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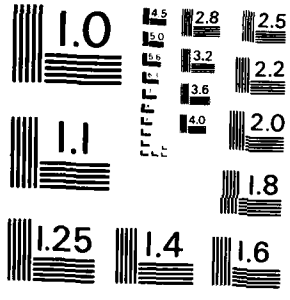

Job and Family Stress as Predictors of Pilot Health, Job Satisfaction and Performance

By

Professor C L Cooper

and

Dr S J Sloan

Grant No. AFOSR-83-0148 May 1984

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REPORT

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USAF GRANT NO. AFOSR-83-0148

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MAY 1984

CONTENTS

ABSTRACT

The objective of the study was to investigate the occupational and domestic sources of pilot mental ill health and performance. Using a psychosocial approach, the major trends and predictive issues were to be identified. These would not only provide extensive information but also form the basis for further research and wider practical application.

Relevant background literature was reviewed. It was concluded that whilst a small amount of previous research had been performed relevant to the area of present investigation, it was of only limited practical utility. Comparisons with data derived from other occupations, revealed that equivalent research in pilots was clearly deficient. This was particularly true in the examination of domestic sources of stress.

Extensive preliminary interviews were performed to investigate the situations, highlight key issues and to generate items that could be further psychometrically tested in the main study that followed. Postal survey technique was used. A large battery of specially designed and pre-designed questionnaires was included. Dependent measures taken were mental ill health, job satisfaction and performance. Responses were received from 523 pilots (52.3% response rate). It was decided that the inclusion of pilots' wives would provide an insight into pilot stress from a unique perspective. A similar procedure was performed and responses were from 280 wives (56% response rate).

The research identified eleven underlying trends in the nature of stressors experienced by pilots: control, scheduling and rostering, anxiety of courses and checks, home/work interface, career and achievement, insufficient flying, responsibility and decision making, interpersonal problems, management and organisational issues, domestic status, fatigue and flying patterns. Life events were found to concern three facets; emotional losses, pilot characteristics and emotional gains.

Coping strategies were found to involve four themes: stability of relationship and home life, reason and logic, social support and wife's involvement.

Different combinations of these underlying trends were found to statistically predict each of the different aspects of the outcome measures. Recurrent predictors of job satisfaction were factors concerning career and achievement, responsibility and decision making and management and organisational issues. Although wider variation was observed in predictors of mental ill health subscales, overall recurrent predictors were responsibility and decision making, age and fatigue of flying patterns. Predictors of performance concern domestic status, fatigue and flying patterns, anxiety of courses and checks and the effects of insufficient flying.

Stresses experienced by pilots' wives were found to embrace five issues: adopting dominant domestic roles, job loss, threats to marital relationship, positive role in husband's career, and social problems. These were predictive of their levels of life satisfaction. Insights were also obtained from the wife's perspective, of the work stresses they thought their husband experienced and the nature of effects work stressors had on their husband at home.

The conclusions drawn from the studies performed are outlined below.

Summary of Results

1. Large amount of biographical data was uncovered involving the pilot and family, interests, lifestyle, work history and experience.
2. Domestic stressors investigated
   - i 29 issues identified and tested
   - ii spread of scores in answers reflects idiosyncracy of pilots' home lives
   - iii correlational analysis revealed pilots to be generally worried about problem identification and achievement

2. continued

   iv factors emerged which were solely domestic relating to control, achievement and career factors, and domestic health

   v many of the items made contributions to other, occupationally oriented trends

3. Occupational stressors investigated

   i 31 issues identified and tested

   ii correlational analysis revealed that job satisfaction was decreased by macro rather than micro issues such as career opportunities, seniority systems and management style. Mental ill health was related to planning ahead and attaining self-set levels of performance

   iii items dominated underlying trends that were extracted. Scheduling and rostering, anxiety of courses and checks, career and achievement, insufficient flying, responsibility and decision making, interpersonal problems, management and organisational issues, fatigue and flying patterns.

   iv domestic issues were found to be clearly linked to occupationally oriented trends

4. Relationship between home and work was investigated. This was a major theme throughout the research, but was explicitly examined in four parts.

   Part 1 Stressors of home that may affect work

   i greatest impacts were found to be related to unresolved and ongoing situations

   ii all items were loaded onto one single factor. This was the fourth factor overall to be extracted and hence was important. This also indicates that the items all relate to the same issue (i.e. relationship between home and work). Overall theme of the factor was stability

   iii the factor was a significant negative predictor of depression

   Part 2 Effects of home stressors at work

   i important effects were found to be cognitive

   ii effects of lesser importance were found to be behavioural.

   Part 3 Ranked determinants of performance

   i items ranked as most important were fatigue, weather conditions and factors not within the control of the pilot

   ii greatest concentration was upon occupational rather than domestic issues, however these were interpreted in the light of the fact that the outcome variable was performance and the nature of the task

   Part 4 Qualitative differences between home and work stresses

   i this part did not yield additional insights and was discarded

4. continued

   Overall conclusions

   i major facet of stressful experience from home to work may be uniformly summarised in a simple home/work relationship

   ii effects of domestic stresses at work tend to be cognitive rather than behavioural

   iii occupational determinants are ranked as higher determinants of performance

5. Life events were investigated

   i most pilots experienced a life event. Content analysis of events and experiences revealed them to be no different from other occupations

   ii pilots felt that performance was not affected but also that it may have been affected without their realising

   iii both positive and negative events were felt to be important

   iv it was thought that the nature of the effect would be difficult to measure

   v opinion was evenly split as to whether safety and proper flight conduct would be affected

   vi approaches developed by other authors (Alkov et al, 1982) were retested and found to be summarised in three trends: emotional losses, pilot characteristics and emotional gains

   vii overall conclusion was that examination of life events should be kept simple. Other approaches tested were unsatisfactory and had little advantage over other more simple techniques

6. Pilot coping strategies were examined

   i four facets in coping were identified: stability of relationship and home life, reason and logic, social support and wife's involvement.

   ii home life established as playing a fundamental role in coping

   iii multiple regression revealed all but reason and logic as coping strategies

7. Job satisfaction was investigated as a dependent variable

   i although only inappropriate norms were available, comparisons revealed that pilots were more dissatisfied in all scales than male blue collar workers in British manufacturing industry. This was not a result one would have expected and one may conclude that pilots do not conform to the predicted satisfaction stereotype

7. continued

   ii pilots were most satisfied with extrinsic aspects of work, again contrary to expectations

   iii correlational analysis revealed most dissatisfying aspects of work to be management, seniority and career variables

   iv underlying trends mediating perception of satisfaction were found to be those that defined status i.e. rank, seniority, etc

   v regression analysis revealed job satisfaction to be boosted by responsibility and decision making and decreased by management and organisational issues and career and achievement variables

8. Mental ill health was investigated as a dependent variable

   i pilots most at risk were identified and form the basis for future research

   ii ill health was found to be associated with compatibility of home and work, practical issues at home, problem identification and attaining self-set levels of performance. Overall the theme was achievement and success

   iii age was an underlying trend but found to conform to previously recorded characteristics for male subjects

   iv regression analysis revealed mental ill health to be function of fatigue and flying patterns, inability to relax and wind down and absence of responsibility

   v different facets of stressors were found to predict different aspects of neuroticism

9. Performance was investigated as a dependent variable

   i the measure was specially designed for the present study and was successful

   ii performance was found to be a function of age, rank and routes flown

   iii performance was decreased by fatigue and flying patterns, anxiety of courses and checks and effects of insufficient flying practice

10. Data on pilots' wives was collected

   i sources of stress were identified for pilots' wives as being: adopting dominant domestic roles, job loss, threats to marital relationship, absence of an active role in husband's career progression and social problems

   ii Wives' perceptions of pilot job stress were found to relate to work pattern fatigue and anxiety of courses and checks

iii wives' perceptions of the effects of job stress on pilots were found to relate to irritability and tension and decreased performance

iv nature of life satisfaction was examined for wives. Underlying stressors were found to be recurrent negative predictors of life satisfaction

Chronological Record of Research

1st June 1983	Research contract commenced
17th June	Letters sent requesting interview sample
31st August	54 interviews completed of London and Manchester based pilots
1st September to 31st October	Interview analysis Questionnaire design and production
10th November	1000 preliminary letters sent
18th November	1000 questionnaires sent

To date: Received 523 completed returns
(Response Rate 52.3%)
20 discarded as unusable
61 arrived too late to be included in analysis
442 subjects used in analysis of data

6th January 1984	Processing completed 442 questionnaires
19th January	Statistical analysis commenced of 442 pilots
6th February	Statistical analysis completed of 442 pilots
29th February	Miscellaneous tasks completed (analysis, report planning and preparation)
1st March	Report writing commenced
3rd April	Report writing completed
30th April	Further analysis, report re-writing, finalisation of report
1st May	Reproduction and distribution of report
31st May	Research contract ends

Concurrently, pilots' wives were also studied

3rd October 1983	Interviews with pilots' wives
28th November	500 wives questionnaires sent

To date: Received 280 completed returns
(Response Rate 56%)
9 discarded as unusable
21 arrived too late to be included in analysis
250 wives used in analysis of data

8th February 1984	Commenced statistical analysis 250 wives
13th February	Completed statistical analysis 250 wives

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INTRODUCTION AND REVIEW OF PREVIOUS RESEARCH

INTRODUCTION AND REVIEW OF PREVIOUS RESEARCH

INTRODUCTION

Much of the data that purports to investigate pilot health has done so from a relatively limited perspective. Empirical evidence, providing insights into the nature of stress experienced by pilots, tends to be narrow in its scope. Most concerns the investigation of physical stressors from an ergonomic perspective. Indeed, much of the psychological data that is relevant, may be categorised under the "Human Factors" label. A smaller though increasingly influential body of research has attempted to examine the sources and outcomes of stress from a wider psychosocial viewpoint. It is this latter approach that will be adopted in the present study.

The background material relevant to this study therefore, is conspicuous by its absence. No previous research or data base was located that had methodically examined the occupational and domestic sources of pilot stress and their associated health and performance outcomes. As will be demonstrated below, some attempts have been made to identify sources by the examination of pilot personality and life events.

The overall objective of this research therefore, is to assess the extent to which job and family stress can predict pilot health and performance. Because of the relative scarcity of background research, the present study will be largely investigative in nature. In particular, the nature and relative importance of home life will be examined - the area of domestic stress being largely ignored in all but a few studies.

RESEARCH LITERATURE

As indicated above, there is no simple body of evidence that may be identified as forming a data base from which one can instigate research. Also indicated was the fact that literature that does purport to investigate pilot stress tends to be within an ergonomic paradigm. This examination of physical stressors is not the concern

of the present research and will not be reviewed here. The present review of data will be based upon that relatively small amount of research that has attempted to examine the sources and outcomes of pilot stress from a wider perspective.

Types of Stress

From a simplistic viewpoint, some aerospace psychologists divide stress into two types: 'physical' and 'emotional' (Haward, 1977). As indicated, the former is not the subject of the present study, however, it is sufficient to note that half a century of research has contributed to the understanding of the effects of vibration, extremes of temperature and noise, oxygen deprivation and so on. Relatively speaking, therefore, the human response to such stresses is well defined. Emotional stress as a factor that markedly influences the state and work efficiency of pilots is also gaining widespread acceptance. Generally, the literature has divided emotional stress into two concepts: 'cognitive' and 'affective' stress (Nimick, Cooper and Sloan, 1984). Cognitive stress can be applied to the intellectual, non-emotional and impersonal functions of aircrew. It may be defined objectively by the nature of the task presented to the operator. Excessive cockpit workload (Parry et al, 1958) or decision-making under conditions of low quality information (Haward, 1977) are examples of this.

'Affective' stress, however, is predominantly subjective in nature. Its effects may only be predicted by the examination of information provided by the individual himself and its intensity measured by the strain produced. It is often hidden from others, is insidious in its onset, and unpredictable in both intensity and duration. Whilst cognitive stress produces a gradual impairment of efficiency, affective stress may evoke a breakdown in rational behaviour within a short time of its onset (Corral, 1969). Other data indicates that affective stress is also additive and cumulative (Shuckburgh, 1975). A survey by Aitken (1969) concluded that approximately 70%

of all the service pilots questioned in the study, had suffered a significant degree of affective stress. In addition, it was suggested that the incidence may be even higher in commercial airline pilots.

To summarise: affective stress is recognised as being of potentially immense importance but, as will be demonstrated, no systematic investigations into the nature of affective stress have been conducted, particularly so with reference to pilot health and pilot performance.

The small amount of literature located has attempted to examine such issues by adopting two approaches, those dealing with the relationship between the pilot personality and stress and those dealing with adverse life events and stress. Research using both approaches has been instigated to explain the relationship between pilot behaviour (as a function of stress) and aircraft accidents and incidents. Neither approaches, however, have been particularly fruitful in expanding our knowledge of the relationships with performance, or indeed, our understanding of pilot health.

Personality Predispositions

Christy (1975) sees pilots as requiring a need for mastery, prestige, control, competition and freedom of expression. The problem is, he believes, that whilst these traits may be assets when learning to fly, they can, if excessive, contribute to conflicts and tensions that produce unsafe flying practices (presumably due to their tendencies for excessive organisation, over conscientiousness, perfectionism, inability to relax, etc). Whilst subject to criticism by some psychologists (Green, 1977), many accept the pilot personality type as being heterosexual, oriented towards demonstrating strength and competency and thriving on adventure and the mastery of complex tasks (Alkov et al, 1980).

Taking the theory of pilot personality one step further, Ursano (1980) found that under stressful conditions, due to their personalities, pilots tend to deny or avoid their internal emotional lives. They externalise their inner feelings and attempt to alleviate the situation by changes in their external environment. Since the pilot is lacking in insight and introspection, he may possess few coping strategies for dealing with the internalisation of feelings that typically occur with the onset of a breakdown in an individual's coping strategies. The results of this inability are externalised in depressive and self-destructive behaviour.

This profile was identified previously by Reinhardt (1966) in pilots who had been involved in accidents. He described such a pilot as "the action oriented individual who acts out his frustrations rather than verbalising them and whose error prone behaviour is manifest in all areas of life; personal, social and professional".

A more finely tuned explanation by Haward (1977) reveals two possible different subsets of responses to affective stress. Type 1 pilot is characterised by a marked increase in activity of the sympathetic nervous system and shows greatest impairment in flying efficiency when his emotions are first aroused, but gradually improves as his inner feelings abate. Type 2 pilot is characterised by minimal autonomic nervous activity, however he may also exhibit excessive mental rumination and although he will show a lower level of impairment in flying performance than the Type 1 pilot, the effects will tend to last for longer.

To conclude, therefore, the literature indicates that personality inadequacies in coping with stress do seem to result in some form of flying impairment. However, the literature does not highlight the costs of inadequate coping in terms of pilot health. More importantly, however, the literature makes no attempt to systematically investigate the sources of stress that may precipitate or trigger off the dysfunctional behaviour in the pilot. The data on life events and life changes, however, has made some attempt to address such issues.

Life Events

It is reasonable to conclude that opinion is widely divided amongst aeromedical psychologists on the degree of causality that may be attributed in aircraft accidents and incidents to the impact of life events on the pilot.

Aitken (1969) tried to establish a link between domestic situations and accident rates in military pilots. It was found that pilots from squadrons with higher accident rates exhibited levels of anxiety (especially 'worry) that were greater than those of pilots from squadrons with lower accident rates. This was not a surprising result, however, sources of worry were highlighted as: flying, bereavement, relationship with wife, and home life. Shuckburgh (1975) identified four major causes of pilot error as fatigue, environmental factors, workload and domestic life.

A more fruitful strategy worthy of further mention, is that adopted by Alkov and his associates (Alkov et al, 1980, Alkov et al, 1982). He has embarked on a series of studies which attempt to establish a direct causal link between life events and life changes and aircraft accidents in US Naval aircrew. His most recent publications have used a refined questionnaire that contained a mixture of life events and pilot characteristics, the objective of which was to precisely identify the sources of pilot accident proneness. The questionnaire was administered to colleagues and physicians of pilots who were known on a priori basis, to possess accident free records, and to those of pilots who had been identified as an error factor in an aircraft accident. The task was to describe the pilot.

It was found that pilots at fault were more likely to 1) have marital problems, 2) have more difficulty in interpersonal relationships, 3) become engaged or married and 4) have made a recent major decision regarding their future.

The sceptics remain unconvinced and question the statistical validity of the relationship between life events and accidents and incidents (Green, 1977). However, all concede that there would appear to be some type of relationship between home-life events and the onset of illness (Ursano, 1980).

Data from other occupations (Cooper, 1983) defines a 'life event' as any event or incident in an individual's health that is seen by them to be important. Generally, five points are worth noting:

1) almost any event may be regarded as positive or negative and weighted for severity of influence
2) events have been found to be significant predictors of subsequent mental and physical ill health
3) less recent the event, the less important its influence
4) given the wide differences in individual's lives, the potential catalogue of events is limitless
5) virtually impossible to establish the relative importance of life events vis a vis work related events.

Within aviation research, support for the relationship between life events and subsequent ill health was found by McCanon and Haakonson (1982). They concluded from their study that the pilots they examined were operating at a 'life crisis level' that would normally predict health changes in 50% of the general population. They add that pilots should be classified as a high risk group when defined by the amount of life changes they are subject to on a routine basis.

Given the two outcomes examined, it is perhaps reasonable to conclude, on balance, that there is probably some sort of relationship between life events and aircraft accidents and incidents. Given the established link with onset of illness, perhaps the precipitating factor in terms of pilot performance may be in the form of mental illness in its non-clinical form.

From an overall viewpoint, the examination of the home/work interface has been generally ignored. We do not know the precise predictive value of life events of health and performance, the nature of home life and its effects on a day to day basis, and, thirdly, the nature of the underlying moderating variables operating.

Affective Pilot Stress

There are several important implications that are worth highlighting.

1) To state that the investigation of potential sources of 'affective' stress is incomplete, is a gross understatement. Psychologists have attempted to examine these by investigating the nature of the pilot personality and the influence of life events. Data on the former is relatively good and it is possible to erect a profile of the pilot personality. This is not the case, however, in terms of home life and life events. Some approaches (such as Alkov et al, 1982) look potentially fruitful, however, they do not appear to have identified the key elements as yet, of home life variables that are important. The data that has been found is interesting but it is difficult to understand the nature of its practical utility (for example Alkov found that 'becoming engaged' was a significant variable!).

2) The costs are well documented of short-lived stressful experiences, usually as a function of physical stressors from an ergonomic perspective. But we do not fully understand their predictive relationship, absolute or relative to long-term costs in terms of mental and physical ill health. Nor indeed, the influences upon performance outside the post accident/incident investigation scenario.

3) The examination of occupational and domestic stressors and their effects have not been the subject of psychological attention from a wider psychosocial perspective. This is neatly illustrated by an examination of occupational stress in other occupations.

Conclusions from Available Research Literature

1. The pool of relevant previous literature is small.
2. Most data on pilot stress is within the realm of ergonomics.
3. Few studies have adopted a psychosocial approach to stress.
4. Data has been collected with the objective of establishing aircraft accident and incident causality - little data exists looking at the day to day effects of stress.
5. Approaches have taken two routes - personality and life events. Data on personality is fairly good and one may erect a profile. Data on life events have been only partly illuminating and results found have been of only limited utility.
6. No systematic approach has detailed the specific job and domestic stressors operating, or their relative contributions to pilot behaviour.
7. Outcome variables have been ill-defined. No systematic appraisal was located of the occupational and domestic determinants of pilot mental and physical health and performance. Short-term effects of stress on attention, vigilance, task performance etc, have been examined. Long-term outcomes (particularly of health) are not documented.
8. There is no complete insight into the non-occupational, home life sources of stress.
9. Examination of data from other occupations reveals no parallel model for pilots. Given the massive body of evidence, deficiencies in pilot research are clearly visible.
10. No insight is given into coping strategies adopted by the pilot, particularly domestic or non-occupational sources of these.
11. Subjects have generally been military as opposed to civilian pilots.
12. Sample sizes have been relatively small and statistical analyses unsophisticated.

Rationales for the Present Research

The aim of the present research is to investigate the nature of the occupational and domestic sources of stress and to relate this to pilot health, job satisfaction and performance. Particular emphasis will be placed upon the examination of the nature and relative importance of home life variables. Secondly, the objective is to focus in on the key issues involved, the underlying trends and themes and most significantly predictive variables and to design a questionnaire that specifically concentrates on these for further application in the practical setting.

OVERVIEW OF PRESENT INVESTIGATION

OVERVIEW OF PRESENT INVESTIGATION

The overall implications of the preceding discussions are fairly clear.

1. The adoption of a psychosocial viewpoint is necessary.

2. Measurement of occupational stressors other than those that are physically determined and examined ergonomically is required.

3. Inclusion of domestic stressors and a full explanation of the nature of the home/work interfaces involved is especially necessary for two reasons

   (i) material on life events looks potentially fruitful but doesn't go far enough

   (ii) such issues are generally ignored in aerospace medicine literature

4. The predictors of stress.outcomes need to be specifically defined, i.e. mental and physical ill health[1] and performance.

5. Subjects should be representative of the broadest category of pilot. Within the present study, commercial airline pilots will be examined, whose military counterpart is the transport pilot. Sample sizes should be relatively large and statistical analyses relatively sophisticated.

1. This is to be included in phase 2 of the project. Re: USAF proposal 1984.

Consistent with project proposals, the study was to concentrate upon the collection and assessment of psychological data. This obviously with the present research context, involved the extensive use of subjective self-report data. The research rationale was geared to establishing the absolute and relative levels of health and performance, and the sources of stressors involved. Due to the relatively unique nature of different applied research settings, there are no standard instruments for achieving the latter goal. Hence it is necessary to specially design a collection of scales that can be applied for this purpose.

One way of designing measurement instruments is to rely on previously published literature or past research findings. However, the best way is to perform a series of relatively intensive interviews.

The interviews yield a vast amount of data that may be developed into questionnaires. Previously designed instruments are available for the measurement of some dependent variables. Combined, the end product is a highly intensive, though relatively crude, instrument. Because the process of questionnaire refinement requires relatively complex statistical procedures, a high sample size of subjects is required. Due to this necessity and other practical constraints (such as time, for example), a survey by post is as good a means as any for assessing a large sample quickly.

The following sections give an account, therefore, of the two processes involved. A brief description is given of Stage 1, preliminary interviews. Greater detail is given about Stage 2, postal surveys, which form the main part of this research.

Finally, it should be noted that all subjects involved were commercial airline pilots. Details of sub groups and characteristics are given below in the text. These were chosen primarily because of the accessibility of the sample and, secondly, because they represent the majority of pilots as a whole (militarily in the form of transport pilots).

Stage 1 - Preliminary Interviews

Objectives

There were three overall aims. Firstly, to set the scene and familiarise the researchers with the specific occupational group, secondly to highlight the areas necessary for investigation and thirdly to generate items for psychometric testing and measurement.

Technique

Since item generation was a particularly important objective, special attention was paid to asking open-ended questions on relevant topics. These are detailed in Appendix 1. The questions outlined in Appendix 1 were designed to tap as much as possible about the home/work relationship. This involved questioning not just about carryover effects between home and work (in both directions), but also stressors solely connected to work and solely to do with home life. Since previous literature indicated life events to be important, these were examined. From a holistic point of view (and perhaps remedial) an insight into coping was acquired. Finally, since previous research provided no insights into self-report measures of pilot performance (which was methodologically desirable and necessary for the postal survey), it was felt that the preliminary study would provide an appropriate mechanism to encourage pilots themselves to design such a measure. The question plan was adhered to as closely as possible throughout all interviews, to induce as much reliability between interviews as possible. However, pilots were also encouraged to develop themes if appropriate. All interviews were tape recorded and were conducted in privacy at a private venue.

Sample

Samples were obtained through the British Airline Pilots Association (BALPA) based in London. Additional subjects were available through contacts by the Civil Aviation Authority Medic for Manchester Airport.

In both sources, pilots were chosen at random from lists available. Due to the relatively small magnitude of pilots examined, this randomisation process may not have been sufficient to account for major biases in the sample. However, before interviewing began, from the information on the pilots already available, it was ensured that as wide a range of characteristics as possible were reflected (e.g. long haul/short haul, rank, seniority, London/non-London based, etc). These pilots were approached by letter. All pilots interviewed were volunteers.

In total 54 pilots were interviewed. Some fundamental characteristics of the pilots were taken to cross check that the major sub groupings of pilots were represented and that no obvious major sources of bias existed. A fairly good cross sectional sample was achieved.

A final comment should be made about sample size. One generally accepted rule of thumb of sample sizes for preliminary background studies is that approximately 30 subjects need be approached (the rationale being that due to the nature of qualitative data, one acquires proportionately smaller insights into the situation as more individuals are interviewed). Indeed, it was found that 54 was a sufficiently high sample for trends to emerge in the data obtained. Each interview lasted approximately 1 hour.

Procedure

The tapes were played back and answers recorded verbatim. The data were divided into the 9 categories relating to the questions asked. Because the qualitative data was self-report, it was necessary to systematically categorise the interview material. Each item was recorded and the frequency of identification of each source of stress was also recorded. Then the items were selected into groups of items that related to similar issues. To ensure no experimenter bias, several individuals not concerned with the project regrouped the items. The comparisons confirmed groups that were in close agreement with those produced by the researchers.

The end result was, therefore, data that had been transformed from qualitative interview data, into that which fulfilled the objectives and specified the relative importance of items produced by pilots within each of the 7 sections of the interview schedule.

Conclusions on Preliminary Interviewing

The primary objectives of the pilot work were fulfilled. First, the interviews provided an opportunity to explore the area of research and a wealth of information in an area of aviation psychology relatively bereft of data. Second, a battery of questionnaires was created for further testing in the investigation. Because the reliance upon efficient pilot work was comparatively high, an overall aim was that any pilot work performend should be as sound and as rigorous as possible. These qualities were felt to have been achieved successfully.

Stage 2 - Postal Survey

This stage forms the major part of the research.

Aims and Objectives

1. To identify a set of items that appear to be; predictive of pilot health and performance, which cluster together and form major trends, and which seem to be statistically reliable. These could then be used for further investigations.

2. Because only a small number of previously published pieces of research were located, a major aim was to fulfil an investigative role, with particular attention to the nature of the relationship between work and home.

3. To identify areas for further investigation.

It is clear that all of the objectives are closely linked. Theoretically they should be sequential, however, practical constraints of time did not permit this. Hence an overall aim was to achieve the objectives concurrently.

Sample

Access to a sample was provided by BALPA.[1] Total BALPA membership if approximately 5/6 thousand pilots, which is itself just over 50% of pilots in Britain with current commercial flying licences. BALPA provided us with 1500 members' names and addresses. They were selected at random from total membership by selecting every third name. From these initial 1500, a further 1000 were selected, again at random. Hence those approached were pilots selected after two stages of random selection.

Eliciting the Sample

(i) Pilots were sent a letter detailing the project and notifying them that they had been selected (Appendix 2).

(ii) Pilots were sent another explanatory letter, questionnaire and pre-paid return envelope (Appendix 3).

(Reference should be made to the Abstract for a timetable of events.)

Comments on the Sample

BALPA membership tends to be comprised of pilots of the largest airlines: British Airways and 3 large independents, British Caledonian, Britannia and Dan Air. This is reflected in the BALPA records of members' names. These are divided into long haul/short haul of British Airways and everyone else i.e. independents. Hence the breakdown of 1000 names was 400/400/200 respectively. This of course may introduce bias into responses obtained, however, little could be done to compensate for this in practice.

[1]BALPA: British Airline Pilots Association

A secondary implication is that pilots from the small independents, who tend also not to be BALPA members, were excluded. These could have been included by going through companies directly, however, the time required to obtain organisational approval did not justify the minor methodological convenience.

One final comment pertains to the fact that all the pilots examined were BALPA members and no non-BALPA members were approached in the postal survey. It may be argued that members may be particularly sensitive to particular issues, or subject to different influences than non-members. However, there was no reason to expect any differences between the two groups in terms of the issues examined, e.g. job and domestic stress on pilot health and performance.

The Sample Obtained

Completed questionnaires were still being received in February 1984. However, the cut off date for inclusion in analysis was the 1st January 1984. In total, completed questionnaires were received from 523 pilots - a response rate of 52.3%. Of these, 20 were discarded as being unusable and 61 arrived too late to be included in the analysis. Hence the sample size used for the analysis of data was 442 subjects.

In terms of response rates the rate of 52.3% is exceptionally high, even from a survey of this type, with a questionnaire that was relatively large.

Instruments

Since the instruments used are fundamental to the objectives and outcomes of the study, it is worth highlighting some of their important and relevant characteristics.

A large battery of inventories was employed. Some were integral parts of the questionnaire which form the main thrust of the analysis. Others are merely included for investigative reasons and were intended for only limited selective analysis. A summary of contents is as follows:

Section		Title	No of Parts	No of Items
1		Biographical Data	1	56
2		Problems, occurrences, issues that are entirely domestically oriented	1	29
3		Problems, occurrences, issues that are entirely occupationally oriented	1	30
4		Relationship between work and home	1	16
5		Relationship between home and work	4	
		i home factors that may affect work		12
		ii nature of effects of home factors on work		12
		iii factors generally affecting pilot performance		12
		iv relative importance and differences in sources of home and work stress		16
6		Life events	3	
		i life events experienced by pilot		6
		ii life events generally		8
	*	iii life events (retest of Alkov, 1982)		22
7		Coping	1	33
8	*	Job satisfaction	1	16
9	*	Mental Health	1	48
10		Performance	1	15

All instruments were designed by the authors especially for the present study. Instruments marked thus*, were designed by previous researchers.

A copy of the questionnaire is included in Appendix 3.

1. Biographical Data

Major sections concern family details, personal habits and details of work and work history. The overall aim of the instrument was not only to identify possible confounding characteristics in the sample, but also to create as complete a picture as possible of the pilot concerned.

Four sections concerning exercise, smoking, eating habits and alcohol consumption are worthy of further comment. Although pilots examined were all "fit" (i.e. had a current medical certificate), it was felt appropriate to gain some insight into these aspects of the pilot's lifestyle since wide variations within these habits might be observed. In addition, this data is not normally recorded in this form or in such detail.

2. Problems, occurrences, issues that are domestically oriented

3. Problems, occurrences, issues that are occupationally oriented

4. Factors of work that affect the pilot at home

All of these are lists of "stressors" generated by the preliminary interviews. They are fairly self-explanatory and require little comment other than to state 2 and 3 are to be rated in terms of "stressfulness" whereas 4 were to be rated on their frequency of occurrence (since this was consistent with interview comments).

5. Factors of home life that affect the pilot at work

This had four parts:

Part i was a list of home factors that might have affected the pilot at work to be rated on their size of effect.

Part ii was a list of effects or consequences of home factors on work. The pilot was asked to rate each on the frequency of observation or experience of effects.

Part iii was a list of factors that might generally affect pilot performance. Pilots were required to rank their top 6 of the items in terms of their perceived effects on performance.

Part iv was a brief series of attitudinal items reflecting the overall differences between the nature or sources of domestic and occupational stress.

6. Life events and life changes

Previous aeromedical literature has identified these as potentially important, hence some detailed comment is required.

The preliminary study collected data of life events experienced by the pilots in the samples. No trends were apparent either in the nature of events experienced or subsequent effects that portrayed these pilots as any different to any other occupational group. Hence there was little evidence to indicate the need to specifically desing an instrument for this study. It was decided that the use of instruments employed by others would be a more appropriate methodology.

The major disadvantages of pre-designed instruments in this area is their length and the fact that they contain many redundant items, in the sense that their predictive power is low. Hence a relatively brief and concise measure of life events was required with preference given to those already used within an aviation context. Examination of relevant literature revealed Alkov's technique (Alkov et al, 1982) as suitable.

It was necessary to modify Alkov's 22 item questionnaire in the following way. The 22 items were a mixture of life events, life changes and pilot characteristics. Alkov asked respondents (flight surgeons) to use the questionnaire to describe a pilot whome they knew. On an a priori basis, however, Alkov knew which pilots had or had not been assigned as being an error factor in an accident or incident. Hence subsequently he could make

comparisons to see which items discriminated between the two groups.

Such a methodology could not be used here. So respondents were asked to think of a typical example of a pilot who might be exhibiting decreased performance or likely to be error prone. Fundamentally the technique is the same as that used by Alkov, however, instead of describing a specific individual using direct information, the pilots are describing a typical example of individuals using indirect information, but based on their own experiences and knowledge of pilots. In addition, the answering scale was expanded from nominal to interval level. The eventual aim therefore, was to uncover a unique insight into these aspects of pilot behaviour using a technique previously employed in the psychological literature and recognised as being potentially fruitful.

7. Coping

The aim of the instrument was to provide an insight into how pilots deal with the stresses they perceive at both home and work. The rationale for inclusion being that if sources of stress cannot be removed, then assistance should be given in helping pilots to cope more efficiently with them. In turn, this infers a knowledge of the factors important in pilot coping.

The coping items yielded by the interviews are not all strategies. Some are characteristics and conditions and some are descriptions of features which are important in themselves in coping. Superficial trends were apparent in these items, even in this preliminary analysis and these were randomised throughout the questionnaire. Pilots were asked simply to rate each item on the degree of importance it played in coping.

8. Job Satisfaction

Although the industrial psychological literature is confused on the precise relationship between occupational stress and job satisfaction, on balance, the data falls in favour of a significant inverse relationship between the two. It was decided

that a valid dependent variable would be provided by a measure of job satisfaction. The scale selected was recently published (Warr, Cook and Wall, 1979) and chosen because it yields 7 scores, each of which may be regarded as a dependent variable in its own right.

The scales yielded are:

(i) intrinsic job satisfaction
(ii) extrinsic job satisfaction
(iii) job itself intrinsic job satisfaction
(iv) working conditions extrinsic job satisfaction
(v) employee relations job satisfaction
(vi) total job satisfaction
(viii) overall job satisfaction (1 item)

9. Mental Health

As mentioned earlier, all of the pilots examined had valid medical certificates and hence were deemed "fit" (and presumably "healthy"). This was accepted and no measure was taken of physical fitness (other than the health related habits in the Biographical questionnaire). It is possible, however, for health to fluctuate yet still meet the minimum standards required. This is particularly true of mental health.

The measure employed was the Crown-Crisp Experiential Index (Crown and Crisp, 1979, formerly the Middlesex Hospital Questionnaire, Crisp et al, 1966). This is a widely used screening device of neuroses. It yields six subscale scores and a total, each of which may be treated as dependent variables.

The scales yielded are:

(i) Anxiety
(ii) Phobia
(iii) Obsessionality
(iv) Somatic disorders
(v) Depression
(vi) Hysteria
(vii) Overall neuroticism

10. Performance

For practical reasons, no objective test of performance could be administered, however, its measurement as a dependent variable was considered important. No self-report measure of pilot performance was located in previously published psychological data. Neither were there any guidelines as to how one might be designed. It was decided therefore to ask the pilots in the preliminary interviews to design a questionnaire themselves. The pilots were asked how they would devise a method of assessing another pilot's performance using self-report data.

It was recognised by most pilots that the task was artificial, however, general consensus of opinion agreed that it was possible to assess performance in this way, and that pilots could satisfactorily assess their own performance. Overall, analysis of the interviews revealed 15 criteria on which they might do so. Because of this artificiality, pilots were instructed in accompanying notes, to be as honest and as accurate as possible (to instill as much reliability into the measure as possible). Respondents were requested to place their position on a simple bi-polar scale.

A note on the analysis of the performance measure

The instrument was desinged with a specific method of analysis as an integral part. Using self-report measures, it was clear that no single item would be in itself sufficiently sensitive to monitor different fluctuations in performance. What was needed was a single score, that reflected the conglomerate effects of all or most of the items. Simple summation was inappropriate since the process fails to account for the relative weight of each item.

It was planned that one way of achieving a measure would be to Factor Analyse the items, if the items relate to the same

issue (i.e. performance), only 1 significant factor should be extracted. Then, use Factor Score Coefficients to erect a performance scale for each pilot. This would be a dependent variable, expressed as a single integer, which would be a conglomerate of all or most items, weighted for their importance in measuring performance.

Details are provided in Appendix 4. However, to summarise, one factor was indeed obtained that accounted for 91% of the variance. Loaded onto this were 13 of the 15 items, all at high levels. Hence, it was possible to successfully create a performance scale using these weighted 13 items, to be used as a dependent variable.

Final Comments

As mentioned above, some parts of the inventory were included for merely investigative reasons, whilst others formed the main part of the study. To summarise:

(i) Instruments measuring independent variables and forming the main thrust of analyses were:
   a) Biographical data (Section 1)
   b) Domestic stressors (Section 2)
   c) Occupational stressors (Section 3)
   d) Occupational factors affecting the pilot at home (Section 4)
   e) Domestic factors affecting the pilot at work (Section 5. part 1)
   f) Life events - Alkov's 22 (Section6, part 3)
   g) Coping (Section 7)

(ii) Instruments measuring independent variables and designed for purely investigative reasons were:
   a) nature of effects of home factors on pilots at work (Section 5, part 2)
   b) factors that might generally affect performance (Section 5, part 3)
   c) differences in nature or sources of stress (Section 5, part 4)
   d) specific life events and life events generally (Section 6, parts 1 and 2)

(iii) Two instruments measuring dependent variables were previously designed (job satisfaction, Section 8, and mental health, Section 9). The third instrument measuring performance was specially designed (Section 10).

Finally, it should be noted that each subject was allotted a reference number, hence a follow up facility is available.

RESULTS

RESULTS

Strategy of Statistical Analysis

The analyses followed 3 sequential stages of univariate, bivariate and multivariate statistics. All procedures were performed using SPSS (Nie et al, 1970), on the facilities of The University of Manchester Regional Computing Centre.

As indicated earlier, certain questionnaires were included for investigative reasons. Only univariate analyses were applied to these sections and these are reported below. To other sections of the questionnaire, analyses were applied and reported as follows:

1. Univariate Analyses

    1.1. Biographical data
    1.2. Nature of effects of domestic factors at work
    1.3. Factors that might generally affect pilot performance
    1.4. Life events specific and general
    1.5. Job satisfaction
    1.6. Mental health
    1.7. Note on performance measure descriptive statistics

2. Bivariate Analyses

2.1.	Pearson Correlation:	Biographical continuous variables with dependent variables
2.2.	Breakdowns:	Biographical discrete variables with dependent variables (one-way ANOVA and test of linearity reported)
2.3.	T-tests:	Dependent variables, groups defined and selected by significant ANOVAS 2 x 2.

3. Multivariate Analyses

3.1. Factor Analysis - domestic, occupational, work/home items, home/work items

Factor Analysis - Alkov's 22 items

Factor Analysis - Coping items

3.2 Multiple Regression - factor scales derived from 3.1., plus selected demographic variables, against job satisfaction, mental ill health and performance.

1. Univariate Analyses

It was decided that an appropriate method of summarising biographical data would be by the application of simple descriptive statistics, such as means, modes, tests of distributions, percentages, etc. These were also applied to selected sections of the questionnaire which were included for investigative reasons only. For discrete variables, 'frequencies' analyses were used, and for continuous variables, 'condescriptive' analyses were used (Nie et al, 1970).

For reasons of brevity , the statistical results are reported in Appendix 5. The notes presented below are the most salient points that emerge upon examination of the descriptive data.

1.1. Biographical Data

You and Your Family

1. Sample 100% male.
2. Majority of sample in 31-40 (54.8%) and 41-50 (27.8%) age ranges.
3. Vast majority married (87.3%).
4. Fairly equal low percentages of single (3.6%), divorced (3.2%) and cohabiting (3.8%) pilots.
5. No preponderance of separated or divorced pilots, though 'married' may well include those re-married.
6. From those married, marginally more of their wives work than do not work.
7. Of wives who work equal percentages of those who work full-time work part-time.
8. Examination of data on number of children, children's ages and number of dependents revealed no surprising trends.

Interests

1. Nearly 50% said they 'always' found time to relax and 'wind down' - probably a function of work and hence integral part of life style.

2. High percentages (40.7%) said they 'sometimes' found time to relax and 'wind down' and only small percentage fell into the lower categories, reinforcing the view that the concept of 'rest' is seen as a fundamental norm.
3. Overwhelming percentages (94.6%) have a hobby which is generally not related to work. This emphasises the need for 'rest' and process of relaxing.
4. Opinion is less extreme in terms of mixing with colleagues outside work. Relatively high percentages of pilots who said 'yes' (40%) could well reflect the post-flight rituals of relaxation with fellow aircrew (particularly in long haul).

Exercise and Fitness

1. A high percentage (69.7%) stated that they always maintained a desired weight. Although good, it probably reflects characteristics sought in medical checks. This conclusion is reinforced upon examination of further answers.
2. Pilots scored badly in terms of performing vigorous exercise, exercise for muscle tone and stretching exercises. Generally 50-60% said that they never did these and only 15-20% said they always did. The latter finding is interesting (muscle tone) given the prevalence (relatively) of muscular skeletal disorders.
3. Scores were better for group fitness but there was still a spread of scores, with the percentage of pilots who never did these (32.1%) exceeding those who did these always (26.5%).
4. The overall conclusion is that as a group the pilots are fairly weight conscious and aware of 'fitness' measured this way. However, they were poor to mediocre in terms of exercise geared towards the prevention of ill health. This was a surprising characteristic of the group and, as indicated above, probably simply reflects characteristics looked for in medical checks.

Smoking

1. Vast majority of pilots do not smoke (78.3%).
2. Of those pilots who do smoke, risks reflect a spread of scores fairly equally divided.
3. There is a tendency for them not to have recently reduced smoking.
4. Divided equally are those who intend and do not intend to quit.
5. Only a small percentage are currently trying to quit.

6. Overall conclusion is that pilots are fairly well aware of smoking risks to health, but of those who do smoke, they do not score well in terms of quitting or reducing smoking.
7. Of those who currently do not smoke, one third were once smokers. In general, they stopped smoking an average of 10 years ago, though there was a high spread of scores.
8. One must remember that all figures are conservative estimates consistent with the tendency for respondents to decrease assessments of smoking habits.

Eating Habits

1. Very high percentages said they frequently (76.2%) or sometimes (21.9%) ate a variety of foods. Only a tiny percentage said they never did so (1.8%).
2. Majorities only sometimes or never eat foods high in cholesterol. However, 22% said they frequently did. This is not surprising since this is a well popularised health risk.
3. Fairly equal majorities never or sometimes ate salty foods. A similar percentage frequently eat salty foods (23.5%) to those who eat cholesterol. Conclusion as above.
4. Very high majorities never or only sometimes eat sugary foods. Very low percentages (6.6%) frequently ate sugary foods. Comments are similar to those about fitness, with results probably related to weight and medical checks.
5. The group were good in terms of fibre intake, which could well reflect recent popular social trends in fibre intake in Britain.
6. The overall conclusion is that the group was good in terms of variety of foods, fibre and sugary foods consumed, however, were only mediocre in terms of salt and (surprisingly) cholesterol consumption.

Alcohol

1. Overwhelming majority of pilots drank alcohol (98.7%).
2. Pilots tend to drink four days or so per week on average and on those occasions consume 4 drinks. This places them in the broad mid-range category. Again, one must assume that these are conservative estimates consistent with the fact that respondents generally decrease their assessments of drinking habits. This latter point was reflected in the more detailed questions.

3. Fairly equal percentages said they did not on average consume more than 2 drinks per day as those who said they did so or did so frequently.
4. To the more value laden questions, only negligible percentages used the 'often' option and the majority of pilots answered 'no' throughout.
5. Overall, one must conclude that as a group they appear to be quite good, however, given previous comments, it is difficult to predict how some answers reflect reality.

Work History

1. By far the biggest employer was British Airways (58.4%), which was expected.
2. Three largest independents all represented by approximately 10% of the sample each.
3. Seven other smaller independents were represented.
4. On average, length of time with present employer was 13 years.
5. Pilots of 21 different aircraft types were represented.
6. On average, number of years experience on present aircraft type was 6 years.
7. Data was collected on experience measured by hours experience, however, standard deviations were massive, as one might expect.
8. Data was collected on experience measured by number of landings, however, standard deviations were massive and some pilots reported that their answers were merely estimates.
9. Data was collected on experience measured by the average length of sector flown (in hours), which was approximately 3 hours. This of course was an unreal statistic and merely reflects the fact that the sample was skewed in terms of the high number of short haul pilots.
10. Breakdown of the sample revealed the proportions of long haul pilots as 26.2% and short haul as 66.7%. Only 7% of the sample said they flew domestic routes only.
11. Just over half (51.4%) were Captain rank, just under 40% (39.8%) were Senior First Officers, and 8.8% were First Officers.
12. Only 13.8% said that they had some additional function other than pilot. These were general route and base training positions or supervisory posts.
13. The distribution of pilots in terms of seniority was unimodal, and fairly symmetrical, though slightly skewed towards those of a higher seniority level.

1.2. Nature of Effects of Home Factors on Work

1. Most answers for the 12 items fell into the mid to lower distributions of the answering scale.
2. Distribution of answers may well be a true reflection of their reactions, but is more likely one or more of the following:
   (i) pilots don't identify effects in such specific terms.
   (ii) pilots cannot articulate their feelings on such issues in this way.
   (iii) the items are simply inadequate.
   (iv) pilots do not answer corrently and (consciously or unconsciously) do not report their true reactions.
3. On balance, data indicates the following as most frequently experienced effects (most important first)
   (i) Experience of tiredness due to disrupted sleep.
   (ii) Recurrence of the items in thoughts during periods of low workload.
   (iii) Decreased concentration.
   (iv) Not listening as intently.
4. On balance, data indicates the following as least frequently experienced effects (least important first)
   (i) Increased alcohol consumption while not flying.
   (ii) Decreased quality of pre-flight preparation.
   (iii) Tendency to talk about the issue at work.
   (iv) Making errors without knowing why.
   (v) Slows one down.

1.3. Factors Which Might Generally Affect Pilot Performance

There are different ways of examining the data which was a series of items to be ranked (top 6 out of 12). The different ways form the basis of points raised.

1. Most frequently identified items ranked as 1
   (i) Fatigue
   (ii) Weather conditions
   (iii) Things not directly under the pilot's control
   (iv) Interpersonal relations with aircrew

2. Most frequently identified items ranked as 2
   (i) Relative time of day one is asked to fly
   (ii) Fatigue)
   Health)
   (iii) Weather conditions
3. Least frequently identified items ranked as 1
   (i) Carryover effects of home life
   (ii) Upset pre-flight routine
   (iii) Inability to separate home and work life
4. Least frequently identified items that were ranked (i.e. low 6)
   (i) Fatigue
   (ii) Upset pre-flight routine
   (iii) Inability to separate home and work life
5. Most frequently identified items left unranked (0)
   (i) Upset pre-flight routine
   (ii) Inability to separate home and work life
   (iii) Carryover effects of home life events
   (iv) Overfamiliarity (with routes, aircraft, etc)
6. Items most frequently ranked (irrespective of value), i.e. on the basis of number of mentions
   (i) Fatigue
   (ii) Relative time of day one is asked to fly
   (iii) Health
   (iv) Things not under the direct control of the pilot
   (v) Weather conditions
   (vi) Poor pre-flight preparation

Comments

1. Throughout, the most highly ranked items appear to be opertionally oriented.
2. Items ranked as of lesser importance tend to be those whose influence is indirect or modifying.
3. Relative disregard for home oriented items seems apparent. This is not really surprising since it reflects the usual view within pilot circles. (This could reflect repression and denial rather than the true situation). This doesn't mean home life is unimportant. One must remember that the nature of the task was to rank. Hence all positions are relative.
4. Comments are with reference to performance. Different answers may have emerged if (with a modified scale) the outcome had been 'health', for example.

1.4. Life Events Specific and General

1. A high majority (77.8%) said that they had experienced some form of life event.
2. Examination of the types of events reported revealed no trends that portray the sample as significantly different from other occupations.
3. On average, events were experienced nearly 11 years ago and their effects lasted a relatively long time - just under 2 years. In both situations, however, there were wide variations in scores
4. On balance, pilots thought their performance was not affected during the life event period.
5. However, these pilots felt that their performance could have been affected without their realising.
6. Conversely, more pilots felt that if their performance had been affected, others (such as colleagues etc) would have realised this.
7. From a more general viewpoint, a vast majority of pilots agreed (95.9%) that life events can affect pilot performance.
8. More specifically, although a high majority (93.0%) confirmed that negative events could affect performance, a surprising majority (86.7%) felt that positive events could also affect performance.
9. Again from a general orientation, majorities of pilots felt that although life events could affect performance, it would not do so to an extent that might be perceived by the pilot himself (58.8%), his colleagues (56.3%) or indeed, was in fact measurable (55.2%).
10. However, majorities of pilots indicated that safety and proper flight conduct may well be affected (52%), and that minimum operational standards might not be met (50.7%). Although these are 'majorities', opinion is clearly split.
11. It should be noted that several pilots expressed difficulty in answering these questions due to the presence of double negatives. It should also be noted however that this was indicated by only a tiny minority of pilots (<3%).

1.5. Job Satisfaction

1. Raw scores were converted to percentage scores as a function of total available for each subscale, to facilitate inter-group comparisons.
2. Pilots were ranked as follows:

Most satisfactory

Overall Job Satisfaction (1 item)
Working Conditions Extrinsic Job Satisfaction
Job Itself Intrinsic Job Satisfaction
Extrinsic Job Satisfaction
Total Job Satisfaction
Intrinsic Job Satisfaction
Employee Relations Job Satisfaction

Least satisfactory

3. Most satisfactory factors associated with Working Conditions Extrinsic Satisfaction. This scale consisted of 5 items:

   (i) Physical work conditions

   (ii) Fellow workers

   (iii) Immediate boss

   (iv) Hours of work

   (v) Job security

4. Overall Job Satisfaction was highest but treated as separate (only 1 item)

5. Contents of most satisfactory scale (WCEJS) were unusual e.g. hours of work, job security, etc.

6. Least satisfactory were factors associated with Employee Relations. This scale consisted of 6 items.

   (i) Recognition you get for good work

   (ii) Rate of pay

   (iii) Industrial relations between management and workers in your company

   (iv) Chance of promotion

   (v) Way your firm is managed

   (vi) Attention paid to suggestions you make

7. On balance, the group are fairly satisfied. However, examination of individual subscales reveals the group only to score on the upper side of 'average' scores. In other words, they seem fairly happy with their jobs but not exceedingly so. (It is certainly not consistent with the idea that flying is a vocation and that those who fly are self-fulfilled.)

8. Contents of the least satisfactory scale (Employee Relations Job Satisfaction) are confirmation of other data.

9. Data was normed. Unfortunately, normative values of scales could not be located which were satisfactorily compatible. In this instance, norms used were those published from data collected during the process of construction of the questionnaire (male, blue collar, working in manufacturing industry).

10. In all instances the pilot sample mean scores fell below those of the norm group.

11. In four of the comparisons, pilots mean scores fell into only 3-4 Decile.

12. In only two comparisons did pilots mean scores fall into 4-5 Decile.

13. In only one comparison did pilots mean score fall into the 5-6 Decile.

14. Hence, overall conclusion is that in absolute terms the pilots weren't particularly satisfied with their jobs. This was a surprising results and one that must be judged in the light of the nature of the comparison group.

1.6. Mental Health

1. No norms available for comparisons - the test is a 'psychiatric' test, not a psychological one, therefore it is difficult to establish what is 'normal'. Various studies have used this instrument (Crown and Crisp, 1979), however, comparisons tend to be precluded by factors that underly variations in mental health data, e.g. gender, age, socio-economic status, etc.
2. One must treat reported data as conservative estimates as respondents usually down-rate their answers to such types of inventory. In addition, one might expect a population such as airline pilots to be cautious, despite guarantees of confidentiality, because of potential threats to livelihood (e.g. suspension or removal of licence on mental health grounds).
3. The role of the measure is to provide data on an important dependent variable, hence simplistic univariate comments are not really appropriate given the nature of the measure.
4. The analysis of different cut-off points revealed pilots at the upper ends of the distributions who were most at risk. These may form the basis for further investigations.

1.7. Performance Measure

1. Univariate analyses are not reported for the dependent performance outcome measure. This is because the variable is a composite weighted scale, hence univariate analyses would be unintelligible.

2. Bivariate Analyses

The second stage of analysis was the examination of relationships between pairs of variables, It was decided to perform this type of analysis for two reasons. Firstly, it permits us to home in on simple inter-relationships, and secondly, it sets the scene for the holistically oriented, multivariate analysis that follows. Three complimentary types of bivariate analysis were selected. Correlational analysis was used to highlight the degree of association between pairs of continuous variables. This was particularly useful, for example, for highlighting the relationship between dependent outcome measures and independent variables.

It was necessary to see if there were any underlying trends that may have existed in the data (particularly in the dependent outcome measures). For continuous variables, this was achieved by correlational analysis, however, for discrete variables, breakdown analysis was used. This examines the nature of the distribution of dependent scores when broken down by different discrete categories. A one-way analysis of variance and test of linearity were also provided.

Finally, it was felt desirable to investigate further the nature of the relationships underlying the dependent variables. Since analysis of variance from previous breakdown analysis above, revealed which variables were important, t-tests for independent means were applied to dependent scores, with groups defined by categories within each variable.

In terms of format of reporting of bivariate analysis, statistics are reported here in the text. It is divided into three sections, with three sets of notes after each table of statistics.

Analysis may be summarised as follows:

1. Pearson correlations: Biographical and independent variables (of a continuous nature) against dependent variables.
2. Breakdowns (including one way ANOVAS and test of linearity) of Biographical (discrete variables) and dependent variables.
3. T-test of dependent variables with groups defined by significant ANOVA tests (in 2 above).

2.1. Pearson Correlations

The test applied was Pearson's Correlation Coefficient. This gives a measure of the degree of linear association between two variables. Upon examination of results it was found that there were many coefficients that were "significant" (i.e. $p \leq 0.05$). The magnitudes of these coefficients were, however, extremely low. Such weak associations are not reported here. The statistics reported here are those that satisfied two criteria; 1) magnitude greater than ± 0.3, and 2) a significance level of $P \leq 0.001$.

Continuous Biographical Variables with Dependent Variables

- No correlations fulfilled both criteria
- Many were significant coefficients but all low in magnitude

Independent Variables with Dependent Variables (p 0.001)

Intrinsic Job Satisfaction with

	r
Career opportunities and lack of potential advancement	-0.59
Seniority systems	-0.49
Future career uncertainty	-0.48
Lack of management support	-0.47
Degree to which your personal goals and aims in life have been achieved	-0.39
Morale and organisational climate	-0.38
Style of management	-0.36
Conditions of employment	-0.34
Impending major career change or threat	-0.31

Extrinsic Job Satisfaction with	r
Lack of management support	-0.46
Morale and organisational climate	-0.46
Career opportunities and lack of potential advancement	-0.42
Future career uncertainty	-0.42
Scheduling	-0.37
Impending major career change or threat	-0.34
Seniority systems	-0.34
Scheduling and rosters	-0.32

Job Itself Intrinsic Satisfaction with	r
Career opportunities and lack of potential advancement	-0.51
Seniority systems	-0.43
Future career opportunities	-0.41
Morale and organisational climate	-0.33
Scheduling	-0.31

Working Conditions Extrinsic Satisfaction with	r
Morale and organisational climate	-0.37
Lack of management support	-0.36
Style of management	-0.35
Conditions of employment	-0.35
Future career uncertainty	-0.34
Scheduling	-0.33
Impending career change or threat	-0.32
Career opportunities and lack of potential advancement	-0.31

Employee Relations Satisfaction with

	r
Career opportunities and lack of potential advancement	-0.55
Style of management	-0.50
Future career uncertainty	-0.49
Lack of management support	-0.48
Seniority systems	-0.47
Morale and organisational climate	-0.45
Conditions of employment	-0.44
Lack of money	-0.36
Impending major career change or threat	-0.33
Scheduling	-0.30

Total Job Satisfaction with

	r
Career opportunities and lack of potential advancement	-0.56
Future career uncertainty	-0.50
Seniority systems	-0.47
Style of management	-0.46
Morale and organisational climate	-0.46
Lack of management support	-0.45
Conditions of employment	-0.44
Scheduling	-0.37
Impending major career change or threat	-0.36
Degree to which your own personal aims and goals in life have been achieved	-0.35
Lack of money	-0.31

Overall Job Satisfaction (1 item) with

	r
Career opportunities and lack of potential advancement	-0.45
Conditions of employment	-0.39
Morale and organisational climate	-0.38
Future career uncertainty	-0.36
Degree to which your personal goals and aims in life have been achieved	-0.34
Seniority systems	-0.31
Style of management	-0.31

Anxiety with

	r
The degree to which your home life is the way you want it	0.33
Degree to which household is 'geared to flying'	0.31
Build up of tasks and duties and things to do	0.31
Effects of minor day to day things	0.31
Attaining your own personal levels of performance	0.30
Issues or situations that are ongoing or left unresolved	0.30

Phobia

Obsessionality

Somatic Disorders

Depression

Hysteria

Many significant coefficients but none fulfilling both selection criteria

Overall Mental Ill Health with

	r
Attaining one's own level of performance	0.35
The aggregate or cumulative effects of minor tasks (when flying)	0.31
Inability to identify problems (and hence solutions)	0.31
Build up of tasks, duties and things to do	0.30
Success or failure of one's efforts to achieve	0.30

Performance with

	r
Attaining one's own level of performance	0.36

Correlations with Job Satisfaction

1. All coefficients were negative. This was as expected since the independent measures were stressors (increasing scale in terms of stressfulness) and dependent measure was satisfaction (increasing scale in terms of satisfaction).
2. Throughout there is a recurrent set of items that are related to most scales, e.g.
   - future career uncertainty
   - career appointments and lack of potential advancement
   - seniority systems
   - lack of management support
3. There is also a subset of recurring items:
   - morale and organisational climate
   - conditions of employment
   - scheduling
4. All items are exclusively work oriented, as might be expected. One exception is 'lack of money', which although included as a domestic stressor, might arguably be an occupational stressor.
5. Strongest associations tend to be with macro rather than micro aspects of work (i.e., those that may well moderate or underline the perceptions of the pilot as a whole).

6. Only the home-work, work-home factors were selected using present criteria.
7. Dividing job satisfaction into two broad categories reveals that intrinsic satisfaction tends to be related to career factors, whilst extrinsic satisfaction tends to be related to morale and organisational factors.
8. Examination of total job satisfaction reflects comments above (point 7), however, on balance, career oriented items tend to take precedence.

Correlations with Mental Health

1. All coefficients were positive. This was expected since both were positively additive scales.
2. Only items for two scales, anxiety and overall mental health, fulfilled selection criteria.
3. Different items were significantly related to the two scales, apart from 2 items ('attaining one's own level of performance' and 'build up of tasks, duties and things to do'). There was no recurrent set of items.
4. For anxiety, items tend to be about the compatibility of home life with work, practical issues and relatively minor but important issues.
5. For overall neuroticism, items tend to exclusively be about problem identification and solving and performance levels attained.
6. In contrast to job satisfaction, items are primarily domestically rather than occupationally oriented. In addition, associations were generally weaker for MHQ compatible with previously recorded answering phenomena.
7. On balance, the overall theme is achievement and concern with success of one's efforts.

Correlations with Performance

Only one item was selected as fulfilling both criteria. This concerned achieving one's own levels of performance. This mirrors comments about the MHQ in that the group appear to be highly achievement oriented as one might expect.

2.2. Breakdowns

Breakdown analysis was applied to examine the distributions of dependent variables when plotted against independent discrete variables. This was useful for teasing out which biographical

variables were important. Three sets of analyses were performed for each of the dependent measures, job satisfaction, mental ill health and performance. Only the significant F ratios are reported here for the analysis of variance and test of linearity. A summary of the most salient points to emerge from the analysis is presented at the end of the statistical data.

Job Satisfaction broken down by discrete biographical variables

Intrinsic Job Satisfaction

	ANOVA		LIN	
	F	Sig	F	Sig
Age	4.48	0.001	3.21	0.022
Rank	38.51	0.000	16.66	0.000
Other function	17.78	0.000	N/A	
Seniority	13.05	0.000	6.27	0.000

Extrinsic Job Satisfaction

Relax and wind down	4.38	0.001	2.06	N.S.
Interest or hobby	5.71	0.017	N/A	
Alcohol	6.89	0.009	N/A	
Present employer	15.56	0.000	14.67	0.000
LH/SH/Dom	13.43	0.000	23.37	0.000
Rank	3.79	0.023	3.14	N.S.
Seniority	4.71	0.001	6.15	0.000

Job Itself Intrinsic Satisfaction

Age	3.32	0.010	2.28	N.S.
Rank	29.47	0.000	5.82	0.016
Other function	13.17	0.000	N/A	
Seniority	10.97	0.000	4.47	0.002

Working Conditions Extrinsic Satisfaction

	ANOVA		LIN	
	F	Sig	F	Sig
Relax and wind down	3.20	0.013	0.95	N.S.
Alcohol	4.58	0.032	N/A	
Present Employer	5.36	0.000	3.45	0.016
LH/SH/DOM	5.90	0.002	10.79	0.001
Seniority	2.76	0.027	3.68	0.012

Employee Relations Satisfaction

Age	4.23	0.002	2.85	0.037
Relax and wind down	2.65	0.032	2.03	N.S.
Alcohol	6.30	0.012	N/A	
Present Employer	10.63	0.000	10.63	0.000
LH/SH/DOM	6.52	0.001	12.34	0.000
Rank	22.06	0.000	16.76	0.000
Other Function	13.04	0.000	N/A	
Seniority	7.80	0.000	6.99	0.000

Total Job Satisfaction (15 items)

Age	3.97	0.003	2.86	0.036
Relax and wind down	2.62	0.034	0.81	N.S.
Alcohol	6.28	0.012	N/A	
Present Employer	5.75	0.000	6.81	0.000
LH/SH/DOM	5.12	0.006	9.58	0.002
Rank	19.95	0.000	10.39	0.001
Other Function	10.58	0.001	N/A	
Seniority	8.76	0.000	7.41	0.000

Overall Job Satisfaction (1 item)

	ANOVA		LIN	
	F	Sig	F	Sig
Age	2.61	0.035	0.81	NS
Alcohol	5.88	0.015	N/A	
Present Employer	6.65	0.000	4.12	0.006
LH/SH/DOM	8.09	0.000	9.25	0.002
Rank	9.28	0.000	4.20	0.041
Other Function	3.95	0.047	N/A	
Seniority	6.02	0.000	4.89	0.002

Mental Ill Health broken down by discrete biographical variables

Anxiety

Relax and wind down	10.38	0.000	5.03	N.S.
Interest or hobby	9.94	0.001	N/A	
Mix socially with colleagues	4.12	0.016	N/A	

Phobia

No ANOVAS significant

No LIN significant

Obsessionality

Age	4.03	0.003	2.35	N.S.
Relax and wind down	2.52	0.04	0.49	N.S.
Mix socially with colleagues	3.54	0.029	0.44	N.S.

Somatic Disorders

	ANOVA		LIN	
	F	Sig	F	Sig
Age	9.85	0.000	1.78	N.S.
Relax and wind down	8.30	0.000	4.03	0.007
Mix socially with colleagues	5.75	0.003	0.19	N.S.
Present Employer	3.14	0.014	3.51	0.015
LH/SH/DOM	4.13	0.016	3.14	N.S.
Rank	5.18	0.005	4.30	0.038
Seniority	2.91	0.021	0.55	N.S.

Depression

Age	8.67	0.000	1.36	N.S.
Marital Status	2.98	0.011	3.45	0.008
Relax and wind down	3.52	0.007	1.04	N.S.
Interest or hobby	4.59	0.032	N/A	
Hobby related to work	4.36	0.013	N/A	
Mix socially with colleagues	5.19	0.005	N/A	
Present Employer	2.56	0.037	3.36	0.018

Hysteria

Age	3.00	0.018	1.42	N.S.
Marital Status	2.65	0.022	3.15	0.014
Present Employer	3.46	0.008	2.97	0.031

Overall Mental Ill Health

Age	2.95	0.020	1.11	N.S.
Relax and wind down	6.91	0.000	0.51	N.S.
Interest or hobby	6.11	0.013	N/A	
Mix socially with colleagues	4.30	0.008	N/A	
LH/SH/DOM	3.23	0.040	5.09	0.015
Seniority	3.08	0.015	0.62	N.S.

Performance broken down by discrete biographical variables

	ANOVA		LIN	
	F	Sig	F	Sig
Relax and wind down	6.07	0.000	5.97	0.000
LH/SH/DOM	5.69	0.003	4.28	0.039
Rank	3.59	0.028	1.30	N.S.

Breakdown of Job Satisfaction by Biographical Discrete Variables

1. Recurrent themes are those that define status such as rank, seniority, long/short haul etc, as one might expect.
2. Other recurrent items are age, which may well underline the major recurrent themes (status increases with age).
3. Dividing job satisfaction into extrinsic and intrinsic types, there appear to be more underlying trends in the variance related to extrinsic satisfaction.
4. Two items, 'alcohol consumption' and 'present employer' play an important role. However, this may well be explained by skewed sample distributions (i.e. only 1.4% did not drink alcohol and 58.4% of sample were British Airways). Similar comments may be directed towards 'other function', which were held by only a small percentage.

Breakdown of Mental Health by Biographical Discrete Variables

1. All subscales possessed underlying trends apart from Phobia, which possessed none that were significant.
2. Anxiety subscale's significant ANOVAS are yielded from items related to relaxation and leisure.
3. Similarly (2 above) for Obsessionality. Age was also an underlying trend (as one might expect since Obsessionality tends to increase with age for male subjects).
4. Greater number of items underly remaining scales, which tend to be a combination of leisure related and work status related items - in contrast to job satisfaction trends.
5. Throughout, recurrent items are age, relax and wind down and mix socially with colleagues. The latter two are fairly self-explanatory, for age however, the relationship is as follows:

(Source: Crown and Crisp, 1979)

(i)	Anxiety	)	
(ii)	Phobia	)	No relationship with age for males
(iii)	Obsessionality	-	Increases with age
(iv)	Somatics	)	
(v)	Depression	)	Increases with age
(vi)	Hysteria	-	Decreases with age

Performance

1. Three underlying trends - each reflecting different characteristics - leisure, rank, long haul/short haul.

Comments on Breakdown Analyses

The reported Breakdowns are those that yielded significant one-way analysis of variance. The second step is then to extract those categorical variables that are significant and to t-test sub groups of populations on the dependent variables with sub group membership defined. Particular attention must be paid to the relative importance of sample sizes in the examination of significant analysis of variances.

It will also be noted that tests of linearity (LIN) are also reported. It if sufficient merely to conclude that there were more significant tests in the job satisfaction and performance analyses than for mental health. In addition, these tended to be those related to rank and seniority. One further consideration with respect to tests of linearity and mental health data is that many were not applicable because the discrete variable did not contain more than two groups. Also, many were not significant. This may well be explained by the fact that the independent variables were not as wide in range, compared to the dependent variables.

2.3. T-tests of Dependent Variables

It was decided to further investigate underlying relationships between dependent measures and discrete biographical variables. Independent variables that yielded significant analyses of variance were examined. Given that this one-way test of variance indicates significant within group variations, the variables were then broken down into their composite sub groups. T-tests for independent means were applied to the dependent variables (job satisfaction, mental ill health and performance) with comparisons made between all combinations of sub groups.

The results reported below are presented by reference to each discrete variable, rather than by dependent variable, since this permits a more intelligible presentation of results.

Upon examination of 't' statistics, it should be noted that the presence of a - sign indicates that the second group possessed the higher mean value of the two compared. Salient points are highlighted at the end of the statistical data presented.

	Groups	Dependent Variable	t
Age	(21-30, 31-40)	Hysteria	2.09
	(21-30, 41-50)	Intrinsic J.S.	-2.32
		Extrinsic J.S.	-2.01
		Job Itself Intrinsic J.S.	-2.24
		Employee Rel J.S.	-1.98
		Total J.S.	-2.67
		Somatics	-3.54
		Depression	-4.40
		Hysteria	2.88
	(21-30, 51-55)	Somatics	-3.30
		Depression	-5.34
	(31-40, 41-50)	Intrinsic J.S.	-4.08
		Extrinsic J.S.	-2.77
		Job Itself Intrinsic J.S.	-3.45
		Employee Rel. J.S.	-3.90
		Total J.S.	-3.79
		Obsessionality	-3.73
		Somatics	-4.42
		Depression	-3.39
		Overall Neuroticism	-2.85
	(31-40, 51-55)	Obsessionality	-3.90
		Depression	-4.41
		Overall Neuroticism	-2.16
	(41-50, 51-55)	Depression	-2.37

	Groups	Dependent Variable	t
Marital Status	(Married, Divorced)	Depression	-2.17
	(Divorced, Cohabiting)	Depression	-2.15
Relax and Wind Down	(Always, Sometimes)	Extrinsic J.S.	2.69
		Working Condit. Ex	2.16
		Employee Rel.	2.22
		Total J.S.	2.13
		Anxiety	-4.35
		Somatics	-3.65
		Depression	-2.09
		Hysteria	-2.11
		Overall Neuroticism	-3.75
		Performance	-4.68
	(Always, Only When Possible)	Extrinsic J.S.	2.76
		Working Cond. Ext.	2.27
		Employee Rel.	2.33
		Total J.S.	2.02
		Anxiety	-3.24
		Obsessionality	-2.36
		Somatics	-3.26
		Depression	-2.92
		Overall Neuroticism	-3.02
	(Sometimes, Only When Possible)	Performance	3.05

	Groups	Dependent Variable	t
Interest or Hobby	(Yes, No)	Extrinsic J.S.	2.39
		Anxiety	-2.37
		Overall Neuroticism	-2.47
Mix Socially with Colleagues	(Yes, No)	Anxiety	-2.96
		Obsessionality	-2.65
		Somatics	-3.39
		Depression	-3.15
		Overall Neuroticism	-3.17

Prese t Employer

Because of massive discrepancies in sample sizes (i.e. 58% were British Airways), many differen were yielded significant - too many to be reported here. It is therefore sufficient to conclud that, as one might expect, the high proportion of British Airways respondents does affect depend results.

LH/SH/Dom. Only	(Domestic only, Long Haul)	Extrinsic J.S.	-3.86
		Working Condit. Ex.	-2.28
		Employee Rel.	-2.49
		Total J.S.	-2.16
	(Domestic only, Short Haul)	Extrinsic J.S.	-5.23
		Working Cond. Ex.	-3.54
		Employee Rel.	-3.52
		Total J.S.	-3.21

	Groups	Dependent Variable	t
LH/SH/Dom Only	(Short Haul, Long Haul)	Obsessionality	-1.97
		Depression	-2.87
		Overall Neuroticism	-2.11
		Performance	-3.34
Rank	(First Officer, Captain)	Intrinsic J.S.	-4.29
		Job Itself Intrin.	-4.90
		Employee Rel.	-2.15
		Total J.S.	-2.72
	(Senior First Officer, Captain)	Intrinsic J.S.	-8.41
		Extrinsic	-2.82
		Job Itself Intrin.	-6.93
		Employee Rel.	-6.56
		Total J.S.	-6.27
		Obsessionality	-2.11
		Somatics	-3.22
		Depression	-2.30
		Performance	2.6
Seniority	(Very low, Low)	Extrinsic J.S.	2.47
		Working Cond. Ex.	2.39
	(Very Low, Middle)	Intrinsic J.S.	-2.86
		Job Itself Intrin.	-2.56
		Anxiety	-2.37
		Overall Neuroticism	-2.73

	Groups	Dependent Variable	t	Sig
Seniority	(Very low, High)	Intrinsic J.S.	-3.60	0.0
		Job Itself Intrin.	-3.35	0.0
		Anxiety	-2.60	0.0
		Overall Neuroticism	-2.70	0.0
	(Very Low, Very High)	Intrinsic J.S.	-2.90	0.0
		Extrinsic J.S.	-2.06	0.0
		Job Itself Intrin.	-2.13	0.0
		Anxiety	-2.27	0.0
		Somatics	-2.34	0.0
		Depression	-2.50	0.0
		Overall Neuroticism	-2.84	0.0
	(Low, Middle)	Intrinsic J.S.	-5.35	0.0
		Extrinsic J.S.	-3.85	0.0
		Job Itself Intrin.	-4.67	0.
		Working Cond. Ex.	-2.63	0.
		Employee Rel.	-5.00	0.
		Total J.S.	-5.03	0.
	(Low, High)	Intrinsic J.S.	-5.87	0.
		Extrinsic J.S.	-2.91	0.
		Job Itself Intrin.	-5.27	0.
		Employee Rel.	-4.81	0.
		Total J.S.	-4.79	0.
		Obsessionality	-2.13	0
		Depression	-2.09	0

	Group	Dependent Variable	t	Sig
Seniority	(Low, Very High)	Intrinsic J.S.	-2.90	0.00
		Job Itself Intrin.	-2.76	0.00
		Somatics	-3.27	0.00
		Depression	-2.50	0.01
		Overall Neuroticism	-2.43	0.02
	(Middle, Very High)	Extrinsic J.S.	-2.26	0.02
		Somatics	-2.41	0.01

T-tests Between Groups

Groups Defined by Age

1. Differences observed for all sub groups (except 5 - very small N).
2. Groups 21-30, 41-50 and 31-40, 41-50 reflected largest range of differences. Thus indicating that 41-50 group are distinctive.
3. The relation between age group and dependent variables was positive throughout.
4. Differences 21-30, 41-50 groups - greatest differences are reflected in Depression, Somatic disorders and Hysteria.
5. Differences 31-40, 41-50 groups - greatest differences are reflected in Somatics, Intrinsic job satisfaction and Employee Relations satisfaction.
6. Overall highest values of 't' are for mental health scores, especially those concerning Depression and Somatic Disorders. This is to be expected since both are positively related to age.
7. Overall lowest values of 't' are for job satisfaction scores, especially Employee Relations satisfaction and Extrinsic job satisfaction.

Groups Defined by Marital Status

1. Only two significant 't' values denoting the group as a whole to be fairly homogeneous - as expected since 87.3% are currently married.
2. Both significant 't' tests concerned Depression and indicated that those who were divorced were significantly more depressed than those currently married, and those cohabiting were more depressed than those divorced, though one must take care, given the relative sample sizes.

Groups Defined by Frequency of 'Relax and Wind Down'

1. Most differences were for groups who found time to relax and wind down, 'Always and Sometimes' and 'Always and Only When Possible'.
2. Surprisingly, no significant differences between groups defined by 'Always and Never' and 'Only When Possible and Never' (though sample size of respondents who answered 'Never' was low).
3. Differences (above) are across most mental health and job satisfaction scales, though for the latter, extrinsic satisfaction in particular seems to yield differences.

4. For differences in job satisfaction, values of 't' are positive, indicating that those who relax and wind down 'Always' are more satisfied with such aspects than those who relax 'Sometimes' or 'Only When Possible'.
5. For differences in mental health, values of 't' are negative, indicating that those who relax and wind down 'Always' are more healthy than those who relax 'Sometimes' or 'Only When Possible'. This is reflected too, in overall neuroticism.
6. For differences between groups who relax and wind down 'Always' and 'Sometimes', greatest values of 't' were yielded for performance, anxiety and overall neuroticism.
7. For differences between groups who relax and wind down 'Always' and 'Only When Possible', greatest values of 't' were yielded for somatics, anxiety and overall neuroticism.
8. Only one scale, performance, yielded significant differences between those who relaxed "sometimes" and those who relax "only when possible" (positive 't').

Groups Defined by Interest or Hobby (Yes, No)

1. Differences in three scales only. Extrinsic Job Satisfaction, Anxiety and Overall Neuroticism. Direction of 't's' indicated that those who had a hobby were more satisfied with extrinsic factors, less anxious and generally less neurotic than those who did not possess a hobby.

Groups Defined by Mix Socially with Colleagues (Yes/No)

1. All significant differences concern mental health scores.
2. All 't' values were negative, indicating those who do not mix with colleagues socially are significantly more anxious, obsessive, depressive, experience more somatic disorders and are generally more neurotic than those who do mix socially with their colleagues.
3. Highest value of 't' was for somatic disorders.

Groups Defined by Present Employer

1. High number of scales observed throughout all scales.
2. Statistics were not reported due to large discrepancies between B.A. sample and others.

Groups Defined by Long Haul/Short Haul/Domestic Only

1. Differences yielded for comparisons between all three sub groups.

2. Sample sizes of pilots who answered 'domestic only' were low, however, differences were yielded. Those differences concerned solely job satisfaction factors.
3. The two major sub groups (long haul/short haul) yielded differences in mental health scales only.
4. Differences between long haul and short haul indicated that long haul pilots were significantly more obsessive, depressive and generally more neurotic than short haul pilots. In addition, they generally rated their performance to be significantly higher.

Groups Defined by Rank

1. Differences yielded in comparisons between First Officers and Captains and Senior First Officers and Captains. No differences were yielded in comparisons of First Officers and Senior First Officers.
2. Differences between First Officers and Captains were only in terms of job satisfaction. 't' statistics indicated significantly higher levels for Captains, especially in terms of intrinsic satisfaction.
3. Comparisons between Senior First Officers and Captains yielded a high number of significant differences embracing job satisfaction, mental health and performance.
4. Captains were significantly more satisfied than Senior First Officers for job satisfaction scales, especially for intrinsic job satisfaction, job itself intrinsic, employee relations and overall job satisfaction.
5. Captains were significantly more unhealthy than Senior First Officers , especially in terms of obsessionality, somatic disorders and depression.
6. Senior First Officers rated their performance as significantly higher than did Captains.
7. Overall highest values of 't' were in differences between Senior First Officers and Captains. The scales concerned intrinsic job satisfaction, intrinsic satisfaction for job itself and satisfaction with employee relations.

Groups Defined by Seniority

1. A vast number of differences were yielded - too many to comment upon individually.
2. Generally, most differences were yielded concerning comparisons with the low and very low groups.
3. Overall greater number of differences were manifest in terms of job satisfaction scales.
4. Differences between groups at ends of the seniority continuum were in terms of both job satisfaction and mental health.
5. Differences between groups towards the middle of the seniority continuum were mainly in terms of job satisfaction.
6. Comparisons indicated that job satisfaction and neuroticism were particularly related throughout to seniority.

3. Multivariate Analyses

Two sets of multivariate analysis were applied: factor analysis and multiple regression.

Factor analysis was applied to the independent variables and was used for two reasons. Firstly to uncover underlying trends, and secondly to reduce the pool of items and home in onto those that were important. Not only would the analysis reveal a high amount of information in itself, but it would also provide factors which could be entered into subsequent analysis.

Since a major objective was to determine which variables were predictive of the dependent measures, multiple regression analysis was selected as an appropriate technique.

The presentation of results is divided into two parts, for each of the two major types of analysis performed. Preliminary notes highlighting details of the statistical tests performed are provided before the tables of results. After the presentation of results, salient points are also highlighted.

3.1. Factor Analysis of Independent Variables

Preliminary Notes on Factor Analyses

1. There were two ways of factor analysing the data proposed. The first was to factor analyse groups of items entered into the analysis, divided into groups on the same basis as their presentation in the questionnaire. The second method was to take all items and simply factor analyse them. In both cases, Alkov's 22 and the coping items would be analysed separately, since this would be more theoretically meaningful. The first method is easier and one may readily see the trends within the subsets of items. However, the second method is better, since it examines items from an holistic viewpoint and makes no a priori judgements as to how items are grouped - an option theoretically more sound.
2. Method of analysis used (SPSS Version 8) was PA2, oblique rotation, default Delta.
3. Criteria for selection of a factor was that it should possess an eigenvalue greater than 1 and explain more than 10% of the variance. These criteria were relaxed in borderline situations where factors just failed to meet either criteria but where the factor was meaningful.

4. Criterion for selecting the significance of items was ± 0.3. This more stringent criterion was preferred over the levels calculated by other means (Burt-Banks, 1947). With such a high sample the Burt-Banks criterion tends to reduce the acceptance level and hence more items would be included. This was not considered as desirable since it is better to concentrate upon the stronger relationships.

Items: Domestic, Occupational, Work to Home and Home to Work Stressors

Factor Solution (PA2, oblique rotation, default Delta)

Factor	Eigenvalue	% of variance	Cum. %
1	18.901	39.4	39.4
2	4.539	9.5	48.9
3	3.956	8.2	57.1
4	3.220	6.7	63.8
5	2.847	5.9	69.7
6	1.820	3.8	73.5
7	1.590	3.3	76.8
8	1.325	2.8	79.6
9	1.251	2.6	82.2
10	1.131	2.4	84.6
11	1.045	2.2	86.8

Items: Alkov's 22 Items

Factor Solution (PA2, oblique rotation, default Delta)

Factor	Eigenvalue	% of variance	Cum. %
1	7.562	58.3	58.3
2	3.439	26.8	84.8
3	1.288	9.9	94.8

Items: Coping

Factor Solution (PA2, oblique rotation, default Delta)

Factor	Eigenvalue	% of variance	Cum. %
1	6.365	46.8	46.8
2	1.834	13.5	60.3
3	1.570	11.5	71.8
4	1.138	8.4	80.2

The Factors Extracted

Factor 1 Control

	Loading
Others not obeying or things that go wrong	0.783
New and unfamiliar experiences	0.437
Disappointment when others fail to meet expectations	0.287
Disagreements, arguments, differences of opinion	0.276
Enforced or adapted roles at home	0.261
Inability to identify problems (and hence solutions)	0.257

Factor 2 Scheduling and Rostering

	Loading
Unpredictability of when you are asked to fly	0.525
Social problems associated with rosters	0.517
Scheduling and rosters	0.501
Scheduling	0.438
Patterns of flying (relative times you are asked to fly)	0.338

Factor 3 Anxiety of Courses and Checks

	Loading
Anxiety of courses and checks	0.957
The whole experience (before and during) of checks on your flying ability	0.808
Preparation necessary for courses and checks	0.789
Changes in your experience of flying (e.g. conversion course)	0.542
The whole experience (before and during) of medical checks	0.311
Attaining your own personal levels of performance	0.293

Factor 4 Home-Work Interface

Overall satisfaction with home life	-0.749
Lack of stability	-0.742
How satisfied one is on how things have been left	-0.686
Spouse's attitudes towards flying	-0.628
Marital problems	-0.625
Indirect results of home life activities	-0.624
Division of loyalties	-0.600
Length of time spent at home	-0.559
Serious events that occur	-0.535
Issues or situations ongoing left unresolved	-0.468
Particular arrangements that have been disrupted	-0.397
Efficiency of pre-flight preparation time (at home)	-0.355

Factor 5 Career and Achievement

Career opportunities and lack of potential advancement	0.780
Future career uncertainty	0.678
Degree to which your personal goals and aims in life have been achieved	0.644
Seniority systems	0.573
Success or failure of one's efforts to achieve	0.406
Impending major career change or threat (redundancy, etc)	0.401

Factor 6 Insufficient Flying

	Loading
Not enough hours actually spent flying	0.774
Sharing of work evenly	0.628
Impact of lack of flying (practice effects)	0.623

Factor 7 Responsibility and Decision Making

Making important decisions	-0.802
Inherent responsibility in your job	-0.768
Periods in flight of high workload	-0.522
Ambiguous factor or difficulties in problem identification	-0.489
Fulfilling role expectations	-0.324

Factor 8 Interpersonal Problems

Interpersonal problems with cabin staff	0.577
Interpersonal problems with aircrew	0.392

Factor 9 Management and Organisational Issues

Style of management	0.900
Lack of management support	0.855
Morale and organisational climate	0.629
Conditions of employment	0.567
Factors not under your direct control	0.370
Scheduling	0.342

Factor 10 Domestic Status

Family health	0.584
Issues associated with children (health, education)	0.465

Factor 11 Fatigue and Flying Patterns

	Loading
Tiredness and fatigue (from section 4)	0.759
How time to work determines when to sleep	0.748
Returning home and time of arrival	0.674
Tiredness and fatigue (from section 3)	0.621
Patterns of flying	0.482
How long a single period of flying lasts	0.372

****

Factor 1 Alkov. Emotional Losses

Recently undergo marital separation	0.862
Recently undergo divorce	0.819
Have marital problems	0.798
Recently have a death in the family	0.679
Recently lose a close friend through death	0.670
Home financial difficulties	0.545

Factor 2 Alkov. Positive Characteristics

Exhibit professionalism in his approach to flying	0.816
Impress others as a good team member	0.792
Exhibit characteristics of maturity and stability	0.775
Exhibit ability to quickly assess potentially troublesome situations	0.767
Impress others as a good leader	0.763
Exhibit mastery of his aircraft within operational parameters	0.732
Handle life difficulties well	0.646
Have a sense of humour and humility concerning himself	0.547

Factor 3 Alkov. Emotional Gains

	Loading
Recently got married	0.805
Recently become engaged	0.758
Recently have a new addition to the family (e.g. birth, adoption)	0.635

****

Factor 1 Coping. Stability of Relationships and Home Life

Stability of relationship with wife	0.772
Home life that is smooth and stable	0.696
Home life that provides a psychological platform	0.644
Home that is a refuge	0.630
Talking to an understanding wife	0.561
Wife who is efficient in 'looking after things'	0.486
Wife who modifies her own behaviours and demands to suit you	0.429
Wife who has known you through your flying career	0.361

Factor 2 Coping. Reason and Logic

Unconsciously separating home and work	0.554
Deliberately suppressing emotion	0.553
Staying emotionally aloof or shrugging things off	0.534
Deliberately avoiding confrontation	0.521

Factor 3 Coping. Social Support

Talking to understanding friends	-0.819
Talking to understanding colleagues	-0.712
Talking to an understanding wife	-0.337

Factor 4 Coping. Wife's Involvement

	Loading
Wife who involves herself and is interested	0.673
Home life that is geared to flying (in practical terms)	0.602
Wife who had prior knowledge of flying or who flies	0.579
Wife who has known you through your flying career	0.304

Notes on Factor Analyses

Factor Analysis of Independent Variables

1. Items entered into the analysis were from

Section 2	-	29 items
Section 3	-	30 items
Section 4	-	16 items
Section 5 part 1	-	12 items
		87

2. 11 factors were accepted as significant and meaningful - 87% of variance was explained.
3. The factors:

Factor 1 'Control'

Reflects a lack of order, continuity, disruption of routine within the domestic sphere and events or processes over which the pilot has no immediate form of control. Since this was the first factor extracted, it may well reflect an overall pilot preference for stability and balance.

Factor 2 'Scheduling and Rostering'

There were three main aspects identified: unpredictability of flying, social problems and relative times of flying. With respect to the first issue - non BA pilots are given their rostas in advance, hence to some extent pilots do know advance when they are flying. BA operate the "Bidline" system when one can chose when one wishes to fly. This issue probably emerged due to the high sample of BA pilots for whom problems arise for the following reasons. The reality of the situation indicates

Factor 2 continued

that a pilot may have to make many bids before achieving a desired flight. Hence, in reality, the pilot does not have as much say in determining when to fly as the theory might suggest. In addition, the problems are exacerbated by stand-by flying, stand down and recency flying. The second issue (social problems(is fairly self explanatory and a function of the first. The third issue (relative times of flying) might include adjustments for nightflying, local time, time zone changes and pre-flight preparation for flying.

Factor 3 'Anxiety of Courses and Checks'

Fairly clear occupational stressor. Items confirm that it is the whole experience of medical and flying checks that is stressful. The presence of both checks and courses suggests simply that the underlying theme is fear of failure. Apart from preparation, another insight into a method of coping is concern with attaining one's own personal level of performance (the inference being that if this is attained, success in courses and checks will also be attained).

Factor 4 'Home-Work Interface'

The factor contains all items from Section 5 part 1, confirming that all the items are measuring the same issue (i.e. factors from home life that affect the pilot at work). Since all items are present, the factor name must be broad (additionally, all items are negatively loaded). On balance, the most highly loaded items indicate that the underlying theme may concern overall satisfaction with home life and absence of stability, with each of the subsequent items being constituents of these. It is readily apparent that this is not unlike factor 1, however, since the cluster of items formed a separate factor, one may firmly infer that a major issue is the carryover effects of home life onto work.

Factor 5 'Career and Achievement'

This was a relatively clear factor in which all items indicated the stress due to stagnant career structures, blocked career pathways and thwarted career goals. Implicated directly in this poor potential for career advancement are the seniority systems used by organisations. Also included is the threat to career progression in the form of organisational change and redundancy. From an holistic point of view, as one might expect, these have direct implications for one's sense of achievement of personal goals and aims in life.

Factor 6 'Insufficient Flying'

Another clear factor that reflects the overall trend within the aviation industry, of lack of work. Although in some cases seasonally determined, the industry has been affected by a decrease in passenger numbers, an increase in the use of large wide-bodied aircraft and the trend towards two-crew aircraft and designs. An additional factor might well be the relatively high number of pilots on stand-by duty only. The experienced stress is due to the resultant reduced hours per pilot spent flying and the incumbent consequences of a lack of practice.

Factor 7 'Responsibility and Decision Making'

This was an 'obvious' stressor inherent to the occupation of pilot. Items were presented as stressors, however, all items were negatively loaded, indicating that this 'stress' is positive and is welcomed. This is consistent with the data that portrays the pilot as someone who thrives on a challenge. Three specific facets involved are; periods of high workload, resolving ambiguities and fulfilling role expectations. The latter item is particularly interesting since it involves interpersonal issues (which in fact was the next factor to be extracted).

Factor 8 'Interpersonal Problems'

The factor consisted of two items referring to interpersonal problems with aircrew and cabin staff. It is interesting to contrast this with 'role expectations' in factor 7 above, which, although a people oriented concept, was seen as a positive challenge. It should also be noted that problems associated with cabin staff were loaded more highly than problems with other aircrew.

Factor 9 'Management and Organisational Issues'

Very highly loaded onto the factor were two issues reflecting style of management and lack of management support. Since more than one organisation was examined, one can only speculate as to the nature of 'style'. From an overall viewpoint, one belief within airline circles is that a proficient pilot will also be a proficient manager. Entangled within such issues are conditions of employment and scheduling. As a consequence, morale may be negatively affected and a negative climate prevail.

Factor 10 'Domestic Status'

This involved only two items and was difficult to name. The items concerned family health and issues associated with children (such as health, education, etc). These were construed simply as reflecting the degree of disruption experienced with home life.

Factor 11 'Fatigue and Flying Patterns'

The factor clearly embraced tiredness and fatigue. Major factors associated with this were how sleep and rest were determined by when one was next expected to fly and also by the time of returning home. In terms of patterns of flying, a specific determinant was how long a single period of flying lasted, as one might expect.

Factor Analysis of Alkov's 22 items

1. Items entered for analysis were 22 items (Alkov, 1982) on life events and life changes.
2. Three factors were extracted and accepted which explained 94.8% of the variance. This dispels Alkov's assumption that all 22 items make individual contributions to the same thing.
3. Factors extracted might simply reflect the groups of items Alkov entered originally, however, present analysis reflects them each to be distinctively separate issues (since no analysis of factor items occurred).
4. The factors extracted were named 'Emotional Losses', 'Characteristics' and 'Emotional Gains'. An interesting point to note is the order of extraction.
5. The factors.

Factor 1 'Emotional Losses' (factor 12 overall)

The most highly loaded items were those involving spouse (two of the six items concerned loss through death). Financial difficulties were loaded onto the factor, since no rational explanation exists for this, one can only assume that this is a statistical artefact.

Factor 2 'Characteristics' (factor 13 overall)

The most highly loaded item concerned the concept of 'professionalism'. A major component of the factor was comprised of a series of 5 items all loaded at similar levels. These were occupationally oriented characteristics. Several remaining characteristics which were significant, but loaded at lower levels, tended to be more general in content.

Factor 3 'Emotional Gains' (factor 14 overall)

The factor consisted of three items. The main point to note is the order of loadings, which presumably must reflect their order of importance.

Factor Analysis of Coping Items

1. Four factors were extracted as being significant and meaningful.
2. Factors explained 80.2% of the variance.
3. The factors:

Factor 1 'Stability of Marital Relationship and Home Life' (factor 15 overall)

The overriding theme was that of a home life that was stable and psychologically supportive. The major determinants of stability and source of support are the personal characteristics of the pilot's wife and also the quality of the relationship the pilot has with her. The extraction of this as the first factor confirms that any simple disruption of domestic balance will affect pilot coping efficiency, especially those involving partner.

Factor 2 'Reason and Logic' (factor 16 overall)

The most highly loaded item concerns the unconscious separation of home and working lives. However, since all items are loaded at similar levels, the factor as a whole seems to concern staying aloof and suppressing emotion (the inference being that unconscious separation of home and work lives may well involve the suppression of emotion, etc).

Factor 3 'Social Support' (factor 17 overall)

The items loaded onto the factor were consistent in their content. All three items referred to talking to understanding friends, colleagues and wife. Loadings of the items were negative. This is a clear indication that such processes are not available to the pilot, i.e. the factor concerns an absence of social support.

Factor 4 'Wife's Involvement' (factor 18 overall)

This could well be interpreted as being related to the first factor extracted, however, there is no evidence of this and the items loaded onto the factors are different. This factor specifically implicated the degree of wife's involvement in flying as a major trend in coping strategies employed by pilots.

To summarise, the following factors were extracted:

1. Control
2. Scheduling and rostering
3. Anxiety of courses and checks
4. Home-work interface
5. Career and achievement
6. Insufficient flying
7. Responsibility and decision making
8. Interpersonal problems
9. Management and organisational issues
10. Domestic status
11. Fatigue and flying patterns
12. Emotional losses
13. Characteristics
14. Emotional gains
15. Stability of marital relationship and home life
16. Reason and logic
17. Social support
18. Wife's involvement

3.2. Multiple Regressions Analyses

Preliminary Notes on Multiple Regressions

1. Dependent variables were 7 mental health outcomes, 7 job satisfaction scales and the measure of performance.
2. Independent variables were scales erected from factor analyses reported above. These were created using Factor Score Coefficients (FSC)

$$\text{Scale} = FSC \times (VAR \times - x)/SD_{x1} \qquad FSC_N \times (VAR_N - x_N)/SD_N$$

There were 18 scales entered into the regression analysis.

3. An array of biographical variables were also entered. These were:

(i)	Age	(vi)	Total flying hours experienc
(ii)	Marital status	(vii)	Long haul/short haul/dom on
(iii)	Partner work?	(viii)	Rank
(iv)	Number of children	(ix)	Seniority
(v)	Relax and wind down		

4. Method of regression analysis was 'stepwise'
5. Only significant solutions are reported and examined
6. Criteria for inclusion of an item were that it should explain more than 1% of the variance (i.e. R^2 Change greater than 0.01) and that the item itself should be significant

Multiple Regression Solutions and Summary Tables

Anxiety	Multiple R	0.486	F = 4.424
	R^2	0.236	Sig = 0.000
	Adj. R^2	0.183	

Variable	Sig	Mult R	R^2	R^2 Ch.	Simple R
Fatigue and flying patterns	0.000	0.312	0.097	0.097	0.312
Relax and wind down	0.000	0.386	0.149	0.051	0.306
Courses and checks	0.003	0.410	0.168	0.018	0.231
Social support	0.008	0.428	0.183	0.014	-0.138
Seniority	0.024	0.440	0.193	0.010	0.122
Career and achievement	0.006	0.457	0.208	0.015	0.207

Phobia — Equation not significant

Obsessionality	Multiple R		0.441	F = 3.612	
	R^2		0.194	Sig = 0.000	
	Adj. R^2		0.141		
Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Scheduling and rostering	0.000	0.238	0.057	0.057	0.238
Responsibility and decision making	0.001	0.288	0.083	0.025	-0.229
Age	0.001	0.332	0.110	0.027	0.158
Insufficient flying	0.007	0.356	0.126	0.016	0.218
Relax and wind down	0.022	0.371	0.138	0.011	0.164
Stability of relationships and home life	0.017	0.388	0.151	0.012	0.157
Psychosomatic Disorders	Multiple R		0.471	F = 4.081	
	R^2		0.221	Sig = 0.000	
	Adj. R^2		0.167		
Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Fatigue and flying patterns	0.000	0.266	0.071	0.071	0.266
Age	0.000	0.368	0.135	0.064	0.260
Relax and wind down	0.000	0.406	0.165	0.029	0.225
Interpersonal problems	0.011	0.422	0.178	0.013	0.207
Depression	Multiple R		0.467	F = 4.356	
	R^2		0.218	Sig = 0.000	
	Adj. R^2		0.168		
Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Fatigue and flying patterns	0.000	0.264	0.070	0.070	0.264
Age	0.000	0.355	0.126	0.056	0.243
Home-Work interface	0.002	0.383	0.147	0.021	-0.233
Relax and wind down	0.010	0.401	0.161	0.014	0.189

Hysteria	Multiple R	0.372	F = 2.301	
	R^2	0.138	Sig = 0.000	
	Adj. R^2	0.078		

Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Responsibility and decision making	0.000	0.206	0.042	0.042	-0.206
Interpersonal problems	0.006	0.245	0.060	0.017	0.200
Age	0.015	0.272	0.074	0.014	-0.117
Total flying hours experience	0.020	0.294	0.086	0.012	0.017

Overall Neuroticism	Multiple R	0.506	F = 4.743	
	R^2	0.256	Sig = 0.000	
	Adj. R^2	0.202		

Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Fatigue and flying patterns	0.000	0.361	0.131	0.131	0.361
Responsibility and decision making	0.000	0.398	0.159	0.028	0.295
Relax and wind down	0.000	0.430	0.185	0.026	0.263
Age	0.002	0.452	0.204	0.019	0.128
Social Support	0.006	0.468	0.219	0.015	-0.155

Intrinsic Job Satisfaction	Multiple R	0.685	F = 12.659	
	R^2	0.469	Sig = 0.000	
	Adj. R^2	0.432		

Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Career and achievement	0.000	0.589	0.348	0.348	- 0.589
Management and organisational issues	0.001	0.603	0.364	0.016	- 0.422
Rank	0.000	0.623	0.388	0.023	0.327
Social support	0.000	0.638	0.408	0.019	- 0.033
Coursesand checks	0.001	0.650	0.423	0.015	0.039

Extrinsic Job Satisfaction	Multiple R	0.611	F = 9.312
	R^2	0.374	Sig = 0.000
	Adj. R^2	0.333	

Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Management and organisational issues	0.000	0.528	0.278	0.278	-0.528
Career and achievement	0.000	0.565	0.319	0.040	-0.451
Responsibility and decision making	0.008	0.575	0.331	0.011	0.030

Job Itself Intrinsic Satisfaction	Multiple R	0.617	F = 9.617
	R^2	0.381	Sig = 0.000
	Adj. R^2	0.341	

Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Career and achievement	0.000	0.498	0.248	0.248	-0.498
Social support	0.000	0.522	0.272	0.024	-0.076
Rank	0.002	0.539	0.291	0.018	0.313
Scheduling and rostering	0.000	0.564	0.318	0.027	-0.302
Checks and courses	0.002	0.579	0.335	0.016	0.036

Working Conditions Extrinsic Satisfaction

	Multiple R	0.503	F = 5.078
	R^2	0.253	Sig = 0.000
	Adj. R^2	0.203	

Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Management and organisational issues	0.000	0.398	0.158	0.158	-0.398
Fatigue and flying patterns	0.000	0.432	0.186	0.028	-0.308
Career and achievement	0.004	0.451	0.203	0.016	-0.308
Domestic status	0.019	0.463	0.214	0.011	-0.012

Employee Relations Satisfaction	Multiple R		0.690	F = 14.177	
	R^2		0.476	Sig = 0.000	
	Adj. R^2		0.442		
Variable	**Sig**	**Mult R**	**R^2**	**R^2 Ch**	**Simple R**
Career and achievement	0.000	0.574	0.329	0.329	-0.574
Management and organisational issues	0.000	0.637	0.406	0.077	-0.541
Responsibility and decision making	0.000	0.659	0.435	0.028	-0.009
Domestic status	0.005	0.668	0.446	0.011	-0.003
Overall Satisfaction	Multiple R		0.563	F = 6.408	
	R^2		0.318	Sig = 0.000	
	Adj R^2		0.268		
Variable	**Sig**	**Mult R**	**R^2**	**R^2 Ch**	**Simple R**
Career and achievement	0.000	0.429	0.184	0.184	-0.429
Checks and courses	0.000	0.465	0.216	0.032	0.116
Management and organisational issues	0.000	0.496	0.246	0.030	-0.372
Domestic status	0.013	0.507	0.257	0.011	0.034
Wife's involvement	0.017	0.518	0.268	0.010	0.043
Total Job Satisfaction	Multiple R		0.685	F = 13.784	
	R^2		0.469	Sig = 0.000	
	Adj. R^2		0.435		
Variable	**Sig**	**Mult R**	**R^2**	**R^2 Ch**	**Simple R**
Career and achievement	0.000	0.574	0.330	0.330	-0.574
Management and organisational issues	0.000	0.628	0.394	0.064	-0.520
Responsibility and decision making	0.001	0.642	0.412	0.017	0.022
Domestic status	0.007	0.650	0.422	0.010	-0.010

Performance	Multiple R	0.484	F = 4.995
	R^2	0.234	Sig = 0.000
	Adj. R^2	0.187	

Variable	Sig	Mult R	R^2	R^2 Ch	Simple R
Fatigue and flying patterns	0.000	0.316	0.100	0.100	0.316
Checks and courses	0.000	0.386	0.149	0.048	0.302
Insufficient flying	0.000	0.422	0.178	0.029	0.275
Age	0.023	0.434	0.189	0.010	-0.059

Notes on Multiple Regression

Regressions onto Mental Health

1. Six of the seven solutions were significant - only the solution for phobia did not achieve significance.
2. Most variance was explained for the solutions to anxiety and overall neuroticism.
3. Predictors extracted as significant were all intelligible.
4. Recurrent predictors were:

   (i) Fatigue and flying patterns

   (ii) Relax and wind down

   (iii) Age

5. Anxiety

(i) Fatigue and flying patterns being the best predictor confirms that such issues are fundamental in determining mental health most readily operationalised in the form of anxiety which is one of the less clinically oriented of the mental health scores.

(ii) Comments raised above(i) also apply to the significant predictive power of 'relax and wind down' which was a positive predictor

(iii) Courses and checks are confirmed as being sources of anxiety. So too is the underlying theme of the factor, which was an overall fear of failure.

(iv) The significant predictive power of social support was more difficult to interpret although the factor itself was not ambiguous. However, since the predictive power was negative, this would indicate that a sense of social support is a coping strategy, i.e. it reduces anxiety, perhaps in the form of introspection.

(v) The positive predictive power of 'seniority' was surprising. One may conclude that it is not seniority per se that is important, but other factors associated with seniority such as changing career variables, home factor changes, etc.

(vi) Stresses concerned with career and achievement were confirmed as positive sources of anxiety.

6. Obsessionality

(i) Compatible with the definition of obsessionality as meticulousness, adherence to routine, punctuality, dislike of sudden change, and a need to control the environment, scheduling and rostas were the highest predictor. Since these are known not to be regular, they are identifiable here as a major disruption of routine, probably exacerbated by other factors such as stand-by, etc.

(ii) Responsibility and decision making was a negative predictor. Since this concerns the exercise of power and discretion again, this is compatible with the nature of obsessionality. Hence, control of the environment in the form of responsibility and decision making are seen in a positive light and reduce negative feelings of obsessionality.

(iii) Age was a positive predictor of obsessive behaviour which is known to increase with age for male subjects.

(iv) Similar comments to (i) above apply to insufficient flying and relax and wind down in the sense that they detract from the concept of repetition and routine.

(v) Stress related to stability of relationships and home life was an expected predictor of obsessionality since it is consistent with the concept of home life as a series of stable routines, a pscyhological platform or a collection of ongoing props upon which the pilot can rely on an ongoing basis, optimally so without disruption

7. Somatic Disorders

(i) Highest predictor was fatigue and flying patterns, which, being physically oriented, is clearly related to somatic disorders. It must be noted, however, that fatigue and flying patterns was a significant predictor of other mental health scales. Hence it may be concluded that although physically oriented, the effects of fatigue and flying patterns are not seen exclusively as such.

(ii) Age was a positive predictor of somatic symptoms which are known to increase with age.

(iii) Comments raised above (i) also apply to relax and wind down.

(iv) Interpersonal problems were also significant predictors of somatic disorders.

8. Depression

(i) Comments regarding fatigue and flying patterns and relax and wind down raised in respect to their prediction of anxiety, also apply here to their prediction of depression.

(ii) Age was a positive predictor, as expected, since depressive symptoms are known to increase with age.

(iii) The large factor concerning home-work interface was a significant negative predictor. Being seen in such a positive light, one can only assume that the relationship is seen in terms of alleviating depression.

9. Hysteria

(i) Responsibility and decision making was the highest predictor. It was also negative and hence reduces hysteria. Since hysterical individuals may be described as possessing labile affectivity and over-dependence on others, one may infer that the reduction of such behaviours is a function of the exercise of control (similar to obsessionality).

(ii) Interpersonal problems was a significant positive predictor which is compatible with the characteristics of hysterical individuals who tend to be unsteady and unreliable in their personal relationships.

(iii) Age was a negative predictor of hysteria, which is known to decrease with age.

(iv) Total flying hours experience was a significant predictor. One can only assume that this is a statistical artefact.

10. Overall Neuroticism

(i) As may be expected, overall neuroticism was predicted by recurrent predictors of subscales.

(ii) Positive predictors were fatigue and flying patterns, relax and wind down and age.

(iii) Negative predictors were responsibility and decision making and social support.

Regressions onto Job Satisfaction

1. Significant solutions were recorded for all scales.
2. Most variance was explained by solutions to employee relations satisfaction and total job satisfaction.
3. Recurrent items were career and achievement and management and organisational issues.
4. Intrinsic Job Satisfaction

(i) Satisfaction derived by the pilot from the job is decreased by stress associated with career and achievement as previous data indicated.

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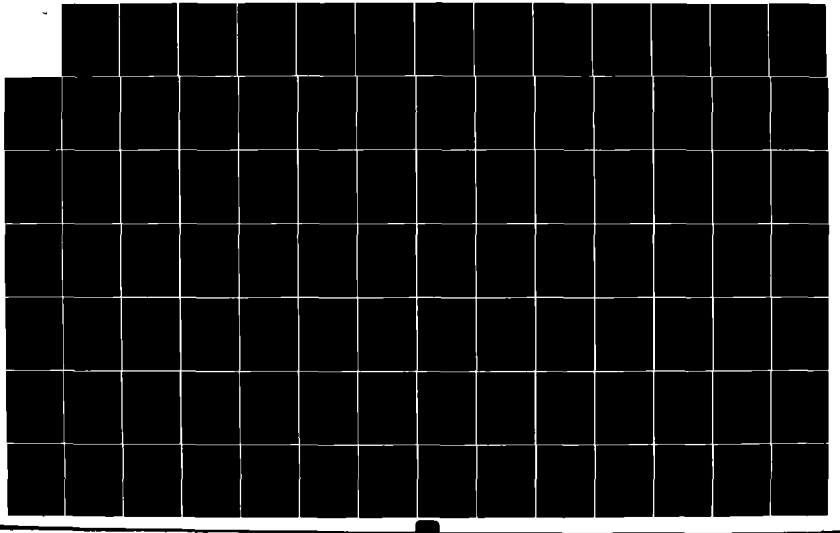

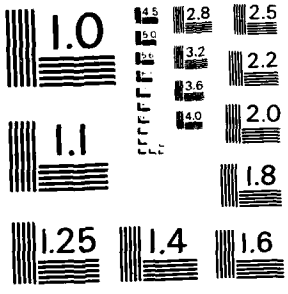

(ii) Management and organisational issues also negative predictors that reduce satsifaction.

(iii) Social support was a negative predictor - since no explanation exists for this, the result may be interpreted as a statistical artefact.

(iv) Rank was a positive predictor, as one might expect.

(v) Intrinsic satisfaction was also positively predicted by courses and checks. Within the context of the mental health this was construed as stressful. Within the present context one can only conclude that (although stressful) successful completion is satisfying.

5. Extrinsic Job Satisfaction

(i) Comments raised above about management and organisational issues and career and achievement apply here. Both reduce extrinsic job satisfaction.

(ii) Responsibility and decision making was a positive predictor, consistent with the idea that pilots thrive on a challenge.

6. Job Itself Intrinsic Satisfaction

(i) As indicated above, rank was a positive predictor.

(ii) Similarly, courses and checks boosted this type of satisfaction.

(iii) Career and achievement was a negative predictor effectively reducing satisfaction. So too did scheduling and rostering.

(iv) Social support was a negative predictor and interpreted as a statistical artefact.

7. Working Conditions Extrinsic Satisfaction

(i) All predictors were negative.

(ii) Satisfaction with working conditions was reduced not only by management and organisational issues as one might expect, but also by fatigue and flying patterns and career and achievement.

(iii) The factor called domestic status also negatively predicted

8. Employee Relations Satisfaction

(i) All predictors were negative.

(ii) Again career and achievement and management and organisational issues were significant. So too was domestic status.

(ii) Responsibility and decision making was also a significant negative predictor, indicating that despite being a positive predictor of other forms of job satisfaction, the processes involved appeared to affect the quality of interpersonal relationships, as measured by this scale.

9. Overall Job Satisfaction (1 item)

(i) Generally, satisfaction with the job as a whole, was boosted by the challenge of checks and courses, domestic status, and the degree of involvement exhibited by the pilot's wife.

(ii) Negative predictors which effectively reduced satisfaction overall were career and achievement and management and organisational issues.

10. Total Job Satisfaction (15 items)

(i) This was positively predicted only by responsibility and decision making.

(ii) It was offset by stress associated with career and achievement, management and organisational issues and domestic status.

Regressions onto Performance

1. There were four items extracted as significant predictors.
2. Not surprisingly, performance was positively predicted by stress associated with fatigue and flying patterns.
3. The fear of failure associated with courses and checks was a positive predictor. One must assume too that performance will also be reduced specifically during the period of such checks.
4. The third positive predictor was insufficient flying - decrements in flying performance clearly a function of a lack of practice.
5. Age was a negative predictor which could mean:

   a) performance decreases as age increases
   b) perception of performance changes with age
   c) older pilots perceive themselves as performing worse than younger pilots
   d) younger pilots tend to over-rate themselves and perceive themselves as performing better than older pilots

Final Comments on Regressions

1. Of the 18 scales and 9 biographical variables entered into the Regression analysis, the following did not have any predictive power in terms of the 3 dependent measures examined:

Factors	Biographical Variables
Control	Marital status
Emotional losses	Partner's work
Characteristics	Number of children
Emotional gains	Long haul/short haul/domestic only
Reason and logic	Rank

It must be remembered that the significance of an item is a relative measure. In most solutions, all items were in the Regression equation. Hence the above variables are still important.

2. Recurrent themes in significant predictors yielded results that were intelligible and which were broadly different for the three main sets of outcomes examined.

DISCUSSION

DISCUSSION

The role of this discussion is to supplement comments which were already raised in the text. It must be noted that this discussion is not, therefore, intended to be read separately from the earlier analysis of results. Additionally, the overall format of discussion adopted has been to go through each of the sections of the questionnaire and to highlight which appear to be recurrent themes and the most important issues raised within each section. The discussion concludes with a note on the final version of the questionnaire.

Biographical Data

The biographical data recorded was extensive. It was subjected mainly to univariate analysis, which was fully reported in point form earlier. This was found to be a fairly satisfactory method of reporting these results and many points raised require no further comment. The role of this section will be simply to highlight those most salient conclusions which may be drawn. For ease of presentation this part of the discussion is sectionalised.

1. The pilot and his family

The pilots were all male, generally married, had several children and tended to have wives who worked. In other words, there did not appear to be any characteristics of the group that might be deemed to be unusual. The data concerning the pilots age is, however, worthy of further discussion. The distribution of age category membership was found to be fairly 'normal'. It was found that age moderated the degree of satisfaction derived from the job. Compatible with previously recorded psychiatric characteristics for male subjects, age also moderated mental health scores. On comparison of job satisfaction and mental health, it would appear that age was more influential in determining the latter. More specifically, most differences appeared to concern comparisons with the 41-50 year old category of pilots. One finds that they report more satisfaction with their job, however one also finds that they report more neuroticism. Additionally, age was a positive predictor of performance.

2. Interests

This section concerned interests, hobbies and leisure time. Overall, it was confirmed that such issues are fundamental parts of pilots' lifestyle, as one might expect. Data gathered concerning the frequency of 'relax and wind down' and 'mix socially with colleagues' yielded interesting insights. The former was construed to be a measure of stress as expressed in lay-persons words. The latter was aimed at measuring the degree of access preferred by pilots to this particular source of social support.

Those who relax and wind down more tend to be healthier and more satisfied with their jobs. There is also some evidence to suggest that they tend to report higher levels of performance. When entered into multiple regression, relax and wind down was a recurrent predictor of all but one of the significant solutions reported for neuroticism scales.

In terms of mixing socially with colleagues, it was found that those who did not mix, were significantly more neurotic than those who did. Other data indicates that pilots and their families tend to be rather socially isolated units. This present finding confirms that the pilot's decision not to mix has negative ill health consequences. No doubt this is due to decreased sources of social support.

3. Exercise and Fitness

These questions yielded some interesting and unexpected insights. One would expect pilots as a group to be fairly 'fit', i.e. exercise is an integral part of their lifestyle. However, this was not found to be the case. Pilots were found to be weight conscious and reported maintaining a desired weight. It was also found, however, that pilots are only mediocre in terms of exercise geared towards the prevention of ill health. One can only assume that concentration on 'fitness' as measured by body weight reflects those characteristics that are sought in annual medicals.

4. Smoking

Only a minority of pilots smoked. These pilots seem fairly well aware of the risks to health, however this is not reflected in terms of quitting smoking or reducing smoking. Overall, the risks associated with smoking are reflected in the numbers who do not smoke now but who were once smokers. Only a minority, approximately one third, were once smokers, who, on average, stopped smoking around 10 years ago. One must remember that respondents generally report under-estimates of smoking habits. However, even when this is accounted for, the group still seem to be aware of smoking risks.

5. Eating habits

The group were particularly good in terms of consuming a variety of foods, fibre (no doubt reflecting recent social trends in Britain) and sugar (probably seen as determinant of body weight, a characteristic examined in medical checks). Foods high in cholesterol (a highly documented health risk), were reported to be consumed 'frequently' by a surprisingly high percentage of pilots (22%). Similarly, pilots were rated as being only mediocre when consumption of salty foods was examined. In terms of eating habits, the group overall appear to be fairly good, though the data did hold some surprises.

6. Alcohol

All but a tiny minority drank alcohol. Consumption figures place the group in the broad mid-range category. Again one must remember that the reported figures are conservative estimates. This reticence to reveal information was reflected by the fact that only negligible percentages of pilots used the 'often' or 'yes' options to more value laden questions, the majority answering 'no' throughout. Overall, therefore, one must conclude that the group appear to be quite good in terms of alcohol consumption, however it is difficult to determine the extent to which the data reflects reality.

7. Work history

Continuous variables measured the pilot's experience in terms of hours experience, landings performed and length of sector flown. Whilst the data yielded was extensive and interesting, there were wide variations in statistics recorded. In addition, some pilots reported difficulty in answering some sections (especially those relating to number of landings performed) and hence reported figures were estimates only. It was found that such wide variations in figures decreased the extent to which the work experience data could be meaningfully applied in subsequent analyses. Characteristics measured by other variables were, however, more fruitful.

The sample was predominantly of British Airways pilots, though the main three independent companies and other small operators were well represented. Average length of time with present employer was around 13 years, revealing the group in these terms to be neither very new or well seasoned employees.

The number of short haul pilots outnumbered long haul by just under three to one. Only a small minority (7%) reported that they flew only domestic routes. Comparison between sub groups revealed that differences involving domestic only pilots were totally in terms of job satisfaction. In both instances, domestic only pilots reported lower job satisfaction. Differences between the two main sub groups were totally in terms of mental health. This was surprising, since the operation sides of long haul and short haul flying are so different, one would have expected some difference, albeit minor, in the nature of satisfaction derived from the job. Additionally, the differences indicated that in terms of mental health, long haul pilots were worse off on all significant scales. Again, this was a surprising result , though it does confirm the different costs of different schedules of flying. Long haul pilots also tended to report significantly higher levels of performance. It should be noted, however, that this variable had no predictive power when entered into multiple regression.

Just over fifty per cent of pilots in the sample were Captains (40% were Senior First Officers and the remaining 10% were First Officers). When within group comparisons were performed, all significant differences concerned comparisons with Captains. This indicated that Senior First Officers and First Officers appear to be fairly similar groups. Differences between Captains and First Officers were solely in terms of job satisfaction (as one might expect) than First Officers, particularly in terms of satisfaction derived from doing the job itself (intrinsic job satisfaction). This result was to be expected. Differences between Captains and Senior First Officers were reflected in terms of both job satisfaction and mental ill health. The comparisons indicated that although Captains report greater satisfaction with the job, they also report higher levels of neuroticism. This is compatible with the simplistic notion that the ultimate career goal of pilots is to achieve the rank of Captain, however the stresses incumbent in this rank may also be manifest in stressful outcomes. When entered into multiple regression, it was found that rank was a positive predictor of job satisfaction - particularly that which was intrinsically oriented.

The data measuring seniority was a unimodal, fairly symmetrical distribution which was, on balance, positively skewed. Examination of sub group differences yielded a high number of significant comparisons, especially, as one would expect, between groups at either ends of the scale. These differences were mainly in terms of job satisfaction. Interestingly, however, comparisons of groups less widely separated were in terms of both job satisfaction and mental health. This was a surprising finding and contrary to intuitive speculation. In all instances, dependent variables were positively related to seniority. when entered into multiple regression, only anxiety yielded seniority level as a significant predictor. This was probably due to the extent of the within group variation.

Domestic Stressors

The items were included with the aim of tapping those sources of stress that were entirely domestically oriented. Since most individuals' home life situations are different, one can only, at best, expect to reveal in terms of explained variance, those factors that appear to be recurrent or common across different pilots. One might speculate therefore that the information yielded may only be small in quantity, but quite important. Indeed, this was found to be the case. In addition, these items formed only a single individual part of the analysis.

Simplistic examination of univariate statistics (unreported) revealed that the most highly rated stressor on average concerned disagreements, arguments and differences of opinion. Another highly ranked item concerned the build up of tasks and things to do, confirming the pilot's concern with practical demands. However, the quality of relationship with one's partner also appears to be rated as being relatively stressful, though no insights were forthcoming as to the reasons why this should be (perhaps arguments). A fourth most highly rated domestic stressor was others not obeying, or when things go wrong - this was construed as reflecting the pilot's need to control a theme identified and discussed in subsequent analysis.

Overall, the univariate analysis revealed that stressors were generally rated using the lower order answers. It should be noted, however, that most answers also reflected a spread of scores.

The items were correlated with the dependent measures. One would not expect these items to be correlated to job satisfaction or performance. This was confirmed in the analysis and none of the coefficients fulfilled the selection criteria. There were several coefficients that were selected illustrating the relationships between the items and mental health. These indicated that generally, pilots were worried about problem identification, i.e. perceived stress is a function of not being able to specifically spot the precise nature of stressors they might encounter. Stress is reduced

by identifying the problem and hence, a solution. In terms of anxiety, items concerning achievement and concern with success of one's efforts were significantly related. In all instances, coefficients were positive.

The items were included in the overall factor analysis of domestic and occupational stressor items. Most of the factors extracted were occupationally oriented, although some domestic stressor items were loaded onto them. Generally, the result was interesting for it confirms that domestic items are very related o occupational items. It also indicates that domestic stress might not be summarised in this way. This was probably due the idiosyncratic aspects of answers, since pilots were asked to sess the stressors in how they applied exclusively within their o mestic context.

Contrary to the above indications, however, the first factor to be extracted in the overall analysis of items was in fact comprised of domestic items. This first factor was interpreted as representing the degree and need for control by the pilot, over the domestic situation. The primary inference to be drawn is that since this was the first factor to be extracted, one can assume that this need is a dominant feature in their stressor profile. Other factors concerned the achievements of the pilots goals and aims in life, though this was specifically linked to career. One final factor confirmed an overall concern with domestic status, particularly that involving family health.

Only the factor scales were entered into multiple regression. It was found that only the family health factor was a significant predictor, surprisingly of job satisfaction and not mental health.

Occupational Stressors

The items presented were to be rated on their stressfulness irrespective of any carryover effects into home life, i.e. issues that were entirely occupationally oriented.

Correlational analysis indicated that individual items such as career opportunities, seniority systems and style of management were negatively related to job satisfaction. Indeed, all significant coefficients were confirmed as reducing job satisfaction. One overall comment is that these more important relationships seemed to concern macro rather than micro occupational stressors. On balance, greatest source of dissatisfaction conerned career issues. Other data indicated this primarily concerned blocked career pathways, a result of stagnant manpower mobility.

Coefficients with mental health outcomes confirmed that all significant items were stressors. Two were highlighted. The first concerned a build up of tasks when flying which one might expect since pilots often claim that much of their job is concerned with planning ahead and dealing with events as they arise. The second was more interesting from a psychological point of view since it confirmed that attaining one's own level of performance was a source of stress. This was interesting because it is a source of stress which is of the pilot's own making. As one might expect, this item was significantly correlated with performance.

As indicated above, most of the factors extracted were occupationally oriented (eight of the eleven). It must be noted, however, that most of those had domestic items or some other items not exclusively work oriented, loaded onto them. This of course confirms that domestic stressors and occupational stressors are inextricably connected.

When one selects factors which comprise solely of items that are entirely occupationally oriented (i.e. from section 3), four factors are identified. These concerned insufficient flying, interpersonal problems, management and organisational issues and responsibility and decision making. Inspection of these factors indicates that these do make intuitive sense. One other factor may also be included: fatigue and flying patterns. The factor was composed almost entirely of items from section 3 and would indeed make sense, at one level, as a stressor that was entirely occupationally oriented. It was found, however, that the factor did contain occupational items, but rated in a different context. In addition, of course, the effects may not be construed as being of sole relevance to work since other data indicates it to be important.

The overall conclusion is, therefore, that the factor analysis provided an important insight into the nature of sources of stress that were entirely occupationally oriented. Although other sets of factors were also important, it may be concluded that a major facet of pilot stress identified here is solely work oriented.

Upon inclusion into multiple regression, it was found that these factors were particularly good predictors of mental health scores. Responsibility and decision making was a recurrent negative predictor, confirming that this 'stress' is positive, i.e. that the pilot thrives on a challenge. This was felt to be compatible with previous data, particularly in terms of power and a need to control. Fatigue and flying patterns was another recurrent predictor, as one might expect. Other significant positive predictors were interpersonal problems, and insufficient flying.

Similar trends were found in the prediction of job satisfaction. However, there were fewer significant predictors, confirming that the factors were seen more as being stressors rather than dissatisfiers. Again, responsibility boosted job satisfaction, which was offset by managerial and organisational issues.

Finally, performance was predicted by fatigue and flying patterns and, as one might expect, by insufficient flying.

Overall the conclusion is, therefore, that the analysis identified key issues that were comprised of items that were entirely occupationally oriented and that were confirmed as being sources of stress.

Factors of Work that Might Affect the Pilot at Home

A limited range of sixteen items had been identified as potentially summarising those factors which were occupational sources of stress, but which had carryover effects into the pilot's home life. Bivariat analysis yielded a number of significant correlations with dependent

variables, that was no greater than one would expect to arise by chance. Hence it was concluded that relationships could not be summarised in this simplistic way. Multivariate analyses were, however, more enlightening.

Items from the subset made major contributions to three factors. The first was that concerning scheduling. More specifically, major carryover effects concerned the nature of the schedules themselves, the unpredictability of flying and social problems that arose. The second major source of stress concerned courses and checks. Items loaded onto this factor confirmed that stress was perceived not only in terms of simple anxiety and concerns with successfully completing courses and checks, but also the preparation seen to be necessary by the pilot, to achieve success. The third factor included here was fatigue and flying patterns (all but one of the items loaded onto the factor came from the pool of items here). Although this factor has already been discussed above, one may add that fatigue and flying pattern issues appear to be seen primarily in terms of their carryover effects into home life. The overall conclusion from the factor analysis is that a major facet of pilot stress is seen in terms of issues that have carryover effects into pilots' home life. This facet is comprised of three aspects, each of which make intuitive sense.

In terms of the predictive powers of the factors, fatigue and flying patterns was a consistent predictor of mental health. This was commented upon above. One particular subscale, obsessionality, was predicted by scheduling and rostering. This was interpreted as indicating that scheduling and rostering were the major disruptive functions of a routine lifestyle. Similarly, this factor also predicted the intrinsic satisfaction derived from doing the job itself

The overall consistent positive predictor of job satisfaction was, however, the factor concerning courses and checks. This was also a significant predictor of performance. The overall inferences one may draw are that given the three trends in occupational stressors that have carryover effects into home life, the anxiety of courses and checks tends to boost job satisfaction, but associated fear of failure decreases perceived performance. Once again the final comment is that the results make intuitive sense.

Factors of Home That Might Affect the Pilot at Work

Although this was a major research theme throughout, this section was specifically geared towards directly examining the relationship between home and work. It was divided into four parts.

In the first section, pilots were asked to rate twelve items on the degree of their effect. The items were stressors which had their origins in home life but which were identified by pilots as potentially having carryover consequences into work. Items which were rated as having greatest effects were those concerning ongoing or unresolved situations and those involving serious events. As one might expect, the effects of such issues, especially the former, last for longer. Other highly rated items were more general, such as the overall satisfaction with one's home life.

Bivariate correlational analysis revealed that none of the items was significantly associated with levels of job satisfaction. This is an interesting result and indicates that these two sets of issues are relatively independent. Only one coefficient fulfilled the selection criteria, which confirmed that domestic issues that were ongoing or left unresolved when the pilot left for work were sources of anxiety. Overall, comments raised above, about simplistic analyses and the relative idiosyncracy of individuals' home life situations, apply here. Additionally, only the strongest relationships were examined.

The twelve items were included in the overall factor analysis of items. Surprisingly, all twelve items formed one single individual factor. This is an important result in two ways. Firstly, the factor itself was the fourth of the eleven extracted, indicating that it was an important factor relative to other factors extracted. Secondly, the fact that all items loaded onto the same factor indicated that all items are measuring the same issue (which presumably is the home to work relationship). Items most highly loaded onto the factor concerned the pilots' overall satisfaction with home life and associated absence of stability that is fundamental to the home/work relationship. Inherent in this is the state of home life the pilot leaves upon leaving for work, presumably with the implication that home life left in an

unsatisfactory state will result in the pilot 'not being at ease'. An additional issue, perhaps in terms of coping, is one's spouse's attitude towards flying as a highly related issue. Contradictory to simplistic univariate analyses outlined above, least important contributions to the factor were made by ongoing issues, disrupted social arrangements and the efficiency of the pilot's pre-flight preparation period at home.

The factor was not a significant predictor of job satisfaction, indicating that the items do not manifest themselves in this outcome. However, the factor was a significant negative predictor of depression from which one may infer that such issues act, therefore, in an 'anti-depressive' role.

The second section of items included for analysis concerned the nature of outcomes of domestic stressors at work. In general, most outcomes were ranked in the lower frequency distributions. This was explained in one or all of the following ways: no specific effects can be identified by pilots, pilots do not articulate effects in this way, the items were not sufficiently comprehensive, or pilots do not report effects using these terms. On balance, the major outcome was behavioural in terms of tiredness due to disrupted sleep patterns. Generally, however, manifestations were primarily of a cognitive nature, such as decreased concentration, recurrence of the issue in the pilot's thoughts and reduced powers of peripheral auditory attention.

Effects that were least important were all behavioural, ie. increased alcohol consumption, decreased quality of pre-flight preparation, etc. This cognitive versus behavioural nature of effects is an important result on theoretical grounds.

The third section was an attempt to put domestic issues into perspective by asking pilots to rank a series of items in terms of their influences on performance. This particular outcome variable was chosen in preference to health, for example, for two reasons. Firstly, pilots may not be able to assess the effects of the items on such outcomes, and secondly, although health was an important outcome, so too was performance. Thus the present study was a unique opportunity to test the determinants of this outcome, as perceived by the pilots.

The most highly ranked items were occupationally oriented, such as fatigue, weather conditions, interpersonal relationships, factors not under the pilot's control. Overall, items ranked as not being important concerned indirect or modifying variables, such as inability to separate home and work, carryover effects of home life, etc. This may be construed as a function of the outcome variable examined rather than meaning that home life variables are of no or little importance. Additionally, one must remember that the task was a ranking measure, hence positions of importance are entirely relative.

the fourth part of the section was an attempt to monitor qualitative differences in the nature of occupational and domestic sources of stress. These measures did not achieve this objective and hence were dropped from the analysis.

To summarise, three major and important conclusions may be drawn. Firstly, a major facet of stressful experiences may be uniformly summarised in home/work relationship. Secondly, the effects of domestic stressors at work tend to be in cognitive rather than behavioural terms. Thirdly, occupational determinants of performance are ranked as having greater influence than domestic determinants (as one might expect).

Life Events

A high majority of pilots said that they had experienced some form of life event, hence as on a prior basis one might expect some relationship to stress outcomes. More detailed analysis revealed, however, that on average, events cited occurred a relatively long time ago and the effects lasted a relatively long time. However, wide variation in scores was also recorded. Examination of the nature of events identified did not reveal any themes or characteristics that would portray the sample of pilots as being any different from those identified by other occupations. Hence one may conclude that the data on specific life events identified by the pilots did not appear to be particularly influential in terms of overall outcomes.

However, the examination of subjective effects of life events did provide a fruitful analysis. Although pilots felt that their performance was not affected during the period of the life event, they felt that there may have been some effect without them realising. This effect would probably, however, have been spotted by colleagues. Perhaps a more efficient way of tapping the effects of life events would have been to adopt this stance and to ask them to assess their colleagues who may have been experiencing a life event.

From a more general viewpoint, the pilots confirmed that any life event, whether positive or negative in nature, could affect pilot performance. In terms of the magnitude of the effect, the pilots felt that although life events might affect performance, they might not do so to such an extent that the pilot himself or his colleagues would notice the effect. The important point to note being that the pilots confirm that this <u>is</u> an effect.

The issue of magnitude of effect is complicated still further by the fact that the pilots felt that it may not be assessed in quantifiable terms, i.e. there is an effect, but it is difficult to measure.

Opinion was evenly split as to whether safety, proper flight conduct or minimum operational standards would be affected. Again, one must assume that the effects of life events are relatively difficult to quantify and even more difficult in terms of attributing causality.

It must be noted that the treatment of life events data within the present study was moderated by the fact that much had already been published about life events, particularly in terms of aircraft accident or incident (i.e. performance measured after the event by error attribution). In addition, extensive data already exists confirming the link between life events and health oucomes in many occupations. This was not tested in the present study and one may safely assume that the health outcomes for pilots is similar to that for other professions. Although left unreported, bivariate analyses were performed between the life events data and the dependent variables in the present study. No new insights were forthcoming.

An integral part of the life events material was the inclusion of Alkov's 22 items. This had been identified as a potentially fruitful technique. Although Alkov's methodology required some modifications, these were not felt to have significantly affected the results observed. It must also be highlighted that Alkov's data had not been applied within a commercial setting.

Alkov's items were subjected to a factor analysis that confirmed three underlying trends. This was contrary to Alkov's assumption that the items were all contributing to a single issue (presumably some form of life event/life change). It may be construed that the analysis simply reflected the initial nature of items Alkov entered into his procedures, however, since three distinctive factors were extracted (i.e., there were no overlapping items loading onto more than one factor), this notion may be dispelled.

From an holistic viewpoint, it would appear that Alkov's 22 items may simply be summarised in terms of 'emotional losses', 'characteristics' and 'emotional gains'. This is in line with more recent thinking in the life events literature that supports the contention that the simplistic examination of life events and changes (such as simply counting their frequency) yields data that, ultimately, is just as useful as more complex strategies (Rahe, 1978).

The three major trends, when entered into multiple regression analysis, did not yield significant predictors of any of the outcome measures employed. Since the predictive powers of independent variables is a relative measure, this was to be expected when one examines the other variables entered into the analyses.

To summarise, the strategy to be adopted, based upon the analysis of Alkov's items, would simply be to investigate life events by establishing:

1. did the event involve an emotional loss?
2. did the event involve an emotional gain?
3. what are the underlying personality characteristics of the individual concerned?

When combined with other questions, such as:

1. when did the event occur?
2. how long did the event last?
3. what were the nature and intensity of effects observed?

there would seem little advantage in employing more complex and laborious techniques in assessing the effects of life events and changes experienced by pilots.

Coping

The inclusion of items related to methods of coping employed by pilots was purely investigative. No similar approach had been located in any of the aviation psychology literature examined. The coping data was comprised of four major trends, which were revealed by factor analysis.

The first major trend concerned the overall degree of stability that that the pilot possesses in respect to his marital relationship and home life. There are two major facets to this. The first is psychological, in which home life is a platform or prop which the pilot may use for support. Incumbent constituents of this are the nature of relationship with wife and the perceived characteristics of one's home as being a place of refuge or a place where one is psychologically separate and at rest. The second facet is a practical one in which stability and support may be assessed in terms of the degree to which they fulfil the pilot's practical needs.

It is often reported by pilots that they separate home and work thoughts (usually during the period of going to work). Although this may be regarded as a psychologically dubious process, it may be manifest in another form by the second factor extracted, 'reason and logic'. In other words, in deliberately trying to suppress emotion and look at things from an objective and logical perspective, the pilot can achieve some degree of coping. Given the data already published on pilot personality, the factor may be construed as a personality characteristic operationalised in the form of a coping strategy.

The third major factor was clear to interpret and was construed as referring to an absence of social support. A major point to draw from the factor was the order in which items were loaded onto the factor. These indicated that support from friends and colleagues was of greatest value. Support from spouse was also important, however, being the least highly loaded of the three, one can only assume that the form of support might be different.

The fourth major trend in the coping strategies adopted by pilots concerned the degree to which the pilot's wife was involved and interested in flying. There is some evidence to suggest that this involvement may have practical aspects and in this way be related to the first trend extracted. However, this fourth factor was a distinctively separate factor (i.e. no overlapping items), and one must conclude the degree of the pilots' wives' interest and involvement as a separate issue fundamental to pilot coping.

The scales derived from the factors were entered into multiple regression analysis. Only the factor 'reason and logic' did not possess any predictive power. One would not expect this to predict performance or job satisfaction. However, one would have expected this factor to predict neuroticism, which it did not.

The factor concerning 'social support' was a negative predictor of anxiety and overall neuroticism, confirming that introspection might be a coping strategy. The factor concerning stability with relationship and home life was a positive predictor of obsessional behaviour. Although it might be inferred that a negative predictive power would confirm this factor formally as a coping strategy, however, since the factor itself consists of a recurrent, routine stable theme, its positive predictive power is intelligible. Finally, the factor concerning wife's involvement and interest in flying was a positive predictor of overall job satisfaction. This confirms that this coping trend affected the pilot's perception and satisfaction with the job as a whole.

To conclude, it appears reasonable to state that home life forms a fundamental role in coping strategies adopted by the pilots.

Job Satisfaction

Examination of descriptive data revealed pilots to be most satisfied with the scale purporting to measure extrinsic satisfaction derived from work conditions. Examination of the scale's contents revealed this to be an unusual result, i.e. items concerning physical working conditions, one's fellow workers, one's boss, etc. One may only assume that this was rated highest on the basis of its relative position to other subscales. The scale rated as least satisfactory was, however, compatible with other indications. The scale indicated that pilots were least satisfied with such issues as recognition for good work, levels of pay, promotion chances and industrial relations between management and pilots. Overall, the conclusion was that pilots were fairly satisfied with their jobs, but not excessively so.

The conclusion was supported by comparisons with other groups. These revealed that in all scales, pilots were more dissatisfied than male, blue-collar workers in manufacturing industry. Although the normative group was inappropriate, this was hardly a result one would have expected to find. Indications are, therefore, that in absolute terms, pilots reflected low levels of job satisfaction. This professional group has high expectations and the job of pilot does not appear to conform to the predicted satisfaction stereotype.

Correlational analysis revealed, as one might expect, that significant negative coefficients were observed for occupational items. Greatest dissatisfaction was expressed with more general rather than specific aspects of work. In particular, pilot were dissatisfied with managerial issues, seniority systems and especially variables associated with their career.

Further bivariate analysis was performed to determine whether or not job satisfaction levels were affected by underlying characteristic in the sample. Those most influential were found to be those that defined status (e.g. rank, seniority, long haul/short haul, etc). In general, job satisfaction levels were found to be positively related to status.

When entered into multiple regression analysis it was found that although job satisfaction was boosted by the inherent responsibility in the job of pilot, recurrent negative predictors that reduced levels of job satisfaction were management and organisational issues, and career and achievement.

Mental Health Questionnaire

Because of the nature of the device, simplistic examination of descriptive data was only of limited utility. Being a 'psychiatric' measurement (as compared to a 'psychological' measurement), the process of making comparisons with 'norms' was theoretically inappropriate.

Interesting results were yielded however, by the inspection of distributions of scores. Simple tabulation of frequencies taking different cut off points indicated that 27.8% (123 pilots) had mental health scores which were greater than one would expect to find on a male industrial population, 12.2% (54 pilots) had scores greater than the normal/abnormal cut off point and 2% (9 pilots had mental health scores that were greater than those one would expect to find in psychiatric outpatients. The identification of these groups forms the basis for further worthwhile research, especially in the light of the fact that these are probably fairly conservative estimates.

All correlation coefficients were positive, with strongest relationships being recorded by anxiety and overall neuroticism only. The compatibility of home and work life and practical issues were significantly associated with the former, whilst problem identification and solving and attainment of self-set performance levels were significantly associated with the latter. In conclusion, the overall theme of associations with mental health concerned achievement and success.

When underlying trends were examined, it was found that those who reported fewer opportunities to relax and wind down reflected higher mental health scores. Additionally, so too did those who

tended to reduce sources of social support by not mixing with colleagues. Age too was an underlying characteristic which complied with previously recorded psychiatric conventions.

Multiple regression analysis revealed that mental ill health was elevated by the stress associated with fatigue and flying patterns and the decreased frequency of opportunities to relax and wind down (as one might expect). Interestingly, neuroticism was offset by the positive stress inherent in the challenge and responsibility in the job.

Performance

A major methodological problem was the measurement of pilot performance. No self-report measure was located in the literature. It was therefore decided to design a suitable instrument. This is described above (Instruments).The measure that was designed was successful. Only one single factor was extracted from which factor score coefficients were extracted to create a factor scale that included items weighted for their degree of influence.

Only two items were not loaded onto the factor. These were about errors made by the pilot. Further inspection revealed, however, that the polarity of the answers was reversed for these two items. This was due to a typographical oversight. These two items were loaded onto a second, though not significant, factor. Either the solution reflects reality and error behaviour is seen by pilots as separate from other performance issues (in this case not significant), or secondly the factor was a function of the scoring error. Thirdly, pilots may not report error behaviour in the same way they report other performance varialbes. Most likely is, of course, that the observed result is a combination of these, plus the fact that the minimum number of factors that may be extracted in Factor Analysis is two. Despite this, the end product was successful and the scale was fully used as a dependent variable.

Only one item fulfilled selection criteria, indicating that the stress associated with attaining one's own level of performance was significantly correlated with the measure. Whilst not being

a surprising result, this does confirm that the scale does seem to measure performance. The analysis of underlying trends indicated that those who report having less time to relax and wind down tend to report higher levels of performance. One can only assume that this is a function of reporting, since it is contrary to intuitive reasoning and other indications. Similarly, long haul pilots reported significantly higher levels of performance than short haul pilots, as did Senior First Officers than Captains.

Multiple regression analysis revealed that performance was a positive function of fatigue and flying patterns, the anxiety associated with courses and checks, and the results of insufficient flying practice. These results make sense and need not be further discussed. It is important to state, however, that these results have important implications. Additionally, it was found that younger age groups tended to report significantly higher levels of performance.

Wives Study

The objective of examining pilots' wives was to gain an insight into the domestic life of a pilot, from an alternative and unique perspective.

The biographical characteristics of the sample generally mirrored those of the pilots, which was probably due to the methodology employed (Appendix 6). Most were married to pilots who worked for British Airways and who flew short haul routes (the splits being approximately 60/40). Almost equal proportions were married to pilots of lower ranks. As many wives had a job as those who did not. In conclusion, therefore, there were no apparent underlying trends in the sample that one would identify as unusual.

Levels of life satsifaction were also measured. Analysis of subscales revealed that the wives were most satisfied with items reflecting their lifestyle. One can only assume that this is due to relative levels of social status and disposable income. Wives were least satisfied with items associated with standards and achievements. Other data permits the inferred reason for this as the magnitude of the wife's role in creating optimal conditions

for flight preparation at home. Although normative data available for comparisons was inappropriate, generally pilots' wives reflected high levels of life satisfaction.

Correlational analysis did not reveal any meaningful insights into the reactions of wives, however, examination of the dependent life satisfaction scale revealed that: overall life satisfaction and satisfaction with personal life were modified by the husband's rank and the company for whom he worked. Satisfaction with standards and achievements was modified by the wife's age. Those wives who reflected the lowest levels of life satisfaction were in the 41-50 age group, did not work, and were married to pilots who were not captains or who did not work for British Airways.

Factor analysis provided interesting major insights into the nature of stress experienced by pilots' wives, their perceptions of pilot stress, and their perceptions of the effects at home of pilot stress.

The stress experienced by pilots' wives was comprised of five facets. The first concerned changing roles at home. This concerned the necessity for the wife to adopt a dominant role with the home setting. No doubt this involved some process of role reversal. It may be easily construed that this is a direct function of the nature of the pilot's job. One could speculate further that, on balance, such issues may be of greater importance to wives of long haul pilots. However, given the composition of the sample in the present study, this does not appear to be the case. The second major facet of pilot wives' stress concerned the threats to the pilot's job in terms of job loss. It is interesting to note firstly that pilots' wives are obviously very aware of the recent economic trends within the aviation industry, and secondly that these pressures have carryover effects of such magnitude that they are now a major facet in the stressor profiles of pilots' wives.

The third aspect of stress experienced by pilots' wives concerned threats to the marital relationship. To the lay person, the life style of a pilot is 'glamorous' and allegations of promiscuity between sexes is a simplistic observation which is generally denied by pilots. It would appear, however, that pilots' wives

do not perceive this to be the case. Hence from the wives' perspective, there may well be some truth in the 'glamorous' lifestyle of the pilot.

The fourth major trend in the nature of stress experienced by pilots' wives concerned the absence of an active role in the pilot's career progression. The loadings of items onto the factor were negative and the factor meaning was clear. The wives feel that they do not play a role in the husband's career progression. They also feel that they are generally regarded as being unimportant and feel that no recognition is given to them in the contribution they make to the quality of the pilot's life.

The fifth source of stress concerned social problems. At a simplistic level, this may be construed as possibly reflecting the disruptive influence of scheduling and rosters, in the form of cancelled arrangements or restrictions in socialising. The problems associated with these would appear to be exacerbated by the fact that wives regard their family unit as being comparatively isolated. Coupled with the fact that wives feel that others regard the lifestyle of a pilot as 'glamorous', a disrupted social life is not only seen as stressful in itself, but possesses decreased sources of social support on which the wife can rely in order to cope with whatever other stresses she might be experiencing.

The wife's perceptions of pilot stress were summarised as embracing two facets, work pattern fatigue and the anxiety of courses and checks. The items presented were a limited array of stressors which the pilots themselves had identified as having carryover effects into home life. It may be alleged that pilots' wives do not have clear perceptions of the occupational stresses experienced by pilots, and indeed one would not expect them to do so. However, although reflecting a fairly simplistic perception of pilot stress, these are probably the two major facets of stress to which the wife would be exposed. On that level, therefore, these results do make sense and substantiate previous claims by pilots.

In a similar vein, the effects of occupational stress on the pilot were perceived as being in terms of irritability and tension and decreased performance. Given the assumption that the pilot's wife occupies an optimal position from which to observe such effects, it would appear that the subjective assessment of mood and the relatively objective assessment of task performance would provide fruitful areas for future research within a domestic setting.

The factors extracted, plus an array of selected biographical variables, were entered into multiple regression analysis. Only the domestic stressors concerning adopting dominant domestic roles, job roles and social problems, provided significant predictors from the array of factors. All predictors were negative.

These recurrent predictors were significantly related to total life satisfaction and satisfaction with personal life cojointly with pilots' employing company. Satisfaction with standards and achievements was negatively predicted by adopting dominant domestic roles, pilots' employing company and pilots' rank. Similarly, satisfaction derived by the wives from their lifestyles was decreased by having to adopt dominant roles and social problems. However, such satisfaction appeared to be positively related to the wives' age.

In conclusion therefore, the data derived from pilots was useful and achieved its objectives in four ways. Firstly it provided insights into the nature of stress experienced by the wives themselves. Secondly it confirmed previous issues as having carryover effects from work into home life that had been previously identified by pilots. Thirdly, several major trends in the nature of the effects of stressors were identified and fourthly an insight was provided into the overall levels of life satisfaction reported by pilots' wives.

A Note on the Final Version of the Questionnaire

An overall objective of the study was to establish a methodology or means of assessing stressors for pilots. This was the questionnaire used in the postal survey of the present study. An important task to identify and select useful as opposed to redundant items and to construct an instrument that could be used in further investigations of the occupational and domestic sources of pilot health and performance.

There were several ways of achieving this goal. One way was to adopt traditional psychometric methods and construct a questionnaire based on reliability coefficients and other statistical criteria. Another approach is to combine empirical evidence with skilled psychological judgement in addition to rigorous statistical analysis. Not only is a high amount of information revealed, but the end result is of greater practical application since it is derived from an analysis that has a psychological input as opposed to a purely statistical one. Overall therefore, the objective was to identify psychologically redundant items.

A copy of the revised questionnaire is included in Appendix 7. The biographical measure was included with only minor alterations for in its original form, it highlighted a wealth of interesting and useful data. The remaining questions (occupational and domestic stressors, home to work and work to home stressors, and coping items) were subject, in the present study, to extensive analyses. Items that were shown to be of little importance in the univariate and bivariate analysis and items that were not parts of underlying trends or had any predictive power in the multivariate analysis, were removed from the questionnaire. The measure of life events (Alkov et al, 1982) is included with some alterations, but is subject to comments presented in the above discussion. Throughout, the factor analysis enabled the identification of underlying trends and hence the erection of subscales. These are reported at the end of the questionnaire. The job satisfaction and measure of mental ill health are previously designed instruments and are included without alteration. The measure of performance is included which was described above.

CONCLUSION

CONCLUSIONS

1. Large amount of biographical data was uncovered involving the pilot and family, interests, lifestyle, work history and experience.

2. Domestic stressors investigated

   i 29 issues identified and tested

   ii spread of scores in answers reflects idiosyncracy of pilots' home lives

   iii correlational analysis revealed pilots to be generally worried about problem identification and achievement

   iv factors emerged which were solely domestic relating to control, achievement and career factors, and domestic health

   v many of the items made contributions to other, occupationally oriented trends

3. Occupational stressors investigated

   i 31 issues identified and tested

   ii correlational analysis revealed that job satisfaction was decreased by macro rather than micro issues such as career opportunities, seniority systems and management style. Mental ill health was related to planning ahead and attaining self-set levels of performance

   iii items dominated underlying trends that were extracted. Scheduling and rostering, anxiety of courses and checks, career and achievement, insufficient flying, responsibility and decision making, interpersonal problems, management and organisational issues, fatigue and flying patterns.

   iv domestic issues were found to be clearly linked to occupationally oriented trends

4. Relationship between home and work was investigated. This was a major theme throughout the research, but was explicitly examined in four parts.

   Part 1 Stressors of home that may affect work

   i greatest impacts were found to be related to unresolved and ongoing situations

   ii all items were loaded onto one single factor. This was the fourth factor overall to be extracted and hence was important. This also indicates that the items all relate to the same issue (i.e. relationship between home and work). Overall theme of the factor was stability.

   iii the factor was a significant negative predictor of depression

Part 2 Effects of home stressors at work

i important effects were found to be cognitive

ii effects of lesser importance were found to be behavioural

Part 3 Ranked determinants of performance

i items ranked as most important were fatigue, weather conditions and factors not within the control of the pilot

ii greatest concentration was upon occupational rather than domestic issues, however these were interpreted in the light of the fact that the outcome variable was performance and the nature of the task

Part 4 Qualitative differences between home and work stresses

i this part did not yield additional insights and was discarded

Overall conclusions

i major facet of stressful experience from home to work may be uniformly summarised in a simple home/work relationship

ii effects of domestic stresses at work tend to be cognitive rather than behavioural

iii occupational determinants are ranked as higher determinants of performance

5. Life events were investigated

i most pilots experienced a life event. Content analysis of events and experiences revealed them to be no different from other occupations

ii pilots felt that performance was not affected but also that it may have been affected without their realising

iii both positive and negative events were felt to be important

iv it was thought that the nature of the effect would be difficult to measure

v opinion was evenly split as to whether safety and proper flight conduct would be affected

vi approaches developed by other authors (Alkov et al, 1982) were retested and found to be summarised in three trends: emotional losses, pilot characteristics and emotional gains

vii overall conclusion was that examination of life events should be kept simple. Other approaches tested were unsatisfactory and had little advantage over other more simple techniques

6. Pilot coping strategies were examined

   i four facets in coping were identified: stability of relationship and home life, reason and logic, social support and wife's involvement.

   ii home life established as playing a fundamental role in coping

   iii multiple regression revealed all but reason and logic as coping strategies

7. Job satisfaction was investigated as a dependent variable

   i although only inappropriate norms were available, comparisons revealed that pilots were more dissatisfied in all scales than male blue collar workers in British manufacturing industry. This was not a result one would have expected and one may conclude that pilots do not conform to the predicted satisfaction stereotype.

   ii pilots were most satisfied with extrinsic aspects of work, again contrary to expectations

   iii correlational analysis revealed most dissatisfying aspects of work to be management, seniority and career variables

   iv underlying trends mediating perception of satisfaction were found to be those that defined status, i.e. rank, seniority, etc.

   v regression analysis revealed job satisfaction to be boosted by responsibility and decision making and decreased by management and organisational issues and career and achievement variables

8. Mental ill health was investigated as a dependent variable

   i pilots most at risk were identified and form the basis for future research

   ii ill health was found to be associated with compatibility of home and work, practical issues at home, problem identification and attaining self-set levels of performance. Overall the theme was achievement and success

   iii age was an underlying trend but found to conform to previously recorded characteristics for male subjects

   iv regression analysis revealed mental ill health to be a function of fatigue and flying patterns, inability to relax and wind down and absence of responsibility

   v different facets of stressors were found to predict different aspects of neuroticism

9. Performance was investigated as a dependent variable

   i the measure was specially designed for the present study and was successful

9. continued

ii performance was found to be a function of age, rank and routes flown

iii performance was decreased by fatigue and flying patterns, anxiety of courses and checks and effects of insufficient flying practice

10. Data on pilots' wives was collected

i sources of stress were identified for pilots' wives as being: adopting dominant domestic roles, job loss, threats to marital relationship, absence of an active role in husband's career progression and social problems

ii Wives' perceptions of pilot job stress were found to relate to work pattern fatigue and anxiety of course and checks

iii wives' perceptions of the effects of job stress on pilots were found to relate to irritability and tension and decreased performance

iv nature of life satisfaction was examined for wives. Underlying stressors were found to be recurrent negative predictors of life satisfaction

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APPENDICES

Appendix 1 Question Structure for Preliminary Interviews

1. Which are the most important domestic stressors? Why? What sort of effects or consequences do they have for you?

2. What are the key elements of domestic stress? What sort of things make you tense/worried/anxious in your life? How do you know when you are experiencing stress?

3. Which are the most important job stressors? Why? What sort of effects or consequences do they have for you?

4. Which are the most important job stressors which affect home life? What is the nature of the relationship between work and home?

5. Which are the most important home stressors which affect work life? What is the nature of the relationship between home and work?

6. Have you experienced any life events? What was the last one? Can you describe the events and your feelings before, during and after the event?

7. How do you cope with stresses you experience and what are the consequences of failure to cope?

8. Can you design a self-report measure of performance for use in a postal survey?

9. Anything else relevant?

Appendix 2

UMIST

The University of Manchester Institute of Science and Technology
P.O. Box 88, Manchester M60 1QD, United Kingdom
Telephone: 061-236 3311
Telex 666094

SJS/LD

November 1983

Dear Sir

We are writing to you to ask you to participate in a forthcoming anonymous survey we are conducting. The aim of the survey is to examine the domestic psychological determinants of pilot health and performance and to examine in detail the nature of the relationship between home and work for commercial airline pilots.

I would like to emphasise that we are a strictly independent, non-profit making, academic institution. The Department has an international reputation in the field of Occupational Psychology and we have conducted extensive research into the area of Occupational Stress. The study we are performing is being sponsored by the United States Air Force and is being performed with the fullest cooperation of BALPA and the CAA.

BALPA have provided us with lists of pilots selected totally at random from their lists of members. Your name was selected (again at random) from these lists.

It will be a confidential survey and no data about specific individuals will be made available to any external body. It will require only a small time commitment from you. Hence, may I take this opportunity to urge you to participate?

Very soon you will receive a questionnaire booklet and further instructions, until then, thank you for your attention.

Yours faithfully

Professor Cary L Cooper
Professor of Organisational Psychology

Dr S J Sloan
Research Fellow

Appendix 3

UMIST

The University of Manchester Institute of Science and Technology
P.O. Box 88, Manchester M60 1QD, United Kingdom
Telephone: 061-236 3311
Telex 666094

Department of Management Sciences

SJS/LD

November 1983

Dear Sir

We hope you received the letter we sent to you some time ago, regarding the survey we are conducting by post. Please find attached a questionnaire booklet and a pre-paid envelope in which to return the completed questionnaire directly to us in Manchester.

Just to recap, we are trying to establish the nature of the relationship between home life and pilot health and performance. It is an important, large scale study and upon completion, the results will be carefully considered by all interested parties (e.g. BALPA). Certainly all of the pilots we have spoken to so far have been very enthusiastic to express an opinion.

You will find a number on the questionnaire. This is your reference number. Names and numbers are held for us by the Project Research Associate who is a medical doctor. They remain strictly confidential, however, if you wish, you may remove this number.

This booklet should take about 90 minutes of your time. We hope you will not find this over-burdensome. Once again may we take this opportunity to urge you to participate in the survey and thank you for your contribution.

Yours faithfully

Professor Cary L Cooper
Professor of Organisational Psychology

Dr S J Sloan
Research Fellow

THIS IS A CONFIDENTIAL SURVEY. ALL INDIVIDUAL DATA WILL REMAIN MEDICALLY IN CONFIDENCE AND WILL NOT BE DIVULGED TO ANY EXTERNAL BODY.

HERE IS YOUR REFERENCE NUMBER. YOU MAY REMOVE IT IF YOU WISH.

THE BASIS OF THE PROJECT

The identification of factors that affect the ways in which pilots behave have long been recognised as important topics for research. From such factors, the features of the pilot's home life have been identified as important, however their precise contribution to deviations from correct flight conduct has not been intensively researched.

A small amount of psychological literature does examine the influence of pilots' home lives on performance and on pilot health also. Several points are noteworthy. The characteristics of home lives examined almost exclusively concentrates on "life events", i.e. very important things that have occurred in the pilot's life. Additionally, such effects are usually examined in the context of accidents and incidents. Whilst of tremendous importance and interest, we do not know the precise nature of the relationship between home and work for pilots. Secondly, we do not know the nature of such effects on a day to day basis. Other sources of data such as reporting systems do not permit the investigation into underlying causes beyond that which is volunteered in the report itself. Hence an investigation is necessary.

WHO WE ARE

UMIST is a technological university with an international reputation. The Department of Management Sciences has expertise in Occupational Psychological research. We have been commissioned by an interested external body (United States Air Force) to undertake this research.

THE PROJECT OBJECTIVES

The objective of this project is to establish the domestic determinants of pilot health and performance and to examine the nature of the relationship between home and work for airline pilots.

DEFINITIONS

We would like you to interpret terms widely, for example "domestic stress" and "stressors". These should simply be interpreted as referring to problems, events, occurrences which are important in home life. Remember too that stressors may be positive as well as negative.

The word "stress" should also be interpreted in a wide sense, i.e. worry, tension, anxiety, anger or perhaps just mild irritation.

EXPLANATIONS

PLEASE READ THIS INFORMATION PAGE BEFORE YOU START TO COMPLETE THE QUESTIONNAIRES.

THIS BOOKLET

In this booklet you will find an array of questionnaires. They are mainly checklists and each has its own set of instructions and notes. Please read each set of instructions before starting to complete each checklist.

HOW TO ANSWER

For most of the questions please ring the number opposite your answer. If you make a mistake and ring the wrong number, cross it out and ring the correct number. For example,

The year is	1981	1
	1982	~~2~~
	1983	(3)

For other questions you simply write in your answer or complete as scheduled. If required to insert a number, please enter only one digit into each box provided.

WHAT YOU MUST REMEMBER

Since I shall not be present, I am depending on you to complete all questionnaires under "scientific" conditions, so please note the following points.

1. Try to give your first and natural answer. This is best achieved by working quickly, but try also to be as honest and accurate as you can.
2. The questionnaires are to be completed by you and no one else.
3. The data must be given by you in private.
   Remember that I shall be keeping the data confidential, so must you.
4. Although some individual questions might seem unusual, remember that I shall be looking at groups of items, so please answer all questions.
5. Please remember the overall project basis, objectives and definitions.
6. Please ignore the numbers in brackets. These are for my own numbering scheme.

AFTER YOU HAVE READ THIS PAGE, PLEASE READ THE NEXT PAGE FOR FURTHER EXPLANATIONS

The scales which follow are a mixture of checklists and questions which relate to home life, work life and the relationships between the two.

You will find checklists compartmentalised into different sections. Within each section you may find more than one part. Please answer all questions.

The sections are separate and relate to the following issues:

Section		No of parts
1	Biographical Data	1
2	Problems, occurrences, issues that are entirely domestically oriented	1
3	Problems, occurrences, issues that are entirely occupationally oriented	1
4	Relationship between work and home	1
5	Relationship between home and work	4
6	Life events	3
7	Coping	1
8	Job satisfaction	1
9	Health	1
10	Performance	1

PLEASE REMEMBER PREVIOUS INSTRUCTIONS AND TURN TO THE NEXT QUESTIONNAIRE WHICH EXAMINES BIOGRAPHICAL DATA

SECTION 1 BIOGRAPHICAL DATA

YOU AND YOUR FAMILY

(Card 1)

Sex? Male 1 (1)
Female 2

Age? 21-30 1
31-40 2 (2)
41-50 3
51-55 4

Marital Status?

Married 1
Single 2
Divorced 3 (3)
Widowed 4
Separated 5
Cohabiting 6

If married now (either formally or in common law), does your partner work?

Yes 2
No 1 (4)
N/A 0

If yes, do they work;

Occasionally 1
Part-time 2 (5)
Full-time 3
N/A 0

Number of children ☐☐ (number) (6) (7)

Age of Children

Number of children over 18 years old ☐☐ (number) (8) (9)

Number of children under 18 years old ☐☐ (number) (10) (11)

Number of dependents (include partner and children where applicable)

☐☐ (number) (12) (13)

YOUR INTERESTS

Do you find time to relax and "wind down"	Always	1	(14)
	Sometimes	2	
	Only when possible	3	
	Not usually	4	
Do you have an interest or hobby	Yes	1	(15)
	No	2	
If yes, is it related to work	Yes	1	(16)
	No	2	
	N/A	0	
In general do you mix socially with other aviation colleagues outside work	Yes	1	(17)
	No	2	

EXERCISE AND FITNESS

	Almost Always	Sometimes	Almost Never	
I maintain a desired weight avoiding overweight or underweight	0	1	3	(18)
I do vigorous exercises for 15-30 minutes at least 3 times a week	0	1	3	(19)
I do exercises that enhance my muscle tone for 15-30 minutes at least 3 times a week	0	1	2	(20)
I use part of my leisure time participating in individual family or team activities that increase my level of fitness	0	1	2	(21)
I do some type of gentle stretching exercises at least 3 times a week to improve flexibility	0	1	2	(22)

SMOKING

Do you smoke now?	Yes	2	(23)
	No	1	
If <u>yes</u>, how long have you smoked for (enter 00 if not applicable)	(24) (25) ☐☐ (number)	years	

If yes, please complete the following:

If you do not smoke, go to

	Almost Always	Sometimes	Almost Never	
I avoid smoking cigarettes	0	1	2	(26)
I smoke only low tar cigarettes or I smoke a pipe and cigars	0	1	2	(27)

	Yes	No	
I smoke less than half a pack daily	0	1	(28)
I smoke more than a pack daily	1		(29)
I have recently reduced my smoking	0	1	(30)
I have plans to quit smoking	0	1	(31)
I am currently attempting to quit	0	2	(32)

If you do not smoke now, have you ever smoked

Yes	2	
No	1	(33)
N/A	0	

If yes, how long ago did you stop (enter 00 if not applicable) (34) (35) ☐☐ years

(number)

EATING HABITS

	Frequently	Sometimes	Almost Never	
Do you eat a variety of foods each day such as fruits, whole grain breads and cereals, lean meats, fish and poultry etc	0	1	2	(36)
Do you eat foods high in fat, saturated fat and cholesterol (e.g. fatty meats, eggs butter, cream, organ meats such as liver)	2	1	0	(37)
Do you eat salty foods, add salt at the table or use a lot of salt in cooking	2	1	0	(38)
Do you eat a large amount of sugar (especially sugary snacks, desserts and soft drinks)	2	1	0	(39)
Do you eat a high fibre diet including lots of whole grain bread and cereals, fresh fruits and vegetables	0	1	2	(40)

ALCOHOL

Do you drink alcohol — Yes 2 / No 1 (41)

If yes: how many days per week do you drink (42) ☐ (number)

On those days in which you drink, on average how many drinks do you have (43) ☐☐ (number)

(Please complete the following)

	Often	Yes	No	
Do you drink more than 2 drinks per day	2	1	0	(44)
Do you use alcohol as a way of dealing with stressful situations or life problems	2	1	0	(45)
Have you ever felt the need to cut down on drinking	2	1	0	(46)
Have you ever felt guilty feelings about drinking	2	1	0	(47)
Has anyone ever told you they think you drink too much	2	1	0	(48)

YOUR WORK HISTORY

Present employer

B.A. 1
B. Cal. 2
Brittannia 3 (49)
Dan Air 4
Other (please state) 5
.....

Number of years with present employer (50)(51) ☐☐ years

Current aircraft type .....

(Insert number as appropriate)
(one digit per box please)

Number of years experience on aircraft type (52) (53) years

Number of hours experience on aircraft type (54) (55) (56) (57) hours

Total flying hours experience (58) (59) (60) (61) hours

Average flying hours experience per month (62) (63) (64) hours

Number of landings performed in aircraft type (65) (66) (67)

Total number of landings performed (68) (69) (70)

Average number of landings performed per month (71) (72) (73)

Average length of sector you fly hours

Do you generally fly ....

Long haul	3	
Short haul	2	
Domestic only	1	(74)

Are you ....

Captain	4	
Senior first officer	3	
First officer	2	(75)
Other (please state)	1	

.....

Do you work at any other function (e.g. training captain)?

Yes	2	(76)
No	1	

If yes, please specify .....

Seniority: This is difficult to assess since different companies use different methods. Please give us some indication of your seniority, using the scale below, on whichever basis is most important for you within the organisation for which you work.

Very High	5	
High	4	
Middle	3	(77)
Low	2	(Go to card 2)
Very Low	1	

PLEASE CHECK THAT YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 2 DOMESTIC FACTORS

This section examines those issues that may be important in your home life. We are examining factors that are entirely domestic. We wish to measure their importance for you generally. Please ignore whether or not you feel these may or may not have carry over effects into your working life. Simply indicate whether something is stressful or not for you as an individual.

THE QUESTIONS

On the left hand side of the page is a list of factors which might be causing you stress.

THE ANSWERS

To answer the question of whether or not a certain factor may be causing you stress or not, circle the appropriate answer from the list on the right hand side.

PLEASE REMEMBER

There are no right or wrong answers
Give your first and natural answer by working quickly but be accurate
There are ~~six~~ nine possible answers provided, remember that you may use any one to answer each question
Remember we interpreted the word "stress" widely
Please ignore the numbers in brackets

		Causes me much stress	Causes me some stress	Sometimes causes me stress	Causes me a little stress	Causes me no stress	(Card 2)
1.	Disagreements, arguments, differences of opinion	5	4	3	2	1	(1)
2.	Quality of marital relationship with partner.....	5	4	3	2	1	(2)
3.	Degree to which household is "geared to flying".....	5	4	3	2	1	(3)
4.	Family health	5	4	3	2	1	(4)
5.	Nature of the home social environment	5	4	3	2	1	(5)
6.	Lack of money	5	4	3	2	1	(6)
7.	Dependability in, and competence of, spouse	5	4	3	2	1	(7)
8.	Potential for extra marital relationships	5	4	3	2	1	(8)
9.	Build up of tasks, duties and things to do	5	4	3	2	1	(9)
10.	Issues associated with children (health, education etc)	5	4	3	2	1	(10)
11.	Domestic situations that aren't clear cut	5	4	3	2	1	(11)
12.	Worries on behalf of others	5	4	3	2	1	(12)
13.	Conflicts of interests and resulting compromises	5	4	3	2	1	(13)
14.	The 'good' use of time at home and how it is spent	5	4	3	2	1	(14)
15.	Inability of spouse to fulfil their own ambitions	5	4	3	2	1	(15)
16.	Absence of calm, stability and dependability in home life ..	5	4	3	2	1	(16)
17.	Constant, ongoing irritations	5	4	3	2	1	(17)
18.	Disappointment when others fail to meet expectations	5	4	3	2	1	(18)
19.	Degree to which your personal goals and aims in life have been achieved	5	4	3	2	1	(19)
20.	Success or failure of one's efforts to achieve	5	4	3	2	1	(20)
21.	Inability to identify problems (and hence solution)	5	4	3	2	1	(21)
22.	New and unfamiliar experiences	5	4	3	2	1	(22)
23.	Others not obeying or things that go wrong	5	4	3	2	1	(23)
24.	Enforced or adapted roles at home	5	4	3	2	1	(24)
25.	Responsibilities of home activities (e.g. PTA, Councillor etc)	5	4	3	2	1	(25)
26.	Spouse's lack of understanding about the job	5	4	3	2	1	(26)
27.	Not having someone to talk to about your work	5	4	3	2	1	(27)
28.	Interpersonal relationships	5	4	3	2	1	(28)
29.	The degree to which home life is the way you want it	5	4	3	2	1	(29)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 3 OCCUPATIONAL FACTORS

This section examines those issues that may be important in your life. We are examining factors that are entirely occupational. We wish to measure their importance for you generally. Please ignore whether or not you feel these may or may not be carryover effects into your home life. Simply indicate whether or not something is stressful or not for you as an individual.

		Causes me much stress	Causes me some stress	Sometimes causes me stress	Causes me a little stress	Causes me no stress	(Card 2)
1.	Career opportunities and lack of potential advancement	5	4	3	2	1	(30)
2.	Seniority systems	5	4	3	2	1	(31)
3.	Impending major career change or threat (e.g. redundancy, redeployment etc)	5	4	3	2	1	(32)
4.	Not enough hours actually spent flying	5	4	3	2	1	(33)
5.	Sharing of work evenly	5	4	3	2	1	(34)
6.	Scheduling.....	5	4	3	2	1	(35)
7.	Patterns of flying (i.e. relative times you are asked to fly)	5	4	3	2	1	(36)
8.	Interpersonal problems with aircrew	5	4	3	2	1	(37)
9.	Interpersonal problems with cabin staff	5	4	3	2	1	(38)
10.	Style of management	5	4	3	2	1	(39)
11.	Lack of management support	5	4	3	2	1	(40)
12.	The whole experience (before & during) of medical checks ...	5	4	3	2	1	(41)
13.	The whole experience (before & during) of checks on your flying ability	5	4	3	2	1	(42)
14.	Misuse of time (e.g. low amount of preparation time, delays)	5	4	3	2	1	(43)
15.	*The aggregate or cumulative effects of minor tasks when* flying	5	4	3	2	1	(44)
16.	Fulfilling role expectations (either as a captain or first officer)	5	4	3	2	1	(45)
17.	Changes in your experience of flying (e.g. conversion course)	5	4	3	2	1	(46)
18.	Impact of a lack of flying (practice effects)	5	4	3	2	1	(47)
19.	Future career uncertainty	5	4	3	2	1	(48)
20.	Tiredness and fatigue	5	4	3	2	1	(49)
21.	Morale and organisational climate	5	4	3	2	1	(50)
22.	Conditions of employment	5	4	3	2	1	(51)
23.	Factors not under your direct control	5	4	3	2	1	(52)
24.	Periods in flight of high workload	5	4	3	2	1	(53)
25.	Inherent responsibility of your job	5	4	3	2	1	(54)
26.	Making important decisions	5	4	3	2	1	(55)
27.	Ambiguous factors or difficulties in problem identification	5	4	3	2	1	(56)
28.	Attaining your own personal levels of performance	5	4	3	2	1	(57)
29.	Situations that are ongoing	5	4	3	2	1	(58)
30.	Effects of being over familiar (with routes, type, routines etc)	5	4	3	2	1	(59)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 4 FACTORS OF WORK THAT MAY AFFECT YOU AT HOME

This section examines those sources of pressure or problems that are associated with your job. In particular it concentrates on those that may have an effect on you outside work i.e. we are examining the relationship in the direction of work to home.

	This item is a source of pressure to me ...	Always	Usually	Sometimes	Seldom	Never	
1.	Tiredness and fatigue	5	4	3	2	1	(60)
2.	How time of work determines when to sleep	5	4	3	2	1	(61)
3.	Returning home and time of arrival	5	4	3	2	1	(62)
4.	Scheduling and rosters	5	4	3	2	1	(63)
5.	Patterns of flying	5	4	3	2	1	(64)
6.	Unpredictability of when you are asked to fly	5	4	3	2	1	(65)
7.	Social problems associated with rosters	5	4	3	2	1	(66)
8.	Seasonal fluctuations in workload (& hence effects)	5	4	3	2	1	(67)
9.	Changes in family life due to job (e.g. promotions, base change etc)	5	4	3	2	1	(68)
10.	Anxiety of courses and checks	5	4	3	2	1	(69)
11.	Preparation necessary for courses and checks	5	4	3	2	1	(70)
12.	Factors out of your control (i.e. delays, cancellations)	5	4	3	2	1	(71)
13.	How long a single period of flying lasts (trip)	5	4	3	2	1	(72)
14.	How many sectors you are asked to fly	5	4	3	2	1	(73)
15.	Effects of minor day to day things	5	4	3	2	1	(74)
16.	Carry over effects of personality clashes or interpersonal issues	5	4	3	2	1	(75)

(Go to card 3

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

This section contains 4 parts which examine the following

Part 1 Home factors which may affect you at work

Part 2 The nature of effects home factors might have for you at work

Part 3 Factors that might generally affect pilot performance

Part 4 The relative importance and difference between sources of stress from home and from work

SECTION 5 PART 1 HOME FACTORS WHICH MAY AFFECT YOU AT WORK

	The size of effect I perceive is	Very high	High	Moderate	Low	Very low	
1.	Efficiency of pre-flight preparation time (i.e. period at home not on duty)	5	4	3	2	1	(Card 3) (1)
2.	Issues or situations that are ongoing or left unresolved	5	4	3	2	1	(2)
3.	Overall satisfaction with home life	5	4	3	2	1	(3)
4.	How satisfied one is on how things have been left	5	4	3	2	1	(4)
5.	Lack of stability	5	4	3	2	1	(5)
6.	Division of loyalties	5	4	3	2	1	(6)
7.	Indirect results of home life activites	5	4	3	2	1	(7)
8.	Marital problems	5	4	3	2	1	(8)
9.	Spouse's attitude to flying	5	4	3	2	1	(9)
10.	Length of time spent at home	5	4	3	2	1	(10)
11.	Serious events that occur	5	4	3	2	1	(11)
12.	Particular arrangements that have been disrupted	5	4	3	2	1	(12)

SECTION 5 PART 2 NATURE OF EFFECTS OF HOME FACTORS ON WORK

	I can usually tell when I'm experiencing stress because at work I react this way	Always	Usually	Sometimes	Seldom	Never	
1.	Tendency to worry	5	4	3	2	1	(13)
2.	Experience of tiredness due to disrupted sleep	5	4	3	2	1	(14)
3.	Increased alcohol consumption when not flying	5	4	3	2	1	(15)
4.	Decreased concentration	5	4	3	2	1	(16)
5.	Reoccurrence of factors in thoughts of item during period of low workload (e.g. cruise)	5	4	3	2	1	(17)
6.	Make errors without knowing why	5	4	3	2	1	(18)
7.	Make errors of omission	5	4	3	2	1	(19)
8.	Decreased quality of preflight preparation	5	4	3	2	1	(20)
9.	Tendency to talk about the issue at work	5	4	3	2	1	(21)
10.	Slows one down	5	4	3	2	1	(22)
11.	Tendency not to listen as intently	5	4	3	2	1	(23)
12.	One's mind becomes detached from tasks in hand	5	4	3	2	1	(24)

SECTION 5 PART 3 FACTORS WHICH MIGHT GENERALLY AFFECT PILOT PERFORMANCE

Below you will find a list of factors that might determine a pilot's performance. We would like you to rank them

(1) Rank your top 6 items in their order of importance in actually determining pilot performance on the basis that you have perceived them in the past and know from your own experience how important or unimportant each of them may be.

PLEASE RANK THE MOST IMPORTANT AS 1 AND THE REMAINDER DOWN TO THE LEAST IMPORTANT AT 6. PLEASE DO NOT RANK ITEMS AT EQUAL VALUES.

		RANK
1.	Weather conditions	(25)
2.	Inability to separate home events from work life	(26)
3.	Overfamiliarity (with type, routes etc)	(27)
4.	Fatigue	(28)
5.	Mind that is "full of other things"	(29)
6.	Relative time of day one is asked to fly	(30)
7.	Interpersonal relations with aircrew	(31)
8.	Upset preflight routine (at home)	(32)
9.	Carry over effects of home life events	(33)
10.	Health (not "ill", but being "out of sorts")	(34)
11.	Poor preflight preparation	(35)
12.	Things that are not under direct control of pilot (e.g. ATC)	(36)

SECTION 5 PART 4 RELATIVE IMPORTANCE AND DIFFERENCES IN NATURE OR SOURCES OF STRESS

The aim of this part is to gain an insight into the relative importance generally in your life, of sources of problems that are work oriented and those sources that are home oriented. Additionally, we would like some indication of the nature of the differences and similarities between the two groups of sources.

1. Generally in my life sources of pressure that arise from work account for the following percentage of that which I experience:

0-10%	0	51-60%	5	
11-20%	1	61-70%	6	
21-30%	2	71-80%	7	(49)
31-40%	3	81-90%	8	
41-50%	4	91-100%	9	

2. Especially in my life sources of pressure that arise from home account for the following percentage of that which I experience:

0-10%	0	51-60%	5	
11-20%	1	61-70%	6	
21-30%	2	71-80%	7	(50)
31-40%	3	81-90%	8	
41-50%	4	91-100%	9	

Below is a series of statements. Please indicate your feelings towards each statement by putting a circle around the number of the answer that best describes how you feel. It is the words of the answers that are important, not the numbers, so read the answers carefully.

3. One can become more emotional about domestic things than job factors

Strongly Disagree	5	(51)
Disagree	4	
Uncertain	3	
Agree	2	
Strongly Agree	1	

4. Although problems may arise associated with work, it is always possible to leave and get away from them, which one cannot do with problems that occur in home life.

Strongly Disagree	1	(52)
Disagree	2	
Uncertain	3	
Agree	4	
Strongly Agree	5	

5. Job stresses occur in short bursts

Strongly Disagree	1	(53)
Disagree	2	
Uncertain	3	
Agree	4	
Strongly Agree	5	

6. Home stresses occur at an acute and intense level

Strongly Agree	1	(54)
Agree	2	
Uncertain	3	
Disagree	4	
Strongly Disagree	5	

7. Job stresses tend to be ongoing.

Strongly Agree	5	(55)
Agree	4	
Uncertain	3	
Disagree	2	
Strongly Disagree	1	

8. Problems at work tend to be "cut and dry" requiring "yes or no" answers

Strongly Disagree	1	(56)
Disagree	2	
Uncertain	3	
Agree	4	
Strongly Agree	5	

9. Chains of command, which do not exist at home, help to deal with job pressures

Strongly Agree	5	(57)
Agree	4	
Uncertain	3	
Disagree	2	
Strongly Disagree	1	

10. Home stress tends to occur at a less intense level

Strongly Disagree	5	(58)
Disagree	4	
Uncertain	3	
Agree	2	
Strongly Agree	1	

11. Home problems are more far-ranging in their implications for me

Strongly Agree	5	(59)
Agree	4	
Uncertain	3	
Disagree	2	
Strongly Disagree	1	

12. Relative importance of home versus work sources is seasonally dependent

Strongly Agree	1	(60)
Agree	2	
Uncertain	3	
Disagree	4	
Strongly Disagree	5	

13. Home factors have greater effects for me

Strongly Agree	1	(61)
Agree	2	
Uncertain	3	
Disagree	4	
Strongly Disagree	5	

14. Stress at work is under my control, unlike things at home

Strongly Disagree	1	(62)
Disagree	2	
Uncertain	3	
Agree	4	
Strongly Agree	5	

15. Stress (from either work or home) can ultimately only be overcome if I have a job

Strongly Disagree	5	(63)
Disagree	4	
Uncertain	3	
Agree	2	
Strongly Agree	1	

16. Stresses tend to separate but affect me 100% in each

Strongly Disagree	1	(64)
Disagree	2	
Uncertain	3	
Agree	4	
Strongly Agree	5	

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 6 LIFE EVENTS AND LIFE CHANGES

We define a "life event" quite simply as something that occurs in an individual's life, that has an important effect on that person. The event may be either positive or negative. For example, *getting married, moving house, birth of child etc.*

This section has 3 parts which examine the following:

Part 1 Life events you may have experienced personally

Part 2 Life events generally

Part 3 Life changes and experiences

SECTION 6 PART 1

If you consider your life generally, would you say that you have experienced any events which have been important to you

Yes 1
No 2 (65)

If yes,

What was the event (*please explain briefly*) .....

How long ago was it (66) (67) months

How long did the period of the event last (68)(69) months

Please sum up in a phrase your feelings before the event .....
.....

during the event .....
.....

after the event .....
.....

Do you think your performance was affected

Yes 2
No 1 (70)
N/A 0

Do you think your performance could have been affected without you realising

Yes 2
No 1 (71)
N/A 0

Do you think your performance could have been affected without others (e.g. colleagues) realising

Yes 2
No 1 (72)
N/A 0

SECTION 6 PART 2

Do you think generally that life events can affect pilot performance

Yes 2
No 1 (73)

Do you think that negative events can affect pilot performance

Yes 2
No 1 (74)

Do you think that positive events can affect pilot performance

Yes 2
No 1 (75)

Do you think that performance could be affected by life events but not to an extent that (answer all parts)

is measurable

Yes 2
No 1 (76)

is perceivable by the pilot

Yes 2
No 1 (77)

Is perceivable by others (e.g. colleagues)

Yes 2
No 1 (78)

safety and proper flight conduct are affected

Yes 2
No 1 (79)

minimum operational standards are not met

Yes 2
No 1 (80) (Go to card 4)

SECTION 6 PART 3

The list below is a series of descriptions of characteristics, life events and life changes which have been used by other researchers to describe pilots who have made errors or who have been involved in incidents. Some are positively oriented, others are negatively oriented, however all might have some effect on pilot performance.

TRY TO THINK OF A TYPICAL EXAMPLE OF A PILOT WHO IS PERFORMING BADLY OR WHO IS LIKELY TO MAKE AN ERROR. CAN YOU DRAW A PORTRAIT OF HIM?

We would like you to do so by weighting each of the items using your own experience and knowledge of other pilots. Use the scale below to rate each of the descriptions on the extent to which they are or are not influential in describing such a pilot.

EXAMINING YOUR PORTRAIT, DOES SUCH A PILOT.....	Very definitely Yes	Definitely Yes	Yes	No	Definitely No	Very Definitely No	(Card 4)
1. Characteristically exhibit poor judgment	6	5	4	3	2	1	(1)
2. Recently undergo a marital separation (for reasons other than duty location)	6	5	4	3	2	1	(2)
3. Handle life difficulties well	6	5	4	3	2	1	(3)
4. Recently have a death in the family	6	5	4	3	2	1	(4)
5. Impress others as a good leader	6	5	4	3	2	1	(5)
6. Have marital problems	6	5	4	3	2	1	(6)
7. Exhibit the characteristics of maturity and stability	6	5	4	3	2	1	(7)
8. Recently lose a close friend through death	6	5	4	3	2	1	(8)
9. Exhibit mastery of his aircraft within operational parameters	6	5	4	3	2	1	(9)
10. Have financial difficulties	6	5	4	3	2	1	(10)
11. Recently have a new addition to the family (i.e. birth, adoption etc).....	6	5	4	3	2	1	(11)
12. Impress others as a good team member	6	5	4	3	2	1	(12)
13. Recently undergo a divorce	6	5	4	3	2	1	(13)
14. Recently become engaged	6	5	4	3	2	1	(14)
15. Make any recent major decisions regarding the future	6	5	4	3	2	1	(15)
16. Exhibit professionalism in his approach to flying	6	5	4	3	2	1	(16)
17. Have difficulty with interpersonal relationships	6	5	4	3	2	1	(17)
18. Recently have trouble with superiors	6	5	4	3	2	1	(18)
19. Have a sense of humour and humility concerning himself	6	5	4	3	2	1	(19)
20. Exhibit the ability to quickly assess potentially troublesome situations	6	5	4	3	2	1	(20)
21. Recently get married	6	5	4	3	2	1	(21)
22. Recently have trouble with peers or others	6	5	4	3	2	1	(22)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 7 COPING

So far, we have examined problems that arise at work and at home, the relationships between the two and events that may have occurred in your life. This section is about "coping" with such things.

When faced with various problems or situations we all try to deal with them by some form of "coping". Some ways are automatic or unconscious whilst others are things that we are aware of doing. Some might simply be the way you have organised things or indeed just particular personal preferences.

Examine the list of items. They are a list of characteristics, techniques or factors that might be important in helping you cope with problems or stresses. We would like you to assess each item on whether or not it is important for you using the following scale:

7	OF PARAMOUNT IMPORTANCE TO ME IN COPING
6	VERY IMPORTANT
5	IMPORTANT
4	NEITHER IMPORTANT NOR UNIMPORTANT
3	UNIMPORTANT
2	VERY UNIMPORTANT
1	OF NO IMPORTANCE WHATSOEVER TO ME IN COPING

Insert the number of your answer beside each item.

Please note: if you are unmarried, for the word "wife", please substitute "partner", "girlfriend" etc, as appropriate

Please insert the number of your answer

1.	Wife who had prior knowledge of flying or who flies	.....	(23)
2.	Hobbies	.....	(24)
3.	Home that is a "refuge"	.....	(25)
4.	Talking to understanding friends	.....	(26)
5.	Unconsciously separating home and work (leading two lives)	.....	(27)
6.	Deliberately avoiding confrontation	.....	(28)
7.	Process of flying itself helps	.....	(29)
8.	Home life that is "geared to flying" (*in practical terms*)	.....	(30)
9.	Wife who involves herself and is interested	.....	(31)
10.	Involving oneself in physical pastimes and exercise	.....	(32)
11.	Home life that provides a psychological platform	.....	(33)
12.	Talking to an understanding wife	.....	(34)
13.	Working things out by logic	.....	(35)
14.	Wife who modifies her own behaviour and demands to suit you	.....	(36)
15.	"Staying busy"	.....	(37)
16.	Home life that is smooth and stable	.....	(38)
17.	Talking to understanding colleagues	.....	(39)
18.	Living in a non-flying social environment	.....	(40)
19.	Planning ahead	.....	(41)
20.	Staying emotionally aloof or shrugging things off	.....	(42)
21.	Not "bottling things up"	.....	(43)
22.	Wife who is "efficient" in looking after things	.....	(44)
23.	Expanding one's interests outside aviation (e.g. small business venture)	.....	(45)
24.	Sleep	.....	(46)
25.	Stability of relationship with wife	.....	(47)
26.	Deliberately suppressing emotion	.....	(48)
27.	Reversal of roles at home	.....	(49)
28.	Smoking	.....	(50)
29.	Selective attention (i.e. concentrating on single problems)	.....	(51)
30.	*Using distractions* (to take your mind off things)	.....	(52)
31.	Drinking *alcohol*	.....	(53)
32.	Stability of relationships with colleagues	.....	(54)
33.	Wife who has known you through your flying career	.....	(55)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 8 JOB SAISIFACTION

This set of items deals with various aspects of your job. We would like you to tell us how satisfied or dissatisfied you feel with each of these features of your present job.

Please use the scale below to indicate your feelings.

PLEASE REMEMBER

There are no right or wrong answers
Give your first and natural answer by working quickly but be accurate
Remember to answer all questions
Please ignore the numbers in brackets

Just indicate how satisfied or dissatisfied you are with each of the various aspects of your job by using this scale

1. I'm extremely dissatisfied
2. I'm very dissatisfied
3. I'm moderately dissatisfied
4. I'm not sure
5. I'm moderately satisfied
6. I'm very satisfied
7. I'm extremely satisfied

Simply write down in the box provided the number of your answer

1.	The physical work conditions	☐	(56)
2.	The freedom to choose your own method of working	☐	(57)
3.	Your fellow workers	☐	(58)
4.	The recognition you get for good work	☐	(59)
5.	Your immediate boss	☐	(60)
6.	The amount of responsibility you are given	☐	(61)
7.	Your rate of pay	☐	(62)
8.	Your opportunity to use your abilities	☐	(63)
9.	Industrial relations between management and workers in your firm	☐	(64)
10.	Your chance of promotion	☐	(65)
11.	The way your firm is managed	☐	(66)
12.	The attention paid to suggestions you make	☐	(67)
13.	Your hours of work	☐	(68)
14.	The amount of variety in your job	☐	(69)
15.	Your job security	☐	(70)
16.	Now, taking everything into consideration, how do you feel about your job as a whole?	☐	(71) (go to card 5)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT QUESTIONNAIRE

SECTION 9 YOUR HEALTH

Since you are flying, you hold a valid Medical Certificate. Hence by definition you are 'fit'. As you will realise of course it is possible for your health to fluctuate yet still meet the minimum standards required. The implications for us as researchers is that we must resort to simply examining various degrees of fitness. In turn, this assumes that whatever measurement scale we use is fairly sensitive.

To induce some sensitivity into our measurements we are assuming that you can monitor fluctuations in your health. The questionnaire in this section is concerned simply with the way you feel or act.

To reply please circle your answer.

(Card 5)

1. Do you often feel upset for no obvious reason? Yes No (1)
2. Do you have an unreasonable fear of being in enclosed spaces such as shops, lifts etc? Often Sometimes Never (2)
3. Do people ever say you are too conscientious? No Yes (3)
4. Are you troubled by dizziness or shortness of breath? Never Often Sometimes (4)
5. Can you think as quickly as you used to? Yes No (5)
6. Are your opinions easily influenced? Yes No (6)
7. Have you felt as though you might faint? Frequently Occasionally Never (7)
8. Do you find yourself worrying about getting some incurable illness? Never Sometimes Often (8)
9. Do you think that "cleanliness is next to godliness" No Yes (9)
10. Do you often feel sick or have indigestion? Yes No (10)
11. Do you feel that life is too much effort? At times Often Never (11)
12. Have you, at any time in your life, enjoyed acting? Yes No (12)
13. Do you feel uneasy and restless? Frequently Sometimes Never (13)
14. Do you feel more relaxed indoors? Definitely Sometimes Not particularly (14)
15. Do you find that silly or unreasonable thoughts keep recurring in your mind? Frequently Sometimes Never (15)
16. Do you sometimes feel tingling or pricking sensations in your body, arms or legs? Rarely Frequently Never (16)
17. Do you regret much of your past behaviour? Yes No (17)
18. Are you normally an excessively emotional person? Yes No (18)
19. Do you sometimes feel really panicky? No Yes (19)
20. Do you feel uneasy travelling on buses or the Underground even if they are not crowded? Very A little Not at all (20)

21. Are you happiest when you are working? Yes No (21)

22. Has your appetite got less recently? No Yes (22)

23. Do you wake unusually early in the morning? Yes No (23)

24. Do you enjoy being the centre of attention? No Yes (24)

25. Would you say you were a worrying person? Very Fairly Not at all (25)

26. Do you dislike going out alone? Yes No (26)

27. Are you a perfectionist? No Yes (27)

28. Do you feel unduly tired and exhausted? Often Sometimes Never (28)

29. Do you experience long periods of sadness? Never Often Sometimes (29)

30. Do you find that you take advantage of circumstances for your own ends? Never Sometimes Often (30)

31. Do you often feel "strung up" inside? Yes No (31)

32. Do you worry unduly when relatives are late coming home? No Yes (32)

33. Do you have to check things you do to an unnecessary extent? Yes No (33)

34. Can you often get off to sleep all right at the moment? No Yes (34)

35. Do you have to make a special effort to face up to a crisis or difficulty? Very much so Sometimes Not more than anyone else (35)

36. Do you often spend a lot of money on clothes? Yes No (36)

37. Have you ever had the feeling you are "going to pieces"? Yes No (37)

38. Are you scared of heights? Very Fairly Not at all (38)

39. Does it irritate you if your normal routine is disturbed? Greatly A little Not at all (39)

40. Do you often suffer from excessive sweating or fluttering of the heart? No Yes (40)

41. Do you find yourself needing to cry? Frequently Sometimes Never (41)

42. Do you enjoy dramatic situations? Yes No (42)

43. Do you have bad dreams which upset you when you wake up? Never Sometimes Frequently (43)

44. Do you feel panicky in crowds? Always Sometimes Never (44)

45. Do you find yourself worrying unreasonably about things that do not really matter? Never Frequently Sometimes (45)

46. Has your sexual interest altered? Less The same or greater (46)

47. Have you lost your ability to feel sympathy for other people? No Yes (47)

48. Do you sometimes find yourself posing or pretending? Yes No (48)

PLEASE CHECK THAT YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 10 PERFORMANCE

As indicated in our objectives, we are trying to examine the determinants of performance. Since this is a survey by post, we must resort to indirect measures of performance by asking you to assess yourself. You will realise that this is, of course, somewhat unsatisfactory. Hence we are again relying on you to instill as high a degree of sensitivity as possible, by being as honest and as accurate as you can.

1. Think about your last few flights recently
2. Consider how well or badly you performed
3. Examine the list of elements below, they are different ways of assessing performance
4. Please rate yourself on the scales by circling the number of your answer. Remember, we are relying on you to make this as accurate a measure as possible.

1.	Being ahead of the game:	Ahead for 100% of flight	2	1	0	1	2	Behind for 100% of flight (49)
2.	Excess mental capacity	Plenty of excess capacity during flights	2	1	0	1	2	No excess capacity during flights (50)
3.	Coping with things that go wrong:	Coped very satsifactorily	2	1	0	1	2	Coped very unsatisfactorily (51)
4.	Attaining self-set levels of performance:	Attained self-set levels of performance for flights	2	1	0	1	2	Did not attain self-set levels of performance for flights (52)
5.	Smoothness and accuracy of approaches:	Very smooth & accurate approaches	2	1	0	1	2	Very unsmooth & inaccurate approaches (53)
6.	Smoothness and accuracy of landings:	Very smooth & accurate landings	2	1	0	1	2	Very unsmooth & inaccurate landings (54)
7.	Degree of basic airmanship exhibited:	Very high degree of basic airmanship	2	1	0	1	2	Very low degree of basic airmanship (55)

8.	Overall smoothness of flights:	Very Smooth	2	1	0	1	2	Very Unsmooth (56)
9.	Quality of interpersonal relations with aircrew:	High and Satisfactory Quality	2	1	0	1	2	Low and Unsatisfactory Quality (57)
10.	Degree of mental and physical coordination:	Very high degree of coordination	2	1	0	1	2	Very low degree of coordination (58)
11.	Number of errors made:	Relatively high number	2	1	0	1	2	Relatively low number (59)
12.	Extent of errors made:	Relatively high importance	2	1	0	1	2	Relatively low importance (60)
13.	Satisfaction with flights generally:	Very high degree of satisfaction	2	1	0	1	2	Very low degree of satisfaction (61)
14.	Ability to divide attention:	Very high ability	2	1	0	1	2	Very low ability (62)
15.	Many pilots when asked to assess the quality of their performance reply that it is "just a feeling" - can you assess yourself on a scale in this way?	Very good	2	1	0	1	2	Very poor (63)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND READ THE NEXT PAGE FOR THE FINAL DE-BRIEFING AND INSTRUCTIONS

WHAT HAPPENS NOW

Your questionnaire will be scored by me and after transfer to computer, will be statistically analysed with the questionnaires of other respondents. Together with the writing and submission of reports this process should be completed by May 1984.

You will have realised by now that this is an original and unique piece of work which examines issues of paramount interest. Your contribution is therefore gratefully acknowledged.

FINAL CHECK

There are several final points I would like you to make:

(i) Please check through the booklet again and ensure that you have answered all questions

(ii) Please send the completed questionnaire directly to me in the pre-paid envelope enclosed

ONCE AGAIN, THANK YOU FOR PARTICIPATING

DR S J SLOAN
RESEARCH FELLOW
DEPARTMENT OF MANAGEMENT SCIENCES
UMIST

Appendix 4 Performance Measure

15 items entered into Factor Analysis (PA2, oblique rotation, default Delta). (Nie et al, 1970).

Factor Solution

Factor	Eigenvalue	% of variance	Cum. % variance
1	5.815	90.3	90.3
2	0.627	9.7	100.0

Item	Loadings onto Factor 1	Factor Score Coefficient
1	0.513	0.080
2	0.531	0.077
3	0.595	0.095
4	0.676	0.111
5	0.617	0.108
6	0.544	0.072
7	0.763	0.153
8	0.642	0.119
9	0.542	0.064
10	0.686	0.127
*11	0.212	0.052
*12	-0.039	0.017
13	0.616	0.108
14	0.692	0.115
15	0.680	0.110

* Not significant

Appendix 5

Biographical Data * Descriptive Statistics (N = 442)

YOU AND YOUR FAMILY

Sex	Male	442	100%	Age	21 - 30	30	6.8%
	Female	0	0		31 - 40	242	54.8%
					41 - 50	123	27.8%
					51 - 55	35	7.9%
					55+	12	2.7%

Marital Status	Married	386	87.3%
	Single	16	3.6%
	Divorced	14	3.2%
	Widowed	2	0.5%
	Separated	7	1.6%
	Cohabiting	17	3.8%

If married now (either formally or in common law), does your partner work

Yes	179	40.5%
No	220	49.8%

If yes, do they work

Occasionally	34	17.4%
Part-time	72	41.3%
Full-time	74	41.3%

Number of children x = 2.07 sd = 4.76

Ages of children

Number of children over 18 years old x 0.82 sd = 5.25

Number of children under 18 years old x 1.96 sd = 5.18

Number of dependents x = 2.48 sd = 1.39

* In certain cases % reported are of total population. In other cases, % are expressed as a function of subgroup depending upon applicability of questions.

YOUR INTERESTS

Do you find time to relax and "wind down"

Always	219	49.5%
Sometimes	180	40.7%
Only when possible	33	7.5%
Not usually	10	2.2%

Do you have an interest or hobby

Yes	418	94.6%
No	24	5.4%

If yes, is it related to work

Yes	23	5.2%
No	397	89.8%

In general, do you mix socially with other aviation colleagues outside work

Yes	186	42.1%
No	256	57.9%

Exercise and Fitness

	Almost Always	Sometimes	Almost Never
I maintain a desired weight avoiding overweight or underweight	308 69.7%	85 19.2%	49 11.1%
I do vigorous exercises for 15-30 minutes at least 3 times a week	84 19.0%	117 26.5%	241 54.5%
I do exercises that enhance my muscle tone for 15-30 minutes 3 times a week	67 15.2%	109 24.7%	266 60.2%
I use part of my leisure time participating in individual family or team activities that increase my level of fitness	117 26.5%	183 41.4%	142 32.1%
I do some type of gentle stretching exercises at least 3 times a week to improve flexibility	89 20.1%	126 28.5%	227 51.4%

SMOKING

Do you smoke now	Yes	96	21.7%
	No	346	78.3%
If yes, how long have you smoked for	x = 20.38 sd = 7.57 years		

	Almost Always	Sometimes	Almost Never
I avoid smoking cigarettes	35 36.4%	29 27.3%	32 36.3%
I smoke only low tar cigarettes or I smoke only a pipe or cigars	51 53.04%	21 21.8%	24 25%

	Yes		No	
I smoke less than half a pack daily	60	63.6%	35	36.4%
I smoke more than a pack daily	21	21.8%	74	78.2%
I have recently reduced my smoking	27	28.1%	69	71.76%
I have plans to quit smoking	47	48.88%	49	51.12%
I am currently attempting to quit	13	13.52%	83	86.32%

If you do not smoke now, have you ever smoked

Yes	123	35.5%
No	223	64.5%

If yes, how long ago did you stop

x = 10.22 Years

sd = 11.46

EATING HABITS

	Frequently	Sometimes	Almost Never
Do you eat a variety of foods each day such as fruits, whole grain breads, cereals, lean meats, fish and poultry etc	337 76.2%	97 21.9%	8 1.8%
Do you eat foods high in fat, saturated fat and cholesterol (e.g. fatty meats, eggs, butter, cream, organ meats such as liver)	98 22.2%	293 66.3%	51 11.5%
Do you eat salty foods, add salt at the table or use a lot of salt in cooking	104 23.5%	162 36.7%	176 39.8%
Do you eat a large amount of sugar (especially sugary snacks, desserts and soft drinks)	29 6.6%	154 34.8%	259 58.6%
Do you eat a high fibre diet including lots of whole grain bread, cereals, fresh fruit and vegetables	281 63.6%	141 31.9%	20 4.5%

ALCOHOL

Do you drink alcohol	Yes	436	98.7%
	No	6	1.4%
If yes, how many days per week do you drink		x = 4.12	sd = 1.96
On those days which you drink, on average how many drinks do you have		x = 4.89	sd = 15.08

	Often	Yes	No
Do you drink more than 2 drinks per day	85 19.2%	145 32.8%	206 46.6%
Do you use alcohol as a way of dealing with stressful situations or life problems	6 1.4%	52 11.8%	378 85.5%
Have you ever felt the need to cut down on drinking	6 1.4%	107 24.2%	323 73.1%

ALCOHOL CONT.

	Often	Yes	No
Have you ever had guilty feelings about drinking	0 0%	62 14.0%	374 84.6%
Has anyone ever told you they think you drink too much	0 0%	56 12.7%	380 86.0%

YOUR WORK HISTORY

Present Employer	No	%
British Airways	258	58.4
British Caledonian	51	11.5
Britannia	45	10.2
Dan Air	39	8.8
Logan Air	16	11.1
BIA	4	
B Midland Airways	15	
Air UK	11	
CAA	1	
British Air Ferries	1	
Manx Airlines	1	

Number of years with present employer $\bar{x} = 13.06$ sd = 6.28

Current aircraft type

	No
Trident	101
B737	84
BAC 1-11	71
B747	57
B707	21
DC10	20
L1011 (Tristar)	19
F27	13
HS748	9
Shorts SD3-30/360	9
B727	8

Current Aircraft Type cont

	No	
DC9	7	
Concorde	6	
EMB110/DHC6	6	(pilots flew both types of aircraft)
B757	3	
Viscount	3	
BAE146	1	
BN2	1	
PA31	1	
Islander	1	
Herald	1	
	N = 442	

Number of years experience on aircraft type	x = 6.06	sd = 4.18
Number of hours experience on aircraft type	x = 3111.38	sd = 3454.24
Total flying hours experience	x = 7912.95	sd = 4518.31
Average flying hours experience per month	x = 45.72	sd = 29.28
Number of landings performed in aircraft type	x = 911.78	sd = 1247.16
Total number of landings performed	x = 3321.67	sd = 3030.11
Average number of landings performed per month	x = 16.90	sd = 19.32
Average length of sector flown (hours)	x = 2.88	sd = 2.38

	No	%
Long Haul	116	26.2
Short Haul	295	66.7
Domestic Only	31	7.0
Captain	227	51.4
Senior First Officer	176	39.8
First Officer	39	8.8
Other functions?		
Yes	61	13.8
No	381	86.2
Seniority		
Very high	28	6.3
High	123	27.8
Middle	181	41.0
Low	82	18.6
Very Low	28	6.3

Nature of effects of Home Factors on Work (Descriptive statistics)

	I can usually tell when I'm experiencing stress because at work I react this way				
	Always	Usually	Sometimes	Seldom	Never
Tendency to worry	4 0.9%	33 7.5%	139 31.4%	212 48.0%	54 12.2%
Experience of tiredness due to disrupted sleep	13 2.9%	59 13.3%	184 41.6%	144 32.6%	42 9.5%
Increased alcohol consumption when not flying	- -	13 2.9%	38 8.6%	157 35.5%	234 52.9%
Recurrence of item in thoughts during periods of low workload	11 2.5%	47 10.6%	156 35.3%	181 41.0%	47 10.6%
Make errors without knowing why	1 0.2%	11 2.5%	115 26.0%	241 54.5%	74 16.7%
Make errors of omission	3 0.7%	9 2.0%	155 35.1%	238 53.8%	37 8.4%
Decreased quality of preflight preparation	2 0.5%	15 3.4%	108 24.4%	230 52.0%	87 19.7%
Tendency to talk about the issue at work	2 0.5%	28 6.3%	79 17.9%	175 39.6%	158 35.7%
Slows one down	2 0.5%	18 4.1%	107 24.2%	200 45.2%	115 26.0%
Tendency not to listen as intently	2 0.5%	38 8.6%	161 36.4%	161 36.4%	80 18.1%
One's mind becomes detached from tasks in hand	1 0.2%	31 7%	125 28.3%	178 40.3%	107 24.3%
Decreased concentration	8 1.8%	29 6.6%	170 38.5%	192 43.4%	43 9.7%

FACTORS WHICH MIGHT GENERALLY AFFECT PILOT PERFORMANCE

	Rank					
	0	1	2	3	4	5
Weather conditions	185	48	45	42	41	42
Inability to separate home from work life	358	4	15	19	14	13
Overfamiliarity (with type, routes)	270	13	17	23	32	39
Fatigue	29	231	68	40	40	24
Mind that is "full of other things"	249	22	31	23	33	49
Relative time of day one is asked to fly	109	25	104	75	53	40
Interpersonal relations with aircrew	222	28	20	40	36	45
Upset pre-flight routine (at home)	371	2	4	11	16	20
Carryover effects of home life events	331	2	5	17	34	25
Health	134	25	68	66	52	44
Poor pre-flight preparation	209	15	29	36	40	52
Things not under direct control of pilot	198	27	36	47	50	43

Generally in my life the pressure that arises from work accounts for the following percentage of that which I experience

	N	%	Cum%		N	%	Cum%
0-10%	26	5.9	5.9	51-60	56	12.7	19.0
11-20%	70	15.8	21.7	61-70	43	9.7	88.7
21-30%	77	17.4	39.1	71-80	28	6.3	95.0
31-40%	49	11.1	50.2	81-90	16	3.6	98.6
41-50%	71	16.1	66.3	91-100	6	1.4	100%

Generally in my life the pressure that arises from home accounts for the following percentage of that which I experience.

	N	%	Cum%		N	%	Cum%
0-10%	18	4.1	4.1	51-60	52	11.8	77.7
11-20%	46	10.4	14.5	61-70	40	9.0	86.7
21-30%	64	14.5	29.0	71-80	35	7.9	94.6
31-40%	65	14.7	43.7	81-90	19	4.3	98.9
41-50%	98	22.2	65.9	91-100	5	1.1	100%

Life Events

If you consider your life generally, would you say that you have experienced any event which has been important to you

Yes	344	77.8%
No	97	21.9%

If yes,

How long ago was it (months)	x = 137.15	sd = 232.37
How long did the period of the event last (months)	x = 22.54	sd = 31.04

	Yes		No	
Do you think your performance was affected	151	43.9%	165	48.0%
Do you think your performance could have been affected without your realising	175	50.9%	143	41.6%
Do you think your performance could have been affected without others realising	145	42.2%	169	49.1%

	Yes		No	
Do you think generally that life events can affect pilot performance	424	95.9%	18	4.1%
Do you think that negative events can affect pilot performance	411	93.0%	31	7.0%
Do you think that positive events can affect pilot performance	383	86.7%	59	13.3%

	Yes		No	
I think that performance could be affected by life events but not to an extent that is measurable	244	55.2%	198	44.8%

		Yes		No	
I think that performance could be affected by life events but not to an extent that is perceived by the pilot	*	260	58.8%	180	40.7%
I think that performance could be affected by life events but not to an extent that is perceived by others (e.g. colleagues)	*	249	56.3%	191	43.2%
I think that performance could be affected by life events but not to an extent that safety and proper flight conduct are affected	*	210	47.5%	230	52.0%
I think that performance could be affected by life events but not to an extent that minimum operational standards are not met	*	218	49.3%	221	50.9%

* Several scores missing

Job Satisfaction. Descriptive Statistics

Total job satisfaction	x = 65.97	sd = 11.83
Intrinsic job satisfaction	x = 29.71	sd = 6.75
Extrinsic job satisfaction	x = 36.27	sd = 6.31
Job itself intrinsic satisfaction	x = 18.50	sd = 4.18
Working conditions extrinsic satisfaction	x = 24.62	sd = 3.69
Employee relations satisfaction	x = 22.86	sd = 6.14
Overall job satisfaction	x = 5.22	sd = 1.17

To facilitate comparisons between subscales, pilots scores were expressed as a percentage of total marks available for each particular subscale.

	Total marks Available	Pilots Scale	%
Total score (15 items)	105	65.97	62.8%
Intrinsic job satisfaction (7 items)	49	29.71	60.6%
Extrinsic job satisfaction (8 items)	56	36.27	64.7%
Job itself intrinsic job satisfaction (4 items)	28	18.50	66.0%
Working conditions extrinsic job satisfaction (5 items)	35	24.62	70.3%
Employee relations job satisfaction (6 items)	42	22.86	54.4%
Overall job satisfaction (1 item)	7	5.22	74.5%

Comparison of Pilots Job Satisfaction Scores with Norms (Warr, Cook and Wall, 1979).

It was difficult to find an appropriate comparison group, therefore the scores from the original study sample were used, ie. male, blue collar, working in manufacturing industry.

	Decile	Range	
Total	3	63.6	Pilots x = 65.97
	4	68.0	Norm x = 70.53
Int.	3	28.1	Pilots x = 29.71
	4	31.4	Norm x = 32.61
Ext.	4	36.2	Pilots x = 36.27
	5	38.2	Norm x = 37.99
Job Itself Int.	3	17.7	Pilots x = 18.50
	4	19.2	Norm x = 20.32
Work Condit. Ex.	4	24.6	Pilots x = 24.62
	5	25.8	Norm x = 25.89
Employee Rel.	3	20.0	Pilots x = 22.86
	4	23.00	Norm x = 24.40
Overall	5	5.11	Pilots x = 5.22
	6	5.40	Norm x = 5.33

Mental Health	Descriptive Statistics	
Anxiety	x = 2.41	sd = 2.23
Phobia	x = 2.05	sd = 1.86
Obsessionality	x = 4.91	sd = 2.95
Psychosomatic Disorders	x = 2.31	sd = 1.91
Depression	x = 2.55	sd = 2.24
Hysteria	x = 3.98	sd = 2.90
Overall Neuroticism	x = 18.21	sd = 9.07

Distribution of Mental Health Scores

Since simplistic statements of univariate statistics were not especially informative, further analysis progressed with examinations of distributions of mental health scores. For reasons of expediency, distributions of overall total neuroticism only are reported. In addition, attention was focused on the upper end of the distributions.

A selection of mean scores was used as cut off points to isolate those most at risk. Distributions of pilots' scores were examined with particular atention paid to identifying those pilots whose scores were greater than the cut off point.

(i) Cut off point = 27.8 "Normals" (Crown and Crisp, 1966)

62 pilots had total neuroticism scores higher than this

(ii) Cut off point = 40.8 "Psychiatric outpatients" (Crown and Crisp, 1966)

9 pilots had total neuroticism scores higher than this

(iii) Cut off point = 22.47 "Males in validity study" (Crisp et al, 1978)

123 pilots had total neuroticism scores higher than this

(iv) Cut off point = 28.6

"Normal" + 1 standard deviation) Cut off point half
"Neurotic" - 1 standard deviation) way between these

54 pilots had total neuroticism scores higher than this

Appendix 6

PILOTS' WIVES STUDY

A primary focus of attention of the present research, was the role of pilots' home lives in the prediction of health and performance. Since opportunities were available to conduct a concurrent study, it was decided that pilots' wives should be approached to gain some insights into the situation from an alternative perspective. Previous research had left this potentially rich source of data completely untapped. Certainly no previous investigations were found in the psychological literature that adopted this unique strategy.

An additional reason for studying pilots' wives is that the preliminary interviews of the pilots indicated that the wife's attitudes and conduct were important, particularly in terms of coping.

To conclude, the aim of the study was to gain positive insights into the quality of pilots' home lives, as perceived by their wives.

Procedure

The rationales and techniques used were essentially the same as for pilots and need not be repeated here. They involved 3 steps.

Step 1 - Preliminary interviews

Wives of Manchester based pilots were interviewed for expediency. They were interviewed on an individual basis. In addition, a group discussion on relevant topics was also organised.

Step 2 - Interview analysis and questionnaire production

Items were analysed and produced using the same technique as for pilots and need not be repeated here. However, further comments about the questionnaire are worthwhile.

In addition to a brief record of biographical details, there were four main parts to the questionnaire produced.

(i) Domestic stressors

There were three options available. The first was simply to use the domestic stressor measure from the pilots. The second was to use the pilots' domestic stressor measure and to add the stressors identified by pilots' wives. The big advantage of both of these methods is that they have some degree of cross-referencing of answers to common items between pilots and pilots' wives.

However, it was decided that the third option would be adopted. This was simply to use the domestic stressor questionnaire based solely on data derived from pilots' wives. Since the major objective of conducting a study on pilots' wives was for purely investigative reasons, this latter option was more compatible with such underlying motives. Respondents were required to rate each item on its stressfulness for her.

(ii) Factors at work that affect the pilot at home

It was found that many of the items identified by pilots were in fact reiterated by their wives. Hence it was decided to use the list of factors identified by pilots. However, the task was for the wives to assess the degree of stress they felt it caused their husbands.

(iii) Effects of work stresses on pilots at home

This list was produced by the pilots, but not administered to them. The aim of including it here was to measure the nature of effects of job stress on pilots at home, as perceived by their wives and expressed in non-clinical terms. Potentially this is quite interesting in the light of the evidence that pilots tend to deny and suppress the effects of stress and are not always aware (or at least do not report) of how things really affect them.

(iv) Life satisfaction

This was a questionnaire previously published in the psychological literature (Warr, Cook and Wall, 1979). It yields 5 scales which were intended to be used as dependent variables. Not only was this intended to reveal insights into the quality of pilots' home lives as perceived by their wives, but it was also intended to see how the preceding 3 scales predicted its value.

Step 3 - Postal Survey

1. The questionnaire was unsolicited.
2. From 1000 pilots approached in the main study, 500 were selected at random.
3. The prefix 'Mrs' was added to the name. This of course will include pilots who do not currently have a wife. Time did not permit a more sophisticated technique.

Sample

Completed returns were received from 282 wives. Hence the response rate was 56.4%. Of these, 9 were discarded as unusable and 23 arrived too late to be included in analysis. Hence the data from 250 wives was used.

Results

The three stages of univariate, bivariate and multivariate analyses were performed. Techniques and statistics generated here are the same as for the main pilot sample. Hence repetition of descriptions and rationales is unnecessary (except where indicated - see Factor Analysis).

Univariate Analyses

Wives Data Descriptive Statistics

Age	No.	%
21-30	43	17.2
31-40	140	56.0
41-50	56	22.4
51-55	9	3.6
55+	2	0.8

Number of Children

$x = 2.07$

Ages of Children

Number of children over 18 years old	0.4
Number of children under 18 years old	1.7

Do you Work

Yes	136	54.4%
No	114	45.6%

If yes, do you work

Occasionally	35	25.7%
Part-time	46	33.8%
Full-time	55	40.4%

Which Company Does Your Husband Work For

British Airways	152	60.8%
British Caledonian	30	12.0%
Britannia	24	9.6%
Dan Air	19	7.6%
Air UK	8	3.2%
Logan Air	11	4.4%
B. Mid.	5	2.0%
Br. Airferries	1	0.4%

Is your Husband

Captain	136	54.4%
Senior First Officer	95	38.0%
First Officer	19	7.6%

Does he Fly

Long Haul	77	30.8%
Short Haul	161	64.4%
Domestic only	12	4.8%

Biographical Data - descriptive statistics

1. Distribution of ages is negatively skewed.
2. Numbers of children and their ages reflect no unusual trends.
3. Marginally more pilots' wives work than those who do not work.
4. Of those wives who work, the sample is fairly evenly split, though more work full-time than part-time or occasionally.
5. Just over 60% (60.8%) of the sample were married to pilots who flew for British Airways.
6. There were relatively equal proportions of wives represented from the 3 main independent airlines.
7. Four other smaller independents were also represented.
8. The majority of husbands were Captains (54.4%). Wives of Senior First Officers comprised of 38% and 7.6% were married to First Officers.
9. A large majority of husbands flew short haul (64.4%), approximately half as many (30.8%) flew long haul. Only a small minority (4.8%) were married to pilots who flew domestic only routes.

Life Satisfaction - descriptive statistics

Satisfaction with personal life

$x = 21.696$

$sd = 3.597$

Satisfaction with standards and achievements

$x = 30.984$

$sd = 5.628$

Satisfaction with lifestyle

$x = 22.144$

$sd = 3.492$

Total Life Satisfaction

$x = 74.824$

$sd = 10.144$

Overall Life Satisfaction

$x = 5.516$

$sd = 1.134$

Life satisfaction - descriptive statistics

To enable comparisons between subscales, wives' scores were expressed as a percentage of total marks available for each particular subscale.

Satisfaction with	Total Marks Available	Wives Score	%
Personal life (4 items)	28	21.7	77.5
Standards and achievements (7 items)	49	30.9	63.0
Lifestyle (4 items)	28	22.1	78.8
Total (15 items)	105	74.8	71.7
Overall (1 item)	7	5.5	78.5

Life Satisfaction Normed

Unfortunately, appropriate norms were not available. The norms used here were from the population that was used to design the measure, i.e. blue collar, males in manufacturing industry (Warr, Cook and Wall, 1979).

Satisfaction with personal life

Decile	Range	
		Wives x = 21.69
5	21.5	Norms x = 21.51
6	22.2	

Satisfaction with standards and achievements

Decile	Range	
		Wives x = 30.98
8	30.8	Norms x = 25.44
9	33.7	

Satisfaction with lifestyle

Decile	Range	
		Wives x = 22.14
7	22.1	Norms x = 20.22
8	23.0	

Total life satisfaction

Decile	Range	
		Wives x = 74.82
7	72.9	Norms x = 67.09
8	76.0	

Overall life satisfaction

Decile	Range	
		Wives x = 5.51
7	5.27	Norms x = 5.13
8	5.64	

Life Satisfaction

1. Wives were most satisfied with the nature of their lifestyles and personal lives.
2. They were least satisfied with standards and achievements.
3. Overall they were quite highly satisfied.
4. Although the norms used for comparisons were very incompatible, they at least provided some sort of yardstick. In 3 out of 5 scales, wives' scores fell into the 7-8 decile. In terms of satisfaction with standards and achievements their scores fell into the 8-9 decile. In terms of satisfaction with personal life, wives' scores fell into the 5-6 decile.
5. One may conclude that as a group, pilots' wives do seem to be fairly happy with life.

Bivariate Analyses

Pearson's Correlations: Continuous Biographical Variables with Dependent Measures

Satisfaction with personal life

No correlations fulfilled selection criteria.

Satisfaction with standards and achievements

Number of children over 18 years old r = -0.173
p = 0.007

Satisfaction with lifestyle

Number of children under 18 years old r = -0.118
p = 0.047

Total life satisfaction

No correlations fulfilled selection criteria.

Overall life satisfaction

Number of children r = -0.155
p = 0.014

Number of children over 18 years old r = -0.143
p = 0.021

Breakdowns: Discrete Biographical Variables with Dependent Measures

	ANOVA		LIN	
	F	Sig	F	Sig
Satisfaction with personal life				
Husband's Company	3.659	0.006	3.842	0.010
Satisfaction with standards and achievements				
Age	2.931	0.021	3.091	0.027
Satisfaction with lifestyle				
No ANOVAS significant				
Total life satisfaction				
Husband's company	3.23	0.013	N.S.	
Overall life satisfaction				
Age	3.433	0.009	3.428	0.017
Husband's company	3.394	0.010	3.862	0.010
Husband's rank	3.244	0.040	4.374	0.037

T-tests of Dependent Measures with Groups Defined by Significant ANOVAS

Groups	Dependent Variable	t	Sig
Age			
(21-30, 41-50)	Overall life satisfaction	2.23	0.028
	Personal life	2.45	0.016
(31-40, 41-50)	Overall life satisfaction	3.26	0.002
	Personal life	2.52	0.013
	Standards and achievements	2.78	0.006
	Total	2.48	0.014
Do you work			
(Yes, No)	Overall life satisfaction	1.98	0.049
Husband's Company			
(B.A., Brit. Cal)	Overall life satisfaction	2.87	0.007
	Personal life	3.33	0.001
	Total	2.49	0.018
(B.A., Small Independent)	Lifestyle	2.04	0.043
	Total	2.31	0.022
(B. Cal, Small Independent)	Overall life satisfaction	-2.08	0.043
	Personal life	-2.92	0.005
(Brit, Small Independent)	Personal life	2.00	0.050

Groups	Dependent Variable	t	Sig
Husband's Rank			
(Senior F.O., Captain)	Overall life satisfaction	2.53	0.012
	Personal life	2.41	0.017

Bivariate Analyses

1. Pearson's Correlations: Biographical (continuous variables) with Dependent Variables

The overall conclusion is that there was little association between the two sets of variables. Coefficients extracted as *significant were only of low magnitude.*

2. Breakdowns: Biographical (discrete variables) with Dependent Variables

1. Significant analysis of variance were yielded for 3 dependent subscales (personal life, total, overall life satisfaction), broken down by the company for which the husband worked. To some extent this would be expected since there was a high percentage (60%) of wives married to pilots who flew for the same airline (British Airways).
2. The analysis of variance broken down by age was significant for *satisfaction with standards and achievements.*
3. In overall life satisfaction terms, as might be expected, husband's rank was important.

3. T-tests of dependent variables with groups defined by 2 above

1. In terms of age, it is the 41-50 year old group who seem to be different.
2. Compared to the 21-30 year old group, the 41-50 group are significantly less satisfied with their personal lives and satisfaction with life overall.
3. A similar trend to 2 above is reflected when the 41-50 group are compared to the 31-40 group. Not only are the 41-50 group significantly less satisfied with overall and total life satisfaction, they are also significantly less satisfied with personal life, and standards and achievements.

AD-A142 176 JOB AND FAMILY STRESS AS PREDICTORS OF PILOT HEALTH JOB SATISFACTION AND..(U) UNIVERSITY OF MANCHESTER INST OF SCIENCE AND TECHNOLOGY (ENGL.. C L COOPER ET AL. 1/3

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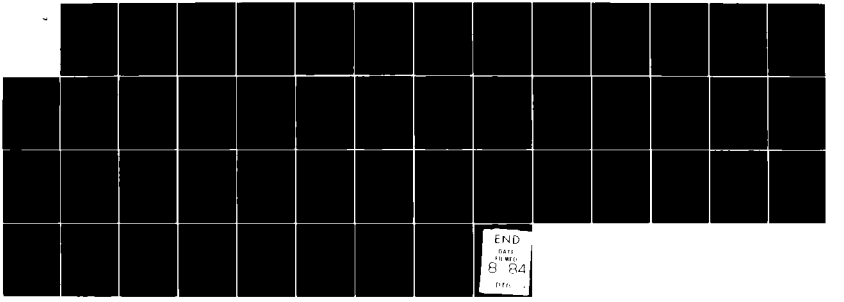

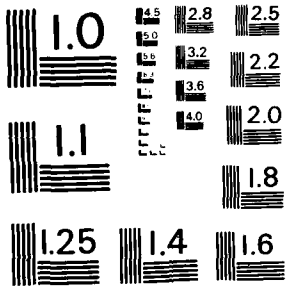

MICROCOPY RESOLUTION TEST CHART
NATIONAL BUREAU OF STANDARDS - 1963 - A

4. Compared to wives who work, those wives who do not work were significantly more dissatisfied with life overall.

5. Husband's company was an important variable

   (i) Wives of BA pilots were significantly more satisfied with overall and total life satisfaction, and personal life, than wives of B. Cal pilots.

   (ii) Wives of BA pilots were significantly more satisfied with lifestyle and total life satisfaction than wives of pilots who flew for smaller independent companies.

   (iii) Wives of Britannia pilots were significantly more satisfied with overall life satisfaction and personal life than the wives of B. Cal. pilots.

   (iv) Wives of Britannia pilots were significantly more satisfied with personal life than wives of pilots who flew for the smaller independent companies.

6. In terms of rank, wives of Captains were significantly more satisfied with overall life satisfaction and personal life than wives of Senior First Officers.

Multivariate Analyses

Factor Analysis

Domestic Stressors — Factor Solution

Factor	Eigenvalue	% of variance	Cum. % of variance
1	9.214	56.6	56.6
2	1.507	9.3	65.9
3	1.495	9.2	75.1
4	1.186	7.3	82.4
5	1.066	6.6	88.9

Job Stressors — Factor Solution

1	6.614	80.2	80.2
2	1.075	13.0	93.3

Stress Effects — Factor Solution

1	6.048	78.1	78.1
2	1.097	14.2	92.3

Note - Method of factor analysing all items was not successful - factors did not make sense therefore items were factor analysed in groups as presented in the questionnaire.

Factors. Domestic Stressors

Factor 1 - Adopting Dominant Domestic Role

		Loadings
24	Husband who doesn't try to understand stresses he creates	0.614
16	At times feeling like a 'one parent family'	0.593
23	Increased domestic workload	0.531
19	Husband's tiredness	0.499
25	Difficulty experienced in involving husband in things he has missed	0.475
15	Feelings of being rejected and upset when husband is tired	0.457
26	Having to deal with things as they occur and not letting them ferment	0.310
31	The fact that the job of pilot isn't 'social' (i.e. being isolated as a family unit)	0.302

Factor 2 - Job Loss

40	Threat of redundancy or early retirement	0.820
38	Health and potential job loss	0.788
39	Difficulty in career change over 40	0.749

Factor 3 - Threats to Marital Relationship

34	Conditions of work that almost 'foster' promiscuity	0.918
28	Tremendous need for trust in marital relationship	0.844

Factor 4 - Absence of Role in Husband's Career Progression

33	Absence of role in husband's career progression	0.832
37	General lack of involvement in husband's working life	0.686
36	Lack of recognition in contribution to pilot's quality of life	0.566
35	Employers who are oblivious to home life or regard wives as unimportant	0.415

Factor 5 - Social Problems

		Loadings
18	Friends not being able to go out midweek	0.580
32	People socially who consider your lifestyle as 'glamorous'	0.514
17	Not being able to mix socially at weekends	0.439
11	People don't drop in for fear of intruding	0.382
22	Responsibility of being married to a pilot	0.325

****

Factors Job Stress

Factor 1 - Work Pattern Fatigue

42	How time of working determines when to sleep	0.885
41	Tiredness and fatigue	0.701
43	Return back and time of arrival	0.693
45	Patterns of flying	0.640
44	Scheduling and rosters	0.545
46	Unpredictability of flying	0.392
53	Length of trips	0.357
55	Effects of minor day to day things	0.315

Factor 2 - Courses and Checks

50	Anxiety of courses and checks	0.915
51	Preparation necessary for courses and checks	0.914

****

Factors Job Effects

Factor 1 - Irritability and Tension

		Loadings
65	Becomes annoyed and angry (on a 'short fuse')	0.844
61	Becomes short tempered and finds it difficult to laugh things off	0.841
57	Becomes irritable	0.739
66	Becomes tense	0.437
67	Becomes aloof and withdrawn	0.319

Factor 2 - Decreased Performance

68	His efficiency decreases	0.841
62	His level of concentration decreases	0.767
60	Performs jobs and tasks unsatisfactorily or incompletely	0.645
69	Feels tired	0.391
71	Expresses an awareness of physical effects	0.346

Factor Analysis

Domestic Stressors

1. Five factors were accepted as being significant or meaningful.
2. Just under 90% (88.9%) of the variance was explained by the factors.

Job Stresses

1. Two factors were accepted as being significant or meaningful
2. Just over 93% (93.3%) of the variance was explained by the factors.

Effects of Stress

1. Two factors were accepted as being significant or meaningful.
2. Just over 92% (92.3%) of the variance was explained by the factors.

The Factors

Domestic Stressors

Factor 1 "Adopting Dominant Domestic Roles"

1. The factor consisted of a high number of variables (8), all positively loaded.
2. Most highly loaded item was having to deal with husband who doesn't understand the stresses he creates.
3. Main theme of the factor comprised of two parts
   (i) 'dominance' - derived from having to include the pilot in things he has missed and dealing with things as they occur.
   (ii) 'role adoption' - including feeling like a 'one parent family' and incumbent increased domestic workload.
4. Stresses due to adopting dominant domestic roles is exacerbated by husband's tiredness, emphasising the practical implications of the processes involved.
5. Indications of emotional implication of processes involved are given by feelings of being rejected when husband is tired, and the fact that the job of pilot isn't 'social' (i.e. being relatively isolated as a family unit). The general inference may be that this overall isolation results in decreased social support.

Factor 2 "Job Loss"

1. There were three very highly positively loaded items.
2. Most highly loaded concerned redundancy and early retirement, a reflection of current economic trends.
3. Job loss due to health was the second item loaded onto the factor, reflecting an ongoing threat.
4. Finally the situation is rendered even more complex by the general difficulties of changing over career over the age of 40.
5. It is interesting to note that this was the second factor extracted, indicating the pilots' wives appear to be very conscious of threats to their husbands' career and economic trends in the industry.

Factor 3 "Threats to Marital Relationship"

1. These very highly (and positively) loaded items, both of which form a clear and separate factor, reflect the fact that the pilots' wives are very aware of the potential threats to their marriages, presented to the pilots and in fact, part of his lifestyle.

Factor 4 "Absence of an Active Role in Husband's Career"

1. The factor reflects the fact that pilots' wives do not see themselves as having: an active role in their husbands' career progression, an involvement in their husbands' working life, and receive no recognition for efforts made by them at home. In addition, employers are perceived as regarding home life as unimportant. In general, due to the nature of the job, this is to be expected. However, one may certainly challenge the treatment of wives and home life as being bad.

Factor 5 "Social Problems"

1. All five positively loaded items concern social issues.
2. Three of the items refer to social disruption due to pilot work patterns, ie. not being able to mix socially at weekends, friends not being able to come out mid week, and others not calling unannounced for fear of intruding. In general the social interaction of pilot and his family does not assume the characteristics of other professions which would be considered 'normal'.
3. Two other issues appear to be related. Social interaction appears to be hampered still further by the fact that wives feel as though others consider their lifestyle as 'glamorous'.
4. The item concerning the responsibility of being married to a pilot is also loaded onto this factor. The inference one may draw is that social problems tend to hamper the social systems of support available to the pilot's wife.

Job Stressors

Factor 1 "Work Pattern Fatigue"

1. The factor consisted of 8 items, all positively loaded.
2. The factor might well simply represent the items that were entered for analysis, however, since they were extracted as a single factor, one may conclude that pilots' wives do not make broad discriminations between job stressors other than the major stressor that carries over into home life. This result might well be expected.

Factor 2 "Anxiety of Courses and Checks"

1. The second factor clearly consisted of anxiety carryover effects of courses and checks. Since it is a separate factor, one may infer that these are separate issues.

Job Effects

Factor 1 "Irritability and Tension"

1. The items loaded onto the factor were clear, indicating that the carryover effects of job stressors are manifest in mood.
2. More specifically, mood is affected in two ways:
   (i) irritability, anger, temper
   (ii) becoming tense and withdrawn

Factor 2 "Decreased Performance"

1. Three items concerning efficiency, concentration and task completion clearly indicated that the factor concerns performance.
2. Tiredness is loaded onto the factor, indicating that it affects performance (and not mood, as in factor 1 above).
3. Similar to tiredness, physical symptoms appear to be related to performance.

Multiple Regression of Selected Biographical Items and Factor Scales Against Life Satisfaction

Satisfaction with personal life

Multiple R	0.571	F = 7.566
R^2	0.326	Sig = 0.000
Adj R^2	0.283	

Variable in Equation	Sig	Mult. R	R^2	R^2 Ch.	Simple R
Adopting dominant domestic role	0.000	0.496	0.246	0.246	-0.496
Social problems	0.000	0.536	0.288	0.041	-0.438
Job loss	0.035	0.548	0.301	0.012	-0.317
Husband's co	0.048	0.558	0.312	0.011	-0.109

Satisfaction with standards and achievements

Multiple R 0.390 F = 3.014
R^2 0.152 Sig = 0.000
Adj. R^2 0.101

Variables in Equation	Sig	Mult. R	R^2	R^2 Ch.	Simple R
Adopting dominant domestic role	0.000	0.283	0.080	0.080	-0.283
Husband's co.	0.029	0.313	0.098	0.017	-0.126
Do you work	0.040	0.336	0.113	0.015	-0.122

Satisfaction with lifestyle

Multiple R 0.389 F = 2.994
R^2 0.151 Sig = 0.000
Adj. R^2 0.100

Variables in Equation	Sig	Mult. R	R^2	R^2 Ch.	Simple R
Adopting dominant domestic role	0.000	0.265	0.070	0.070	-0.265
Social problems	0.022	0.300	0.090	0.019	-0.260
Age	0.034	0.326	0.106	0.016	0.059

Overall Life Satisfaction

Multiple R 0.472 F = 4.826
R^2 0.223 Sig = 0.000
Adj. R^2 0.177

Variables in Equation	Sig	Mult. R	R^2	R^2 Ch.	Simple R
Adopting dominant domestic role	0.000	0.381	0.145	0.145	-0.381
Social problems	0.001	0.428	0.183	0.038	-0.370
Do you work	0.029	0.446	0.199	0.015	-0.121

Total life satisfaction

Multiple R	0.511	F = 6.427	
R^2	0.261	Sig = 0.000	
Adj. R^2	0.220		

Variables in Equation	Sig	Mult. R	R^2	R^2 Ch.	Simple R
Adopting dominant domestic role	0.000	0.425	0.180	0.180	-0.425
Social problems	0.001	0.465	0.216	0.035	-0.387
Husband's co.	0.009	0.487	0.237	0.021	-0.147
Job loss	0.031	0.502	0.252	0.014	-0.299

Multiple Regression

1. All solutions were significant.
2. Items entered for analysis were the life satisfaction scales forming the dependent variables. Factor scales derived from the factors described above plus selected biographical items, form the independent variables.
3. The two factors embracing job stressors and two factors embracing the effects of job stressors did not possess significant predictive power. Neither did the two factors embracing domestic stress (factors 3 and 4). To some extent the non-significance of job oriented factors was to be expected.

Satisfaction with Personal Life

1. All predictors were negative, reducing satisfaction
2. Adopting dominant roles and social problems reduced satisfaction with wives' personal lives.
3. Job loss also reduced satisfaction.
4. Interestingly, husband's company was a significant predictor, though one must remember that the sample sizes distribution were not equal.

Satisfaction with Standards and Achievements

1. All predictors were negative.
2. Adopting dominant domestic roles and husband's company were significant predictors (see above).

3. Whether or not the wife worked was an interesting predictor. This confirms that the inability of the pilot's wife to possess a job or pursue a career, does reduce the degree to which she is satisfied with standards and achievements (as one might expect).

Satisfaction with Lifestyle

1. Once again adopting dominant domestic roles and social problems reduced satisfaction by being significant negative predictors.
2. Age was a significant predictor, confirming that as it increases, so does the degree of satisfaction derived from lifestyle. One can conclude that it is not age itself, but probably factors associated with age that affect the perception of lifestyle.

Total Life Satisfaction (15 items)

Predictors the same as satisfaction with personal life.

Overall Life Satisfaction (1 item)

1. The recurrent predictors, adopting dominant domestic roles and social problems, negatively predicted overall life satisfaction
2. Interestingly, however, whether or not the wife worked also negatively predicted overall life satisfaction.

UMIST

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Telephone: 061-236 3311
Telex 666094

Department of Management Sciences

SJS/LD

Dear Madam

We are writing to you to ask you to participate in an anonymous survey we are conducting. The aim of the survey is to examine the dynamic psychological determinants of pilot health and performance and to examine in detail the nature of the relationship between home and work for commercial airline pilots.

We would like to emphasise that we are a strictly independent, non-profit making, academic institution. The Department has an international reputation in the field of Occupational Psychology and we have conducted extensive research into the area of Occupational Stress. The study we are performing is being sponsored by the United States Air Force and is being performed with the fullest cooperation of BALPA and the CAA.

BALPA have provided us with lists of pilots selected totally at random from their lists of members. Your husband's name was selected (again at random) from those lists. The reason we are writing to you is to gain some insight into the situation from an interesting and often ignored perspective. Certainly all of the pilots' wives we have spoken to so far have been very enthusiastic to express an opinion.

Please find attached a questionnaire booklet and a pre-paid envelope in which to return the completed questionnaire directly to us in Manchester. This booklet should take about 45 minutes of your time. We hope you will not find this over-burdensome. Once again may we take this opportunity to urge you to participate in the survey and thank you for your contribution.

Yours faithfully,

Professor Cary L Cooper
Professor of Organisational Psychology

Dr S J Sloan
Research Fellow

THIS IS A CONFIDENTIAL AND ANONYMOUS SURVEY. PLEASE DO NOT PLACE ANY IDENTIFYING MARKS (such as your name) ON THE QUESTIONNAIRE BOOKLET.

THE PROJECT OBJECTIVES

The objective of this project is to establish the domestic determinants of health and performance in pilots and to examine the relationship between home and work. We are writing to you to examine the situation from an alternative perspective and to gather data about an important group who are rarely approached in research situations, i.e. pilots' wives.

DEFINITIONS

The terms "domestic stress" and "stressors" apply, but these should be interpreted as referring to problems, events, occurrences etc and general features which are important in home life.

The word "stress" should be interpreted in a wide sense, i.e. as worry, tension, anxiety, anger or perhaps just mild irritation.

EXPLANATIONS

PLEASE READ THIS INFORMATION PAGE BEFORE YOU START TO COMPLETE THE QUESTIONNAIRES.

THIS BOOKLET

In this booklet you will find an array of questionnaires. They are mainly checklists and each has its own set of instructions and notes. Please read each set of instructions before starting to complete each checklist.

HOW TO ANSWER

For most of the questions please ring the number opposite your answer. If you make a mistake and ring the wrong number, cross it out and ring the correct number. For example,

The year is	1981	1
	1982	~~2~~
	1983	(3)

For other questions you simply write in your answer or complete as scheduled.

If required to insert a number, please insert one digit only in each box provided.

WHAT YOU MUST REMEMBER

Since I shall not be present, I am depending on you to complete all questionnaires under "scientific" conditions, so please note the following points.

1. Try to give your first and natural answer. This is best achieved by working quickly, but try also to be as honest and accurate as you can.
2. The questionnaires are to be completed by you and no one else.
3. The data must be given by you in private. Even though this is an anonymous survey, please remember that I shall be keeping the data confidential, so must you.
4. Although some individual questions might seem unusual, remember that I shall be looking at groups of items, so please answer all questions.
5. Please remember the overall project basis, objectives and definitions.
6. Please ignore the numbers in brackets. These are for my own numbering scheme.

The scales which follow are a mixture of checklists and questions which relate to home life, work life and the relationships between the two.

You will find checklists compartmentalised into different sections. Within each section you may find more than one part. Please answer all questions.

The sections are separate and relate to the following issues:

Section		No of parts
	Biographical Data	
1	Problems, occurrences, issues that are entirely domestically oriented	1
2	Work factors which affect your husband at home	1
3	Experience of stress	1
4	Life satisfaction	1

PLEASE REMEMBER PREVIOUS INSTRUCTIONS AND TURN TO THE NEXT QUESTIONNAIRE WHICH EXAMINES BIOGRAPHICAL DATA

FIRST, PLEASE COMPLETE THIS BRIEF BIOGRAPHICAL QUESTIONNAIRE

(Card 1)

Age

21-30	1	(1)
31-40	2	
41-50	3	
51-55	4	

Number of children (2) (3)

Ages of children

Number of children over 18 years old (4) (5)

Number of children under 18 years old (6) (7)

Do you work

yes	2	(8)
no	1	

If yes, do you work

Occasionally	1	(9)
Part-time	2	
Full-time	3	
N/A	0	

For which company does your husband work

BA	1
B. Cal.	2
Britternia	3
Dan Air	4
Other (please specify)	.....

Is your husband

Captain	4
Senior First Officer	3
First Officer	2
Other (please specify)	.....

Does he fly

Long haul	3
Short haul	2
Domestic only	1

SECTION 1 DOMESTIC STRESSES

This section is about those problems or pressures you might perceive generally in your life.

THE QUESTIONS

On the left hand side of the page you will find a series of items that could be sources of pressure in your life.

THE ANSWERS

On the right hand side you will find a numbered scale. Please indicate how stressful or not each item is by circling the number of your answer.

PLEASE REMEMBER

There are no right or wrong answers
Give your first and natural answer by working quickly but be accurate
There are six possible answers provided, remember you may use any one answer for each question
Remember to answer all questions
Please ignore the numbers in brackets

		Causes me much stress	Causes me some stress	Sometimes causes me stress	Causes me a little stress	Causes me no stress	
1.	No definable pattern of work	5	4	3	2	1	(10)
2.	People don't "drop in" for fear of intruding	5	4	3	2	1	(11)
3.	Almost impossible to plan social things ahead	5	4	3	2	1	(12)
4.	Disturbed nights (e.g. feeling restless waiting for him to return, preparation for flights)	5	4	3	2	1	(13)
5.	Inability to do things socially on a regular basis	5	4	3	2	1	(14)
6.	Feelings of being rejected and upset when husband is tired (and perhaps withdrawn)	5	4	3	2	1	(15)
7.	At times feeling like a "one parent family" (i.e. role reversal)	5	4	3	2	1	(16)
8.	Not being able to mix socially at weekends	5	4	3	2	1	(17)
9.	Friends not being able to come out midweek	5	4	3	2	1	(18)
10.	Husband's tiredness	5	4	3	2	1	(19)
11.	Keeping things quiet for husband to sleep	5	4	3	2	1	(20)
12.	Not having friends who are understanding and patient	5	4	3	2	1	(21)
13.	Responsibility of being married to a pilot (i.e. feeling that if something at work ever went wrong, you might feel at fault)	5	4	3	2	1	(22)
14.	Increased domestic workload	5	4	3	2	1	(23)
15.	Husband who doesn't try to understand the stresses he creates	5	4	3	2	1	(24)
16.	Difficulty experienced in involving husband in things he has missed	5	4	3	2	1	(25)
17.	Having to deal with things as they occur and not letting them ferment	5	4	3	2	1	(26)
18.	Reconciling work pattern with routine of "Monday to Friday plus weekend"	5	4	3	2	1	(27)
19.	Tremendous need for trust in marital relationship	5	4	3	2	1	(28)
20.	Need for household flexibility	5	4	3	2	1	(29)
21.	Not being able to work (because of resulting decreased time left together)	5	4	3	2	1	(30)
22.	The fact the job of a pilot isn't "social" (i.e. being isolated as a family unit)	5	4	3	2	1	(31)
23.	People socially who consider you and your lifestyle as glamorous	5	4	3	2	1	(32)
24.	Absence of a role in husband's career progression	5	4	3	2	1	(33)
25.	Conditions of work that almost "foster" promiscuity	5	4	3	2	1	(34)
26.	Employers who are oblivious to home life or who regard wives as unimportant	5	4	3	2	1	(35)
27.	Lack of recognition in efforts made in contributing to pilots quality of life	5	4	3	2	1	(36)
28.	General lack of involvement in husband's working life	5	4	3	2	1	(37)
29.	Health and potential job loss	5	4	3	2	1	(38)
30.	Difficulty in career change over 40	5	4	3	2	1	(39)
31.	Threat of redundancy or early retirement	5	4	3	2	1	(40)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 2

As someone who is married to a pilot you might be aware of those factors associated with his work, that affect him at home.

Examine the list below. Rate each of these on their stressfulness for him

		Causes him much stress	Causes him some stress	Sometimes causes him stress	Causes him little stress	Causes him no stress	
1.	Tiredness and fatigue	5	4	3	2	1	(41)
2.	How time of working determines when to sleep	5	4	3	2	1	(42)
3.	Return back and time of arrival	5	4	3	2	1	(43)
4.	Scheduling and routes	5	4	3	2	1	(44)
5.	Patterns of flying	5	4	3	2	1	(45)
6.	Unpredictability of flying	5	4	3	2	1	(46)
7.	Social problems with routes	5	4	3	2	1	(47)
8.	Seasonal effects	5	4	3	2	1	(48)
9.	Changes in family life due to job (e.g. promotions, base change)	5	4	3	2	1	(49)
10.	Anxiety of courses and checks	5	4	3	2	1	(50)
11.	Preparation necessary for courses and checks	5	4	3	2	1	(51)
12.	Factors out of the pilot's control (e.g. cancellation, delays)	5	4	3	2	1	(52)
13.	Length of trips	5	4	3	2	1	(53)
14.	Number of sectors he is asked to fly	5	4	3	2	1	(54)
15.	Effects of minor, day to day things	5	4	3	2	1	(55)
16.	Carry over effects of personality clashes (interpersonal things)	5	4	3	2	1	(56)

(Go to card 2)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 3

Stress can affect people in many different ways. There may be occasions when you suspect that your husband is experiencing stress. How can you tell? Please use the list below to illustrate by completing each item.

"I know when he is experiencing stress or under pressure because he ....."

		Always	Often	Sometimes	Seldom	Never	(Card 2)
1.	Becomes irritable	5	4	3	2	1	(1)
2.	Expresses a nagging doubt about things generally	5	4	3	2	1	(2)
3.	Finds sleeping more difficult	5	4	3	2	1	(3)
4.	Performs jobs and tasks unsatisfactorily or incompletely	5	4	3	2	1	(4)
5.	Becomes short tempered and finds it difficult to "laugh things off"	5	4	3	2	1	(5)
6.	His level of concentration decreases	5	4	3	2	1	(6)
7.	Worries	5	4	3	2	1	(7)
8.	Feels that generally things aren't right and that they need correcting	5	4	3	2	1	(8)
9.	Becomes annoyed and angry, i.e. "on a short fuse"	5	4	3	2	1	(9)
10.	Becomes tense	5	4	3	2	1	(10)
11.	Becomes aloof and withdrawn	5	4	3	2	1	(11)
12.	His efficiency decreases	5	4	3	2	1	(12)
13.	Feels tired	5	4	3	2	1	(13)
14.	The problem concerned dominates his thoughts	5	4	3	2	1	(14)
15.	Expresses an awareness of physical effects (e.g. pulse increased, sweating etc)	5	4	3	2	1	(15)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 4 LIFE SATISFACTION

This final section is intended to assess satisfaction with life in general. We would like you to assess your life from the perspective of someone who is married to a pilot.

Please respond to each question by inserting the number of your answer from the following scale:

1 I'm extremely dissatisfied
2 I'm very dissatisfied
3 I'm moderately dissatisfied
4 I'm not sure
5 I'm moderately satisfied
6 I'm very satisfied
7 I'm extremely satisfied

Please insert the number of your answer for each item

16. The house or flat that you live in ☐ (16)

17. The local district that you live in ☐ (17)

18. Your standard of living: the things you can buy and do ☐ (18)

19. The way you spend your leisure time ☐ (19)

20. Your present state of health ☐ (20)

21. The education you have received ☐ (21)

22. What you are accomplishing in life ☐ (22)

23. What the future seems to hold for you ☐ (23)

24. Your social life ☐ (24)

25. Your family life ☐ (25)

26. The present government ☐ (26)

27. Freedom and democracy in Britain today ☐ (27)

28. The state of law and order in Britain today ☐ (28)

29. The moral standards and values in Britain today ☐ (29)

30. Britain's reputation in the world today ☐ (30)

31. Taking everything together, your life as a whole these days ☐ (31)

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND TURN OVER THE PAGE FOR FINAL EXPLANATIONS

WHAT HAPPENS NOW

I shall now score the questionnaires and statistically analyse the data. The information gathered will not only provide an interesting comparison to that collected from pilots but will in itself provide an invaluable insight into the situation from a unique perspective.

WHAT YOU MUST DO NOW

There are several points I would like you to make:

(i) Please re-examine the booklet and ensure that you have answered all questions

(ii) Please send the completed questionnaires directly to me in the pre-paid envelope enclosed

ONCE AGAIN, THANK YOU FOR PARTICIPATING

DR S J SLOAN
RESEARCH FELLOW
DEPARTMENT OF MANAGEMENT SCIENCES
UMIST

Appendix 7

FINAL VERSION OF QUESTIONNAIRE

THE BASIS OF THE PROJECT

The identification of factors that affect the ways in which pilots behave have long been recognised as important topics for research. From such factors, the features of the pilot's home life have been identified as important, however their precise contribution to deviations from correct flight conduct has not been intensively researched.

A small amount of psychological literature does examine the influence of pilots' home lives on performance and on pilot health also. Several points are noteworthy. The characteristics of home lives examined almost exclusively concentrates on "life events", i.e. very important things that have occurred in the pilot's life. Additionally, such effects are usually examined in the context of accidents and incidents. Whilst of tremendous importance and interest, we do not know the precise nature of the relationship between home and work for pilots. Secondly, we do not know the nature of such effects on a day to day basis. Other sources of data such as reporting systems do not permit the investigation into underlying causes beyond that which is volunteered in the report itself. Hence an investigation is necessary.

WHO WE ARE

UMIST is a technological university with an international reputation. The Department of Management Sciences has expertise in Occupational Psychological research. We have been commissioned by an interested external body (United States Air Force) to undertake this research.

THE PROJECT OBJECTIVES

The objective of this project is to establish the domestic determinants of pilot health and performance and to examine the nature of the relationship between home and work for airline pilots.

DEFINITIONS

We would like you to interpret terms widely, for example "domestic stress" and "stressors". These should simply be interpreted as referring to problems, events, occurrences which are important in home life. Remember too that stressors may be positive as well as negative.

The word "stress" should also be interpreted in a wide sense, i.e. worry, tension, anxiety, anger or perhaps just mild irritation.

EXPLANATIONS

PLEASE READ THIS INFORMATION PAGE BEFORE YOU START TO COMPLETE THE QUESTIONNAIRES.

THIS BOOKLET

In this booklet you will find an array of questionnaires. They are mainly checklists and each has its own set of instructions and notes. Please read each set of instructions before starting to complete each checklist.

HOW TO ANSWER

For most of the questions please ring the number opposite your answer. If you make a mistake and ring the wrong number, cross it out and ring the correct number. For example,

The year is	1982	1
	1983	~~2~~
	1984	(3)

For other questions you simply write in your answer or complete as scheduled. If required to insert a number, please enter only one digit into each box provided.

WHAT YOU MUST REMEMBER

Since I shall not be present, I am depending on you to complete all questionnaires under "scientific" conditions, so please note the following points.

1. Try to give your first and natural answer. This is best achieved by working quickly, but try also to be as honest and accurate as you can.
2. The questionnaires are to be completed by you and no one else.
3. The data must be given by you in private.
   Remember that I shall be keeping the data confidential, so must you.
4. Although some individual questions might seem unusual, remember that I shall be looking at groups of items, so please answer all questions.
5. Please remember the overall project basis, objectives and definitions.
6. Please ignore the numbers in brackets. These are for my own numbering scheme.

AFTER YOU HAVE READ THIS PAGE, PLEASE READ THE NEXT PAGE FOR FURTHER EXPLANATIONS

The scales which follow are a mixture of checklists and questions which relate to home life, work life and the relationships between the two.

You will find checklists compartmentalised into different sections. Within each section you may find more than one part. Please answer all questions.

The sections are separate and relate to the following issues:

Section		No of Parts
1	Biographical Data	1
2	Problems, occurrences, issues that are domestically and occupationally oriented	1
3	Life events	2
4	Coping	1
5	*Job* satisfaction	1
6	Health	1
7	Performance	1

PLEASE REMEMBER PREVIOUS INSTRUCTIONS AND TURN TO THE NEXT QUESTIONNAIRE WHICH EXAMINES BIOGRAPHICAL DATA

SECTION 1 BIOGRAPHICAL DATA

YOU AND YOUR FAMILY

Sex?	Male	1	Age?	21-30	1
	Female	2		31-40	2
				41-50	3
				51-60	4

Marital Status?	Married	1
	Single	2
	Divorced	3
	Widowed	4
	Separated	5
	Cohabiting	6

If married <u>now</u> (either formally or in common law), does your partner work?

Yes	2
No	1
N/A	0

If <u>yes</u>, do they work;	Occasionally	1
	Part-time	2
	Full-time	3
	N/A	0

YOUR INTERESTS

Do you find time to relax and "wind down"	Always	1
	Sometimes	2
	Only when possible	3
	Not usually	4
Do you have an interest or hobby	Yes	1
	No	2
If yes, is it related to work	Yes	1
	No	2
	N/A	0
In general do you mix socially with other aviation colleagues outside work	Yes	1
	No	2

EXERCISE AND FITNESS

	Almost Always	Sometimes	Almost Never
I maintain a desired weight avoiding overweight or underweight	0	1	3
I do vigorous exercises for 15-30 minutes at least 3 times a week	0	1	3
I do exercises that enhance my muscle tone for 15-30 minutes at least 3 times a week	0	1	2
I use part of my leisure time participating in individual family or team activities that increase my level of fitness	0	1	2
I do some type of gentle stretching exercises at least 3 times a week to improve flexibility	0	1	2

SMOKING

Do you smoke now?	Yes	2
	No	1
If <u>yes</u>, how long have you smoked for (enter 00 if not applicable)	☐☐ (number)	years

If yes, please complete the following:

If you do not smoke, go to

	Almost Always	Sometimes	Almost Never
I avoid smoking cigarettes	0	1	2
I smoke only low tar cigarettes or I smoke a pipe and cigars	0	1	2

	Yes	No
I smoke less than half a pack daily	0	1
I smoke more than a pack daily	1	0
I have recently reduced my smoking	0	1
I have plans to quit smoking	0	1
I am currently attempting to quit	0	2

If you do <u>not</u> smoke now, have you ever smoked

Yes 2
No 1
N/A 0-

If yes, how long ago did you stop (enter 00 if not applicable) ☐☐ years
(number)

EATING HABITS

	Frequently	Sometimes	Almost Never
Do you eat a variety of foods each day such as fruits, whole grain breads and cereals, lean meats, fish and poultry etc	0	1	2
Do you eat foods high in fat, saturated fat and cholesterol (e.g. fatty meats, eggs butter, cream, organ meats such as liver)	2	1	0
Do you eat salty foods, add salt at the table or use a lot of salt in cooking	2	1	0
Do you eat a large amount of sugar (especially sugary snacks, desserts and soft drinks)	2	1	0
Do you eat a high fibre diet including lots of whole grain bread and cereals, fresh fruits and vegetables	0	1	2

ALCOHOL

Do you drink alcohol — Yes 2 / No 1

If yes; how many days per week do you drink ☐ (number)

On those days in which you drink, on average how many drinks do you have ☐☐ (number)

(Please complete the following)

	Often	Yes	No
Do you drink more than 2 drinks per day	2	1	0
Do you use alcohol as a way of dealing with stressful situations or life problems	2	1	0
Have you ever felt the need to cut down on drinking	2	1	0
Have you ever felt guilty feelings about drinking	2	1	0
Has anyone ever told you they think you drink too much	2	1	0

YOUR WORK HISTORY

Present employer

- B.A. 1
- B. Cal. 2
- Britannia 3
- Dan Air 4
- Other (please state) 5

.....

Number of years with present employer ☐☐ years

Current aircraft type .....

(Insert number as appropriate)
(One digit per box please)

Number of years experience on aircraft type ☐☐ years

Number of hours experience on aircraft type ☐☐☐☐☐ hours

Total flying hours experience ☐☐☐☐☐ hours

Average flying hours experience per month ☐☐☐ hours

Number of landings performed in aircraft type by you ☐☐☐☐

Total number of landings performed by you ☐☐☐☐☐

Average number of landings performed per month by you ☐☐☐

Average length of sector you fly ☐☐ hours

Do you generally fly .....

Long haul	3	
Short haul	2	(49)
Domestic only	1	

Are you .....

Captain	4	
Senior first officer	3	
First officer	2	(50)
Other (please state)	1	

.....

Do you work at any other function (e.g. training captain)?

Yes	2	
No	1	(51)

If yes, please specify .....

Seniority: This is difficult to assess since different companies use different methods. Please give us some indication of your seniority, using the scale below, on whichever basis is most important for you within the organisation for which you work.

Very High	5
High	4
Middle	3
Low	2
Very Low	1

PLEASE CHECK THAT YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 2 DOMESTIC AND OCCUPATIONAL SOURCES OF STRESS

This section examines those issues that may be important in your home and working lives. Simply indicate whether something is stressful or not for you as an individual.

THE QUESTIONS

On the left hand side of the page is a list of factors which might be causing you stress.

THE ANSWERS

To answer the question of whether or not a certain factor may be causing you stress or not, circle the appropriate answer from the list on the right hand side.

PLEASE REMEMBER

There are no right or wrong answers

Give your first and natural answer by working quickly but be accurate

There are five possible answers provided, remember that you may use any one to answer each question

Remember we interpreted the word "stress" widely

	Causes me much stress	Causes me some stress	Sometimes causes me str	Causes me a little stre	Causes me no stress
1. Disagreements, arguments, differences of opinion ...	5	4	3	2	1
2. Quality of marital relationship with partner	5	4	3	2	1
3. Degree to which household is "geared to flying"	5	4	3	2	1
4. Family health	5	4	3	2	1
5. Nature of the home social environment	5	4	3	2	1
6. Dependability in, and competence of, spouse	5	4	3	2	1
7. Potential for extra marital relationships	5	4	3	2	1
8. Issues associated with children (health, education, etc)	5	4	3	2	1
9. Inability of spouse to fulfil their own ambitions ..	5	4	3	2	1
10. Absence of calm, stability and dependability in home life	5	4	3	2	1
11. Constant, ongoing irritations	5	4	3	2	1
12. Disappointment when others fail to meet expectations	5	4	3	2	1
13. Degree to which your personal goals and aims in life have been achieved	5	4	3	2	1
14. Success or failure of one's efforts to achieve	5	4	3	2	1
15. Inability to identify problems (and hence solution).	5	4	3	2	1
16. New and unfamiliar experiences	5	4	3	2	1
17. Others not obeying or things that go wrong	5	4	3	2	1
18. Enforced or adapted roles at home	5	4	3	2	1
19. Spouse's lack of understanding about the job	5	4	3	2	1
20. Interpersonal relationships	5	4	3	2	1
21. The degree to which home life is the way you want it	5	4	3	2	1
22. Career opportunities and lack of potential advancement	5	4	3	2	1
23. Seniority systems	5	4	3	2	1
24. Impending major career change or threat (e.g. redundancy, redeployment, etc)	5	4	3	2	1
25. Not enough hours actually spent flying	5	4	3	2	1
26. Sharing of work evenly	5	4	3	2	1
27. Patterns of flying (i.e. relative times you are asked to fly)	5	4	3	2	1
28. Interpersonal problems with aircrew	5	4	3	2	1
29. Interpersonal problems with cabin staff	5	4	3	2	1
30. Style of management	5	4	3	2	1
31. Lack of management support	5	4	3	2	1
32. The whole experience and anxiety (before and during) of medical checks	5	4	3	2	1

Cont

		Causes me much stress	Causes me some stress	Sometimes causes me stress	Causes me a little stress	Causes me no stress
33.	The whole experience and anxiety (before and during) of checks on your flying ability	5	4	3	2	1
34.	Fulfilling role expectations (either as a captain or first officer)	5	4	3	2	1
35.	Changes in your experience of flying (e.g. conversion course)	5	4	3	2	1
36.	Impact of a lack of flying (practice effects)..	5	4	3	2	1
37.	Future career uncertainty	5	4	3	2	1
38.	Tiredness and fatigue	5	4	3	2	1
39.	Morale and organisational climate	5	4	3	2	1
40.	Conditions of employment	5	4	3	2	1
41.	Factors not under your direct control	5	4	3	2	1
42.	Periods in flight of high workload	5	4	3	2	1
43.	Inherent responsibility of your job	5	4	3	2	1
44.	Making important decisions	5	4	3	2	1
45.	Ambiguous factors or difficulties in problem identification	5	4	3	2	1
46.	Attaining your own personal levels of performance	5	4	3	2	1
47.	How time of work determines when to sleep	5	4	3	2	1
48.	Returning home and time of arrival	5	4	3	2	1
49.	Scheduling and rosters	5	4	3	2	1
50.	Unpredictability of when you are asked to fly .	5	4	3	2	1
51.	Social problems associated with rosters	5	4	3	2	1
52.	Preparation necessary for courses and checks ..	5	4	3	2	1
53.	How long a single period of flying lasts	5	4	3	2	1
54.	Efficiency of pre-flight preparation time (i.e. period at home not on duty)	5	4	3	2	1
55.	Issues or situations that are ongoing or left unresolved	5	4	3	2	1
56.	Overall satisfaction with home life	5	4	3	2	1
57.	How satisfied one is on how things have been left	5	4	3	2	1
58.	Lack of stability	5	4	3	2	1
59.	Division of loyalties	5	4	3	2	1
60.	Indirect results of home life activities	5	4	3	2	1
61.	Marital problems	5	4	3	2	1
62.	Spouse's attitude to flying	5	4	3	2	1
63.	Length of time spent at home	5	4	3	2	1
64.	Serious events that occur	5	4	3	2	1
65.	Particular arrangements that have been disrupted	5	4	3	2	1

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT QUESTIONNAIRE

SECTION 3 LIFE EVENTS

We define a "life event" quite simply as something that occurs in an individual's life, that has an important effect on that person. The effect may be either positive or negative.

This section has two parts which examine the following:

Part 1 Life events you may have experienced personally

Part 2 Life events generally

PART 1

If you consider your life generally, would you say that you have experienced any events which have been important to you

Yes 1

No 2

If yes,

What was the most recent event (please explain briefly) .....

.....

How long ago was it ☐☐☐ months

How long did the period of the event last ☐☐ months

Please sum up in a phrase your feelings before the event .....

.....

during the event .....

.....

after the event .....

.....

Do you think your performance was affected

Yes	2
No	1
N/A	0

Do you think your performance could have been affected without you realising

Yes	2
No	1
N/A	0

Do you think your performance could have been affected without others (e.g. colleagues) realising

Yes	2
No	1
N/A	0

PART 2

Life Events

The list below is a series of descriptions of characteristics, life events and life changes which have been used by other researchers to describe pilots who have made errors or who have been involved in incidents. Some are positively oriented, others are negatively oriented, however all might have some effect on pilot performance.

TRY TO THINK OF A TYPICAL EXAMPLE OF A PILOT WHO IS PERFORMING BADLY OR WHO IS LIKELY TO MAKE AN ERROR. CAN YOU DRAW A PORTRAIT OF HIM?

We would like you to do so by weighting each of the items using your own experience and knowledge of other pilots. Use the scale below to rate each of the descriptions on the extent to which they are or are not influential in describing such a pilot.

EXAMINING YOUR PORTRAIT, DOES SUCH A PILOT .....

		Very definitely Yes	Definitely Yes	Yes	No	Definitely No	Very Definitely No
1.	Recently undergo a marital separation (for reasons other than duty location) ..	6	5	4	3	2	1
2.	Handle life difficulties well	6	5	4	3	2	1
3.	Recently have a death in the family	6	5	4	3	2	1
4.	Impress others as a good leader	6	5	4	3	2	1
5.	Have marital problems	6	5	4	3	2	1
6.	Exhibit the characteristics of maturity and stability	6	5	4	3	2	1
7.	Recently lose a close friend through death	6	5	4	3	2	1
8.	Exhibit mastery of his aircraft within operational parameters	6	5	4	3	2	1
9.	Have financial difficulties	6	5	4	3	2	1
10.	Recently have a new addition to the family (i.e. birth, adoption, etc)	6	5	4	3	2	1
11.	Impress others as a good team member	6	5	4	3	2	1
12.	Recently undergo a divorce	6	5	4	3	2	1
13.	Recently become engaged	6	5	4	3	2	1
14.	Exhibit professionalism in his approach to flying	6	5	4	3	2	1
15.	Have a sense of humour and humility concerning himself	6	5	4	3	2	1
16.	Exhibit the ability to quickly assess potentially troublesome situations	6	5	4	3	2	1
17.	Recently got married	6	5	4	3	2	1

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT QUESTIONNAIRE

SECTION 4 COPING

So far, we have examined problems that arise at work and at home, the relationship between the two and events that may have occurred in your life. This section is about "coping" with such things.

When faced with various problems or situations we all t.y to deal with them by some form of "coping". Some ways are automatic or unconscious whilst others are things that we are aware of doing. Some might simply be the way you have organised things or indeed just particular personal preferences.

Examine the list of items. They are a list of characteristics, techniques or factors that might be important in helping you cope with problems or stresses. We would like you to assess each item on whether or not it is important for you using the following scale:

7	OF PARAMOUNT IMPORTANCE TO ME IN COPING
6	VERY IMPORTANT
5	IMPORTANT
4	NEITHER IMPORTANT NOR UNIMPORTANT
3	UNIMPORTANT
2	VERY UNIMPORTANT
1	OF NO IMPORTANCE WHATSOEVER TO ME IN COPING

Insert the number of your answer beside each item.

(Please note: if you are unmarried, for the word "wife", please substitute
("partner", "girlfriend" etc, as appropriate.

Please insert the number of your answer

1.	Wife who had prior knowledge of flying or who flies	.....
2.	Home that is a "refuge"	.....
3.	Talking to understanding friends	.....
4.	Unconsciously separating home and work (leading two lives)	.....
5.	Deliberately avoiding confrontation	.....
6.	Home life that is "geared to flying" (in practical terms)	.....
7.	Wife who involves herself and is interested	.....
8.	Home life that provides a psychological platform	.....
9.	Talking to an understanding wife	.....
10.	Wife who modifies her own behaviour and demands to suit you	.....
11.	Home life that is smooth and stable	.....
12.	Talking to understanding colleagues	.....
13.	Staying emotionally aloof or shrugging things off	.....
14.	Wife who is "efficient" in looking after things	.....
15.	Stability of relationship with wife	.....
16.	Deliberately suppressing emotion	.....
17.	Wife who has known you through your flying career	.....

PLEASE CHECK THAT YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 5 JOB SATSIFACTION

This set of items deals with various aspects of your job. We would like you to tell us how satisfied or dissatisfied you feel with each of these features of your present job.

Please use the scale below to indicate your feelings.

PLEASE REMEMBER

There are no right or wrong answers
Give your first and natural answer by working quickly but be accurate
Remember to answer all questions
Please ignore the numbers in brackets

Just indicate how satisfied or dissatisfied you are with each of the various aspects of your job by using this scale

1. I'm extremely dissatisfied
2. I'm very dissatisfied
3. I'm moderately dissatisfied
4. I'm not sure
5. I'm moderately satisfied
6. I'm very satisfied
7. I'm extremely satisfied

Simply write down in the box provided the number of your answer

1.	The physical work conditions	☐
2.	The freedom to choose your own method of working	☐
3.	Your fellow workers	☐
4.	The recognition you get for good work	☐
5.	Your immediate boss	☐
6.	The amount of responsibility you are given	☐
7.	Your rate of pay	☐
8.	Your opportunity to use your abilities	☐
9.	Industrial relations between management and workers in your firm	☐
10.	Your chance of promotion	☐
11.	The way your firm is managed	☐
12.	The attention paid to suggestions you make	☐
13.	Your hours of work	☐
14.	The amount of variety in your job	☐
15.	Your job security	☐
16.	Now, taking everything into consideration, how do you feel about your job as a whole?	☐

PLEASE CHECK YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT QUESTIONNAIRE

SECTION 6 YOUR HEALTH

Since you are flying, you hold a valid Medical Certificate. Hence by definition you are 'fit'. As you will realise of course it is possible for your health to fluctuate yet still meet the minimum standards required. The implications for us as researchers is that we must resort to simply examining various degrees of fitness. In turn, this assumes that whatever measurement scale we use is fairly sensitive.

To induce some sensitivity into our measurements we are assuming that you can monitor fluctuations in your health. The questionnaire in this section is concerned simply with the way you feel or act.

To reply please circle your answer.

PLEASE REMEMBER

There are no right or wrong answers
Give your first and natural answer by working quickly, but be accurate
Remember to answer all questions
Please ignore the numbers in brackets

1.	Do you often feel upset for no obvious reason?	Yes No
2.	Do you have an unreasonable fear of being in enclosed spaces such as shops, lifts etc?	Often Sometimes Never
3.	Do people ever say you are too conscientious?	No Yes
4.	Are you troubled by dizziness or shortness of breath?	Never Often Sometimes
5.	Can you think as quickly as you used to?	Yes No
6.	Are your opinions easily influenced?	Yes No
7.	Have you felt as though you might faint?	Frequently Occasionally Never
8.	Do you find yourself worrying about getting some incurable illness?	Never Sometimes Often
9.	Do you think that "cleanliness is next to godliness"	No Yes
10.	Do you often feel sick or have indigestion?	Yes No
11.	Do you feel that life is too much effort?	At times Often Never
12.	Have you, at any time in your life, enjoyed acting?	Yes No
13.	Do you feel uneasy and restless?	Frequently Sometimes Never
14.	Do you feel more relaxed indoors?	Definitely Sometimes Not particularly
15.	Do you find that silly or unreasonable thoughtskeep recurring in your mind?	Frequently Sometimes Never
16.	Do you sometimes feel tingling or pricking sensations in your body, arms or legs?	Rarely Frequently Never
17.	Do you regret much of your past behaviour?	Yes No
18.	Are you normally an excessively emotional person?	Yes No
19.	Do you sometimes feel really panicky?	No Yes
20.	Do you feel uneasy travelling on buses or the Underground even if they are not crowded?	Very A little Not at all
21.	Are you happiest when you are working?	Yes No
22.	Has your appetite got less recently?	No Yes
23.	Do you wake unusually early in the morning?	Yes No
24.	Do you enjoy being the centre of attention?	No Yes
25.	Would you say you were a worrying person?	Very Fairly Not at all
26.	Do you dislike going out alone?	Yes No

27.	Are you a perfectionist?	No Yes
28.	Do you feel unduly tired and exhausted?	Often Sometimes Never
29.	Do you experience long periods of sadness?	Never Often Sometimes
30.	Do you find that you take advantage of circumstances for your own ends?	Never Sometimes Often
31.	Do you often feel "strung up" inside?	Yes No
32.	Do you worry unduly when relatives are late coming home?	No Yes
33.	Do you have to check things you do to an unnecessary extent?	Yes No
34.	Can you often get off to sleep all right at the moment?	No Yes
35.	Do you have to make a special effort to face up to a crisis or difficulty?	Very much so Sometimes Not more than anyone else
36.	Do you often spend a lot of money on clothes?	Yes No
37.	Have you ever had the feeling you are "going to pieces"?	Yes No
38.	Are you scared of heights?	Very Fairly Not at all
39.	Does it irritate you if your normal routine is disturbed?	Greatly A little Not at all
40.	Do you often suffer from excessive sweating or fluttering of the heart?	No Yes
41.	Do you find yourself needing to cry?	Frequently Sometimes Never
42.	Do you enjoy dramatic situations?	Yes No
43.	Do you have bad dreams which upset you when you wake up?	Never Sometimes Frequently
44.	Do you feel panicky in crowds?	Always Sometimes Never
45.	Do you find yourself worrying unreasonably about things that do not really matter?	Never Frequently Sometimes
46.	Has your sexual interest altered?	Less The same or greater
47.	Have you lost your ability to feel sympathy for other people?	No Yes
48.	Do you sometimes find yourself posing or pretending?	Yes No

PLEASE CHECK THAT YOU HAVE ANSWERED ALL QUESTIONS AND PROCEED DIRECTLY TO THE NEXT SECTION

SECTION 7 PERFORMANCE

As indicated in our objectives, we are trying to examine the determinants of performance. Since this is a survey by post, we must resort to indirect measures of performance by asking you to assess yourself. You will realise that this is, of course, somewhat unsatisfactory. Hence we are again relying on you to instill as high a degree of sensitivity as possible, by being as honest and as accurate as you can.

1. Think about your last few flights recently
2. Consider how well or badly you performed
3. Examine the list of elements below, they are different ways of assessing performance
4. Please rate yourself on the scales by circling the number of your answer. Remember, we are relying on you to make this as accurate a measure as possible.

1.	Being ahead of the game:	Ahead for 100% of flight	2	1	0	1	2	Behind for 100% of flight
2.	Excess mental capacity	Plenty of excess capacity during flights	2	1	0	1	2	No excess capacity during flights
3.	Coping with things that go wrong:	Coped very satsifactorily	2	1	0	1	2	Coped very unsatisfactorily
4.	Attaining self-set levels of performance:	Attained self-set levels of performance for flights	2	1	0	1	2	Did not attain self-set levels of performance for flights
5.	Smoothness and accuracy of approaches:	Very smooth & accurate approaches	2	1	0	1	2	Very unsmooth & inaccurate approaches
6.	Smoothness and accuracy of landings:	Very smooth & accurate landings	2	1	0	1	2	Very unsmooth & inaccurate landings
7.	Degree of basic airmanship exhibited:	Very high degree of basic airmanship	2	1	0	1	2	Very low degree of basic airmanship

8.	Overall smoothness of flights:	Very Smooth	2	1	0	1	2	Very Unsmooth
9.	Quality of interpersonal relations with aircrew:	High and Satisfactory Quality	2	1	0	1	2	Low and Unsatisfactory Quality
10.	Degree of mental and physical coordination:	Very high degree of coordination	2	1	0	1	2	Very low degree of coordination
11.	Satisfaction with flights generally:	Very high degree of satisfaction	2	1	0	1	2	Very low degree of satisfaction
12.	Ability to divide attention:	Very high ability	2	1	0	1	2	Very low ability
13.	Many pilots when asked to assess the quality of their performance reply that it is "just a feeling" - can you assess yourself on a scale in this way?	Very good	2	1	0	1	2	Very poor

PLEASE CHECK YOU HAVE ANSERED ALL QUESTIONS AND READ THE NEXT PAGE FOR THE FINAL DE-BRIEFING AND INSTRUCTIONS

WHAT HAPPENS NOW

Your questionnaire will be scored by me and after transfer to computer, will be statistically analysed with the questionnaires of other respondents. Together with the writing and submission of reports this process should be completed by May 1984.

You will have realised by now that this is an original and unique piece of work which examines issues of paramount interest. Your contribution is therefore gratefully acknowledged.

FINAL CHECK

There are several final points I would like to make:

(i) Please check through the booklet again and ensure that you have answered all questions

(ii) Please send the completed questionnaire directly to me in the pre-paid envelope enclosed

ONCE AGAIN, THANK YOU FOR PARTICIPATING

Supplementary Notes on Final Version of the Questionnaire

The data from the present study permits the identification of questionnaire subscales. These are provided below, together with relevant items that comprise each subscale.

Section 2 Domestic and Occupational Stressors

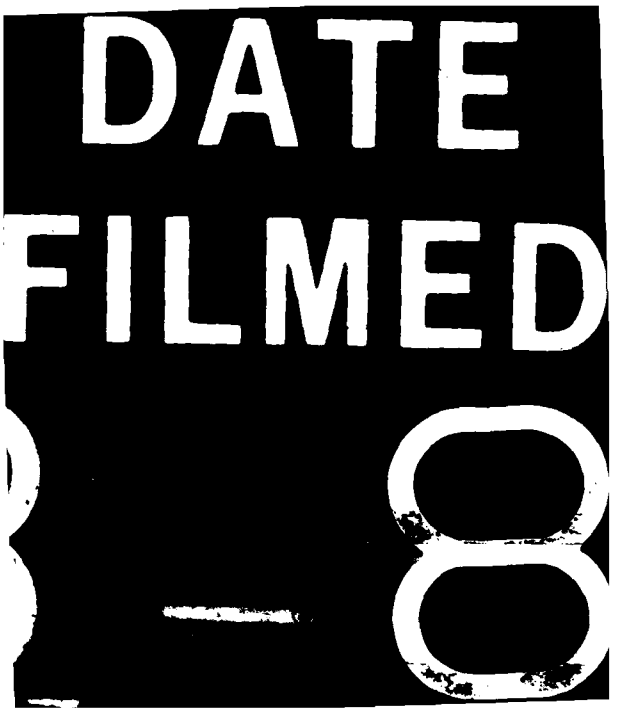
Control	1, 12, 15, 16, 17, 18
Scheduling and rostering	27, 49, 51, 52
Anxiety of courses and checks	32, 33, 46, 52
Home/work interface	Items 54 to 66 inclusive
Career and achievement	14, 22, 23, 24, 37, 75
Insufficient flying	25, 26, 36
Responsibility and decision making	34, 42, 43, 44, 45
Interpersonal problems	28, 29
Management and organisational issues	30, 31, 39, 40, 41, 49
Domestic status	4, 8
Fatigue and flying patterns	27, 38, 47, 48, 53
Plus a general domestic factor	2, 3, 5, 6, 7, 9, 10, 11, 19, 20, 21

Section 3 Life Events

Emotional losses	1, 3, 5, 7, 9, 12
Pilot characteristics	2, 4, 6, 8, 11, 14, 15, 16
Emotional gains	10, 13, 17

Section 4 Coping

Stability of relationship and home life	2, 8, 9, 10, 11, 14, 15, 17
Reason and logic	4, 5, 13, 16
Social support	3, 9, 12
Wife's involvement	1, 6, 7, 17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