling" in emotional situations	0	1	2	3	4
312. Decreased en-joyment or interest in sex	0	1	2	3	4
313. Procras-tination	0	1	2	3	4
314. General dis-satisfaction	0	1	2	3	4

	Almost Never	Once in Awhile	Some-times	Fre-quently	Almost Always
315. Not going to work, not coming home	0	1	2	3	4
316. Feeling lonely	0	1	2	3	4
317. Crying easily or feeling like crying	0	1	2	3	4
318. Having a pessministic attitude	0	1	2	3	4

IV. Next, please indicate if you have experienced the following change in the past few weeks. Please circle number below answer.

	YES	NO
401. Loss or increase of appetite	0	1
402. Increased smoking	0	1
403. Increased use of drugs/medicines	0	1
404. Increased use of alcohol	0	1
405. Increased use of tranquilizers	0	1

V. Using the following numbers, please describe your family now:

1 = ALMOST NEVER

2 = ONCE IN AWHILE

3 = SOMETIMES

4 = FREQUENTLY

5 = ALMOST ALWAYS

___ 501. Family members ask each other for help.

___ 502. In solving problems, the children's suggestions are followed.

___ 503. We approve of each other's friends.

___ 504. Children have a say in their discipline.

___ 505. We like to do things with just our immediate family.

___ 506. Different persons act as leaders in our family.

___ 507. Family members feel closer to other family members than to people outside the family.

___ 508. Our family changes its way of handling tasks.

___ 509. Family members like to spend free time with each other.

___ 510. Parent(s) and children discuss punishment together.

___ 511. Family members feel very close to each other.

___ 512. The children make the decisions in our family.

___ 513. When our family gets together for activities, everybody is present.

___ 514. Rules change in our family.

___ 515. We can easily think of things to do together as a family.

___ 516. We shift household responsibilities from person to person.

___ 517. Family members consult other family members on their decisions.

1 = ALMOST NEVER

2 = ONCE IN AWHILE

3 = SOMETIMES

4 = FREQUENTLY

5 = ALMOST ALWAYS

___ 518. It is hard to identify the leader(s) in our family.

___ 519. Family togetherness is very important.

___ 520. It is hard to tell who does which household chores.

VI. Our next concern is about how you feel about yourself. Please circle the appropriate answer, indicating how strongly you agree or disagree with these statements:

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
601. All in all, I am inclined to feel that I am a failure	0	1	2	3	4
602. At times, I think that I am no good at all	0	1	2	3	4
603. I do not have much to be proud of	0	1	2	3	4
604. I have a positive attitude toward myself	0	1	2	3	4
605. On the whole, I am satisfied with myself	0	1	2	3	4
606. I feel I am a person of worth, at least on an equal with others	0	1	2	3	4
607. I can do anything I really set my mind to	0	1	2	3	4
608. There is really no way I can solve some of my problems	0	1	2	3	4
609. I have little control over the things that happen to me	0	1	2	3	4

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
610. There is little I can do to change many of the important things in my life	0	1	2	3	4
611. I often feel helpless in dealing with my problems	0	1	2	3	4
612. Sometimes I feel I am being pushed around in life	0	1	2	3	4
613. What happens to me in the future depends on me	0	1	2	3	4
614. I feel I have a number of good qualities	0	1	2	3	4
615. I am able to do things as well as most other people	0	1	2	3	4
616. I certainly feel useless at times	0	1	2	3	4
617. I wish I could have more respect for myself	0	1	2	3	4

VII. The dots on the following line represent different degrees of happiness in your relationship. The middle point, "happy," represents the degree of happiness of most relationships. Please circle the dot which best describes the degree of happiness, all things considered, of your relationship.

	0	1	2	3	4	5	6
	.	.	.	.	.	.	.
701.	----------	----------	----------	----------	----------	----------	----------
	Extremely Unhappy	Fairly Unhappy	A little Unhappy	Happy	Very Happy	Extremely Happy	Perfect

Now a few questions about family relations. Most persons have disagreements in their relationships. How often do you and your partner agree or disagree on the following issues?

	Always agree	Almost always agree	Occasionally disagree	Frequently disagree	Almost always disagree	Always disagree
702. Philosophy of life	0	1	2	3	4	5
703. Aims, goals and things believed important	0	1	2	3	4	5
704. Amount of time spent together	0	1	2	3	4	5

How often would you say the following events occur between you and your mate?

	Never	Less than once a month	Once or twice a month	Once or twice a week	Once a day	More often
705. Having a stimulating exchange of ideas	0	1	2	3	4	5
706. Calmly discuss something	0	1	2	3	4	5
707. Work together on a project	0	1	2	3	4	5

VIII. Finally, please circle the answer that best describes how you feel now.

801. My chances of finding employment elsewhere, with pay and benefits equal to those of my present job are:

a. Excellent
b. Good
c. Fair
d. Poor

802. In general, my physical health in the past few months has been:

a. Excellent
b. Good
c. Fair
d. Poor

803. In general, my mental health in the past few months has been:

a. Excellent
b. Good
c. Fair
d. Poor

804. I have experienced the following number of physical illnesses in the past 6 months:

a. 0
b. 1
c. 2-3
d. 4 or more

805. In the past 6 months, I have visited (Okay to circle more than one):

a. a medical doctor
b. a family therapist
c. a psychologist
d. a psychiatrist
e. none of the above

IX. The following 8 questions are for PILOTS ONLY.

901. Do you feel you are financially better off now than you were five years ago?

a. Yes
b. No

902. If you were offered full projected retirement today, would you accept the offer and retire?

a. Yes
b. No

903. In the last contract negotiations, would you say your company's actions toward employees were fair and reasonable?

a. Yes
b. No

904. In your opinion, have maintenance procedures been affected negatively by recent management actions/decisions?

a. Yes
b. No

905. In your opinion, has cockpit safety been negatively affected by recent management actions/decisions?

a. Yes
b. No

906. In your opinion, has crew morale been negatively affected by recent management actions/decisions?

a. Yes
b. No

907. Compared to your fellow pilots in other airlines, would you say your career has been:

a. very rewarding
b. somewhat rewarding
c. occasionally rewarding
d. not rewarding at all

908. When you consider your future with this airline, are you:

a. very optimistic
b. somewhat optimistic
c. somewhat pessimistic
d. very pessimistic

X. Please read each question and circle the appropriate response. The "EVENT" refers to your last contract negotiation process.

	NOT AT ALL	MINI-MALLY	MODER-ATELY	VERY MUCH
1001. How upsetting was this event for you?	0	1	2	3
1002. How much control over the occurance of the event did you have?	0	1	2	3
1003. To what extent do the causes of this event affect other areas of your life?	0	1	2	3
1004. How likely do you feel it is that a similar event will occur in the next year?	0	1	2	3
1005. To what extent did management intentionally cause this event to happen?	0	1	2	3
1006. How much had you expected this event to occur?	0	1	2	3
1007. How much uncertainty have you experienced in your life as a result of this event?	0	1	2	3

1008. When I consider the actions/decisions of management during the past few months, I NOW feel:

a. I don't like to think about it.
b. Angry
c. Confident
d. Depressed
e. Frustrated
f. Enthusiastic

Appendix D

Cover Letters

(On Virginia Tech Stationery)

Dear ALPA Member:

Employment as an airline pilot is, in itself, considered to be a physically and mentally demanding profession which impacts the pilot and the pilot's family as well. Pilots in any airline, are continually faced with sporadic work hours, long work shifts, considerable time away from home, the responsibility for the safety of passengers and crew, and a time limited career requiring optimum health and rigorous review of physical capabilities. Besides these inherent strains, is the stress of working in a volatile industry which undergoes frequent financial upheavals and reoccurring crises. And now, an additional source of tension is the increasing and escalating threats of corporate sales, mergers, bankruptcies, strikes, and contract concessions.

Although there is growing recognition of the important consequences of stressful working conditions and work events upon employees and their families, until now, there has been NO systematic research about airline pilots, their families, and their work environment. No one really knows how airline pilots and their families are coping, how management's actions and decisions are affecting you and your family's well being, or how well you and your family are adapting to a changing airline industry.

Virginia Tech University, in cooperation with ALPA, is conducting a two part study to determine how stessful you feel, what you think about your future, and what you think about the quality of your life. The information you provide can be of major importance to all pilots. For example, the results can be especially valuable in negotiating with present managements or new managements for your working conditions, benefits, and other issues that directly affect you, your family, your well being, and your career. The usefulness of our results, therefore, depends upon how accurately you respond.

Your household is one of a small number selected at random to represent the entire ALPA membership. We ask that you and your spouse complete and return the enclosed questionnaires, and, in about six months, complete and return a second set of questionnaires, representing the second phase of our investigation, which will be mailed to you at that time.

Please be assured of complete confidentiality. Your name will never be placed on the questionnaire. If you would like a summary of the results, simply send us a postcard with your name and address.

Thank you for your assistance. Your contribution to the success of this project is greatly appreciated.

Sincerely,

Irene C. Gaffney

Linda F. Little, Ph.D.

(On Air Line Pilots Association Stationery)

June 5, 1986

TO ALL PIEDMONT PILOTS

Dear Fellow Pilot:

Enclosed is an important survey, the first of a two-part research project conducted by Virginia Tech University, with the support and cooperation of ALPA. This unique and timely survey is part of ALPA's effort to better understand the effects of recent industry events upon our members and their families and, in addition, to demonstrate to you our commitment to continue working for your overall welfare.

I urge you to take the time to complete and return the survey as soon as possible. Your response is important.

Now, regarding confidentiality, you have my assurance that your name will never be linked to your answers. The survey will be handled similar to normal ALPA voting methods.

You have received two surveys, a pilot form and a spouse form, as well as two envelopes. Please complete the pilot form and have your spouse complete the spouse form. Place the two completed surveys into the blank, inner envelope and seal it. Place this blank, sealed envelope into the larger, outer envelope and mail it. As you see, only the larger envelope will identify you. Upon receipt of the surveys, the larger envelope will be opened and separated from the sealed inner envelope. Now, the outer envelope will no longer be linked to your responses. The inner envelope will then be opened and the survey data recorded. Information from the outer envelope will be retained only as a record of respondents to this survey in order that respondents can be recontacted. These procedures will be monitored by ALPA Election Committee personnel.

I wholeheartedly support this project and believe the results can be of great benefit to you and your career.

Sincerely,

Don H. McGregor
PAI MEC Chairman

DHM:ag
Enclosures

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